

COMMITTEES ON THE USE OF LEAD IN PAINTING.

## REPORTS

OF THE

### DEPARTMENTAL COMMITTEES

APPOINTED TO INVESTIGATE THE

DANGER ATTENDANT

ON THE

USE OF PAINTS CONTAINING LEAD IN THE PAINTING  
OF BUILDINGS

AND ON THE

USE OF LEAD COMPOUNDS IN THE PAINTING,  
ENAMELLING, AND VARNISHING OF COACHES AND  
CARRIAGES.

#### VOL. IV.—MINUTES OF EVIDENCE.

This series of Reports consists of Four Volumes:—

Report of Committee on the Use of Lead in the Painting of Buildings [Cd. 7882] forming Vol. I.

Report of Committee on the Use of Lead Compounds in the Painting, Enamelling, and Varnishing of Coaches and Carriages [Cmd. 630] forming Vol. II.

Vol. III.—Appendices to both Reports [Cmd. 631].

Vol. IV.—Minutes of Evidence taken by both Committees [Cmd. 632].

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1920.

[Cmd 632.]

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WITNESSES GIVING EVIDENCE BEFORE THE  
COMMITTEES ON THE USE OF LEAD COMPOUNDS IN THE PAINTING OF  
BUILDINGS AND IN THE PAINTING OF COACHES, ETC.

(A.)—List showing POSITION, SOCIETY REPRESENTED, &c.

(For Alphabetical Index to Names, see List B.)

| No. of Day's Evidence. | Page. | Name of Witness.  | Position or Society represented.  |
|------------------------|-------|---|---|
| 1                      | 1     | Legge, Mr. T. M., M.D. - - -  | H.M. Medical Inspector of Factories.  |
| 1                      | 13    | Platau, Capt. L. S., and Milnes, Mr. F. H.                                  | Rabok Manufacturing Co., Ltd.   |
| 1                      | 16    | Rywaters, Mr. C. H. - - -   | Granitic Paint Co.  |
| 1                      | 18    | Heydorn, Mr. A. F. - - -  | Rugosine & Co., Ltd.  |
| 2                      | 20    | Laidler, Mr. G. G. - - -  | National Association of Master House Painters and Decorators of England and Wales.                                |
| 2                      | 30    | Patterson, Mr. G. D. - - -  | H.M. Office of Works.   |
| 2                      | 34    | Jordan, Mr. T. - - -  | Chief Foreman in the painting department of the carriage and wagon works of the Midland Railway Company at Derby. |
| 2                      | 37    | Steinitz, Mr. J. I. - - -   | Joint General Manager, Brush Electrical Engineering Co., Ltd., Loughborough.                                      |
| 2                      | 40    | Wuit, Mr. D. - - -  | Works Chemist, R. Gay & Co., Ltd.   |
| 2                      | 42    | Smith, Mr. J. Cruikshank, B.Sc.   | Director and Technical Adviser, Indestructible Paint Co., Ltd.  |
| 3                      | 46    | Baly, Professor E. C. C., F.R.S.  | Grant Professor of Inorganic Chemistry at the University of Liverpool.  |
| 3                      | 50    | Hardwick, Mr. W. R., B.Sc. - - -  | Consultant, Purex, Ltd.   |
| 3                      | 54    | Crace, Mr. J. D. - - -  | Incorporated Institute of British Decorators.   |
| 3                      | 59    | Cookson, Mr. C. - - -   | Director, Cookson & Co., Ltd.   |
| 3                      | 65    | Mumby, Mr. A. E., M.A., A.R.I.B.A., and Wonnacott, Mr. W., A.R.I.B.A. - - - | Royal Institute of British Architects.  |
| 3                      | 70    | Garson, Mr. J. W. - - -   | Managing Director, Lewis Berger & Sons, Ltd.  |
| 3                      | 73    | Humfrey, Mr. W. A. - - -  | Works manager, Brimsdown Lead Co., Ltd.   |
| 4                      | 75    | Parsonage, Mr. J. - - -   | Member of Committee. Secretary, National Amalgamated Society of Operative House and Ship Painters and Decorators. |
| 4                      | 85    | Pickles, Mr. W. - - -   | National Amalgamated Society of Operative House and Ship Painters and Decorators.                                 |
| 4                      | 88    | Walsh, Mr. J. - - -   | " " " " "   |
| 4                      | 91    | Wilson, Mr. F. - - -  | " " " " "   |
| 4                      | 93    | Lowe, Mr. F. - - -  | " " " " "   |
| 4                      | 96    | Campbell, Mr. H. A. - - -   | National Association of Master House Painters and Decorators of England and Wales.                                |
| 4                      | 102   | Harris, Mr. Vigurs - - -  | " " " " "   |
| 4                      | 108   | Cantrill, Mr. W. H. - - -   | " " " " "   |
| 5                      | 112   | Parsonage, Mr. J. (recalled).   | " " " " "   |
| 5                      | 112   | Gardner, Mr. A. - - -   | Member of Committee. Secretary, Scottish Painters' Society.   |
| 5                      | 112   | Collis, Mr. E. L., M.B. - - -   | Member of Committee. H.M. Medical Inspector of Factories.   |
| 5                      | 115   | Baneroff, Mr. J. - - -  | National Amalgamated Society of Operative House and Ship Painters and Decorators.                                 |
| 5                      | 118   | Webb, Mr. G. - - -  | Foreman Painter.  |
| 5                      | 121   | Bonner, Mr. F. - - -  | Working Master House Decorator.   |
| 6                      | 125   | Kinggate, Mr. C. - - -  | Member of Committee. Secretary, United Kingdom Society of Coachmakers.  |
| 6                      | 130   | Willix, Mr. D. - - -  | United Kingdom Society of Coachmakers.  |
| 6                      | 133   | Daly, Mr. B. - - -  | Operative (Coachpainters' Brush Hand).  |
| 6                      | 137   | Swain, Mr. J. T. - - -  | United Kingdom Society of Coachmakers.  |
| 6                      | 139   | Allen, Mr. H. - - -   | " " " " "   |
| 6                      | 142   | Spencer, Mr. C. J., A.M.I.E.E. - - -  | General Manager, City of Bradford Tramways Department.  |
| 7                      | 144   | Bailey, Mr. E. - - -  | Institute of British Carriage Manufacturers.  |
| 7                      | 152   | Maythorn, Mr. F. A. - - -   | " " " " (President).  |
| 7                      | 159   | Meier, Mr. A. - - -   | " " " " "   |
| 7                      | 162   | Fuller, Mr. S. C. L. - - -  | " " " " "   |
| 7                      | 164   | Croall, Mr. P. - - -  | " " " " "   |
| 7                      | 168   | Arnold, Mr. W. J. - - -   | " " " " "   |
| 8                      | 170   | Pattrell, Mr. J. - - -  | National Association of Master House Painters and Decorators of England and Wales.                                |
| 8                      | 177   | Chappell, Mr. J. R. - - -   | " " " " "   |
| 8                      | 182   | Wiltshier, Mr. A. - - -   | " " " " "   |
| 9                      | 187   | Barker, Mr. J. W. - - -   | " " " " "   |
| 9                      | 194   | Grundy, Mr. F. - - -  | National Association of Master House Painters and Decorators of England and Wales (President, 1911).              |
| 9                      | 198   | McDermid, Mr. J. H. - - -   | National Association of Master House Painters and Decorators of England and Wales.                                |
| 10                     | 203   | "X," Mr. - - -  | Operative (Coach Painter).  |

| Ns. of Day's Evidence. | Page. | Name of Witness.                         | Position or Society represented.   |
|------------------------|-------|--|--|
| 10                     | 207   | Mulliner, Mr. A. F. - - -                | Society of Motor Manufacturers and Traders.  |
| 10                     | 215   | Goodman, Mr. W. L. - - -                 | " " " " " "  |
| 11                     | 228   | Holliday, Mr. J. S. - - -                | Institute of Builders. " " "   |
| 11                     | 233   | Philip, Mr. A. - - -                     | Admiralty Chemist. - - -   |
| 11                     | 237   | Mockford, Mr. G. B. - - -                | Foreman of Painters, His Majesty's Dockyard, Portsmouth.   |
| 11                     | 240   | Higgs, Mr. F. - - -                      | National Federation of Building Trades Employers.  |
| 11                     | 244   | Walker, Mr. F. L. - - -                  | London Master Builders' Association.   |
| 12                     | 247   | White, Mr. A. G. - - -                   | National Federation of Building Trades Employers.  |
| 12                     | 260   | Hall, Mr. T. - - -                       | London Master Builders' Association.   |
| 13                     | 261   | Coysh, Commander W. H. - - -             | Marine Superintendent, Great Eastern Railway.  |
| 13                     | 264   | Schobert, Mr. G. - - -                   | Schoberts.   |
| 13                     | 266   | Baker, Mr. H. B. - - -                   | Rothschild and Baker.  |
| 13                     | 268   | Ball, Mr. H. S. - - -                    | Works Manager, Chubb's Safeworks.  |
| 13                     | 269   | Line, Mr. C. A. - - -                    | Consultant on House Decoration.  |
| 14                     | 277   | Hooper, Mr. E. G., F.I.C. - - -          | Superintending Chemist of the Government Laboratory.   |
| 14                     | 281   | Cumnew, Mr. A. - - -                     | Szerelemey & Co.   |
| 14                     | 284   | Cunynghame, Sir H. H. S., K.C.B.         | Legal Assistant Under Secretary of State to the Home Office.   |
| 14                     | 288   | Tuke, Captain F. M. - - -                | Marine Superintendent, Orient S.S. Co.   |
| 15                     | 290   | Ellson, Mr. G. - - -                     | Resident Engineer in charge of the painting of Charing Cross and Cannon Street Bridges, South Eastern and Chatham Railway. |
| 15                     | 292   | Orr, Mr. J. M. - - -                     | Association of Master House Painters in Scotland.  |
| 15                     | 301   | Carfrae, Mr. G. - - -                    | " " " " " "  |
| 15                     | 304   | Dobie, Mr. W. F. - - -                   | " " " " " "  |
| 15                     | 309   | Guest, Mr. E. - - -                      | " " " " " "  |
| 15                     | 313   | Bennett, Col. R. J. - - -                | " " " " " "  |
| 15                     | 316   | Anderson, Mr. R. L. - - -                | " " " " " "  |
| 16                     | 320   | Holzappel, Mr. M. - - -                  | North East Paint and Oil Trades Association.   |
| 16                     | 324   | Willis, Mr. A. W. - - -                  | London Colour, Paint, Oil, and Varnish Trades' Association.  |
| 16                     | 327   | Carson, Mr. K. K. - - -                  | " " " " " "  |
| 16                     | 331   | Crow, Mr. J. K., D.Sc. - - -             | " " " " " "  |
| 16                     | 338   | Scott, Mr. J. - - -                      | Association of Master House Painters in Scotland.  |
| 16                     | 341   | Donald, Mr. J. R. - - -                  | " " " " " "  |
| 17                     | 342   | Robins, Mr. W. - - -                     | Member of Committee. "United Kingdom" Society of Coachmakers.  |
| 17                     | 343   | Readman, Mr. W. - - -                    | Foreman Painter, London County Council Tramway Car Repair Depot, Charlton.   |
| 17                     | 346   | Awcock, Mr. W. - - -                     | United Kingdom Society of Coachmakers.   |
| 17                     | 351   | Atkins, Mr. T. R. - - -                  | Antimony Paint Manufacturers.  |
| 17                     | 353   | Cornett, Mr. K. J. - - -                 | United Kingdom Society of Coachmakers.   |
| 18                     | 356   | Patterson, Mr. G. D. (recalled).         | " " " " " "  |
| 18                     | 363   | Edginton, Mr. R. W., M.D. - - -          | Certifying Surgeon, North Birmingham.  |
| 18                     | 365   | Austin, Mr. H. - - -                     | Society of Motor Manufacturers and Traders.  |
| 18                     | 373   | Smyth, Mr. G. I. - - -                   | Mander Bros.   |
| 19                     | 376   | Vaughan, Mr. J. C. - - -                 | National Association of Master House Painters and Decorators of England and Wales.   |
| 19                     | 385   | Morton, Mr. G. H. - - -                  | National Federation of Building Trades Employers.  |
| 19                     | 389   | Griffiths, Mr. F. - - -                  | " " " " " "  |
| 19                     | 392   | Styles, Mr. W. J. - - -                  | London Master Builders' Association.   |
| 20                     | 396   | Kaup, Dr. I. - - -                       | Departmental Chief of the Central Organisation for Social Hygiene in Berlin.   |
| 21                     | 413   | Rambousek, Dr. J. - - -                  | Official of the Government of the Kingdom of Bohemia.  |
| 21                     | 422   | Meissl, Mr. O. M. - - -                  | Master Painter, Vienna.  |
| 22                     | 430   | Ricker-Devroede, Mr. C. - - -            | " " Brussels.  |
| 22                     | 438   | Expert-Bozançon, Mr. E. - - -            | Principal Partner, E. Expert-Bozançon & Co., White Lead Manufacturers.   |
| 23                     | 445   | Nooijen, Mr. - - -                       | Member of the Guild of Dutch Master Painters.  |
| 23                     | 452   | Rivet, Mr. A. - - -                      | T. and W. Farmiloe, Ltd.   |
| 24                     | 459   | Rivet, Mr. A. (recalled).                | " " " " " "  |
| 24                     | 460   | Goadby, Mr. K. W.,* D.P.H., &c.          | Consulting Pathologist, London.  |
| 25                     | 474   | Armstrong, Prof. H. E., F.R.S. - - -     | Professor of Chemistry at the City and Guilds of London Central Institute.   |
| 26                     | 484   | Villemot, Mr. A. - - -                   | President of the Colour and Varnish Manufacturers' Association, Paris.   |
| 26                     | 488   | Niederhaiser, Mr. E. - - -               | Master Painter, Cologne.   |
| 26                     | 492   | Leyendecker, Mr. H. - - -                | President of German White Lead Manufacturers' Association.   |
| 27                     | 496   | De Morsier, Mr. - - -                    | Reporter to the Swiss White Lead Commission.   |
| 27                     | 506   | Roeh, Dr. M. - - -                       | Chef de Clinique, at the Cantonal Hospital, Geneva.  |
| 28                     | 512   | Klein, Mr. C. A. - - -                   | Chief Chemist, Brimsdown Lead Co.  |
| 28                     | 527   | Baly, Prof. E. C. G., F.R.S. (recalled). | " " " " " "  |

| No. of Day's Evidence. | Page. | Name of Witness.                                      | Position or Society represented.                                   |
|------------------------|-------|---|--|
| 28                     | 529   | Miller, Mr. H. - - - -                                | London Chamber of Commerce.  |
| 29                     | 536   | Francis, Capt. M. - - - -                             | Francis and Sons, Halkyn.  |
| 29                     | 540   | Humphreys, Mr. E. N. - - - -                          | Director, East Halkyn Mining Co., Ltd.                             |
| 29                     | 542   | Gardner, Mr. H. - - - -                               | Director, H. R. Merton & Co., Ltd.                                 |
| 29                     | 545   | Matton, Mr. J. - - - -                                | Member of Metal Exchange.  |
| 29                     | 547   | Lancaster, Mr. H. C. - - - -                          | Technical Director, Locke, Lancaster & Co., Ltd.                   |
| 30                     | 551   | Sibthorpe, Mr. J. - - - -                             | Master House Painter, Dublin.                                      |
| 30                     | 565   | Plumb, Mr. G. - - - -                                 | Foreman Painter, G. Trollope, Ltd.                                 |
| 31                     | 575   | Bettink, Prof. W. - - - -                             | Investigator for Dutch Government.                                 |
| 31                     | 581   | Schooling, Mr. J. H., F.R.S.S.                        | Consulting Actuary.  |
| 31                     | 607   | Pisart, Mr. F. - - - -                                | Managing Director, Maastricht Zinc White Co                        |
| 31                     | 611   | Depierres, Mr. G. - - - -                             | Indestructible Paint Co.   |
| 32                     | 616   | Cail, Mr. W. - - - -                                  | Cail's Bitneo Co., Ltd.  |
| 32                     | 619   | Vickers, Mr. A. - - - -                               | A. Vickers, Ltd.   |
| 32                     | 623   | Readman, Mr. (recalled).                              |  |
| 32                     | 624   | Ireland, Mr. W. E. - - - -                            | Rolling Stock Superintendent, L.C.C. Tramways.                     |
| 33                     | 624   | Anderson, Mr. J. - - - -                              | London Association of Master Decorators.                           |
| 33                     | 635   | Wilkinson, Mr. C. E. - - - -                          | " " " "  |
| 33                     | 638   | Honeychurch, Mr. J. J. - - - -                        | " " " "  |
| 33                     | 648   | Milton, Mr. J. - - - -                                | " " " "  |
| 34                     | 646   | Devine, Mr. J. - - - -                                | National Society of Operative House and Ship Painters.             |
| 34                     | 652   | Wallis, Mr. W. F. - - - -                             | National Federation of Building Trades Employers.                  |
| 34                     | 655   | McHugh, Mr. T. - - - -                                | National Association of Master House Painters and Decorators.      |
| 35                     | 657   | McKillop, Mr. D. - - - -                              | Scottish Painters' Society.  |
| 35                     | 663   | Smith, Mr. A. - - - -                                 | " " " "  |
| 36                     | 670   | Chancellor, Mr. H. G., M.P., and Penwarden, Mr. S. P. | C. Chancellor & Co. "  |
| 36                     | 674   | Hunter, Mr. P. J. - - - -                             | Inspector, Forth Bridge Railway Co.                                |
| 36                     | 676   | Simpson, Mr. W. - - - -                               | Foreman Painter, Brown & Co.'s Engineering and Shipbuilding Works. |
| 37                     | 679   | Giraud, Mr. - - - -                                   | Giraud and Co., London.  |
| 37                     | 679   | Petit, Mr. - - - -                                    | Curlier Frères.  |
| 38                     | 683   | Pisart, Mr. F. (recalled).                            |  |
| 38                     | 685   | Connell, Mr. A. - - - -                               | Moister, Lucius, and Bruning.                                      |
| 38                     | 687   | Goadby, Mr. K. W.* (recalled).                        |  |
| 38                     | 696   | Armstrong, Prof. H. E., F.R.S. (recalled).            |  |
| 38                     | 699   | Johnson, Mr. E. M. - - - -                            | Director, Locke, Lancaster & Co., Ltd.                             |
| 39                     | 711   | (recalled).   |  |
| 39                     | 715   | Dobbie, Dr. J. J.† - - - -                            | Principal Chemist, Government Laboratory.                          |
| 40                     | 718   | Miller, Mr. H. (recalled).                            |  |
| 40                     | 721   | Tanner, Sir H., C.B., I.S.O.                          | Principal Architect, H.M. Office of Works.                         |
| 40                     | 724   | Patterson, Mr. G. D. (recalled).                      |  |
| 41                     | 730   | Morley, B. J. - - - -                                 | Cadbury Bros.  |

White Lead Corroders' Section of the London Chamber of Commerce.

White Lead Corroders' Section of London Chamber of Commerce.

\* Now Sir Kenneth Goadby, K.B.E.

† Now Sir James Dobbie.

(B.)—LIST OF WITNESSES IN ALPHABETICAL ORDER.

| No. | Name of Witness.   | No. of Day's Evidence. | Page.      | No. | Name of Witness.              | No. of Day's Evidence. | Page.      |
|-----|--|------------------------|------------|-----|-------------------------------|------------------------|------------|
| 1   | Allen, Mr. H.  | 6                      | 139        | 73  | Kaup, Dr. I.                  | 20                     | 396        |
| 2   | Anderson, Mr. J.   | 33                     | 624        | 74  | Kinggate, Mr. C.              | 6                      | 125        |
| 3   | Anderson, Mr. R. L.  | 15                     | 316        | 75  | Klein, Mr. C. A.              | 28                     | 512        |
| 4   | Armstrong, Prof. H. E., F.R.S.                                   | 25<br>38               | 474<br>696 | 76  | Laidler, Mr. G. G.            | 2                      | 20         |
| 5   | Arnold, Mr. W. J.  | 7                      | 168        | 77  | Lancaster, Mr. H. C.          | 29                     | 547        |
| 6   | Atkins, Mr. T. R.  | 17                     | 351        | 78  | Legge, Mr. T. M., M.D.        | 1                      | 1          |
| 7   | Austin, Mr. H.   | 18                     | 365        | 79  | Leyendecker, Mr. H.           | 26                     | 492        |
| 8   | Awcock, Mr. W.   | 17                     | 346        | 80  | Line, Mr. C. A.               | 13                     | 269        |
| 9   | Bailey, Mr. E.   | 7                      | 144        | 81  | Lowe, Mr. F.                  | 4                      | 93         |
| 10  | Baker, Mr. H. B.   | 13                     | 266        | 82  | McDermid, Mr. J. H.           | 9                      | 198        |
| 11  | Ball, Mr. H. S.  | 13                     | 268        | 83  | McHugh, Mr. T.                | 34                     | 655        |
| 12  | Baly, Prof. E. C. C., F.R.S.                                     | 3<br>28                | 46<br>527  | 84  | McKillop, Mr. D.              | 35                     | 657        |
| 13  | Baneroff, Mr. J.   | 5                      | 115        | 85  | Mutton, Mr. J.                | 29                     | 545        |
| 14  | Barker, Mr. J. W.  | 9                      | 187        | 86  | Maythorn, Mr. F. A.           | 7                      | 152        |
| 15  | Bennett, Col. R. J.  | 15                     | 313        | 87  | Meier, Mr. A.                 | 7                      | 159        |
| 16  | Bettink, Mr. W.  | 31                     | 575        | 88  | Meissl, Mr. O. M.             | 21                     | 422        |
| 17  | Bonner, Mr. F.   | 5                      | 121        | 89  | Miller, Mr. H.                | 40                     | 718        |
| 18  | Bywaters, Mr. C. H.  | 1                      | 16         | 90  | Milnes, Mr. F. H.             | 1                      | 13         |
| 19  | Cail, Mr. W.   | 32                     | 616        | 91  | Milton, Mr. J.                | 33                     | 643        |
| 20  | Campbell, Mr. H. A.  | 4                      | 96         | 92  | Mockford, Mr. G. B.           | 11                     | 237        |
| 21  | Cantrill, Mr. W. H.  | 4                      | 108        | 93  | Morley, Mr. B. J.             | 41                     | 730        |
| 22  | Carfrae, Mr. G.  | 15                     | 301        | 94  | Morton, Mr. G. H.             | 19                     | 385        |
| 23  | Carson, Mr. K. K.  | 16                     | 327        | 95  | Mulliner, Mr. A. F.           | 10                     | 207        |
| 24  | Chancellor, Mr. H. G., M.P.                                      | 36                     | 670        | 96  | Munby, Mr. A. E., A.R.I.B.A.  | 3                      | 65         |
| 25  | Chappell, Mr. J. R.  | 8                      | 177        | 97  | Niederhäuser, Mr. E.          | 26                     | 438        |
| 26  | Collis, Mr. E. L., M.B.  | 5                      | 112        | 98  | Nooijen, Mr.                  | 23                     | 445        |
| 27  | Connell, Mr. A.  | 38                     | 685        | 99  | Orr, Mr. J. M.                | 15                     | 292        |
| 28  | Cookson, Mr. C.  | 3                      | 59         | 100 | Parsonage, Mr. J.             | 4<br>5                 | 75<br>112  |
| 29  | Cornett, Mr. R. J.   | 17                     | 353        |     |                               | 2                      | 30         |
| 30  | Coysh, Commander W. H.   | 13                     | 261        | 101 | Patterson, Mr. G. D.          | 18<br>40               | 356<br>724 |
| 31  | Crace, Mr. J. D.   | 3                      | 54         |     |                               | 36                     | 670        |
| 32  | Croall, Mr. P.   | 7                      | 164        | 102 | Penwarden, Mr. S. P.          | 37                     | 679        |
| 33  | Crow, Mr. J. K., D.Sc.   | 16                     | 331        | 103 | Petit, Mr.                    | 11                     | 233        |
| 34  | Cunnaw, Mr. A.   | 14                     | 281        | 104 | Philip, Mr. A.                | 4                      | 85         |
| 35  | Cunynghame, Sir H. H. S., K.C.B.                                 | 14                     | 284        | 105 | Pickles, Mr. W.               | 31<br>38               | 607<br>683 |
| 36  | Daly, Mr. B.   | 6                      | 133        | 106 | Pisart, Mr. F.                | 30                     | 565        |
| 37  | De Morsier, Mr.  | 27                     | 496        | 107 | Plumb, Mr. G.                 | 8                      | 170        |
| 38  | Depicross, Mr. G.  | 31                     | 611        | 108 | Puttrell, Mr. J.              | 21                     | 413        |
| 39  | Dovino, Mr. J.   | 34                     | 646        | 109 | Rambousek, Dr. J.             | 17<br>32               | 343<br>623 |
| 40  | Dobbie, Mr. J. J., D.Sc. (now Sir James Dobbie).                 | 39                     | 715        | 110 | Readman, Mr. W.               | 22                     | 430        |
| 41  | Dobio, Mr. W. F.   | 15                     | 304        | 111 | Ricker-Dovreode, Mr. G.       | 23<br>24               | 452<br>459 |
| 42  | Donald, Mr. J. R.  | 16                     | 341        | 112 | Rivet, Mr. A. R.              | 17                     | 342        |
| 43  | Edginton, Mr. R. W., M.D.  | 18                     | 363        | 113 | Robins, Mr. W.                | 27                     | 506        |
| 44  | Ellson, Mr. G.   | 15                     | 290        | 114 | Roch, Dr. M.                  | 13                     | 264        |
| 45  | Expert-Bezangon, Mr. E.  | 22                     | 438        | 115 | Schobert, Mr. G.              | 31                     | 581        |
| 46  | Flatau, Capt. L. S.  | 1                      | 13         | 116 | Schooling, Mr. J. H.          | 16                     | 338        |
| 47  | Francis, Capt. M.  | 29                     | 536        | 117 | Scott, Mr. J.                 | 30                     | 551        |
| 48  | Fuller, Mr. S. C. L.   | 7                      | 162        | 118 | Sibthorpe, Mr. J.             | 36                     | 676        |
| 49  | Gardner, Mr. A.  | 5                      | 112        | 119 | Simpson, Mr. W.               | 35                     | 663        |
| 50  | Gardner, Mr. H.  | 29                     | 542        | 120 | Smith, Mr. A.                 | 2                      | 42         |
| 51  | Garson, Mr. J. W.  | 3                      | 70         | 121 | Smith, Mr. J. C., B.Sc.       | 18                     | 373        |
| 52  | Giraud, Mr.  | 37                     | 679        | 122 | Smyth, Mr. C. I.              | 6                      | 142        |
| 53  | Goadby, Mr. K. W., D.P.H., &c. (now Sir Kenneth Goadby, K.B.E.). | 24<br>38               | 460<br>687 | 123 | Spencer, Mr. C. J.            | 2                      | 37         |
| 54  | Goodman, Mr. W. L.   | 10                     | 215        | 124 | Steinitz, Mr. J. I.           | 19                     | 392        |
| 55  | Griffiths, Mr. F.  | 10                     | 389        | 125 | Styles, Mr. W. J.             | 6                      | 137        |
| 56  | Grundy, Mr. F.   | 9                      | 194        | 126 | Swain, Mr. J. T.              | 40                     | 721        |
| 57  | Guest, Mr. E.  | 15                     | 309        | 127 | Tanner, Sir H., C.B.          | 14                     | 288        |
| 58  | Hall, Mr. T.   | 12                     | 260        | 128 | Tuke, Capt. F. M.             | 19                     | 376        |
| 59  | Hardwick, Mr. W. R.  | 3                      | 50         | 129 | Vaughan, Mr. J. C.            | 32                     | 619        |
| 60  | Harris, Mr. V.   | 4                      | 102        | 130 | Vickers, Mr. A.               | 26                     | 484        |
| 61  | Heydorn, Mr. A. F.   | 1                      | 18         | 131 | Villemot, Mr. A.              | 2                      | 40         |
| 62  | Higgs, Mr. F.  | 11                     | 240        | 132 | Wait, Mr. D.                  | 11                     | 244        |
| 63  | Holiday, Mr. J. S.   | 11                     | 228        | 133 | Walker, Mr. F. L.             | 34                     | 652        |
| 64  | Holzappel, Mr. M.  | 16                     | 320        | 134 | Wallis, Mr. W. F.             | 4                      | 88         |
| 65  | Honeychurch, Mr. J. J.   | 33                     | 638        | 135 | Walsh, Mr. J.                 | 5                      | 118        |
| 66  | Hooper, Mr. E. G., F.I.C.  | 14                     | 277        | 136 | Webb, Mr. G.                  | 12                     | 247        |
| 67  | Humfrey, Mr. W. A.   | 3                      | 73         | 137 | White, Mr. A. G.              | 33                     | 635        |
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## MINUTES OF EVIDENCE

TAKEN BEFORE THE

## DEPARTMENTAL COMMITTEES

On the use of Lead Compounds in the Painting of Buildings  
and in the Painting of Coaches, &c.

Home Office, Whitehall, S.W.

### FIRST DAY.

Wednesday, 22nd February 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER } (*Acting Secretaries*).  
R. U. SHAXBY }

Mr. T. M. LEGGE, M.D., examined.

1. (*Chairman*.) You are a doctor of medicine and a diplomat in public health, are you not?—Yes; and have been Medical Inspector of Factories since 1898.

2. Have you, in your capacity as Medical Inspector, devoted a large part of your time to the study of industrial lead poisoning?—Yes. Section 73 of the Factory and Workshop Act, 1901, requires every medical practitioner attending on or called in to visit a patient whom he believes to be suffering from lead poisoning to report the case to the Chief Inspector of Factories. All those notifications come before me, and I have to see to their proper following up by the certifying surgeon and the Factory Inspector, and tabulate in the Labour Gazette every month the figures for lead poisoning and other diseases.

3. Are you prepared to give evidence to-day with regard to the occurrence of lead-poisoning cases among both coach-painters and house-painters?—Yes.

4. Which of these two classes do you wish to deal with first?—The coach-painting, because house-painting proper does not come under the Factory and Workshop Act.

5. Are reliable statistics of plumbism among coach-painters available?—Yes, following on the section that I quoted, and I have tabulated since 1899 cases occurring in that industry.

6. With regard to coach-painting cases, how long have such notifications been collected?—Might I say that, in addition to the notification from the medical practitioner, an arrangement was made as long ago as 1898 with the registrars of deaths that they should send to the Chief Inspector of Factories a copy of every death certificate on which lead poisoning was entered as directly or indirectly a cause, and in that way we have had full particulars of deaths amongst coach-painters and house-painters.

7. Then with regard to non-fatal cases, how long have such notifications been collected?—Since the Act came into force in 1896; but personally I should prefer only to deal with the figures that I have myself prepared since 1899. In the earlier years notification was not properly recognised perhaps.

8. Up to 1899 or 1900 is that?—Up to 1899, but perhaps 1900 is a good date at which to commence with the figures.

9. Do you think the notifications since 1900 have been complete and reliable?—As far as any statistics on lead poisoning can be complete and reliable. There is always a difficulty with regard to them, because there is no definition of what constitutes lead poisoning, and every medical practitioner has to form his own judgment of what is lead poisoning, and cases that one medical practitioner would report another would consider to be premonitory symptoms, and consequently there is some doubt arising from that fact.

10. Can you put in a table to show the number of cases of lead poisoning reported from the coach-building industry since 1900?—Yes; I have prepared those figures regularly since 1900, and I hand in a table\* giving that list; and further Mr. Shaxby has been preparing in graphic form diagrams showing at a glance the extent of the prevalence of lead poisoning.

11. What is the general conclusion that you draw from this table?—This table shows the reported cases of lead poisoning grouped under 18 industries, of which coach-building is No. 15, and it shows that there is a considerable occurrence of plumbism in that industry.

12. Is there a tendency for the number of lead-poisoning cases in factories and workshops generally to decrease from year to year?—Yes, since 1900 the total has decreased by about half.

13. Does this apply to the coach-building industry taken by itself?—No, and I attribute that to the fact that the same remedial measures which have brought about the reduction in the other industries are not applicable in coach-building; in particular I refer to the removal of dust at the point at which it is produced by means of fans and locally-applied exhaust ventilation, and also periodical medical examination.

\* See Appendix I.

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[Continued.]

14. Will you please tell us what industries are included under heading No. 17 of the table?—No. 17 is "Paint used in other industries."

15. Are the conditions of work in factories of that class similar to those in coach-building?—They are precisely the same in that, and it has been very difficult to separate the two classes, and indeed I think for one or two years such industries as perambulators were included under "Paint used in other industries," but latterly I have included them under "coach building." The use of paint in the manufacture of safes, bicycles, bedsteads, gas meters, metallic enamelling of baths, and the use of lead in engineering and machine-making works, in cabinet-making and in French polishing, in the painting of bridges, girders, and signal posts, and the making of tape measures, would all come under "Paint used in other industries."

16. Most of these trades appear to be outside the scope of the terms of reference to the present Committee on coach painting, which are worded as follows:—"The use of lead compounds in the painting, enamelling, or varnishing of coaches and carriages"?—Yes; but I should hope that the terms of reference would include the manufacture of perambulators. It is a very small industry and the incidence of poisoning is considerable, and there seems to be no reason at all why the poisoning should arise from the use of lead paint there. There does not seem to me to be the exposure to weather conditions for a perambulator that there is in the case of house-painting. I might say that the recommendations that your Committee eventually makes in reference to coach-building would have a very direct application to industries like the painting of safes and bicycles and bedsteads and gas meters, which cause a good deal of lead poisoning, and it would give us a remedy, no doubt, for those trades also.

17. Do you include agricultural machines in the statement that you have just made?—Yes, I include them under coach-painting. I should like to regard under the heading of "Coach-building" anything that is on wheels.

18. That would rule out safes, would it not?—Yes, quite so. You would want the terms of reference widened to include safes, but it would include perambulators and agricultural machines.

19. But not bedsteads?—I do not think that it would include bedsteads.

20. Have you prepared a further table showing the severity of the attacks in the 18 classified industries of Table I.?—Yes; that I have done for a number of years past, and I put in this table\* showing an analysis of reports on lead poisoning by certifying surgeons, distributed according to the severity of the symptoms, the number of the attacks, and the main symptoms.

21. Will you explain the method of tabulation by severity?—The personal element enters into the character of the reports somewhat. I mean the personal element of the reporting surgeon and symptoms which one surgeon might describe as slight, another might regard as moderate or severe. In general, however, "slight" includes cases of colic without complication and of comparatively short duration, anæmia, and either of those with a tendency to weakness of the wrists. "Moderate" would include a combination of colic with anæmia, profound anæmia, and partial paralysis of the wrist, and cases in which there was constitutional undermining of the health. And "severe" would include marked paralysis, drop wrist, and brain symptoms, such as convulsions and blindness.

22. Is any account taken of the possible after effects of an attack of lead poisoning?—No. The reports are made during the attack, and information of the ultimate result we do not obtain unless the man returns to work, and is again attacked by lead poisoning. Then he is reported again, and we follow up the same procedure.

23. In what way is the number of the attack arrived at?—Transient attacks which have preceded the disabling condition are usually disregarded. I call

a second attack an attack where a man has been definitely reported, say a couple of years ago for colic, and then returns to work, and two years after has a fresh attack perhaps more severe. And I call it a chronic attack where that is repeated for a third time.

24. To which of the columns headed "Symptoms" do you attach the most importance?—I think the headings "Gastric," "Paretic," and "Encephalopathic," which are the brain symptoms, represent fairly accurately the relative incidence of these symptoms; and of those the paralysis and the brain symptoms are the most important. The headings "Anæmia" and "Headache" are useful in comparing the relative incidence on men and women, as headache is much more prevalent as a symptom of lead poisoning in women and anæmia also, whereas paralysis is commoner in men. Under "other symptoms" I have included sequelæ such as gout, chronic nephritis, and cerebral hæmorrhage, which indicate chronic rather than mild lead poisoning.

25. What general conclusions do you draw from this table?—In regard to coach-painting, that the symptoms in general are colic rather than paralysis or other very serious injury arising from plumbism. Comparing it with other non-regulated industries the severity of the attacks among coach-painters is rather below the average.

26. With regard to the 697 lead poisoning cases reported from the coach-building industry, can you tell us in what classes of work the greatest numbers originated?—352 of those were reported from railway carriage and wagon works, 297 from ordinary carriage works and wheelwrights' shops, and 46 from motor-car manufactories, but it is only since 1905 that these last have been classed separately from the others. So that those 46 cases in motor-car works occurred within the last five years.

27. What is the total number of railway carriage and wagon works, of ordinary carriage works, and of motor-car works respectively?—I am afraid I have not those figures. I do not think that one can say. It is not accurately known.

28. Do you mean that the totals have not been tabulated?—They have been tabulated, but not in such a way as to account for a considerable number.

29. Can you tell us the number of lead workers employed in the coach-building industry as a whole?—The total number employed, as given in returns from occupiers in 1904-1907, was 106,434, of whom I estimate that 10,000 or 11,000 use lead paint. I base this estimate on the fact that, from the inquiry that was made by the Factory Department in 1902, 9,605 persons were found who used lead paint in 603 factories and workshops.

30. Is it impossible at the present moment to say what is the precise number of men among whom the 697 lead poisoning cases originated?—Yes; but in 58 of the factories visited in 1902, principally large works, including several railway carriage works, it has been found that 354 cases of lead poisoning have occurred in the 10 years 1901 to 1910, and those 354 cases occurred amongst 5,469 men exposed to lead, using lead paint, out of a total of 59,700 men employed. This corresponds to an attack rate of 6.5 per 1,000 annually. In the china and earthenware industry last year the attack rate worked out at 8 per 1,000, and in previous years nearly 15 per 1,000. It was exceptionally low last year.

31. Is it not essential that statistics should be collected on all these points in order that the Committee may be in possession of the attack rates among lead workers in each section of the industry?—It would be useful no doubt, but I think that you can get at the facts in other ways. If an examination, for instance, of 1,000 lead workers was made, and you knew how many of them were showing signs of lead absorption, you would get a better criterion of the actual effects of the industry on the men employed, I think, than by a single statement of so many reports per 1,000 employed. You would know how many were being affected who were not being reported, and

\* See Appendix II.



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you want to get that as well as the figures for actual reported plumbism.

32. You suggest that as a very valuable addition to the general statistics?—Yes; we must have statistics to base conclusions on.

33. Can you give us a table showing the reported cases classified according to the description of works in which they originated?—I have tables here showing the cases during those 10 years for railway carriage and wagon works, for tramcar works, for perambulator works, and for the principal other carriage works in which poisoning occurred, distributed according to the factory where the actual poisoning occurred, with the name of the factory and the number of cases which occurred in each year.

34. Do you hand in that paper?—Yes. I suppose that the names of the particular factories will not be published. That would be contrary to our practice.

35. No. Names will not be published?—I have classified these cases for each year, and under three heads: those that are included in the return, which of course are much the largest; then a certain number which were excluded because the diagnosis was wrong, or in my opinion I felt that it would be unfair to put it down against the industry; and others which were excluded because they had been previously reported within a year, and one imagined that that was really the same attack the effects of which had not passed off.

36. Have you distinguished cases from perambulator works throughout the years 1900 and 1909 inclusive?—The number of perambulator works is quite small, and I do not suppose that in any of them there would be more than ten persons employed exposed to lead, and yet the incidence is considerable.

37. Have the Home Office conducted any systematic inquiry into the dangers attendant on the use of lead in this industry prior to the appointment of the present Committee?—Yes, in consequence of the fact that no diminution was taking place in coach-painting factories, inquiry was made in 603 factories and workshops in 1902 by the staff of inspectors, and forms were supplied stating the information that they were requested to give. I can hand in one of those forms.

38. In what manner were those 603 factories and workshops selected for the inquiry of 1902?—In view of the large number of such factories and workshops generally (something like 4,000), district inspectors were asked to take the opportunity of visiting as many as possible of the coach, carriage, wagon, and locomotive factories, especially the more important of them. They could not be expected to visit them all.

39. How many other coach-building factories and workshops were there, which were not included in that inquiry?—Rather over 3,000 I think, judging from the fact that there were 1984 factories in the 1907 returns from occupiers and 1825 workshops in the 1904 returns.

40. Why were so many coach-building works omitted from the scope of that inquiry?—The Inspectors were asked to visit the more important ones only.

41. What were the points dealt with in this inquiry?—On that form information had to be given as to the number of persons employed in painting with lead paint, the total number employed, a description of the method adopted in rubbing down, whether it was done by a wet method, that is with use of pumice stone and water, or whether it was done dry by means of sand-paper, or by what other method, and whether substitutes had been tried for white lead paint, and with what success, and also they were asked to state the number of cases of lead poisoning that had occurred within, I think it was, five years.

42. Did this inquiry embrace every class of coach works?—I think pretty well every class.

43. What was the result of the inquiry as to the number of persons using lead paints?—The number of persons found to be employed in painting with lead paints was 9,608 in the 603 works.

44. How many lead cases have been reported from those 603 works?—Well, during the last 10 years, 1901 to 1910, there have been at least 354.

45. With regard to the other coach-building works, you have told us that you have no means of knowing

the number of workers exposed to contact with lead?—I have already explained, in an answer, that I have given the approximate number whom I believe to be working in contact with lead, which is based on this very considerable number that was found in the 1902 inquiry.

46. What method of smoothing the coats of paint was found to be most generally adopted?—Certainly the wet method; but in 52 works smoothing of coats of paint was not practised at all; in the remaining 551 it was affirmed that a wet method alone was used in 178, a dry method of sand-papering alone in 39, and both wet and dry methods at some stage or other of the work in 334.

47. Where a wet method took the place, either wholly or partially, of the dry sand-papering, what materials were used?—Generally pumice stone and water.

48. Of what class were the 52 works wherein all smoothing was dispensed with?—Those 52 places were nearly all premises for the repair or manufacture of railway trucks requiring no special finish.

49. In which classes of works did it appear that dry sand-papering alone was done?—The 39 factories coming under this head were premises in which rough, cheap, or common vehicles, such as carts, were made.

50. Why is the dry process used in such works?—Because sand-papering is a quicker and less expensive method than the use of pumice stone and water, and where there are any iron surfaces wet methods cannot very well be used.

51. Will you describe to us the processes carried on in the better class coach-building establishments?—In ordinary coach and carriage building the first two coats, known as the priming coats, are sand-papered, and after that six or seven coats of filling are applied, each of which is rubbed down wet with pumice stone and water. The body is then ready for the application of the final coats of colour.

52. What is the nature of the material which you speak of as filling?—Usually it consists of ground slate mixed with gold size and turpentine.

53. Are there any subsidiary processes in which lead is used in ordinary coach work?—All joints and interstices and irregularities in wooden surfaces and iron surfaces are filled in with a stopping or paste of white lead, in the smoothing of which sand-paper is often used.

54. Are the processes the same in the manufacture of motor-car bodies?—Not entirely. The motor-car body is made from terns plates, that is sheets of iron or steel coated with lead, and these plates are generally first sand-papered, after which two coats of a lead paint are applied. These are either lightly sand-papered or flatted with pumice and water. Three coats of a non-poisonous filling next follow. These are flatted with pumice stone and water or with German brick and water, and after that the body passes to a skilled workman who applies the final coats of paint.

55. Are those final coats of paint treated dry or not?—They are not sand-papered, I believe.

56. There is, then, a considerable amount of dry sand-papering in motor-car body work?—Yes, and, moreover, for facing mouldings and corners, throughout all stages of the work, dry sand-papering would take the place of pumice stone and water. All stopping on the chassis, the first coat—a lead coat—on the bonnet, and all coats of paint on the wheels are sand-papered dry. For wheels and rounded surfaces pumice stone and water cannot be used.

57. What can you tell us with regard to the wet process?—The figure given—178—as the number of places where the wet method alone is used is probably much too high; it doubtless means that pumice and water alone are used for the flat surfaces which constitute the bulk of the work; but dry sand-papering of the two priming coats and of the final finishing coats (when white cream or yellow is the colour) of the under parts of carriages, of the iron chassis of motor-cars, and of curved surfaces such as spokes of wheels, is almost universal. The reason for thus

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[Continued.]

treating the priming coat dry, I am always told, is that a wet process would raise the grain of the wood.

58. What information did you gain in regard to the use or trial of substitutes for white lead?—Substitutes are mentioned as having been tried at one time or another in 94 instances, but this was almost exclusively for the filling and jointing processes, and not for the priming and finishing coats if of a white colour.

59. Has any detailed information been collected in respect of these substitutes?—Yes; 28 of these substitutes which were said to be free from lead were forwarded by the Inspectors and were analysed in the Government Laboratory, and we have particulars of the samples as forwarded and particulars of the analyses that were made. They were nearly all free from lead or with very little lead in them.

60. Which of the operations, which you have referred to, do you consider to be the most dangerous?—The dry sand-papering. Rubbing down the wheels probably causes more poisoning than any other operation.

61. Would it be possible to determine by experiment the amount of lead dust in the atmosphere of rooms where sand-papering or other specially dangerous work is being done?—I think it would be extremely useful to have exact analyses made of the amount of lead in the air at the level where the workman is breathing. It could be done by aspirating a volume of air and weighing the amount of dust, and of lead in the dust in the same way as was done in the inquiry by Mr. Duckering in china and earthenware factories.

62. Is the wet process entirely free from danger?—The actual operation would be, but what is rubbed off falls on the floor and dries there and gets trodden upon, and there must inevitably be a certain amount of lead dust in the air, I think.

63. What means do you advocate for mitigating the dangers which you have described?—In the absence of the possibility of replacing white lead by some substitute, I do not see any complete remedy. There are the usual precautions of washing accommodation, which, of course, would not affect the poisoning from lead dust at all, but would be a safeguard for the men whose hands are smeared with lead paint. Then the wearing of overalls is essential where there is the possibility of splashing from paint, and there should be meal rooms.

64. And exhaust ventilation?—Exhaust ventilation is practicable for the rubbing down of wheels, and if it were installed, as I know it is installed in some works in Coventry, it would improve the conditions very much, and possibly when locally applied exhaust ventilation is impracticable it would be possible to arrange a respirator through which compressed air was delivered.

65. Is that something new?—I have seen an arrangement that the Vacuum Cleaning Company have devised with that object in view. It would give complete protection.

66. Is it comfortable?—I think it might be made quite comfortable.

67. I have never heard of a respirator that is comfortable yet, and I think you will agree with that?—The ordinary respirator which simply covers the nose and mouth, owing to the fact that the man has to re-breathe his expired air and consequently has to take deeper breaths, he cannot be expected to wear for the whole day; he can only do it for half an hour at a time.

68. Is the respirator you have seen of the Vacuum Cleaning Company a new invention?—It is. It is a new application.

69. In your view is it a success?—It has not been tried on any scale, and I would reserve my judgment, but the principle seems to me quite sound.

70. In cases where it is not found practicable to apply local exhaust ventilation, what would you suggest?—I have mentioned the usual requirements of washing accommodation, meal room, cloak room, overalls, and principally the substitution of wet methods for dry.

71. Is personal cleanliness of very great importance?—While I think that in all painting operations inhalation of dust is the most potent cause of lead poisoning, I do think that the eating of food with

unwashed hands is a more prevalent source of plumbism in the coach-painting and house-painting industries than in any of the other industries involving the handling of lead or lead colours.

72. Would you then advocate the provision of lavatory accommodation similar to that recommended by the Committee which recently reported on regulations for the earthenware and china industry?—Yes, but at the same time I would rather see substitution of leadless paint than the requirement of lavatories.

73. That would be the ideal solution. You would extend to this trade the requirement of the provision of hot and cold water?—Certainly. In fact I do not think a painter with hands smeared with paint could really remove the paint very well in cold water alone.

74. Also nail-brushes and soap and an adequate supply of clean towels?—Quite so, and preferably a trough with jets of warm water so that they can wash under running water and not in basins.

75. Similar, in fact, to that which we recommended in the recent report on earthenware and china?—Yes.

76. Would you advocate also the provision of mess rooms, to be kept clean and healthy, and to be properly warmed in winter?—I should.

77. You offer these suggestions, of course, only as an alternative if the substitution of non-poisonous materials for white lead is found to be impracticable?—Yes.

78. How far have you found that the use of lead has been discontinued?—The progress, so far, in this direction has been limited. A few firms manufacturing motor cars use no lead colours at all. One important railway company in England, which, however, does not paint its carriages white, and another railway in Ireland, and a few perambulator makers have dispensed with the use of white lead altogether, I believe, and in some other industries, as, for example, the making of cornice poles, where there used to be incidence of lead poisoning, the substitution of lithopone has been entirely successful. Those are the principal cases.

79. (Mr. Fell.) Have you found that there is a very great difference between actual contact with paint and inhalation? Is there a great distinction between them?—Do you mean in the symptoms?

80. Yes?—I should say not; but my view is that what you might perhaps consider poisoning produced by the paint I would attribute to the dust. What I mean is that a man is breathing 17 times a minute, and in that time the exchange of air that is going on, setting up currents in the air and wafting particles of dust into his lungs from which lead is absorbed, is a far more rapid method of getting lead into the system than getting lead on the fingers. It will not go through the skin. There is no lead poisoning caused through the skin unless you have absolutely soluble salts like acetate of lead. White lead will not go through the skin, nor do I think it will go through a cut.

81. Is there not any case where a man is poisoned through lead getting through a cut?—I do not believe so. I think that the amount of lead that is transferred to food through the hands is very very small compared with the amount that he gets in ordinary breathing.

82. Is not the trouble in the air got over to a great extent by constantly pumping fresh air into a paint shop?—No, because that pumping in, although it would be extremely useful in improving the air breathed, would only tend rather to keep the dust in motion in the air. Unless you can get the air at the point where the dust is produced, and remove it, it is still floating about.

83. Can you do anything by altering the temperature in the shop and the arrangement of heating, so as to keep the lead floating at a height that is not dangerous?—No, I do not think you can.

84. You think that that would not alter it?—I do not think it would. I agree that pumping in air for purposes of ventilation is a good procedure.

85. (Mr. Mason.) I would like to ask whether it is not very difficult to diagnose these cases of lead poisoning, especially in their early stages, not when they get to the drop-wrist stage?—The symptoms set

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[Continued.]

up by lead in the early stages, anæmia, headache, indigestion, constipation, are, of course, the same symptoms as are commonly met with apart from lead, and there may be difficulty. Undoubtedly a number of cases are reported in which other causes ultimately are found, but still they do not interfere with the general statement as to the numbers. I have made out a list of the deaths in regard to house-painters, but perhaps that had better come later.

(Chairman.) I will question you on that later.

(Witness.) I might say that about 7 or 8 per cent. of cases that pass through my hands I exclude, because I do not think it would be fair to include them. There is so much doubt about the case that I do not include it.

86. (Mr. Mason.) Have these cases increased since lead poisoning came under the Factory Act?—Before that one had no means of telling the state of affairs. It was on the 1st January 1896 that the section requiring notification of lead poisoning came into force. I do not think that in the coach-building industry it has increased. It keeps stationary. It just keeps about the same as it was 10 years ago. The table shows that. You see that in 1900 it was 70, in 1909 it was 95, and in 1910 it was 70. Do you mean that the Workmen's Compensation Act may have increased the number of cases brought to light?

87. That is what I was thinking of?—I think that the Workmen's Compensation Act operates in bringing to light old-standing cases that have not been notified, and it will lead a man, I think, to consult a doctor more readily for symptoms due to lead now that he knows that he can claim compensation if he gets a certificate from the certifying surgeon that it is lead poisoning. You see the ordinary practitioner's notification does not enable the man at all to claim compensation. He can only get compensation for lead poisoning on the certificate of the certifying factory surgeon, who must be satisfied that it is lead poisoning.

88. Then the certifying surgeon does not see him for some days after?—No.

89. That would render a diagnosis still more difficult?—Yes. It is best, of course, to see the case as soon as one can.

90. They would not go against the other doctor if there was any doubt?—I do not know. They do form an independent judgment.

91. Perhaps we misunderstand each other. I meant to say in doubtful cases, and many of these are very doubtful cases in the early stages?—Yes.

92. He would certainly give it as a case of lead poisoning, would he not, if he had any doubt?—Really I do not think he would. My feeling after having examined thousands of persons for lead poisoning is this—my inclination would be to consider, as lead is so subtle in its manifestations, that in a doubtful case, lead had had a share.

93. You were speaking some time ago about dry and wet rubbing. I take it that that refers to filling only and not to the coat of paint after the filling?—No. The dry rubbing refers to the priming coats, the first coats.

94. Do I understand that a large number of people use wet rubbing in coach-building?—That is where I expressed the doubt. I think that that is not the case. The information the inspectors got on that point was wrong, I think.

95. It would seem from your figures that they were referring more to the filling coats? I think they were.

96. There is not very much lead in the filling coats? They were misled, I think, on that point.

97. (Lord Henry Bentinck.) Do I understand that there is no wet rubbing in the priming coats?—I think there may be; I think that that is possible.

98. (Mr. Mason.) Do you think that there is any danger from the fumes of wet paint?—No. I think there may be danger from the fumes of burning off, but not from wet paint. I do not understand the reported cases to show that.

99. I have had cases of men who have never touched lead at all, and who never go near paint at all, who have suffered from lead poisoning, and I cannot understand how they got it?—There is an

inclination to assume that the illness is associated with the work. If men have the symptoms of anæmia and dyspepsia and constipation and are asked, "Where do you work?"—"We work in a lead works," naturally it will be assumed that the illness is associated with their work unless an inquiry follows as to whether they come into contact with lead or not. I told you that I excluded about 8 per cent., and it would be for such reasons as that that I would exclude them—because there is no possible contact with lead.

100. You would know that from the report?—Yes, I would know that from the report.

101. Taking a case of a man working in a paint shop but not working with lead, would you know then?—There I can quite conceive that the symptoms would be lead poisoning from the dust that has been floating about in the air. Take the case of a man in a paint and colour works grinding colours in the same room where white lead has been ground. If the exhaust ventilation is imperfect he may get poisoned, even although he is 5 or 6 yards away, through the dust floating in the air.

102. I take it that the effects of lead are different according to a man's state of health?—Yes.

103. It is more likely to affect him if he is not in good health? If he is an alcoholic subject he is undoubtedly more likely to get lead poisoning. If he is run down in health I think he is more susceptible; and many certifying surgeons lay great stress on the necessity of men commencing work with food in their stomachs, because an empty stomach predisposes to absorption. But mind you, unless there is lead dust floating about I do not think that those cases come in. If you can keep the dust away then those points do not signify.

104. (Chairman.) Would you say from your observation that a large number of people are more susceptible to lead poisoning than others?—I suppose that that is so. Women are more susceptible to lead poisoning than men.

105. You get cases of lead poisoning in some works, and, under precisely the same conditions, no lead poisoning at all in others?—Yes, but I would not like to push that too far. If you had half a dozen men each one exposed to the same amount of lead dust, I should be surprised if any of them escaped. One might get colic, another might get brain symptoms, another might get anæmia; but I think they would all show something. I think that susceptibility is brought in too much to explain the effects of lead dust.

106. (Mr. Mason.) Following on that in times of bad trade, when the men would not be perhaps getting so much to eat, and would not be so well fed, would they be more liable to lead poisoning in such cases?—I suppose that might be so. I know one big railway carriage works, for instance, where they tried to explain a rather heavy incidence in that way; but I would not lay too much stress on it.

107. (Mr. Kinggate.) I desire to ask whether any distinction is made in returning the cases of white lead, as to whether they are painters or any other branch of the coach-making industry?—Do you mean whether they are coach bodymakers or actually painting?

108. Yes?—Very often that distinction would be made, but I have not classified them separately.

109. What was the instruction to the inspectors when they examined these various works; was it only in the painting departments they were supposed to examine?—No, I think they were to include the coach bodymaking too. But by coach bodymaking do you mean the woodwork solely?

110. Yes?—Where they use red lead paste or white lead paste in jointing.

111. They use white lead in jointing and in fixing ironwork. In the carriage making industry they use a great deal more white lead than painters use, and in proportion to the number employed a very much heavier percentage suffer from white lead poisoning. Take those that make the undercarriage for instance?—For broughams, &c.

112. Landau or Victoria or Brougham—the body is hung on—you understand that?—Yes.

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[Continued.]

113. The underpart is of wood and iron, and it is all put together with white lead; every bolt is put in with white lead under the head. A man putting his work together is practically covered with white lead the whole of the day. He cannot get it from his hands. My experience is that the large proportion of carriage makers have always suffered very much from gout brought on by that. I am a carriage maker myself. With regard to the number examined you said 11,900 out of 106,434 that were employed were painters, as I understood, coming into contact with white lead in bodymaking, or in painting?—I should take it that the terms of reference of the Committee cover bodymaking just as much as painting.

114. Yes. I have noticed that the factory inspectors seem to neglect that branch very much. No accommodation has been given for washing with regard to bodymakers or coachmakers such as has been carried out in the painting department?—I should think myself that the risk was very much greater in the painting department, where they are putting on the priming coats, than in coach body-making where only a little of the lead paste is used to fix spokes in.

115. But the spokes are not fixed in with lead at all in an ordinary wheel?—Then I stand corrected; but surely they use white lead paste. Do you mean for the iron part—the chassis only?

116. With regard to chassis, that is engineers' work, and they do not use lead; and they somewhat ridicule us with regard to using lead so much for putting on ironwork; but every bit of iron has to be covered with white lead?—And has it to be sand-papered?

117. No, putting them together. With regard to the bodymaker or the coachmaker it is the practice generally, as soon as a body is finished, to take it away from the bodymakers' bench, and take it to where another man works at it. The priming coats are put on there, and the sand-papering and filling are done. So, apparently, they suffer more than the painters do, because they are always breathing it?—I do not think that my figures would bear out the fact that the bodymaker suffers more than the painter.

118. They are not very frequently reported as cases of lead poisoning. There is also this to be considered; we know that men ask not to be reported as suffering from lead poisoning for fear of losing their jobs?—But do you think that that is so much so now?

119. I think that it is more so now?—Since the Workmen's Compensation Act?

120. Yes. It is a fact that men ask not to be stated as suffering from white lead on account of fear of losing their employment. With regard to using water for priming, I have never known that to be done, and my colleague, I think, would say the same as a practical painter—that he never saw water used for two coats of priming. It is all sand-papering. The most fruitful cause, undoubtedly, is the dust. We had a case in the Manchester Corporation of a man not using lead at all who died from lead poisoning. We had three cases in the Manchester Corporation in two years, of deaths from lead poisoning in the Tramways Department?—Three cases of lead poisoning?

121. (Mr. Robins.) I speak as a practical painter. I commenced at thirteen, so I have some knowledge of the trade. With regard to the perambulator industry which you touched upon, the great prevalence of lead poisoning there is in connection with the sand-papering, and not the rubbing down. My experience of eight years goes to prove that no wet rubbing down is done, or very little, in perambulators, at all. I have unfortunately suffered from lead poisoning, and ever since that time I have been troubled with lumbago; in fact I can feel a little of it this morning. I was glad to hear your testimony with regard to the after effects of lead poisoning, that, although it did not attack a man a second time, yet it may attack him in other forms, such as gout or lumbago. My medical adviser told me after I had been attacked a time or two with lumbago, that it was nothing more nor less than having lead poisoning that was running its course. Do you believe that these after effects follow lead

poisoning?—Undoubtedly there are sequelæ of lead poisoning. I do believe in the association of gout with lead poisoning and of chronic Bright's disease.

122. With regard to the inspection that was made of factories some years ago, you said, I believe, that the larger of the factories were visited with regard to lead poisoning, but the smaller ones were not visited?—Wheelwrights' shops in villages would have been omitted from that inspection I dare say. They would have gone to places where the largest number of men were employed.

123. Do you find among your figures that there is any great prevalence of lead poisoning in these little shops?—No. I take it that that is because the work is done intermittently, and there is not the rush and hurry that there is in big shops. I believe that the speed at which lead work has to be produced profoundly influences the incidence of the poisoning. Where there is pressure of work and piecework, there you get lead poisoning, but you do not get it in leisurely work.

124. Do you believe that within the last two years the large increase of lead poisoning has been due to the large amount of overtime and Sunday work that has had to be put in in the motor and coach-building trades of the country?—You are referring to coach-painting?

125. Yes?—I should think that is undoubtedly the cause—the rush to get the cars out. There has been a diminution in lead poisoning generally throughout the country.

126. There has been a boom during the last two or three years; that I know from my own knowledge. Taking one firm where I was employed, I was at work no less than eight Sundays. I have had to work with my men, and late at night too, and that high pressure that men have to work at, certainly, in my humble opinion, must be detrimental. I should like your opinion on the matter?—Most certainly. I think any overtime work in lead work is certain to have an effect on the incidence of lead poisoning.

127. You made some remarks with regard to the substitutes for lead. Do I understand that nearly all the samples were free from lead?—For the filling I might say that they were nearly all free from lead and the jointing pastes. There were very few analyses of priming coats.

128. Were there any analyses of zinc whites and other substitutes for white lead?—Yes.

129. Those you found to be practically free from lead?—Yes.

130. Do you think that they were non-poisonous?—Yes.

131. With regard to factory inspectors, I am afraid that the inspectors do not come into paint shops at the proper time. It may be a charge, but still it is a friendly one. I contend, myself, that factory inspectors should come more at night. Would you consider, with regard to the increase of lead poisoning from inhaling, that men would be more susceptible to it at night when you have to have gas, and the fumes of the gas?—I do not think that that would influence it much. It would all depend on the amount of dust floating in the air.

132. And then at night you find a greater amount of dust. It is at its height then?—Do you refer to working overtime or do you mean the night shift?

133. I mean the last hour, between five and six?—I do not see why men should be getting more lead poisoning between five and six than they would between nine and ten in the morning, if they are making the same amount of dust.

134. (Dr. Collis.) It has been suggested that lead has to bear a burden which is not always its due. A number of cases are put down to lead which may perhaps be doubtful. That being so, I wish to ask you a few questions. Could not a man absorb small amounts of lead and yet never have any definite attack of lead poisoning?—Undoubtedly.

135. Do you consider that these small amounts may have some influence, never diagnosed as plumbism, and that we see this influence in the high mortality from Bright's disease and gout, which undoubtedly occur among lead workers?—Yes.

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[Continued.]

136. (*Lord Henry Bentinck*.) How far is it possible to apply exhaust ventilation to a whole shop?—What is meant by "locally-applied exhaust ventilation" is the arrangement of a duct, say a foot in diameter, or six inches in diameter, with small branch ducts coming to the actual point where sand-paper is applied, and sucking the dust away. There is a fan at the end.

137. It is not possible to apply that ventilation to a large area?—No.

138. It would not carry away the dust arising in a whole shop?—No, and if you applied it to a large area you would perhaps be drawing the dust across the faces of the people before it got to the exhaust. It must be below the level of the person's mouth. It is owing to the exhaust ventilation that the reduction in lead poisoning has been possible in industries where it can be applied, such as the large china and earthenware industry.

139. It could not be applied to coachbody building?—I thought it might be possible to get an exhaust apparatus fixed to the back of a man's hand, so that when he was sand-papering, this arrangement fixed to the back of his hand would take away the dust. The Vacuum Cleaning Company kindly experimented in that direction when the suggestion was made, but apparently they found it was not practicable.

140. Can you tell me something about the extra cost of respirators with compressed air?—I believe that a large shop with, say, 20 men, could be supplied with a compressor—the engine for compressing air—and all the apparatus for 50*l*.

141. That would be the initial cost?—Yes, and the cost of running it would be 1½*d*. an hour, perhaps.

142. Have you had any experience with regard to the working of it?—I have tried it myself.

143. Is it possible to wear it for long?—It is like breathing fresh air. It is a perfectly different idea from the respirator covering the nose and mouth. The idea rather is to have a collar round the neck, and from this collar to have jets of air coming up across the man's face, exerting a pressure, and preventing any of the dusty atmosphere coming through.

144. Is it used in any other trades?—I believe that something similar is used for sand blasting. I believe it is being used in the London streets for cleaning the tram lines, and it is used for sand blasting certainly; but it is a much clumsier apparatus, quite an impossible apparatus to expect men to wear constantly.

145. Is it?—The sand-blasting apparatus is; this would be very different.

146. Not so clumsy?—No, not so clumsy. It requires of course a flexible half-inch pipe attached to the collar from which the stream of air is being delivered. In several of the big railway carriage works now they are using the vacuum cleaning arrangement for taking the dust out of cushions.

147. Would this be any use as regards burning-off or cleaning?—I think that it would be an entire protection in regard to burning-off.

148. (*Chairman*.) Now I will put a few questions to you in connection with house-painting; and then ask gentlemen to cross-examine on that section. Will you now give us your evidence on the incidence of plumbism amongst house-painters? Are such cases also notified to you?—There is no legal requirement for the notification of cases of lead poisoning occurring outside a factory or workshop. The object of notification is to obtain a clue to unsatisfactory conditions over which the inspector can exercise control; and, consequently, these cases, although they are notified are not followed up.

149. Are men not frequently employed as house-painters working part of their time in a workshop and part of their time on jobs outside?—Yes. Where a painter is employed part of his time at the mixing of paints in a workshop, the question may legitimately be raised as to whether plumbism may not be due to mixing the paint in the workshop. But I classify all those cases as house-painters. I do not consider them as coming under the Factory Act.

150. Do you then get a number of notifications of cases of lead poisoning among house-painters?—

A large number of cases are notified although there is no obligation on the medical practitioner to notify; and the practice of the department is to accept and pay the medical practitioner for his notification, but not to follow it up by detailed inquiry, for the reason I stated—that the inspector cannot do any good. In the painting of a house he cannot require the installation of washing accommodation for the house-painter. At first a number were followed up, but it involved such difficulties in administration to the staff, that what is done now is to send a leaflet on the dangers of lead poisoning to the decorating firm employing the workman, and also a leaflet explaining section 73 of the Factory Act, and asking them, if the man contracted it really in a workshop, to report it. I should like to hand in those two leaflets that are used in following up these cases.\*

151. This state of affairs results in the notification to the Home Office of many cases, then?—Yes. The number exceeds that of any lead industry in the kingdom.

152. What was the number of cases of lead poisoning among house-painters and plumbers notified to the Home Office in the years 1900 to 1909 inclusive?—1,973 among house-painters and plumbers. Of the 232 cases in 1910, 197 were house-painters and 35 were plumbers. That is about the relation of house-painters to plumbers.

153. Where did these cases chiefly occur?—I have a table† here showing the distribution of these cases for five years. The largest number occurred in South London, in West London, in East London, and in North London. Then comes Birmingham with 71 and Manchester with 59, Bristol with 44, and Leeds with 32. In the whole of Scotland there are only about 20 cases—12 in Glasgow. I attribute that not to what might be thought to be the reason—practitioners not notifying cases there—but to the fact that it is a stone country and consequent absence of outside painting. Certainly in Edinburgh lead poisoning is practically unknown. Those are figures for the five years 1906 to 1910.

154. These figures, for the reasons you have given, represent probably only a fraction of the whole?—That is undoubtedly the case.

155. Have you any means of estimating the number of fatal cases with any certainty?—Yes, by arrangement with the Registrar-General whereby the District Registrars in England, Wales, and Scotland notify the Chief Inspector of Factories, sending copies of death certificates in which lead poisoning is directly or indirectly the cause.

156. What is the number of deaths from lead poisoning among house-painters and plumbers ascertained by this means?—In the 10 years 1900 to 1909, 387 deaths.

157. What means have we of estimating the proportion of house-painters who are attacked by plumbism, or who die of lead poisoning?—There are no means of calculating that, as there are no exact statistics as to the numbers employed in house-painting.

158. If the Trade Unions and Friendly Societies would give the number of house-painters in their memberships, and would state also the number compensated for lead poisoning each year, do you not think we could deduce valuable percentages from that information?—Well, you would get a number of house-painters, but I do not think that the number who get compensation or who apply for compensation for lead poisoning now is sufficiently large to be a fair criterion of the amount of lead poisoning occurring amongst them.

159. At the present moment we have merely the total deaths in 10 years, namely 387, as a reliable figure. Have you made any estimate of the total amount of lead poisoning existing in this trade, based on the number of fatal cases ascertained through the registrars?—I think it would be fair to assume that the proportion of deaths to attacks would be about the same amongst house-painters as amongst

\* See Appendices III. and IV.

† See Appendix V.

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other lead workers; and a calculation based on that assumption gives the total attacks in the 10 years amongst house-painters and plumbers as 9,516.

160. Should the medical practitioner not be expected to report to the Home Office all lead cases arising among house-painters and plumbers?—It would be useful for the statistical information which it gave, but it would throw a great burden on the Factory Department if we were asked to follow them up. We cannot do any good, and I do not think it would be right to expect the factory staff, with its present powers, to spend their time in the futile inquiry which would be involved.

161. Have you observed anything noteworthy as regards the severity of the cases notified?—I am impressed with the prevalence of severe symptoms such as paralysis and brain symptoms and chronic plumbism amongst many of those reported.

162. What, in your opinion, are the main sources of lead poisoning among house-painters?—I think that the chief causes, in the order of their importance, are: first, dust from mixing dry white lead with oil; secondly, dust arising from paint which has dried on overalls; thirdly, dust from sand-papering one coat of paint before applying another; fourthly, contamination of food by unwashed hands; and fifthly, possibly the fumes from burning off old paint.

163. Would it be possible to determine, by experiment, the amount of lead dust in the atmosphere of rooms where sand-papering or other specially dangerous work is being done?—Yes, in the same way as was suggested for coach-painting. It is more difficult perhaps in house-painting, and if it were limited to the coach-painting industry you would get all the information you wanted.

164. To what extent have you found in your experience that leadless paints have been introduced?—I believe that zinc oxide or zinc sulphide or mixtures of the two have been tried.

165. Are they efficient substitutes for white lead?—There is some divergence of opinion on that point notwithstanding the numerous experiments and investigations made by different foreign Governments; but I think that there is a general consensus of opinion that for internal painting in a house, and for all surfaces that are not exposed to the weather, zinc paints have advantages, apart from their non-poisonous quality, over white-lead paint, as they do not change in colour so much.

166. Can zinc-oxide paints be applied in precisely the same manner as white-lead paints?—So far as I have been able to gather, the technique for applying zinc-oxide and zinc-sulphide paints differs materially from that for white-lead paints. As the zinc oxide is much less dense and much more bulky it requires to be ground with a much greater proportion of oil, and the driers and vehicles necessary for thinning the stiff paste are different from those ordinarily used for thinning and mixing white lead.

167. Does this involve difficulties for a painter who is accustomed to the use of lead paints?—It would mean that he had to learn a new trade practically. The coats of zinc oxide should be applied as thin as possible, and consequently three coats of white lead might suffice where five coats of zinc oxide were necessary, unless they were skilfully applied.

168. Can you tell us anything about the vehicle?—I understand that linseed oil should be the vehicle for zinc oxide, with a minimum of turpentine.

169. To what extent can zinc sulphide be used in the place of white lead?—Zinc sulphide is usually mixed with zinc oxide and barytes because it has defects in colour which are concealed in that manner. It adds to the paint an important property known to the painter as "body."

170. Is zinc sulphide widely used?—Yes, for internal decoration.

171. Under what names?—Under the names of lithopone (which is a mixture of zinc sulphide with zinc oxide) patent zinc white, enamel white, and so on.

172. Are there any regulations in force in Great Britain dealing with the work of house-painters at the present time?—No.

173. Why is this? Because the Home Office has no powers to deal with the painting carried on in places outside the Factory and Workshop Act.

174. Then it would be necessary to apply to Parliament for powers to enforce any of the recommendations of this Committee?—Yes.

175. In your view, are the dangers of plumbism to which the house-painter is exposed as great as those in other employments for which regulations have been made?—Quite as great.

176. Would you say greater? Yes, I think they would be greater, perhaps.

177. Then should not similar precautions be adopted?—Well, here again the exhaust ventilation cannot be applied, and precautions short of exhaust ventilation do not seem to me to have the desired effect.

178. What are the difficulties?—You could not apply exhaust ventilation to house-painting. Also, as I said before, we have no control over house-painting operations. Then again, the trade is a seasonal one. House-painters are a migratory class of people, who change their employment a good deal. It would be a very difficult trade to control.

179. Would it not be possible to overcome these difficulties by requiring every painter to have a certificate from the certifying surgeon in a portable register, as has been done for the last eight years for casual lead workers in the pottery industry? There are administrative difficulties that I see in such a recommendation. If you are going to make a man submit to a periodical medical examination, if it is going to be of any service, the certifying surgeon who examines the man would need to have the power to suspend him from his work; but if power of suspension is contemplated, I do not approve of suspending a man from his work if the conditions cannot be improved. I would say that the man should be left alone.

180. What conditions do you mean?—The conditions that produce the ill-health. If you cannot remedy them, it is unfair to the workman to make him submit to a medical examination, I think.

181. The two ought to go together, you think?—Yes.

182. If no one was allowed to work in house-painting without a certificate, we should very soon know from the certifying surgeon the exact number of men so employed?—Yes, but still that presupposes that it could be easily carried out, with which I am afraid I am not in accord.

183. Are there any regulations for house-painters in Germany? There are regulations in Germany. The work of house-painters and decorators is controlled by special rules, dated 27th June 1905,\* prescribing, firstly, the prohibition of actual contact with the material (that is with white lead) in crushing and mixing, and adequate protection from the dust so created; secondly, the mechanical incorporation of the white lead with oil and varnish. That means no handling and prevention of the escape of dust into the workroom. That would apply to the workshop where the mixing is done.

184. (*Mr. Sutherland.*) Does that refer to house-painters and decorators?—Yes.

(*Mr. Rice.*) In Germany, much more than we do here, they mix their paints in the paint shop.

185. (*Chairman.*) Any further regulations?—(*Witness.*) Thirdly, scraping or chipping off dry oil colours shall be done only after preliminary moistening. The fourth and fifth regulations require provision of overalls and washing accommodation, including soap, nail-brushes and towels, and they say in connection with the erection of new buildings, that provision must be made so that the workers can wash in a place free from frost.

186. Free from frost?—So heated, I suppose, as to prevent the pipes freezing. Seventhly, the employer must instruct the workman as to the risk attaching to the work by supplying him with a copy of these regulations, and with a cautionary notice. That is a leaflet such as we have drawn up, and which

\* See Appendix VI

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[Continued.]

we send also to the house-painters. Then it deals with places where painting operations are carried on in factories or workshops as subsidiary to other processes—in coach-building, for instance. The washing accommodation must be in a special room capable of being heated, and provision must be made for keeping clothing, and for periodical medical examination of the workmen at half-yearly intervals. Then there is prohibition of smoking in the factory.

187. Are similar regulations in force in other countries?—In Belgium they have a somewhat similar law dating from the 20th August 1909. I can hand in a translation of that.\*

188. What are the requirements in Belgium?—The sale, transport, and use of white lead are forbidden in the form of powder, small pieces or lumps, when intended for paint work. The sale, transport, and use of white lead in the form of powder, small pieces, or lumps intended for other uses—I suppose that would be, for instance, for glazing pottery—are only permitted under such conditions and such limitations as are fixed by Royal decree. Secondly, white lead intended for paintwork shall not be sold, carried, or used except in the form of a paste combined with oil. Thirdly, the partial or total prohibition of the sale, transport, and use of other products, of which lead is the basis, in the form of powder, small pieces, or lumps, and intended for paintwork, can be determined by ministerial decree. Fourthly, dry scraping or dry rubbing of surfaces covered with white lead is forbidden. The rest refers to administration and penalties.

189. Do you know if these regulations are found to work satisfactorily?—I cannot express an opinion on that. I know that in Belgium the periodical examination of house-painters has been found a difficult matter. The trouble of finding them by the surgeon, and so on, leads to difficulty.

190. How could that regulation be improved, in regard to the medical examination?—I am not prepared with a suggestion on that point.

191. Can you tell us anything further with regard to regulations dealing with house-painting in foreign countries?—Regulations have been made, I believe, in France and in Austria.

192. Can you give us the details of the French regulations?—I cannot quote the details, but the text of the law has been published in the "Journal Officiel."†

193. Can you give us the details of the Austrian regulations?—The Austrian‡ are very similar to those that I have read from Belgium. I rather fancy that in France there is a definite prohibition of the use of white lead for painting.

(Mr. Parsonage.) In five years' time.

194. (Chairman.) Will you let us have the original documents so that we can have them translated and circulated?—Yes, I will.

195. (Mr. Sutherland.) With regard to the point that you stated as to the German practice, is it not necessitated by the practice of painters grinding their paint very much more than we do here? Our men buy paint ready ground. In Germany, and generally on the Continent, the master painter has in his workshop the machine that he grinds the dry powder with, and mixes it with the oil?—That I did not know, but I can quite believe it is so, because so much dry white lead is manufactured in Germany.

196. The terms of restriction point to it, do they not?—Yes. We have similar regulations for paint and colour factories requiring exhaust ventilation, and so on, where grinding of white lead is done.

197. Practically every painter is a small mixer really; he grinds for himself?—Yes; a small paint factory.

198. In reference to the question the Chairman asked about applying exhausts to house painting, you quite recognise the difficulty of that? It is impossible, I think.

199. Do you think that, even if it were possible, it would be desirable or necessary? It is so fraught with difficulty that I have never given it consideration.

200. Do you think that the danger of inhalation is as great with the house-painter as with the coach-painter?—No, I should not think it was quite so much, but I am not so familiar with the work of the house-painter.

201. Take a room like this. There would not be a great deal of rubbing down here. It would probably be all confined to the doors, and that would probably be done by the wet process, so that the air could not get charged with the dust?—But I have seen house-painters sweep their hands over wall surfaces with sand-paper. Is it not a fact that they get a matt surface on the wall sometimes?

202. Not with sand-paper?—On which to put another coat of paint.

203. They always rub it down, but very lightly. They do not break the surface? But from my point of view, to do it very lightly is just as hurtful as to do it heavily.

204. Do you think they get it from the surface which is charged with oil? The lead rubs on to the sand-paper, and ultimately makes the sand-papered surface smooth. Do you think that that would get into the atmosphere?—I think it would.

205. I am not with you there. You give a medical opinion, not an expert opinion. Years ago the trade used to fill up with a white lead filling, and then they would sandpaper it down?—Yes.

206. The rubbing would distribute the dust?—Yes.

207. In answer to a question on coach-painting you said you did not think that there is danger from the fumes of paint, you said?—I was thinking of the fumes from burning off.

208. You do not think that there is any danger of actual contact with lead?—Do you mean with the hands?

209. Yes?—Only by subsequent contact with food or smoking, or putting the hand near to the mouth, and so on.

210. What is the danger from smoking?—The danger from smoking would be the contamination of the pipe stem.

211. (Chairman.) You think that the actual smoking would not harm the worker?—No, the actual smoking would not harm him.

212. (Mr. Sutherland.) He gets the lead on the pipe and gets it into his mouth?—Yes, or he may take a cigarette out with paint covered fingers.

213. Are not many people sufferers from the fumes from paint?—Yes, but I do not think that they would get lead poisoning, they would get headache perhaps. There are some cases of lead poisoning, I am bound to say, where the only explanation seems to be fumes given off from the paint; but those are to my mind inexplicable. From my knowledge of thousands of cases of lead poisoning, I have no experience of such cases. They are curiosities.

214. The custom of the trade has changed a good bit in recent years. 20, 30, or 40 years back there was a good deal of what is known as flutting, where a number of men would lock themselves up in a room. They would use turpentine in the paint; the fumes would rise and I know would produce headache?—Yes.

215. Would that produce lead poisoning?—No, I do not think it would. The lead poisoning that the house-painter gets is not from smell, certainly not.

216. And not from actual handling of paint?—That contributes materially.

217. Except when it gets into his system?—That contributes materially, I think, in house-painting.

218. You have no absolute data to go on as to substitutes for white lead, have you, in this country?—General reading, and the discussion of the subject.

219. And the statements of proprietors, which are very picturesque?—I believe you will get evidence from the Office of Works on the subject.

220. There are plenty of substitutes, but we have no absolute proof as to their physical or wearing

\* See Appendix VII.

† See Appendix VIII. ‡ See Appendix IX.

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[Continued.]

qualities?—No, the evidence is very contradictory indeed.

221. If we could solve the difficulty we should achieve a very great task?—You would.

222. (*Mr. Rice.*) You make no distinction between men working as mixers and men working as painters in your returns?—Do you mean in coach-painting?

223. No, house-painting. I know it is the custom for men in some cases to mix paint and use it, but my experience is that men are set apart mostly for mixing paint?—Yes.

224. That is on account of the migratory state of the trade. Men work in other businesses in the slack season, and a good colourman is rare. I wanted to get from you, if I could, whether the returns show the colourman or mixer to be more liable to lead poisoning than the ordinary painter who uses the paint?—I cannot speak of that with regard to house-painting, but I can with regard to coach-painting, where also there is a special mixing shop. The number of cases of lead poisoning in paint mixing in coach works is very small, because they are only grinding sufficient for use on their own premises, and they do it all in pug mills. It is not like the paint and colour manufacturer who is grinding white lead in edge runners.

225. Do I understand from that that the mixing of paint is less dangerous than applying the paint? No, it is not, but I take it that the amount of time taken up in mixing is so small that it is negligible compared with the amount of time that is taken up in actual painting operations.

226. Assuming that the man mixes his paint? If the man is engaged in mixing he is running infinitely greater risk unless there is very efficient exhaust ventilation.

227. Do I understand, with regard to notification by doctors of lead poisoning, that they are paid for notifying?—Yes, they are paid half-a-crown.

228. Lead poisoning is a case where a man would be compensated under the Workmen's Compensation Act, is it not?—It comes under that Act, but the workman has to apply, and he has to get a certificate from the certifying surgeon before he can claim.

229. Not from the ordinary medical man?—No. The medical man's notification would not help him at all in regard to compensation. He has to apply to the certifying factory surgeon even if he is a house-painter.

230. I asked that question because I rather thought that the returns for workmen's compensation did not sufficiently indicate the amount of lead poisoning in the trade?—No, they do not. I feel sure that that is because so many workmen do not know that lead poisoning comes under the Act yet, and they do not know how to proceed about getting their claims established. They do not know that they must go to the certifying factory surgeon. They do not take action in a slight case.

231. If the doctor certified a man to be suffering from lead poisoning, you do not think that he would say to him: "This is a case under the Workmen's Compensation Act," and explain how he can claim?—If he were to do that, no doubt they would proceed further, but I should imagine that most doctors would be unaware of it themselves.

232. And yet they would receive the payment on application to your department?—Yes, but you see the factory department has nothing to do with the Workmen's Compensation Act. The Workmen's Compensation Act is a Home Office matter. The Factory Inspector wants to be impartial. He has to be impartial, and it is not his business to tell the workman who is suffering from lead poisoning that he comes under the Workmen's Compensation Act. The workman may have reasons of his own for not wishing to apply.

233. The doctor to whom the men go for lead poisoning might suggest it?—He ought to.

234. With regard to the leaflet you referred to, was that sent to all employers, or only to employers whose workmen were suffering from lead poisoning?—The decorating firms.

235. But to the employer of men suffering from lead poisoning?—Yes.

236. Not to every employer?—No.

237. Assuming that an employer had no men suffering from lead poisoning, he would not know of this leaflet?—No, he would not.

238. You do not make a distinction between painters and plumbers? You bring painters and plumbers into your statistics?—Yes.

239. But in your statement with regard to cases of lead poisoning you do not mention any cause that applies to the plumber, as far as I can see. You use the term "house-plumber"? I take it that the house-plumber gets his poisoning from making red lead paste and applying it, and from handling the old lead pipes, which have got oxide of lead formed on them. In cleaning them he would detach dust. He gets it in these ways from the dust of the red lead, from the dust of the oxides of lead on the pipe, or from contamination of his hands, and so transferring it to his mouth.

240. With regard to the 387 fatal cases in 10 years, by some calculation you make out that the number of persons suffering in the time was 9,516?—Yes; I take that from the death certificates that were received from the registrars. We know, under the Factory Act, the various lead industries, and how many deaths there are in a year. There are usually about 30, and we know that those 30 deaths represent 600 or 700 cases of lead poisoning that are reported. The number of deaths amongst house-painters is usually about 40, and, assuming that there is the same incidence generally, those 40 deaths would mean 900 cases.

241. But you have only had notified in that time a very much smaller number?—Yes, but you see we make no effort to get house-painters notified. It is all done by the medical practitioner thinking: "This is industrial lead-poisoning; I must notify it." He does not look at that section which says that it has to be contracted in a factory or workshop before it is notifiable. Then we were getting into difficulties with the medical men. We were not paying them, and they got annoyed at not receiving their fees, and we had to go into this question. It was useful to have the information. Some of them may have been due to poisoning in the workshop, and we could not say when a case was or was not properly reportable; and so we agreed to pay them.

242. Then this is quite an estimate on your part?—It is an estimate, but it is based on an accurate figure of deaths.

243. On the deaths in another trade?—No. We know the deaths amongst the house-painters. They are sent to us from the district registrars. As you have referred to that point I might say that I have prepared a table showing the main symptoms appearing as the cause of death, and the average age at death entered on the death certificate.\* With regard to lead poisoning in house-painters and plumbers the usual cause of death is Bright's disease, or cerebral hemorrhage, which is due to Bright's disease, or paralysis from lead poisoning. Nearly all those are chronic Bright's disease. Then there are a certain number which are due to brain symptoms. They are quite small in number. There are others which are put down as chronic lead poisoning. Phthisis and all sorts of things may appear in association with lead poisoning. There are a certain number which I should hesitate to call lead poisoning. For instance, in looking through this list I have down here "Lead poisoning, diphtheria." That man undoubtedly must have died of diphtheria; but it is included as a case of lead poisoning.

244. That man would be a painter who died of diphtheria?—Yes, but he had lead poisoning associated with that condition, and he is entered as a lead poisoning case. Then I have one "chronic lead poisoning, acute pericarditis." He died of rheumatic fever. The acute inflammation called pericarditis here would mean rheumatic fever, but he had lead poison in his

\* See Appendix X.



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[Continued.]

system. Then another is "typhoid fever." He died of that. The lead poisoning was there. So there is a certain number of these to which I attach very little value.

245. That would be a small proportion?—That would be a small proportion. It would be perhaps 10 per cent.

246. Is it possible for anyone not working with lead to have lead poisoning?—Yes, through drinking water.

247. It is not possible unless one comes in contact with lead to have lead poisoning?—No.

248. And yet lead poisoning seems to cover many diseases that are common. I gather from your evidence that the symptoms which are characteristic of lead poisoning cases are common symptoms?—It sets up a change in the blood, anæmia, which other things cause also, and you cannot distinguish the anæmia of lead poisoning from the anæmia set up by other causes.

249. Arthritis and gout have been referred to. Is it not possible for that to be hereditary?—Yes.

250. There is no reason why a painter should not suffer from hereditary gout or hereditary arthritis?—None at all. It is found that a large number of painters also have gout, and therefore the gout is associated with lead poisoning, and similarly with Bright's disease. Many people die of Bright's disease who have never come into contact with lead; but it is found much more frequently amongst lead workers than it is amongst the general population. It is based on numbers. One therefore cannot deny that it is a sequela.

251. These figures are more of an estimate, and cannot be actually set down to lead poisoning. That is the whole point of my question?—Some of them are open to doubt.

252. (Chairman.) You say the figures you refer to reported by the certifying surgeons are open to doubt to a certain extent?—Yes.

253. But the figures which you have given to us are less open to doubt?—Yes, after I have excluded the 10 per cent. I feel that I cannot touch a death certificate; I dare not do so. I definitely make it a rule to include all cases where on a death certificate lead poisoning is entered as directly or indirectly a cause. Once you begin to try to separate in death certificates, you do not know where you are.

254. If you take the deaths as absolute cases, have you made a reduction of 10 per cent.?—No, not from the deaths, but from the notifications.

255. So the figures you gave us are accurate?—With the exception of the small percentage of cases that may be doubtful.

256. (Dr. Collis.) Are you dealing with factory cases?—There is a possible point of confusion there. We are dealing now with the house-painters. Seeing that we do not make the same inquiry into house-painters that we do in the factory cases, I have not the same knowledge from the certifying surgeon's reports as to whether a case is a case of lead poisoning or not, and therefore I include all the house-painters. You see they are tabulated separately in the returns in the "Labour Gazette" from the factory cases, and they are not subject to this 10 per cent. reduction for doubtful cases.

257. (Mr. Rice.) They are returned as lead-poisoning cases?—They are all notifications of lead-poisoning cases. At the outside I should say 10 per cent. are doubtful.

258. You say it is not possible to get lead poisoning in the case of persons who do not come into contact with lead?—Yes.

259. For how many hours could a painter work with safety?—It would all depend on the amount of dust to which he is exposed. If you had complete absence of dust the ordinary 10-hour day would not expose him to any greater risk.

260. I was rather interested in the question of certificates of good health of workers. They adopt that arrangement in Germany, where they have a six-monthly examination?—A six-monthly interval is too long to be of much use.

261. You think it is not possible to do that here I gathered?—That German regulation dates from 1909.

262. 1905 according to my note here; Belgium is 1909?—A six-monthly examination does not seem to me likely to influence the matter one way or the other. It does not say that the doctor who makes the examination can do anything more than make recommendations as to treatment.

263. Are there any penalties for having cases of lead poisoning?—No.

264. You do not think that the change of employment from painting to something else that you referred to undermines a man's constitution in any way which makes him susceptible to lead poisoning?—Do you mean transference to other work for a time?

265. Yes?—I think it very good.

266. You referred to the trade being seasonal, and to the men as being a migratory class?—Certainly the change ought to do him good if it is good employment.

267. So that the fact that the trade is seasonal is a little safeguard? Yes. That had not occurred to me; I think that that may influence it.

268. You mentioned the rush of trade and working overtime?—Yes.

269. You think that that is a considerable cause?—In the presence of dust.

270. Only in the presence of dust? Yes, or getting the hands specially contaminated.

271. That could be remedied by frequently washing, I suppose?—The contamination of the hands?

272. Yes?—Well, they would soon get them dirty again.

273. Have you any suggestion to make with regard to the possible cleanliness of the painter, and as to how that could be enforced, assuming that an employer was desirous of meeting every requirement and provided towels and hot water?—My feeling about that always is this, that unless you can go to the fountain head of the mischief—the dust—and stop that you are not going to secure much improvement by all the personal cleanliness in the world.

274. So it comes to this, that unless the dust can be stopped, it is not much use doing anything else?—That is my feeling exactly.

275. (Mr. Parsonage.) With regard to painters following other occupations in what is called the slack season, does that obtain to such an extent that it would be of any value to consider it?—I should have thought it did; but I am not sufficiently familiar with the ins and outs of the trade.

276. In my experience as a painter for 30 years, I do not think it would apply to one in 500 of painters. I am referring to men who learn painting as a skilled trade and who are brought up to the trade of a painter. Unfortunately there are men brought into it who are not skilled, and those men in my opinion contract lead poisoning because they are not aware of the danger of the work which they are put to?—That is profoundly important.

277. But skilled painters, those who have served an apprenticeship to the trade, do not follow any other occupation even in the slack time?—My colleague, Dr. Collis, has brought out the fact that attacks of lead poisoning are commonest in the first and second years of employment, and it would be amongst those who newly came in, especially if they were ignorant of the care that is necessary, that you would get most of the reported attacks.

278. You mentioned certain towns where it was most prevalent. I have been taking out statistics with reference to cases that we take up for compensation. I place London first and Manchester second. You gave Manchester as third I think?—Yes.

279. Taking the whole of England, in London and Lancashire we get far more lead poisoning cases there than anywhere else?—That is probably because the population is greatest.

280. And in London particularly, because more white lead work is done there than in any other town, and also the preparation of work between coats is mainly done by glass-paperying or sand-paperying, as

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[Continued.]

you term it. Would you not really place that as the first cause—the preparation of work between coats, the dry rubbing with sand-paper?—Yes, I thought I did do so.

281. You placed it third. I would place it first?—I should be quite ready to admit that I was wrong.

282. With regard to the mixing of white lead, it is not the mixing of dry white lead. The white lead is already moist when it is mixed?—That may be so, but it used not to be so.

283. It is so now. In not one of a hundred cases would they mix the dry white lead in ordinary work. It is already moist, so that there would not be the lust from that that there is from the other? No.

284. With regard to the certifying surgeons examining the house-painters, are instructions issued to each certifying surgeon that he must examine a house-painter for lead poisoning?—No. We do not control the house-painting trade at all. It would require special legislation.

285. Is it compulsory on the certifying surgeon under the Factory Act to examine house-painters?—No.

286. He can refuse to do so?—Do you mean for workmen's compensation?

287. Yes?—He is bound under the Workmen's Compensation Act to examine, but unfortunately it is a very complicated Act, and some certifying surgeons have not studied the Act, and, because a house-painter has come and he is not under the Factory Act, they have told him erroneously that as he had nothing to do with the Factory Act they could not see him. Whenever such a case comes to the knowledge of the Home Office they write at once to the certifying surgeon to tell him that his duties do apply to house-painters.

288. I had one particular case in which we had certificates from three doctors certifying that the man was suffering from lead poisoning. We sent him to the certifying surgeon, who absolutely refused to examine him. I had to write to the Home Office for instructions to be sent to him. That caused a delay of eight weeks. When he examined our member after that, he certified him as not suffering from lead poisoning, and the man got no compensation, although we had three certificates previously?—With the introduction of a new Act, you have hardships and stupidities.

289. Would it be possible for a list of certifying surgeons to be supplied to persons like myself who are taking up these cases and continually dealing with them? We find a difficulty in getting the certifying surgeons' addresses in many places?—Yes. I think such a printed list has just been prepared, and, no doubt, by writing to the Home Office, you can get one.

290. I have written, and I was informed that one will be prepared. Now with reference to painters reporting themselves as suffering from lead poisoning and claiming compensation, do you think that the fact that insurance companies are discriminating, when a man has received compensation, is now operating to prevent men claiming compensation and reporting themselves?—No, I should not have thought that that was sufficiently widely known.

291. Insurance companies are now refusing to re-insure men who have claimed compensation for lead poisoning?—Then the burden of compensation will fall directly on the occupier. Do you mean that he will not employ such men?

292. It prevents the man getting employment, and for that reason the man prefers to take the ordinary sick benefit to claiming compensation, because he knows that to claim compensation against his employer means that he will not get a job in the shop again. The insurance companies are issuing notices to the effect of what I have stated?—I do not think that has operated so far. The statistics I have given you are not complete.

293. Would you advise compulsory notification of all cases in house-painting?—I think it is certainly worth considering.

294. It should be so?—I think it is a useful provision.

295. (Chairman.) You mean notification by ordinary medical practitioners?—Yes, in the same way as lead poisoning in a factory or workshop is reportable.

296. (Mr. Parsonage.) With regard to the difference in the number of coats when using lithopone or oxide of zinc preparations, the technical information is very nearly correct, as far as I can gather. It is about as exact a proportion as it could be?—Yes.

297. (Mr. Gardner.) With regard to these 387 deaths you quoted during 10 years, are they plumbers and painters combined or purely painters?—Plumbers and painters, but I gave you the proportions. It is rather remarkable that so far as the deaths are concerned the incidence seems rather higher on plumbers than on painters.

298. Are those who are returned as painters all men employed as house-painters, or do any work in ship-yards, do you know?—No; ship-building is under quite a different heading. I classify ship-building under a separate heading of its own.

299. All lead poisoning cases in shipyards are put in an entirely different statement?—Yes.

300. But with regard to many of these certificates which you get from a registrar, the man simply says he is a painter. He will not say ship-painter. These are all taken into your forms for painters?—Yes, but I do not know that I should quite agree that the registrar would not say "ship-painter."

301. There is no difference between a ship-painter and a house-painter. One man may say he is a ship-painter, but only one in a thousand may say it. The industry is the same all through, although the men work in shops in one case and in ship-yards in the other, except the man who works as a red-leader?—Even if ship-painters were in this table, the number of deaths among painters would not be so large as to indicate much error in the figures of reported cases.

302. You are of opinion that the danger from white lead is due to the dust from sand-papering work and dust from paint which has dried on the overalls, and which cracks up and gets into the atmosphere, the dust being absorbed through the mouth?—Yes.

303. You do not think that paint getting on the hands under the nails or into a cut creates lead poisoning? It may create blood poisoning apart from lead?—Yes, except with regard to its getting on to the food.

304. What do you say with regard to the use of spraying machines for putting paint on? Would, not these be very dangerous machines?—Extremely dangerous.

305. Extremely dangerous for applying white lead paint?—I cannot conceive anything more dangerous. My colleague investigated the use of such an apparatus in railway carriage works in Lancashire. I think it was given up.

306. I am sorry to say that it has not been given up everywhere. Among the 387 you include every case in which lead is put in as a subsidiary or indirect cause of death?—Yes.

307. You take them all?—I take them all.

308. You say it has been found that plumbism affects house-painters more in the first and second years of their employment?—That was based on the examination of a large number of these reports.

309. In that case it would affect in the north of the country lads from 14 to 17 years of age. Have you any knowledge of the ages?—Yes, the ages are given.

310. Can you say if that is borne out?—No, I should not have said that it was so. Mind you, everybody who works in lead is not going to get lead poisoning. It all depends on the dust.

311. You will find that in the second or third year's employment, because we deal largely with the apprenticeship system, boys are very largely employed in doing sand-papering, the polishing between coats, and these would be lads whom you would think would suffer most from the trouble?—But are you certain that lead enters into the paint that they sand-paper, or that it is not much diluted?

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[Continued.]

312. All the paint has white lead as a ground except dark paint?—If they were sand-papering a paint that contained 10 or 15 per cent. of white lead in the base, I should not anticipate anything like the same amount of poisoning from sand-papering as I should if it contained 75 per cent., because of dilution.

313. Have any females been certified as suffering from white lead in the painting industry?—Only in perambulator works, I think. They are employed a little there.

314. (*Dr. Collis.*) On the question of the ship-painter and the possibility of the ship-painter being included as a house-painter, a ship-painter would be under the Factory and Workshop Act, and we should get information in the Department?—Yes.

315. (*Lord Henry Bentinck.*) Are you prepared to give the Committee an opinion about how far the wet process of rubbing down is possible in house-painting?—No, I am afraid I cannot.

316. There has been introduced lately some substitute for turpentine, has there not, called "Russian turpentine"?—Yes.

317. What is the effect of that substitute; is it injurious to health?—We have had cases of eczematous conditions produced on the hands, and I should anticipate that they would occur.

318. It is not so healthy a material as turpentine?—No.

319. It is cheaper?—It is cheaper.

320. Is zinc sulphide the same thing as what they call "zinc white"?—No, zinc white is zinc oxide.

321. Zinc white used to be used in the trade some years ago?—Zinc white very often now means a mixture of zinc oxide and zinc sulphide. They are both white. Zinc sulphide is a white colour.

322. That is a substitute for lead?—Yes. Zinc white is a wider term.

323. Why was it abandoned?—Because zinc sulphide was found to be better, and, combined with zinc oxide, better still.

324. (*Mr. Sutherland.*) More body?—More body.

325. (*Lord Henry Bentinck.*) Zinc sulphide was in use some time ago, was it not?—Not to the same extent, I think.

326. (*Mr. Sutherland.*) Would not anything that tended to encourage the men to clean habits be a good thing?—Undoubtedly.

327. Have you examined many painters' workshops?—A good many.

328. What condition are they in?—There is usually too much paint.

329. And are they dirty on the whole?—Yes, they are.

330. Very dirty on the whole?—Yes.

331. What lavatory accommodation is there?—Very little.

332. Not even basins?—Practically none; merely a tap over a sink.

333. It would be a good thing if there were soft soap and basins, and baths even?—Yes. I think that those are all admirable from the general point of view, but I doubt whether they will do much to stop lead poisoning.

334. If a man mixes his paint in a shop, should not he wash his hands before his meals?—He gets his injury from the dust in doing that mixing, and it will not stop his getting lead poisoning to go off and wash his hands. It is a good thing for him generally to wash his hands, I quite admit.

335. It has been suggested to me that it would be a good thing if every chargineman in charge of a gang of men were to carry a bucket and soft soap, so that men might wash their hands before they had their meals?—If they are using paint and getting it on their hands, I am entirely with you there.

336. Do you think that it would be possible to carry that out and enforce it?—Yes, I think it would.

337. Overalls are at present supplied by the men, are they not?—Yes.

338. In Germany they are supplied by the masters?—Under all our factory regulations they are supplied in nearly every instance by the employer. Personally, I do not see why the workman should not provide his own overalls. He will take more care of them.

339. Yes, but if they are the men's the master cannot see that the overalls are clean, but if they are his own, he will see that they are clean?—Yes, that is a point. Overalls again may be a source of danger from the dust given off.

340. If they are clean there is not that danger?—No. I should advocate some washable material, some impervious material, or waterproof material that could be sponged—an apron, for instance, over the overall, which would take most of the paint.

341. In the German regulations there is one to prevent scraping and chipping off before moistening. Would such a rule be possible in England?—Yes, I think so. That would be a wet method.

342. Could not mixing in shops be done under an exhaust process?—You would want power for your fan.

343. They have no power?—No.

The witness withdraw.

Captain I. S. FLATAU and Mr. FRED H. MILNES examined.

344. *Chairman (to Captain Flatau).* You are attending to-day as a representative of the Rabok Manufacturing Company, of Sheffield?—Yes.

345. What is your speciality?—We make a carbon paint only.

346. Is that intended to be used as a substitute for the lead base of paints used by house-painters?—Yes.

347. Have you brought a sample of your paint with you?—Yes, we have a small sample with us of the material from which it is composed.

348. What is the composition of your paint?—We have a flaked graphite from Ceylon, and you cannot grind it in a common grinder; therefore we ball-roll it into a flour; and we have the purest hydrocarbon, from which we make an oil that we suspend the paint in, which is a substitute for linseed oil. Those are the component parts of the paint. Therefore, it would be a high grade graphite with a very pure plumbago suspended in hydrocarbon oil instead of linseed.

349. Is it then entirely non-poisonous?—Perfectly so.

350. Have you brought with you specimens of surfaces painted with Rabok paint?—Yes.

351. Will you show them to us?—Yes. (*Samples were produced.*) I also brought some Government tests to show its not being destroyed by the strongest

acids. That is a piece of steel painted with this paint, and then subjected to 20 per cent. of sulphuric acid for 400 hours. It destroys the steel, but does not hurt the paint. To prove that the paint is very elastic, the hydrogen gas blows that paint into those little balloons, and does not burst them. Here are some boxes of paint (*some boxes were produced*). I have been trying to do this for a long time, and I think I have done it. There is a hydrocarbon that we make that we convert into an oil, which is as durable as the pigment, or the substance of the paint. Other paints only live the life of the linseed oil. That is their life. Oil made from 99 per cent. pure hydrocarbon has almost as long a life as the pigment. The pigment of plumbago and pulverised flake graphite is as durable as time. It floats on water. It is 99 per cent. pure.

352. Do you make white paint?—No, we do not make white colours. But that is a primer over which white colours made from non-poisonous whites may be applied without the least danger of discolouration. It is a good paint; it will stick to the skin, and any paint that will do that will stick to paint.

353. Can it be used in a similar manner to ordinary lead paints?—Yes.

354. How does the cost compare with that of an ordinary lead paint?—Half the price.

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[Continued.]

355. Does the paint deteriorate when stored for any length of time?—We have had it under test by the American Government, in the Navy and in the Army, and we have watched it closely for seven years. Where it has been painted for four years and a half it looks to-day like it did 60 days after it was applied; therefore the American Government has adopted it, because salt water has no effect upon it, barnacles will not adhere to it, and no sea moss will gather on it. It was designed by me for the Navy for gun carriages for coast defence and all steel structure works exposed to the salt atmosphere. Nothing will destroy it.

356. What is its covering capacity as compared with a lead paint?—It covers the same quantity depending on the gravity. If you wanted to put a coat of paint on and only used one coat that should be heavy. It would cover the same amount of squares that red lead would cover, which is 500 squares to the gallon. The gallon weighs 9 lbs., and if you put the paint on as it should go on it will cover from 600 to 700 squares per gallon.

357. What do you call a square?—10 feet every way is a painter's square—10 by 10.

358. Does it retain its colour for a length of time unchanged?—The natural Rakok paint is a dark steel grey, and we colour it a maroon and an olive green, which are the standard colours in our country for painting bridges and boats and all structural work. It is not supposed to be a fancy paint, but you can rub your piece of paint so bright that you can see your face in it. It is a fine surface for finishing bodies like coach bodies and automobile bodies—anything where you would like the surface just like glass without having varnish, and so on. That will do it.

359. Is it a suitable base for mixing with the pigments or colouring ingredients in common use by painters?—Yes. They can colour that any colour they want, but it would be detrimental to this paint to mix common oxides or leads with it. It has a sort of a nature of its own, you know, and it doesn't like to have anything to do with any other kind of paint. If you understand that paint as it is composed, if you put lead in it, it would become a lead paint. If you put common English oxides in it, it would soon be nothing but an oxide paint; but as it is, it is a metallic paint.

360. Can it be used with the same vehicles and thinners as the painter would use for ordinary lead paint?—Yes. There are no instructions at all, except to keep it agitated while applying, because the pigment is very heavy and does not stay in suspension very well. Therefore, in stirring it, you apply the substance on the parts to be painted, and the colour just appears on top and floats. If you put oxide in it, the oxide will float and give it the colour, yet this pigment is underneath it. So with the olive green.

361. Is it supplied in powder form?—No; we supply it ready for the brush—ready to be put on.

362. It is of the utmost importance for our present inquiry to ascertain the durability of the various available substitutes for white lead; first, as regards interior decoration, and, secondly, as regards exterior decoration; that is to say, on surfaces exposed to all weathers. Will you please give us particulars of a few buildings where your paints have been used, first, for internal decoration?—We have a catalogue here (*producing the same*). We do not think that you can destroy it outside by any process. No climatic conditions would have any effect on it whatever; no acids, no gases, no fumes from any source, and, of course, inside, the very building and roof, the enclosure, would protect it, and I think it would be perpetual almost.

363. Can you tell us a few particulars of buildings where your paint has been used, first for internal decoration?—Well, I would not say decoration. If they used the paint as they should use it, they would use it as a primer, which would stop all corrosion and adhere to the steel indefinitely, to which they might apply any beautifier they chose. Therefore it has been used in all the big packeries in America. They have never been able to find anything that would stand

the salts and fumes from the cattle. In packing houses this paint has proved perfect. That is indicated in one of the catalogues here, and in a letter from the biggest packer in the world—Armour.

364. Can you give us particulars of any buildings in England where your paints have been used, first for internal work?—(*Mr. Milnes.*) Tennant's Brewery, Sheffield.

365. For any other internal work?—One minor one in the London City and Midland Bank for damp-proof work, but that is a very small quantity. It has been as satisfactory as they wanted.

366. Have you used it very largely in America for internal work?—(*Captain Flatau.*) Not in America for internal work. It is mostly outer.

367. Do you assume that it is efficacious for internal work?—Yes, it is quite satisfactory.

368. But you have no proof of it?—(*Mr. Milnes.*) Not for inward application.—No. The Sheffield Corporation have it for outward application.

369. Can you tell us whether your paints were applied (I am speaking now of internal work) over former coats or priming coats of white lead, or not?—In the London City and Midland Bank, Bank Street, Sheffield, it was applied over the bare walls. The old paint, which had become damp and mouldy, was fetched off, and our man applied it practically direct to the bricks.

370. Can you give any other instance?—The Sheffield tramways. We have a testimonial in the latter part of these books.

371. Did you apply it over former coats?—That was applied in some cases over old coats and in some cases on absolutely new.

372. Will you now name a few buildings where your paints have been used for exteriors?—I refer you to the town clerk of Sheffield, who used it on his own private house, and the Sheffield Corporation applied it to the electric standards, near the gasworks and elsewhere. It has been most satisfactory, and beyond others, and they have adopted it for the whole of their electric standards throughout the city. You will find a testimonial in the book.

373. Are there any other buildings where it has been used externally?—(*Captain Flatau.*) They are so numerous that I hardly know how to tell you.

374. Tell us two or three?—(*Captain Flatau.*) One of the largest buildings in St. Louis is the American Tobacco Company, I suppose. It is one of the largest concerns, too, in America. They use it throughout their entire place everywhere, internally and externally, and they have it internally applied to cover the vats that hold the mixture that goes into tobacco. The mixture will destroy copper, and they paint the vats with the paint to preserve the copper. That is very strange, you know. We claim that it is far superior to galvanising iron. Galvanised iron is expensive and it is deceiving. Galvanised iron is always the commonest iron they roll in the mills, and they cover up the little bad places by galvanising. They buy good straight clean black iron and paint it with this paint, and we guarantee it that it will outlast any galvanising.

375. What other buildings besides that at St. Louis can you name?—The next greatest building we have and the greatest company in St. Louis are the Union Electric Light Company. They generate the heat, light, and power for St. Louis. They use it internally.

376. And externally?—Yes, and externally.

377. On what dates were these exteriors painted?—(*Mr. Milnes.*) With regard to the Sheffield Corporation, twelve months ago, I should say. They have used it since. (*Captain Flatau.*) The places I named were painted some five years ago.

378. It is quite satisfactory now?—Oh, yes. It has been tested by the Navy. We have that report here. It was declared to be far superior to lead, and stood in their torpedo boats where lead or white lead would not stand.

379. Now, speaking of the external painting, were your paints applied over former coats or priming coats of white lead, or what?—We generally advise those who are going to use them for a test to sandblast the

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work and get all foreign matter off the material to be painted. But where you scrape down with a steel brush red lead or white lead; and that which adheres has not set up corrosion beneath it, it is pretty apt to be a fixture, and we apply the paints over it. We do not ask anything more than just what is done with other paints.

380. To sum up, then, so far as your experience goes, do you assert that you have found your paints to be efficient substitutes for ordinary lead paints?—Yes. We claim no equality. We claim double superiority and absolute non-poisonousness. I have worked 18 years to accomplish that. We have no patience with white lead or red lead at all, none in the world. It is very expensive. All the great gasometers in St. Louis and in Denver, Colorado, and other places could not give up red lead. Your Government and every other government knows that red lead has been the best paint that was ever applied upon anything. It has never met its Waterloo unless it has met it in this liquid carbon of ours. Now all chemists know that the life of red lead is about two years and a half or three years, and its life would be ten years, but at the expiration of two years if you examined it with a microscope you would find that it had become porous and was admitting oxygen, which sets up fire and sets up corrosion. Then it must be scraped and painted again. But they have found after four years' experience with these gasometers that this is the way to paint them. They are the hardest things in the world to maintain with paint on them, rising and falling as they do in that gassy water, and when they give them a rub with red lead and let it dry and then give them a coat of this non-porous paint, no pores ever form; the red lead adheres well. They feel satisfied after long experience with red lead that that is the stuff, and this will keep it from becoming porous, and they declare now that that is the way to paint a gasometer.

381. Have you used the paints for any other buildings in America, New York or Washington or Chicago, for instance?—Yes, in Chicago.

382. We do not want any particulars. Have you used it in New York too?—In New York, and in many countries in South America, in China and in Japan, and almost every foreign country. I am here to-day. I have been in Sheffield, where we have just finished a plant. I go from here to Naples, Italy, to put in a plant for an Italian company. I go from there to Paris, France, to put one in for a Paris company; and I go from there to Berlin to put in one for a Berlin company, because of their personal knowledge of its superiority over anything they ever experienced or could inquire about in the way of paint. It is not only a good paint, but it is the best paint to-day in the United States or any other country, and you can make 50 barrels a day of that paint with the machinery I have furnished, with one man and a helper.

383. (Mr. Sutherland.) In what way does it differ from ordinary graphite paint?—Ordinary graphite paint is sold to you from many places. It is very common, and it is more or less full of dust and impurities, but I am sure the finest lubricant we have and the finest graphite is the flake. It is in flake, and looks like isinglass. So that graphite is formed from the flake, which is ball-rolled in a ball mill to flour it, and the plumbago that is in there is just as pure as Ceylon can afford. This is graphite too, if you please, but that is not the secret of that paint. Those two pigments are imperishable, non-destructible by fire or any other process ever known to the chemical world. You cannot destroy them.

384. Is the secret in the vehicle?—The secret is in the amalgamation and the formation of the oil from the pure hydrocarbon.

385. What makes it so coarse?—The graphite. It is hard to pulverise, and it is better coarse than smooth.

(Mr. Milnes.) We have it much smoother than that.

386. (Mr. Rice.) If used as a priming coat, would it be necessary to rub it down, and would there be any dust coming from it?—(Captain Flatau.) Yes, if you

had a piece of sand-paper you could rub it, and the oil that floats is rubbed away.

387. Will it produce a dust?—Not enough for you to detect it. It packs. But you do not have to do that. If you wanted paint to adhere nicely, you would like it to penetrate the wood. A penetrative paint adheres and penetrates the wood, and hangs with millions of little pointers, if you understand, in porous wood. You ought to have a penetrative paint for a priming coat. Then you would put on the next coat and the next coat. That put on as a primer adheres and penetrates the wood. It leaves a rather rough surface, and the coat of finish that you put over that would fill the little pits, the little roughnesses, and it would hang better, and the next coat would finish it without any rubbing down.

388. (Mr. Parsonage.) This would not apply to indoor painting at all for finishing?—No, unless you wanted to rub down and varnish.

389. It is useless for indoor work. If that door (indicating a white painted door) had to be re-painted, would it be advantageous to give it a coat of this material?—If I wanted to finish the door as it should be finished with the highest finish, I would burn everything off the door and rub it down with sand-paper.

390. That is the point I wanted to get at?—I would give it three coats of Rabok paint, and the other process is the same as in finishing a coach or anything. I would rub it down till it appeared just like a brass finish, and you could see your face in it. Then I would give it any colour you like it to have, or any transfers that you liked to have. And then I would give it two coats of varnish.

391. It would cost a good deal?—Just half what any other would cost. It would not take three or four days to dry.

392. How many coats of white paint would it require to cover with that material?—One, and not the least discoloration. It has no effect on other paint at all, except to hold it on.

393. (Mr. Robins.) I can hardly conceive, as a coach-painter, that you could put one coat of white on that graphite to make a cover. You have the surface black to start with. I speak from experience?—You will understand, if you know anything about painting, that I would not profess to attempt to make a finishing job with white zinc or any other white colour over a dark. In putting on the priming coat you put on lead and oil with a little lampblack in it. You would lead it up first.

394. Do you say that one coat of white would do: To put one coat of white on that surface would not cover at all? I do not mean that that would finish. It would cover it and not discolour. You would put two or three more coats on to get a fine finish.

395. But a white is a white; it is not partially white?—No.

396. It would require three or four coats before it was white?—No. The second coat would be a perfect snow white, just as white as the door.

397. After my 30 years' or more experience, I am surprised?—There is a piece. We have brought that here for you to have (producing a specimen). The proof of the pudding is eating it, and if you take that dark piece or any piece, and take a white-lead brush and stroke over it white lead or any other whitening or zinc, if the white is not too thin it will cover. You will not see any dark beneath it at all. It would not be a good job without another coat. We do not put that paint up as a fancy paint. That paint was intended as a primer, or for the preservation of great structural work, railroads, bridges, and cars, and steel, and we have exposed it to fire. It will not burn. If you were to hold a match to that piece it would burn, but take a wooden railroad bridge, where the cinders fall out of the engine, and burn up the bridges, if you paint up the tops of the bents and stringers with that paint you can go there and build a fire on it if you want to, and it will not catch fire. It is a fire shield. If you paint a shingle roof with it, it will stop it from leaking. It looks like a slate roof. You cannot set-it

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on fire with coal unless you go there and tear up the shingles and build a fire where there is no paint.

398. (Chairman.) Have you had experience in using your paint and then finishing it off with white paint?—Yes.

399. How many coats have you generally used on those occasions?—Two coats.

400. Would the cost of the original painting, plus the two coats of white paint, be as cheap as doing it in the ordinary way with white paint?—It would be cheaper. It would be a heap cheaper than three coats of white paint.

401. (Mr. Robins.) I can see one advantage with regard to it, and that is, that it would prevent the use of white lead. That is the most beneficial thing we have had to consider with regard to anything of this kind?—(Captain Platau.) I have some very fine letters in my pocket from the best men in America, including the Secretary of State, and several Congressmen and Senators and Attorney-Generals and Governors, and they would back me up in what I am about to say, if you please. I have worked for 20 years to get a substitute, and you know as well as I do, speaking from the painter's standpoint, that there never was a painter of any good or any intelligence that had not

hoped some day to be able to invent a substitute for linseed oil, and you know as well that at an early date when they made white lead, and made it honestly, it was like tanned Russian leather, and when you got it out of the tan bark it was pretty good stuff, but it is very bad now. It is very poisonous. Instead of being made in seven weeks or months, it is made in seven days or seven hours. It is not white lead; it is destroyed. I have worked for 20 years to try to get a substitute for linseed oil to beat lead paint. Well, I think I have done it. With regard to my experience, I have been in seven or eight paint factories, and I have been in the paint business for about 18 years on my own account. Our success has been that Englishmen have thought we had a pretty good thing, and they have put their money into it, and so have the other countries I have mentioned. I am not here to sell Rabok paint. All the interest I have to-day is this: that this Committee should see fit to make a close examination and criticism of it in every way. The best old judge of paint is time. They have plenty of the paint in Sheffield, and it is just as free to you as the water—two barrels—any amount you want. Put it anywhere you want, under the most scrutinising critics, and if it does not stand the music, why, I will take a buck seat.

The witnesses withdrew.

Mr. C. H. BYWATERS examined.

402. (Chairman.) You attend to-day as a representative of the Granitic Paint Company, of Barking, London?—Yes.

403. What paints do you manufacture?—The Astrium paint we manufacture principally, a paint that was originally suggested by Sir Henry Tanner.

404. Do you manufacture other paints?—Yes. We have an enamel paint, Rystolite, and we also supply general paints to builders.

405. Are the Astrium paints intended to be used as substitutes for the lead base of paints used by house painters?—Yes.

406. What is the composition of your paints?—The base of the paints is zinc oxide.

407. Is no white lead used in any of them?—No, no white lead at all; they are absolutely free from white lead.

408. Is no poisonous ingredient used?—There are other lead compounds.

409. What are they?—Mostly the oxides to a very small extent, and the chromates of lead.

410. That is for colouring?—The oxides are used for drying purposes, and the chromates are used for colouring purposes.

411. What are the colours in which they are used?—The chromates are yellow, and they form the greens as well. There is only a limited demand for yellow paints.

412. Could the use of chromate of lead not be dispensed with?—We could dispense with that entirely, I think.

413. Have you brought with you specimens of surfaces painted with Astrium paint?—Yes. (Some specimens were produced.) They were special tints of Astrium paints, if I may say so, made for the Government Labour Exchanges.

414. Can they be used in a similar manner to ordinary lead paint?—Yes.

415. How does the cost compare with that of ordinary lead paint?—As a rule, the zinc paints are five to ten per cent. cheaper. To-day there is not very much difference, but they are a shade cheaper. That is due to the present high prices of the linseed oil.

416. Does the paint deteriorate when stored for any length of time?—No; it keeps quite well.

417. What is its covering capacity compared with lead paint?—Do I understand that you mean the area?

418. Yes, the area which a given amount will cover?—Bulk for bulk it would be the same.

419. Does it retain its colour for a length of time unchanged?—Yes. It is better than white lead in

that respect because the atmosphere of the towns has no chemical action on it, or not the same action. In towns and manufacturing districts, the sulphurous gas in the atmosphere has a chemical effect on the paints. On the white lead it forms sulphides. Lead sulphides are black. On the zinc oxide it also forms sulphides—not so readily, perhaps—but those are white, so it does not discolour white paint.

420. Is it a suitable base for mixing with the pigments or colouring ingredients in common use by painters?—Yes, I think it is more general than white lead. It will mix with every colour, I should think.

421. Can it be used with the same vehicles and thinners as a painter would use for ordinary lead paint?—Yes. There is a slight variation with regard to the oil. The oil is treated a little differently. That is the only thing. It is the same oil.

422. What is its durability with regard to interior painting?—Apart from losing its colour, do you mean?

423. Yes, its lasting power?—It is quite as good. It will stand as well as white lead. I do not see any difference. In fact, the chemicals in the atmosphere would not act on it, as they will act on white lead.

424. Will you give us a few particulars of buildings where your paints have been used?—Yes. In this building it has been used.

425. For internal decoration?—For internal decoration it was used here about three years ago, on the second or third floor; I could not tell you which till I saw it. It is at the end of the corridor running parallel with Charles Street, I think.

426. That was three years ago?—About three years ago.

427. Have you inspected it since?—No, I have not seen it since. I only thought of it this morning.

428. In what other places have you used the paint internally?—Practically all the Labour Exchanges, and there have been some 250 of those. In most Government buildings it has been used to some extent, and at the new General Post Office, that huge building in the City. Astrium and Rystolite are practically made in the same manner. Some 4,000 gallons were used there under Sir Henry Tanner's instructions.

429. You are speaking of internal painting?—In all these places it was internally and externally used, and in some of the museums in London.

430. What test have you given this paint with regard to internal painting?—Only length of time. It has had four years.

431. Have you examined the places which you painted four years ago?—It was not used in a practical way four years ago, but three years ago it was. We

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used it ourselves in our own works and painted doors and so on, and watched it.

432. Do people who have used the paint tell you that it is entirely satisfactory?—We have been told that it has been satisfactory, but paint manufacturers do not hear when paint is satisfactory; they generally only hear complaints, and we have had few. When we first brought out the paint we did receive certain complaints, due chiefly to its not drying sufficiently quickly for some of the purposes for which it was used. It was easy to accelerate the drying, and such complaints do not now reach us.

433. Have you had such satisfactory results that people have recommended you?—Yes.

434. Have you any specific case of that to tell us?—It has been used for the War Department, and they have recommended it to the different Division Officers and different surveyors, and one has used it after the other. It was originally used at Kingston Barracks.

435. Will you send us a list of places that you have supplied it to for Government purposes?—It is difficult to do that. We supply the contractors for the Government, and not the Government direct, and we seldom know where it has actually been used.

436. You have made certain statements this afternoon which would lead us to believe that you know where it was used?—We do know in certain cases. It was used in this building as I have said, and at the Post Office I have seen it.

437. You have given us other illustrations which could only convey one meaning, and that is that it has been used there?—Yes, but the buildings are so huge that I could not point out the paint to you where it has been used in them. That is what I mean.

438. How do you know it has been used?—The Office of Works told us so.

439. Would you give us a list of places, which the Office of Works have told you it has been used in?—I can give you a list. It will not be complete. In the Labour Exchanges I know it has been used exclusively.

440. Your evidence will not be of much use to us unless we can have specific information as to where it has been applied?—I can give you that in many cases. In all the Labour Exchanges throughout the country it has been used.

441. We shall have to have some places other than those. We should like to have the dates when the painting took place, so that when we care to we can examine and see how we think it has lasted. Can you tell us whether your paints were applied over former coats or priming coats of white lead or not?—When it has been new work with regard to woodwork they have generally had a priming coat of lead first. That is not supplied by us. Before the joinery leaves the works it is generally done with a very thin coat. On plaster work no priming has been put on, and our paint has been put on direct.

442. You might let us know, in the information which you supply us with, the places that you have painted externally as well as internally, and the dates when the painting took place, so that we can judge as to its durability. Then, to sum up your evidence, do you assert that, so far as your experience goes, you have found your paints to be efficient substitutes for ordinary lead paints?—Yes; they are free from white lead, and I think that we can make them free from lead of every kind.

443. (Mr. Fell.) Have you tried this paint at all on vehicles?—No, we have not supplied carriage builders at all with it.

444. (Mr. Sutherland.) It is quite modern, is it not—quite a new invention? How long have you had it?—This particular paint only goes back four years, but we have been making zinc oxide paints for many years.

445. (Mr. Rice.) You say in this little book which has been handed to us, "His Majesty's Government has been for some time desirous of discontinuing the use of white lead on account of the danger to the health of those employed in its manufacture and use." Did you design your paint to meet this requirement?—Yes, on the suggestion from the Office of Works we made this particular paint.

446. On their suggestion?—On their suggestion.

447. And they tried it before they used it?—Yes; they experimented for about a year with it.

448. Have you any chemical expert's evidence that it absolutely fulfils this condition?—Yes; and their own chemists at the Office of Works have tested it.

449. You have not a chemist of your own like Sir Boverton Redwood to give an opinion?—No, but we know what is in the materials that we put in that paint.

450. We do not, and I want to know whether any chemical expert says that it fulfils this condition?—No, but we know that it does. The Office of Works check us; they draw samples from time to time. We make this paint under guarantee to the Office of Works, really.

451. (Mr. Gardner.) You do not supply this in paste form at all?—No. It is ready mixed for use.

452. If the painter wants to alter the tint it can be tinted with the ordinary pigments?—Yes.

453. Your paint is no use for filling purposes?—No. We should supply the zinc oxide for that purpose.

454. When you say that this was supplied for the Labour Exchanges exclusively, do you mean to say that every Labour Exchange throughout the country was painted with your paint?—Yes, and the tints were specially got up.

455. Specially for the contractors who had Labour Exchanges to paint?—Yes.

456. (Mr. Parsonage.) Was that specified by the Government?—It was specified by the Government—those particular tints.

457. If it is supplied ready mixed, how long will it keep without requiring thinners?—It does not require thinners as a rule. It becomes thick sometimes.

458. A sediment?—No, there is no sediment, but it becomes thick.

459. Is that the fat?—Hardly fat. It can be got over by the addition of linseed oil—a spoonful or two.

460. Coat for coat, will it cover like lead paint?—Yes. You are speaking of the area.

461. What do you say about the body?—The body is practically the same.

462. Three coats of this will be equal to white lead paint for finishing and for body?—Yes.

463. (Dr. Collis.) Do you think that you could get rid of the chromates of lead for producing yellow colours?—Yes.

464. By using chromate of zinc?—Yes.

465. Would it increase the cost appreciably?—Not appreciably. The yellows we supply are very pale colours.

466. If you wanted to obtain a deep yellow would it be more expensive than?—Yes, for deep yellows it would be. The white Astrium paint is absolutely leadless. It contains no lead of any kind.

467. (Lord Henry Bontinck.) Was the suggestion of the Board of Works, with regard to experimenting, made to your firm alone?—I expect they asked other manufacturers. I expect our paint was tested against that of other manufacturers. There were three or four, I know, because I saw the samples. I do not say that they use our paint exclusively. Do not let me mislead you.

468. Not for the Labour Exchanges?—Yes, for the Labour Exchanges they are used exclusively, but for other work they are not.

469. (Chairman.) When giving us the list of places you have painted internally and externally, will you tell us specifically those which you have painted with white paint?—It is more the toned whites.

470. (Mr. Parsonage.) It would be white used in this building, would it not?—No; it was stone colour used in this building; I think.

471. (Chairman.) Have you made no experiments with white paints in any building?—Yes; we have made the same experiments with white paint.

472. Have you used the white paint in any appreciable amount in any building you can mention?—Yes, one I can call to mind is the new General Post

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Office, King Edward's Building. A vast amount was used there.

473. Was that internal or external?—Internal. I think outside it was not quite white.

474. Can you mention any place you have painted with your white paint externally?—I could not tell you from memory.

The witness withdrew.

Mr. A. F. HEYDORN examined.

478. (*Chairman.*) You are attending to-day as a representative of Ragsone & Co., Limited, Bow, London?—Yes.

479. Are you concerned in the manufacture of a non-poisonous paint?—Yes.

480. What is it called?—"Dixon's White."

481. Is it intended to be used as a substitute for the lead base of paints used by house-painters?—Yes.

482. What is the composition of your paint?—I am afraid I could not tell you the composition.

483. Is it entirely non-poisonous?—Entirely non-poisonous.

484. Have you brought with you specimens of surfaces painted with Dixon's White paint?—No, I have not, but I can produce them if required.

485. Will it answer all the same requirements as white lead?—Almost entirely. There are one or two requirements which I should not recommend it for.

486. Which are they?—For sign-writing, for instance, if thinned with turps.

487. Can it be used in a similar manner to ordinary lead paints?—Yes, absolutely.

488. How does the cost compare with that of ordinary lead paint?—The same cost as lead paint.

489. Does the paint deteriorate when stored for any length of time?—No; it has the same durability as white lead.

490. What is the covering capacity as compared with lead paint?—It has a greater covering capacity than lead paint.

491. In what sense are you now using the expression "covering capacity"?—I define covering capacity as spreading capacity and obliterating capacity. As far as spreading capacity goes, Dixon's White is undoubtedly far superior to white lead. It will go much further than white lead. As regards obliterating capacity it is equal if prepared properly.

492. What do you mean by obliterating capacity?—Opacity.

493. What do you say with regard to the tendency of the paint to chalking or flaking?—Dixon's White will not chalk or flake if prepared in the right way—that is, if thinned in the right way.

494. Please explain exactly what you mean by chalking?—I take it that from the point of view of a painter, chalking would mean that after a surface painted with Dixon's White was exposed for a number of months it would rub off. That is a term used in the trade, which I think those interested in the trade will understand better than those who are not.

495. What is the exact meaning of "flaking"?—To define it exactly I should say it is chipping off.

496. Do your non-poisonous paints retain their colour for a length of time without change?—My non-poisonous paint retains its colour considerably longer than white lead. It will not change colour at all within a certain number of years.

497. What have you to say as to the spreading capacity of zinc paints?—The spreading capacity of zinc paints is much superior to that of white lead paints.

498. Is it a suitable base for mixing with the pigments or colouring ingredients in common use with painters?—Yes.

499. Can it be used with the same vehicles and thinners as painters use for ordinary paint?—Yes, it can.

500. Can you tell us of any places where your paints have been used for internal decoration?—In practically every town in England, and many towns in Australia, Turkey, and Roumania.

475. Will you look it up?—I will look it up. It is difficult to know where the paints go to.

476. But that is the only test we can apply?—You see my difficulty—we supply the contractors.

477. But you can easily find out, if you are supplying contractors with this paint, where the contractors use it?—Yes, I can find out.

501. Can you give us any particulars of actual buildings where your paint has been used?—With the consent of my directors, I am prepared to supply a list of about 200 or 300 places where it has been used.

502. I will ask you to do that?—Our managing director not being in London at present, I shall have to get his consent to that, I think.

503. Can you tell us of a few buildings where your paint has been used for exteriors?—No, but I can obtain that information quite easily from our customers.

504. Perhaps you will ask your managing director if he will be kind enough to send us a list of those places, and also the dates when these interiors and exteriors were painted?—Yes.

505. Can you tell us whether your paints were applied over former coats or priming coats of white lead?—Yes, they were applied over former coats and priming coats.

506. Have you done any considerable amount of work in white painting?—Yes, principally white painting.

507. When you send us the list of places you will define those?—Yes. With regard to the nature of the work done, the material will require to be collected from the painters.

508. Does Dixon's White replace white lead for priming?—Yes. The thinners are always the same as in white lead, but we suggest a different proportion of thinners.

509. Do I understand that you can use your Dixon's White without any use of lead?—Yes, absolutely.

510. For priming or anything else?—Yes, excepting for the particular purpose I have just mentioned—that is, for sign-writing.

511. (*Mr. Sutherland.*) When you say that the spreading capacity is superior, you mean that you can spread a given amount over a larger surface?—Yes.

512. But the covering capacity is only equal to white lead?—Only equal to white lead.

513. So that practically the spreading capacity is a defect?—It is a defect in a sense.

514. Cannot that be modified in some way?—It would appear to be a defect, but really I do not think it is, because the non-poisonous pigment, being ground so very much finer than white lead, requires a thinner layer, if I may use that expression, to obliterate equally as well as white lead.

515. Do you mean to say that its covering capacity is greater than that of white lead?—If you take spreading and covering capacity together it is greater than white lead.

516. A pound of your material would really spread over a larger surface than a pound of white lead?—Yes.

517. But it would not give the density of white lead?—No, not the density.

518. So that to get the density we should have to go over it again or use it thicker?—To obtain the density you would have to use it thicker.

519. That practically brings it to the equivalent of white lead?—I quite agree.

520. You say that it does not chalk?—Yes.

521. Can you prove it?—Yes, I am prepared to prove it by testimonials from leading decorators.

522. It has a zinc base?—Yes.

523. I do not want to know the secret of it. Does it not chalk on outside work?—No. At first we had great difficulty with outside work, but during the last two years we have made it for outside use quite successfully. We have had experiments made by



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[Continued.]

decorators who have actually used it in many places for outside work with satisfactory results, and they are prepared to testify to it. If I may explain, the principal reason for that efficiency is, in my opinion, the medium which we use.

524. Do you send it out in paste form?—Yes, only in paste form—not dry. We make it up as paint if required.

525. You sell it in bulk—per hundredweight?—Yes.

526. Is it thinned with the normal thinners—turpentine and oil?—Yes, precisely, with the normal thinners.

527. (Mr. Rice.) Before you applied the second coat, would there be much dust in rubbing down?—No, not any more than with white lead. I am told by painters (I have no personal experience) that they think that less dust comes off it, and I have one letter to that effect to submit to the Committee if it will interest them.

528. There is less dust given off in rubbing down, you say?—Yes.

529. Is the dust that is given off at all injurious?—No.

530. Quite uninjurious?—Absolutely.

531. (Chairman.) You take it into consideration that all dust is injurious?—Yes, to a certain extent, of course.

532. But there is no poisonous matter at all in this, you mean?—No poisonous matter at all.

533. (Mr. Gardner.) Your paint is supplied in paste form?—Yes.

534. To be thinned up by the ordinary materials?—Yes.

535. Why do you not recommend your paint for sign-writing, because it would require to be diluted with turpentine? You dilute all paint with turpentine?—Yes, but a certain proportion of oil is required.

536. When writing a sign we mix our paint much in the same proportion as we do for ordinary paint. Your paint then is not much good for a flatted surface, is it?—We have supplied Dixon's White for writing names on railway trucks, and for that particular purpose they use it in a certain way. I am told that they thin it with turps. I understand for that purpose it is no use. We still have an inquiry pending as to the reasons for its being no use. I give you the information for what it is worth. We have not proved the case. It is the case of a big colliery owning many hundreds of trucks.

537. Does not that rather seem to point to the want of covering power in your material?—I should say not. My explanation would be that non-poisonous pigments of that particular nature require certain mediums. If a dry pigment is not properly enclosed, if it has not a proper film all round every molecule, it does not form an efficient paint. In that respect I believe that white lead is superior, because it has a very peculiar character—the character of absorbing or of being absorbed into the surface on which it is painted.

538. I am dealing with your paint from the standpoint of a man putting it on every day of the week. If it cannot be diluted with turpentine it would be no use for a flatted wall. You said in your examination in chief that your paint spread better than white lead, that it was of greater density and that it was more opaque than white lead. In answering Mr. Sutherland you said that it did not cover so well and that you required to put it on thicker to get the same body?—I think I defined covering capacity as spreading and obliterating capacity. I think I admitted to Mr. Sutherland that as far as obliterating capacity goes it is equal to white lead, and as far as spreading capacity is concerned it is better than white lead.

539. A pound of your paint would go further than a pound of white lead?—Yes.

540. And it would cover as well?—Yes.

541. That was not quite clear. You said that it would not cover so well?—It has not the same density

542. (Mr. Sutherland.) I asked you if it was equivalent to white lead and you said "Yes"?—Equivalent in obliterating capacity.

543. (Mr. Gardner.) Could you make a filler for filling up the roughnesses and inequalities out of your paint?—Yes; you could use it for flattening, as you term it, particularly for enamelling. That is one of its principal uses.

544. I do not follow you: You would seem to require to have it with turpentine for flattening?—It is used for that purpose.

545. (Mr. Parsonage.) You mix this with more linseed oil than with turpentine?—Yes.

546. How do you say that it is more suitable for enamel or varnish finish? To finish with enamel you want a flat surface, but you say that this is mixed more with linseed oil than with turpentine?—When I say that it has to be mixed more with linseed oil than with turpentine I am referring to a ready mixed paint as a finishing coat. If you have a flatted surface on which you want enamel, you can with equally good results thin it with turpentine.

547. I happen to know personally that this has been used and gives a better result, and answers the purpose for enamelling as well as, or equal to, white lead. Now with regard to using it for filling, how would you stiffen it up? What would you put into it? It is not sufficient for filling as it is?—I am afraid that I cannot give you that particular, but I am prepared to get you any particulars you like from customers.

548. It would spoil the usefulness of it if we had to mix it with lead or any poisonous substance for filling. Would it mix with whitening or something of the kind?—Yes, you could mix it with whitening, or with white lead, for that matter.

549. But we do not want to do that if it is to be non-poisonous. Would it rub down if you mixed it with whitening?—Yes.

550. It would require oiling over then?—Yes, I suppose so. You quite understand that I am a manufacturer; I am not a painter, and therefore I am quite prepared to submit to your superior knowledge as far as uses by painters are concerned.

551. (Chairman.) We want you to supply particulars of places you have painted, and the times at which you painted them, and to tell us, whether internally or externally, the colour of the paints you used, and whether your clients were satisfied?—Yes.

552. (Mr. Parsonage.) If this work had to be finished with varnish or enamel, would two coats of your paint answer the purpose better than any other?—The general opinion is that it does—I cannot say more—and we are constantly overcoming certain convictions in that way.

553. I am speaking from my own personal experience of the material?—I am prepared to agree with you.

554. For priming, your material would not answer the same purpose as white lead, but for finishing or enamel or varnish purposes it may be superior. Do you agree with that?—I do not agree with the first part of it. I do not say that it is not equal to white lead as a priming coat, but I say that I have heard it stated, I have repeatedly heard it said, that the best results are obtained by first having a coat of white lead.

555. (Mr. Sutherland.) And then finishing with this?—Yes, and then finishing with it. I also know many cases where painters say that the best results have been obtained by using nothing else but Dixon's White.

556. (Chairman.) You have rather a conflict of opinions?—We have all sorts, I am afraid. We have had to work our way up for the last six or seven years, and every year has meant a step towards perfection.

557. Did your firm introduce this paint for humanitarian purposes, or was it entirely a matter of business?—It was entirely a matter of business.

558. Because you thought that it was a better paint than white lead paint?—Yes, and because we thought that sooner or later non-poisonous pigments would come into favour.

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[Continued.]

559. You had the humanitarian idea at the back of your mind all the time, then?—We had that, I suppose, in view more or less. In our works we use nothing poisonous, and it is the decision of our directors wherever possible not to do so.

560. (Mr. Fell.) Have you used this paint at all on vehicles?—We have not.

561. But have you sold it for that purpose?—We have supplied it to coachbuilders.

562. You said just now that you did not recommend it where there was any sign-writing or anything of the sort?—Yes.

563. Most public vehicles are covered with signs?—Yes.

564. How does your paint act under those conditions?—We have had no experience of that. One experience we had was with a colliery company who were using it for lettering, as they term it, for their trucks. Although we have supplied our paint to other colliery companies we have had no complaints except from this one company. That rather made us think that we have not the proper thing yet for sign-writing, and we have ceased selling it for that particular purpose. But I cannot say that it is not suitable for it.

565. You do not know whether it has been used for painting tramcars or anything of the sort?—No.

566. You could not give us the names of any places where it has been used?—No. One railway company have used it for various purposes, and I propose to call on them and get their opinion. They may have used it for purposes such as you describe.

567. (Mr. Kinggate.) You might ask the coachbuilders whom it has been supplied to what uses they have put it to?—Yes, I could get that information.

(Mr. Robins.) I would like to speak about one expression which has been used this afternoon by our friends on the opposite side of the table, and that is the word "flat." It may be conflicting. What the house painter calls "flat" is a dead colour, but with regard to coach painting as a rule when we say "flattening" it means rubbing down with pumice stone or a cloth.

568. (Dr. Collis.) Do you get every colour from your paint without ever introducing a small percentage of lead?—You can use any kind of stainer with it, the same as with white lead.

569. But do you obtain every colour without even a small percentage of lead?—That I could not say. As you are probably aware, some colours have all sorts of chemical combinations. Some of them contain lead, particularly greens, and there are some colours even more poisonous than lead. So it does not follow that, while Dixon's White is non-poisonous, anything you mix with it is also non-poisonous.

570. Do you only issue your paint in the form of a white?—It can be used in precisely the same way as white lead. It can be mixed with stainers.

571. But as a matter of fact do you issue this in various colours or only as a white?—We only send it out as white, and leave it to the painter to mix it up in whichever way he likes.

The witness withdrew.

## SECOND DAY.

Tuesday, 28th March 1911.

PRESENT :

SIR ERNEST F. G. HATCH, BART. (Chairman).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BABING, Bart, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER } (Acting  
R. U. SHAXBY } Secretaries).

Mr. G. G. LAIDLER examined.

572. (Chairman.) Are you a master house decorator?—Yes.

573. Where is your business?—In Newcastle-on-Tyne.

574. How long have you been engaged in the painting trade?—About 90 years, my father and myself.

575. How long have you yourself been an employer?—I have been an employer for 48 years.

576. Were you apprenticed to the trade?—I was.

577. How many men have you employed during these years?—From 80 to 120.

578. Were they all painters?—All painters.

579. Perhaps you would tell us the average yearly number of painters you employ?—About 80 or 90.

580. Have you an even run of business all the year round, or do you have a busy time of year and a slack time?—We have a very good run all through the year. For April, May, and June we generally employ perhaps 30 or 40 more men.

581. What happens to your men in the slack time; are they discharged?—They are discharged.

582. Do you employ the same men year after year?—We do.

583. Do they come to you as boys?—They are all bound by indenture.

584. Do many leave you of their own accord?—We like them to leave after they have served a year and then come back again.

585. What reason have you for that?—We want them to get experience outside of the shop.

586. Do any of them leave the trade because of ill-health?—I do not remember any.

587. Do you take on and discharge your men personally?—Either myself, my son, or my foreman.

588. Do you make inquiries when a man is away as to whether he is ill, and if so, what is the matter with him?—Oh, yes, as a rule we do. We have a little Benevolent Society in the shop where the men contribute so much a week; and when they are ill and laid by for two or three weeks they receive 10s. or 12s. a week from that fund.

589. What sort of paints do you apply? Do they all contain lead compounds?—Two-fifths of them do.

590. I should like to know what quantities you use of (1) white lead, (2) red lead, and (3) Brunswick green, and other paints containing lead chromate?—I think we use about 18 tons of what is called genuine white lead; that is, by preference, a mixture of stack white lead, and that made by the Chamber process of manufacture.

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[Continued.]

591. And red lead?—We use very little red lead.
592. Any Brunswick green?—Yes; we use probably a ton of Brunswick green in the year.
593. And other paints containing lead chromate?—Yes, not more than perhaps a ton and a half during the year, in addition to the 18 tons of white lead.
594. What quantity of red oxide of iron do you use?—It is included in the ton and a half; I should think not more than perhaps 6 or 7 cwt.
595. What quantity of zinc oxide do you use?—Very little.
596. Practically nothing?—Practically nothing at all.
597. Do you use lithopone?—No.
598. Do you use carbon or graphite paints?—No.
599. Do you use any particular brand of leadless paints?—No.
600. Then do nearly all your paints contain lead?—About 18 to 19 tons contain lead, and about 20 to 25 tons do not contain lead. I include all these distempers that we use—Duresco, Walpamur, and so on.
601. (Mr. Sutherland.) Some of those are based on lithopone?—Yes, I did not follow that.
602. (Chairman.) Then you do use lithopone?—I do not know it by that name.
603. May I put it in this way—that about half the paints you use contain lead, and half do not?—Yes.
604. Is that substantially correct?—Yes, the larger proportion is leadless.
605. You are sure that the larger proportion is leadless?—We use 18 or 19 tons of lead paint and from 20 to 25 tons without lead.
606. Now, about lead poisoning or painters' colic, have you known any cases of it?—Not in our shop. I heard it mentioned when I was a boy as painters' colic, but I have had no experience of it.
607. Do you mean that you have paid no compensation, or that your men have not, to your knowledge, broken down on account of lead absorption?—No, none.
608. Have your men had occasional days of sickness due to lead?—No, not to my knowledge.
609. Do you have periodical medical examination of your men?—No.
610. Then it is possible, perhaps, that some of them may be suffering from the slower and more insidious forms of lead poisoning?—I have no knowledge of that at all, so I cannot say.
611. You know, I suppose, that lead poisoning frequently undermines the health without immediate violent manifestations?—Yes, I know that.
612. The first point in your evidence amounts to this, that you are not aware of any damage being done to your men by their contact with lead paints. Is that correct?—Yes, that is correct.
613. I suppose you take precautions to guard against your men being lead poisoned?—We try to make them do their work as cleanly as we possibly can, and in every way we make them carry out the work as perfectly as possible.
614. I will now take the principal painting processes and ask you what precautions you adopt in each of them. Let us begin with mixing. Do your men do any paint mixing?—Yes.
615. Does one man do it all, or does each man do his own?—If it is a small job every man mixes his own paint.
616. Where is the mixing done?—On the job; not in the shop.
617. Is it all done outside the shop?—It is all done outside. We employ very few men in the shop.
618. Do you use a grinding or mixing mill?—No.
619. Do you mix any dry powders with liquids to make up filling or stopping, for example?—Yes, we do.
620. Do you mix white lead or red lead in this way?—Yes, we do.
621. Do you do any mixing by hand on a slab?—By hand. Yes.
622. On a small slab?—Yes.
623. What precautions do you take? Of course you have a lavatory at your headquarters where the men can wash?—Yes.
624. What accommodation do you give them? How many men are there to each lavatory basin?—We have a lavatory and closet for the men. We do not employ painters in the shop at all.
625. I am speaking about the men who mix the paint. I am taking each process separately, and I want to know precisely what precautions you adopt to protect your men?—We do not take any precautions at all.
626. What accommodation do you provide, with regard to washing, for the men who mix the paint?—We do not give any accommodation at all.
627. Do they have any place to wash in?—If it is an empty house, they use the lavatory or the basin in the house.
628. Do they have hot and cold water supplied to them necessarily?—We do not provide accommodation.
629. You do not know whether they have soap or nail brushes and towels?—They always have soap. They can heat the water, and they do, I believe. We do not provide any accommodation.
630. You do not know whether any provision is made for them or not?—We do not provide any; they provide everything themselves in the shape of washing.
631. Is it easy to remove paint from the hands?—Yes, I think so.
632. I should have thought it was very difficult?—A clean workman does not need to have his hands messed with paint.
633. That is not the point. Is it easy to remove paint from the hands when it is once on them?—Yes, I think so.
634. With cold water?—No.
635. Then you think it is essential that they should have hot water?—I think so. It requires turpentine and a cloth to remove paint. I always use hot water myself.
636. Do you think it possible for them to have hot water in houses where they go to paint?—Yes, always.
637. Do the men wear overalls?—Yes.
638. Who provides them?—Themselves.
639. Who washes them?—I suppose their wives probably. We do not wash them.
640. Do you know how often they are washed?—Once a week.
641. Are you sure of that?—We compel every man that comes to the shop to have clean overalls every Monday morning.
642. What steps do you take to prevent dust from the mixing getting into the air that the men breathe?—We have very little dry paints used. They are nearly all ground in oil.
643. But if they are not ground in oil, do you have the work done under a hood connected to a fan or exhaust of any kind?—No.
644. Now the next process I wish to ask you about is smoothing or rubbing down. Is much of your work rubbed down?—Yes; the principal part of the work is filling up.
645. I am coming to that in a moment. Would you kindly answer my questions as I come to each process. I want to know whether you do much rubbing down?—Yes.
646. Do you use dry sandpaper or German brick?—We use dry sandpaper for ordinary walls and ceilings, but mostly woodwork is rubbed down with pumice stone and water.
647. Have you used wet sandpaper?—No.
648. Do you use pumice stone and water a good deal?—Yes, a good deal.
649. About what proportion of the work is rubbed down with pumice stone and water?—We always use it. The work is commenced by rubbing down with pumice stone and water.
650. How many times do you rub down?—Between each coat.
651. Are all the undercoats rubbed down?—Yes.

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[Continued.]

652. Do you rub down mouldings and curves, or only flat work?—Yes, we rub down mouldings and curves, and flat work as well.
653. Can you use wet methods throughout?—Yes.
654. But you do some dry rubbing down?—No.
655. You said just now that you used sandpaper?—Not on woodwork.
656. I did not ask about woodwork only; I mean all work?—Yes. We do walls and ceilings with sandpaper.
657. You do dry rubbing down of walls and ceilings?—Yes.
658. Do you do anything to prevent the dust being breathed?—No.
659. Are overalls worn at this work?—Yes.
660. Do you arrange for washing appliances at the jobs, or is that left to the painters themselves?—It is left to the men themselves.
661. What do the available appliances consist of as a rule?—If there is a lavatory basin in the house they use that; if not they provide themselves with a zinc pail and hot water.
662. Do you know of your own knowledge that the men wash at every opportunity?—I think they do—Yes.
663. Can you speak from your own knowledge?—Yes.
664. How do you get that knowledge?—I have asked the men.
665. The men themselves?—Yes.
666. Now, would you tell us about your stopping? What do you use as stopping?—A little dry white lead. We use very little of that in the year.
667. How is it applied?—It is applied by a knife process.
668. Can the workman avoid getting his hands soiled with this stopping?—Yes.
669. How?—By keeping his hands out of the paint. He need not touch it.
670. But if it does come in contact with the hands, can it be got off with cold water?—No.
671. He must have hot water?—Yes, he must have hot water.
672. You think it absolutely essential that they should have hot water near at hand?—I think so.
673. In every case?—Yes, in every case.
674. Now, as to scraping and burning off; when you are repainting, how do you deal with the old paint?—If it is in bad condition we burn it off to remove it.
675. Do you sometimes scrape it off?—We scrape it off, or burn it off, or use solution.
676. What is the proportion of scraping off to burning off?—I can hardly say; it is mostly burnt off if the woodwork requires it to be burnt off; it is not scraped off. There may be a little scraping where the paint has become dry with the sun; that is scraped off. The other is all burnt off, as a rule.
677. Can you give us any idea of the proportion?—A hundredth part of the work is scraped off, as a rough guess.
678. Do you burn off interior work as well as exterior?—Yes.
679. Is this ever done where space is limited?—It does not matter about the space; if the work requires to be done in that way it has to be done.
680. When scraping off is done, is the paint hard or soft?—It is generally very dry indeed; and that is the reason it is scraped.
681. Does it chip off?—Yes; it will scrape off with a knife.
682. Have you noticed if there is ever any dust or small particles?—Yes, there is dust.
683. Do painters carry a brush amongst their tools?—Yes.
684. What is that for?—For dusting purposes.
685. What do you do to prevent inhalation of fumes from burning off?—We do not use any precautions at all, and never have.
686. What precautions do you use in regard to dust from scraping?—We do not take any precautions at all, nothing beyond the care that a man would have of his own health.
687. It comes to this, that your men seem to be so unusually careful that you have no precautions, and the men are absolutely immune from any danger?—Yes.
688. Is not that rather a remarkable situation?—I do not know that it is; it is my experience. We do a very good class of work, and we employ most careful men.
689. If what you tell us was general, there would be no necessity for this inquiry at all?—In my case there is absolutely none.
690. And yet the incidence of lead poisoning amongst house painters is terrible?—It is not my experience. I never knew a case amongst our men.
691. Now with regard to the application of wet paint; does this necessarily involve soiling of the hands?—No, you need not soil the hands at all, a dirty man would certainly do so.
692. Have you ever seen a painter working without soiling his hands if he is painting all day?—No.
693. Do you not think, then, that it necessarily involves soiling the hands?—Not the mere painting, but the work generally.
694. I mean the work that the man is employed in; you do think that it necessarily involves soiling the hands?—Yes, to a certain extent, very small.
695. And I suppose his garments too?—Yes.
696. Do fine specks of wet paint get upon the hands and clothing or are there only large splashes?—It depends on his work. If he is painting railings or anything outside, there would be a good deal of splashing there, and in trellis work too; but it is not necessary in painting ordinary woodwork in a room.
697. I suppose overalls are worn during actual painting?—Yes.
698. Do your other remarks, about washing and the like, apply in the same way?—Yes.
699. So far you have told us that there are no particular precautions adopted by you in these various processes. I want to ask you a few questions as to general precautions. First about meals. What time do your men commence work in the morning?—6.30.
700. Do they have their breakfast before they begin?—No.
701. How long do they have for breakfast?—From 8.30 to 9.
702. Do they go home for that as a rule?—No; it is taken on the job.
703. Do any of them take their breakfast in the paint-mixing shop?—I should think they generally breakfast where the paints are. They have a fire there and probably sit round it and smoke afterwards.
704. With dirty painty hands?—No; I should think the men as a rule would wash their hands before.
705. You think they might?—Yes.
706. But they might not. Do they breakfast ever in the plumbers' shop?—We do not have any plumbers' shop.
707. Do you provide a messroom at your headquarters?—We have a large shop. We have no particular messroom.
708. You do not have a messroom?—No, we do not have a messroom.
709. Do they sometimes have all their meals away on the job where they are working?—Yes, on country jobs and jobs a distance from their homes.
710. You have told us that they eat their meals where their brushes and pots are?—Yes, as a rule.
711. Can you say what is the average wage for a working painter?—The wage for the painter right through the year, do you mean?
712. Yes, an average?—38s.
713. Is this in the busy season, including overtime?—No.
714. What are the usual hours of work?—Fifty a week.
715. What would be the maximum at times of great pressure?—In all country work the men work two hours overtime, and in the busy season they work probably eleven hours a day and two hours extra sometimes.

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[Continued.]

716. Can you tell us whether the men are well fed; that is an important matter?—Yes; I think so.

717. An important precaution which is required in, I think I might say, all the regulated dangerous trades involving exposure to lead compounds, is a periodical medical examination. You have already told us that you have not adopted such a precaution?—No.

718. Do you insure against your liability under the Workmen's Compensation Act?—We do.

719. Can you tell us whether the rate you pay is heavier for painters than for paperhangers, plasterers, and so on?—We pay the same rate for paperhangers and painters.

720. And for plasterers?—We do not employ plasterers.

721. Then the rate is the same for all your men?—Yes.

(Mr. Sutherland.) It is less for plasterers.

722. (Chairman.) For painters it is higher?—Yes.

723. How much higher?—I do not know. The rate is about 13s. or 14s. per cent. for painters and paperhangers.

724. Will you take it from Mr. Sutherland that the rate is higher for painters than for plasterers?—Yes.

725. It is a very important point. It shows how Insurance Companies regard the danger. Would you suggest that this increased premium is due to any other cause than the risk of lead poisoning which the painter has and the plasterer has not?—I could not answer that question.

726. Has the rate changed since the Employers' Liability Act came into force?—I think we pay about the same. I do not know that there has been any difference. It may be a little more—yes, it is probably a little more.

727. I have the impression from your answers that you have hardly realised the magnitude of this lead poisoning evil. Do you know that the Registrar General has recorded no less than 234 definite deaths from lead poisoning amongst house painters in the last ten years?—I was not aware of it.

728. And that his mortality figures show, for painters, a death rate considerably higher than the normal; from troubles which are the frequent effects of exposure to lead, such as Bright's disease and nervous diseases?—Does the question relate to house painters?

729. Only house painters?—No; I was not aware that there was that mortality amongst them.

730. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the same ten years?—No.

731. I am sure you will agree with me that all this sickness and death is very deplorable?—It is very deplorable. I was not aware that there was so much sickness and death from that cause.

732. There seem to be only two ways by which this state of affairs can be remedied. One remedy would be to prohibit the use of lead compounds, or to restrict them to say 4 or 5 per cent. of the whole material used, and the other method would be to regulate the trade very strictly. Do you agree with either one way or the other being adopted?—No, I do not agree.

733. But you agreed just now that this sickness and death is very deplorable?—It is so.

734. Something ought to be done to stop it?—Yes.

735. Then there seem to be only two ways by which this state of affairs can be remedied: either to prohibit the use of lead compounds or at least to restrict them to say 4 or 5 per cent. of the material used, or to regulate the trade very strictly. Do not you think that one of those two methods is absolutely essential?—Some regulation, yes, but not the restriction of lead. May I give my opinion upon that?

736. Certainly.—The reason is that I think that many of these men are sick through their want of cleanliness in their work—entirely. Dirt produces illness—

737. (Dr. Collis.) What disease?—Lead poisoning, I should say. If men keep their hands clean, they are not liable to be attacked by these diseases.

738. (Chairman.) It seems that there are already a lot of substitutes for lead paints on the market. What

do you say about those?—I have no experience outside my own particular trade. I do not use substitutes of any kind.

739. Will you tell us what attempts you have made to get a substitute for white lead paint that is suitable for your work in all respects?—I have never used any and never tried any.

740. Have you made any experiments to compare the behaviour of substitutes with the white lead you are now using?—None.

741. I have just explained to you the lamentable position of workmen in the painting industry. I gave you some figures which indicate the extent of lead-poisoning that is going on. Can you offer any suggestions for appreciably relieving all this suffering?—I am quite surprised to hear about it really, because my experience that I have spoken of is quite the reverse.

742. Can you offer any suggestions for the relief of that suffering?—I should say that great precautions ought to be taken to see that the men keep themselves clean and that the conditions of their work are the best possible in every respect.

743. You do not think that this deplorable state of affairs should be allowed to continue?—No; I think it ought to be remedied.

744. Do you think that it is possible to invent any apparatus which could control effectually all the dust that at present gets into the atmosphere breathed by the workpeople?—I cannot say.

745. Then either painters must go on suffering or the use of lead paints must be prohibited. That seems to be the only corollary?—I think if the conditions of the work were altered, this mortality and suffering amongst the men would be considerably reduced.

746. But I ask you, do you think it is possible to invent any apparatus which would control effectually all the dust which gets into the atmosphere breathed by these people whom we are talking about? If you cannot make a suggestion, what are we to do but to prohibit the use of lead?—I cannot say. I am quite surprised to hear that there is so much against the use of lead.

747. Do you know anything of the position abroad in regard to this matter of lead poisoning?—I know it is prohibited in France.

748. You know that in France a law was passed on the 20th July, 1909, which prohibited, five years from that date, the use of white lead in the interior as well as on the exterior of buildings?—Yes, I know that they have prohibited the use of lead.

749. Do you know that in Austria the use of white lead for the interior of buildings has been prohibited since the 1st April, 1909, by a decree dated 15th April, 1908?—No, I do not. I only know that with reference to France, because I have employed French people myself.

750. Have you heard that many Governments and Municipal Authorities in such countries as Switzerland, Germany, and Belgium have prohibited the use of white lead in works undertaken on their account?—No.

751. Are you conversant with the classical experiments which the Dutch Government have carried on for the last five years?—I am not.

752. Do you know that they got excellent results with zinc paints for interior work and also for exterior work, except for iron bridges, &c., exposed to exceptionally severe smoke conditions?—I know that zinc paint is very largely used. I was not aware of any action taken by the Dutch Government.

753. I will not weary you with any more questions regarding the painting industry in foreign countries, but I should like to know if you are aware that Germany and Belgium have strict regulations for the use of lead paints?—Yes.

754. Do you not think it regrettable that this country should be behind other nations in this respect?—As I said before, I think that precautions ought to be taken, but what these precautions should be, apart from the cleanliness of the men and seeing that they do their work in a clean manner, I cannot say.

755. Do not you think it imperative that we in England should be well abreast of foreign countries in

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[Continued.]

this respect and protect the men in every possible way?—I cannot see why the use of white lead should be prohibited—from my experience, at all events, and that of many others that I know. They rarely have a case of lead poisoning, and we never have had a case. It must be the conditions that the men work under.

756. There are a large number of businesses in England where lead is used, and it is a well known fact that contact with it does produce such results?—I should think the conditions under which these men work are very different from the conditions that our men work under.

757. What is there in your particular business that makes it different from that of other master painters?—Do you refer entirely to house painting?

758. Speaking of your own business, why is your business so different from that of other house painters?—I do not know that it is so much different.

759. Then how do you account for the immunity of your men?—Simply from the conditions which the men work under.

760. Do you train them to be very careful?—Very.

761. Have you a school in which they paint and learn care?—Yes, we have a technical school that boys are trained in, and during the winter time we give the boys, day after day, time to train themselves, along with men in the shop, to be competent workmen; and cleanliness is the first thing that we impress upon them.

762. Is that a novelty in your particular firm?—No.

763. Is it general in other firms?—Yes.

764. Then why should you be immune and other people not?—I do not know that other people are not. I say, as far as I know, other shops are in the same position as ourselves.

765. (Lord Henry Bentinck.) Do all the boys go to the technical school?—Most of them go. We require them all to go, and we have no improvers. They are all indentured; every boy is indentured after a few months.

766. You put the immunity down to their training?—Yes. For 40 years I have had breakfast at half-past five in the morning so that I might get down to my men and be amongst them constantly.

767. (Chairman.) Do you know that, for the last four years at least, His Majesty's Office of Works have dealt with many thousand pounds worth of paint yearly and have been using non-poisonous zinc paints almost entirely?—No.

768. With that information before you, do you still say that it would be unwise to prohibit the use of lead?—I can only repeat again what I have said.

769. I will put it in this way: If we can prove to you that the Office of Works for the last four years have been using non-poisonous paints with the best effects and preventing this evil, would you then say it would be a wise thing to prohibit the use of lead entirely?—I think it would be unwise.

770. Why would it be unwise, if you can get the same effect without letting the men run these terrible risks? I will put the question again: If it can be proved to you, beyond question, that His Majesty's Office of Works have for the last four years been using non-poisonous paints with the very best results in every respect, would you then not say that the Home Office ought to prohibit the use of lead throughout the country?—No.

771. Why?—For the reasons that I have already given you from my experience.

772. But that is not the point. I have told you that we have independent testimony that the incidence of lead poisoning amongst painters is deplorable. You naturally regret that incidence. Then I go on to say: if it is proved beyond question to you that you can get the same good results from non-poisonous paints, do not you think that, in view of protecting the workmen in this country, we ought to prohibit the use of white lead?—Well, I cannot say that the use of white lead should be prohibited altogether.

773. But why? I cannot understand your objection. If you can get the same results without exposing

these people to this dreadful risk, why should not you protect the men?—I am surprised at the dreadful risk at all.

774. But that is not the point. I want you to assume what I have put to you, and I ask you if you can get the same results with these non-poisonous materials, would not you yourself advocate, as a humane gentleman, that lead should be prohibited so that we might protect the workmen from these deplorable results?—But you cannot get the same results.

775. I am putting it to you with that as a proviso; if you can get the same results?—Yes, but you cannot.

776. But, if you can get the same results, then would you think it would be a right thing to prohibit the use of white lead?—How long is the experience?

777. Four years?—I do not think it is long enough.

778. I want an answer one way or the other. Will you tell me whether, if you can get the same results from the use of non-poisonous paints, you think the Home Office ought to prohibit the use of white lead?—I am sure the experience is not long enough. Probably if they had used lead compounds they would have found the same results.

779. I want to know what you would say should be done if you can get those results?—But you cannot get them.

780. That is not the point. If you can get the same results do you think the Home Office ought to prohibit the use of white lead?—I cannot accept the "if."

781. (Lord Henry Bentinck.) But if you can get the same results you will have no objection?—If, after a long experience, it was found that there was no mortality amongst the men, then I would say "Yes." But after such a short experience as four years I would say "No."

782. You said that employers should give facilities to their men to enable them to keep clean. What facilities can you suggest beyond what they do get at present?—I think that painters ought to be trained from their youth to be clean in their work and clean in themselves and their clothes.

783. But it must be very difficult for men on a job to keep themselves clean and wash their hands?—No, it is not difficult.

784. Why? Supposing they are in an empty house, they cannot get water. Do you think that the masters should supply buckets?—They do.

785. Do your men not supply their own buckets?—No.

786. I thought you said they supplied them?—No.

787. Do you think that all employers should supply buckets?—Yes, and soap, and we do supply them.

788. That would be a step in advance?—Yes.

789. Is it possible to pumice stone and water walls and ceilings when you rub down?—If they are painted walls we use pumice stone; but if they are unpainted walls, in preparing for paperhangers, they are sandpapered.

790. If you were going to paint this wall, would you pumice stone it or sandpaper it?—We should use pumice stone and water.

791. Would it be possible to make it compulsory to pumice stone and water all walls and ceilings?—You must do so if they are painted walls; but, if you are pumice-stoning on an unpainted wall, you would take the skin of the plaster off.

792. You must sandpaper it, then?—You must sandpaper it. You sandpaper the rough surface.

793. Is it known throughout the trade that walls which are painted must be pumice-stoned?—Yes.

794. And all wood-work?—All painted wood-work must be pumice-stoned, and any work that is not painted is sandpapered.

795. Do you say that you have no evidence that painting causes an increase of sickness? You said that you had a sick fund?—Yes, amongst the men.

796. Have you no evidence to prove that in the painting trade the nature of their employment causes sickness?—No. It is only a small fund. The men

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contribute 2d. or 3d. per week, and if they are off had they have 10s. or 12s. from the fund.

797. Do you inquire why they are off?—Yes.

798. You know it?—Yes, always.

799. What are the chief reasons that they go off for?—Perhaps colds.

800. Nothing to do with the trade?—No. I have no experience of lead poisoning in my business. I do not know anything about it.

801. (*Sir Godfrey Baring.*) Do you really say you have never in your experience known a man suffer in health from lead poisoning in your employment?—No.

802. Nor from indirect causes?—No.

803. Up to what age do you find that men can do a full day's work in your business?—I have men working with me now who were apprenticed to me 44 years ago.

804. You have no experience of men prematurely breaking down at a comparatively early age?—In my own employment?

805. Yes, in your own employment?—Yes, I have.

806. With regard to empty houses, do you say that in an empty house, at times of pressure in your business, it is always easy for a man to obtain hot water?—Yes, always.

807. Even at times of greatest pressure?—Yes.

808. If hot water was not provided in the house the men would provide it themselves?—Yes, they would.

809. With regard to scraping off, when scraping off is going on there is a considerable amount of dust, I suppose?—Yes.

810. And the men would be compelled to breathe that dust?—Yes.

811. And in the dust there would be a large admixture of white lead?—Yes.

812. That would be inevitable from scraping off?—Yes.

813. Have you anything to recommend with regard to obviating the dust in scraping off? Is there any way of preventing it?—The scraping off is a very small proportion compared with burning off. Burning off the paint causes it to crumble away as it were, and there would be probably a little sandpapering after that, mostly pumice stone and water.

814. If a man was scraping off, it would be inevitable that he would be breathing dust all the time?—Yes, in the scraping.

815. And there would be no way of correcting that?—No, I have nothing to recommend. But the scraping is only a hundredth part of the preparation.

816. I understand that the extra regulations you recommend are chiefly with regard to washing?—Yes, I think so. I think if a man is clean over his work he takes the best precaution for preventing himself being struck with illness.

817. But even the most careful man at his work must inevitably get paint on him. There must be a great deal of paint on his hands and overalls?—There may be—yes.

818. Your experience is that, before their meals, the men take the precaution to wash in hot water?—Yes.

819. No matter what the pressure of work may be?—Yes.

820. (*Dr. Collis.*) My experience of house-painting is slight. It has always appeared to me, and I wish to ask whether you agree, that the occupation should be a very healthy one in that the men have plenty of fresh air and plenty of change. Do you agree with that?—That they have plenty of fresh air.

821. Yes?—I think they have. The occupation of a painter is a very healthy one. He travels all over the country. Many of our men spend half the year in the country.

822. And his work is not laborious?—No, it is not.

823. And does not expose him to any great extreme of temperature, like working before furnaces?—That is so.

824. How is it that when we look up the Registrar General's Report on plumbers, painters, and glaziers,

we find him stating that they have 11 per cent. of mortality above the standard?—I do not know.

825. Is it not rather curious that you should be an employer of many people for this length of time without having taken the trouble to look into the health question of your people? You say that you and your father have been for 90 years employing people in house painting?—That is so.

826. Perhaps you would be able to give us some information, or perhaps you will be able to claim acquaintance with some statistics which were published many years ago—in 1854—about the commencement of the time you were interested in the trade—by the Registrar of Friendly Societies for England and Wales. Are you aware that at that time he was unable to class painting with other forms of labour because of the extra danger that he found that painters were exposed to in their trade?—I was not aware of that.

827. There are four extra-dangerous trades. One of the four extra-dangerous trades is that of painters. Are you not aware of the fact that all workpeople are occasionally prone to illness? I suppose your men have occasionally been ill?—Yes.

828. Have you ever kept statistics of the number of days that they have been off their work?—No.

829. Then how are you able to say that your trade was more healthy than others?—I have not said more healthy than others.

830. Or as healthy as others, unless you can compare them with the amount of sickness and illness that your men suffer? The statement is a little *ex parte*?—I do not know exactly what you mean.

831. If you have never taken the trouble to look into the statistics of illness which men suffer from, and compare them with the statistics found in other trades, you are not able to say that your trade is either healthy or unhealthy. You have no opinion on the point?—It is a healthy one.

832. On what do you base your statement?—Experience.

833. But your experience is not statistical?—No, it is not.

834. (*Mr. Parsonage.*) With reference to the use of pumice stone and water in preparing the work, you use pumice stone and water on old work?—Yes.

835. After you have given it a coat, and you are going to finish the work with three or four coats, you do not use pumice stone and water on that same work again?—No.

836. You use sandpaper between each coat?—Yes, a little.

837. You must rub it down with something?—Yes.

838. Then you only use pumice stone and water once?—No, we use ground pumice stone and water afterwards.

839. For the finishing coat, I suppose; but between each coat you use sandpaper?—Not always.

840. In ninety-nine cases out of a hundred you use sandpaper between each coat?—No; we use felt and pumice stone.

841. I am speaking as a painter who has served an apprenticeship to the trade and has thirty years' experience. Now on extra good work you may use felt and ground pumice stone, but in ordinary work between each coat you use sandpaper?—Not always.

842. You use nothing at all?—We do the filling up; we fill up with knives. You know that process?

843. Yes, I know all that?—And we get a perfectly smooth surface.

844. Taking new woodwork, you prime it?—Yes.

845. You do not put pumice stone and water on that?—No.

846. Sandpaper?—Yes, a little with that class of work.

847. It all depends what kind of finish you want?—Yes.

848. You use sandpaper between each coat?—Yes, a little.

849. I want to demonstrate that that is the usual thing, and that pumice stone and water is not used between different coats?—Always for rubbing down.

850. At first you rub down the old work?—Yes.

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[Continued.]

851. But between the coats you use sandpaper?—Not always.
852. What do you use?—With varnish we use felt and ground pumice stone.
853. You would not use felt and ground pumice stone between each coat?—No, towards the finishing coat.
854. Mainly you use sandpaper?—A little fine sandpaper occasionally.
855. But is it occasionally or mainly? It is a very important point. My contention is that sandpaper is used between every coat after the work is rubbed down in the first instance with pumice stone and water. This is an important point, because the dust arising from sandpapering is, in my opinion, the main cause of lead poisoning, and I wish to prove conclusively that the wet process in rubbing down paintwork between coats is not used at all. It is very very little used except on special work where an extra special finish is required?—Yes. That is the class of work that we use it in.
- (Chairman.) Perhaps that is the reason—because he uses felt—that his men are immune.
856. (Lord Henry Bentinck.) Would it be possible to use pumice stone and felt between each coat always?—No, not always.
857. (Mr. Parsonage.) I will give you a practical instance. If you were going to paint this room, and going to finish the woodwork in the room flat, you would not use felt on that?—Yes, we should.
858. You would?—Yes.
859. To finish it in flat colour?—Yes.
860. Well, I am surprised. I could understand if you were going to finish it in varnish, but I cannot understand that you would use felt and ground pumice stone. You would use sandpaper?—I want to impress upon you, gentlemen, that we use wet processes in rubbing down and smoothing in preference to dry processes, because we get finer results from them.
861. But between each coat you use sandpaper?—No, not always.
862. In five out of six cases you would use sandpaper?—No.
863. You would not paint a door at all without using sandpaper on it?—We should certainly use a little fine sandpaper.
864. (Chairman.) Is the use of felt and ground pumice stone more expensive than sandpapering?—Yes.
865. Would it take longer to rub down a door with ground pumice stone and felt than with glasspaper?—It would take longer.
866. Far longer?—Yes.
867. And must, therefore, be a more expensive operation?—Yes.
868. Is that why sandpapering is done in preference to the other?—I use the wet process in preference to the dry process.
869. I did not ask that?—Is it done sometimes on the score of expense?—It is more costly to use the wet process than it is the dry process, but we get finer results from it, and that is why we use it. It is not a question of expense with us.
870. (Mr. Gardner.) But it is only used in special jobs?—No; we constantly use it and we fill up most of our work.
871. (Mr. Parsonage.) You estimate for work in competition with other firms in Newcastle?—Yes.
872. You do not merely have your own special customers?—We have our own special customers.
873. I have worked on some—I know that—but you estimate against other firms?—Yes.
874. Is it a usual thing for these firms in Newcastle to use the wet process for preparing paint work?—I should say so.
875. You think so?—It ought to be so.
876. I am acquainted with many painters in Newcastle, and I know some of the work too. You do not say that the wet process is mainly used in Newcastle?—I do.
877. In your own shop?—Yes.
878. But if you used that and other firms used a much cheaper one, you could not compete with these people?—No; that is so. Do you know my business in Newcastle?
879. I have known some of it in London?—You know the quality of my work?
880. Yes, I do, and I know it is above the average?—It is got by the wet process and not the dry one.
881. I wish to bring out clearly the fact that glasspapering or sandpapering between coats is always used?—Yes.
882. Pumice stone and water is used for rubbing down the old work?—Always.
883. Afterwards it is sandpapering mainly?—Not with me.
884. But it is generally?—It is probably owing to the process that I use that we have such a clean bill of health in our shop. I think, if the wet process was more used than it is now and the men were compelled to be cleanly over their work and the employers took certain precautions, there would not be such dire results and these cases of illness and mortality amongst the men.
885. In taking on your men you make no inquiries as to whether they have served their time at the trade; you simply go by their ability? As a painter any man that comes to your shop for a job would be taken on, and his being kept on would depend on his ability?—If he was not a bound apprentice. But we make inquiries as far as possible. I am very sorry to say that a large proportion of these men have never been bound owing to the carelessness and indifference of the employers. We never employ a boy unless he is indentured, and if he is bound as apprentice to serve his time with us he will turn out a good man.
886. You would think that a boy apprenticed to the trade and brought up to it would be more cleanly in his habits than a man who comes into the trade casually?—Certainly.
887. You have had no cases of lead poisoning in your firm?—No, none.
888. Not to your knowledge?—Not to my knowledge.
889. But there may have been many cases that you have no knowledge of?—That is so.
890. I could mention to you names of men employed by you who have suffered from lead poisoning?—Indeed! I was not aware of it.
891. I could give you names and call them to your mind now, but I should not wish the names to be reported?—I was not aware that we had ever had a case of lead poisoning in the shop.
892. We have cases of lead poisoning every year from Newcastle the same as from other places?—Indeed!
893. There may be 100 men at work in your shop who had lead poisoning and you would not know it?—I have given you my experience.
894. It has not come to your knowledge?—That is the fact.
895. Now you mentioned that you used 19 to 20 tons of lead?—I said 18 tons of lead.
896. And 25 tons of leadless paint?—I said 20 to 25 tons.
897. Do you use any of this leadless paint on woodwork? Does the 20 to 25 tons include distemper?—Yes.
898. It is not used on woodwork?—No.
899. It really does not come into this question at all?—But I was asked the question.
900. I want to show that this quantity of 20 to 25 tons includes distemper, and that does not come into the question of woodwork in any way. You would not use Duresco on woodwork?—No.
901. We class that as ordinary distemper, and the 20 to 25 tons is not relative to this inquiry in any way?—I see.
902. (Chairman.) I am afraid that you inadvertently failed to apprehend the meaning of one of my questions, because you certainly implied that you used a much larger amount of non-lead paint than lead paint?—Yes.
903. But you did not mean that?—Yes, I meant that. You asked me how many tons of lead paint I used and how many tons of leadless paint I used.



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[Continued.]

904. (Mr. Parsonage.) Do you term distemper "paint"?—Yes, it is a water paint.

905. You would apply that term to ordinary distemper?—Yes.

906. You would use no substitutes for white lead on woodwork at all?—None.

907. You use nothing but the ordinary white lead mixed with oil or turps?—That is for painting.

908. The other is merely distemping work?—Distemping; or whatever it may be.

909. (Chairman.) We are here to inquire as to painting, not distemping or anything of that sort?—At all events, the men are employed for a large portion of their time in using these distempers. They are not always painting. A man may not be painting more than half the time during the year.

910. (Mr. Parsonage.) That is right. Now you say painting is a healthy occupation, and the men get a good many changes. I know that your firm sends men all over the country and they are away a good deal. Their hours of labour are from six in the morning in the summer?—6.30.

911. Until 7.30 in the evening?—About that.

912. Twelve hours?—Eleven. They are very anxious to work twelve, but we try to limit them to eleven.

913. In many shops they work twelve?—Yes.

914. They have half an hour for breakfast?—Yes.

915. They sit in the paint shop?—Yes, I think so as a rule. I always did.

916. And for the dinner hour the same?—No. If it is fine they will sit outside.

917. They will have their dinner there or go outside and get it?—As a rule they are provided with a mess room on a country job; the men may pick a room out in the house for their meals.

918. Until when do they work on Saturdays?—To five o'clock.

919. I should think they would get very little time for fresh air if they started at 6.30 and worked till 5.0 on Saturday. They would get a chance on Saturday, but I do not see how it can be a healthy occupation with those hours?—The house is in the open air and there is plenty of fresh air coming into the house. It is not like a street.

920. You cannot work in a room with windows open. You must keep them shut or you will get the dust all over the paint work?—Yes.

921. With regard to insurance, you mentioned painters and paperhangers. You pay the same rate?—Yes.

922. Do you employ one in twenty paperhangers to painters?—One in ten.

923. Do the painters do the paperhanging?—Occasionally. We generally employ paperhangers to do that and nothing else.

924. As a rule, in the country, painters would do the paperhanging?—Yes.

925. So there is really not so much distinction between painters and paperhangers?—There is not any.

926. You have had no experience whatever of substitutes for lead, so it is useless asking you questions about them?—No.

927. (Mr. Gardner.) In the 20 to 25 tons of leadless paint you use, you include all the greens, the oxide of iron, browns, and all the other paint materials used in the shop with the exception of white lead?—In addition to the 18 tons of lead we use about a ton and a half of other paints that contain lead.

928. But many of these paints do not contain lead—some of the oxides, the greens, and the chromes?—I put them amongst the others.

929. That helps to bring it up?—It is only a small proportion. There are the siennas and all the different over-glazing colours.

930. You say that, from your experience of the trade, you have had to take no special precautions whatever in the shop, and that so far as you know the men have taken no special precautions?—Yes.

931. The only time you mix white lead in the dry state is when it is used for filling?—I do not think we use two hundredweights of dry white lead in the year. We use that for hard stopping.

932. You use it very seldom then?—I use the filling up that was introduced in the year 1870 by some French refugees from the Franco-Prussian war—they were fillers or enduiseurs. I have used that ever since.

933. Now, Dr. Collis referred you to a report of 1854 of what the Registrar-General said in connection with illnesses of painters at that date. Was there not a good deal of dry colour mixed in the paint shops at that time—dry white lead? Each paint shop was then practically its own grinding shop?—Yes, I believe the conditions were quite different from what they are now.

934. I cannot go back to that but I expect you will be able to?—Yes, I can go a long time back.

935. So that the conditions, generally speaking, of the trade are altered very much since 1854?—Yes, probably.

936. I think it has been proven here that the inhalation of dust is a great cause of lead poisoning. When you speak about scraping paint and burring off paint, do you mean that you scrape off the paint from window sashes that has been burnt by the sun without using any solvent?—Yes.

937. That causes dust. When you speak of burning paint do you mean burning by lamp or burning off by a solvent?—We use both.

938. Both terms are used to mean the one thing. In what proportion would you use the lamp to the solvent?—Three to one; I think.

939. The men are more exposed to the fumes of burnt-off paint in these processes during that time?—Yes I think so.

940. You do not think that the men require to soil their hands very much?—I do not think that they should.

941. You could not stipple a ceiling or a wall without soiling your hands?—I have not stippled a ceiling for years.

942. It is still done?—They are obsolete terms to me.

943. The man would be covered with a multitude of small spots if he did it; he could not do it without?—No.

944. It would require hot water to take it off. If the men only got half an hour for breakfast and were working in an empty house, who would provide hot water?—If I wanted hot water I could get hot water.

945. But you said in your examination that the men could get hot water. Now, I say if the men have only half an hour for breakfast and they require to get hot water in an empty house, how are they going to get it? Does the employer provide any facilities for enabling them to get hot water?—Yes.

946. That is what I want to know?—We generally send an apprentice to the job, and he puts the fire on and gets the hot water, and warms the men's breakfasts.

947. (Chairman.) You said "generally." Is it a specific order?—Yes. We always send an apprentice or, if it is a large job, one man is deputed to look after it. In an ordinary case we always send a boy to put the fires on and heat the water and warm the men's breakfasts.

948. Does the boy take coal and wood?—Yes.

949. Do you provide coal and wood?—Yes. If the men are at a country job near the cottage where they lodge, generally the landlady provides them with their meals and they go there. In nine cases out of ten the men get their meals in the houses where they lodge. It is only in isolated cases where they do not.

950. (Mr. Gardner.) Take an empty house in town where the men cannot get home for food. Would it surprise you to know that in not one case out of a hundred does the boy heat water for washing the hands?—I do not know what people do outside, but I know what I do in my own business.

951. But I am taking painters working on a job. The employer cannot always be on the job. It is a fact that in not one case out of a hundred does the boy, who is heating the men's breakfasts, heat the water for the washing of the hands?—He ought to do so.

952. But he has no orders to do it, and that is the danger?—That is the fault of his employer or the foreman.

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[Continued.]

953. That is what I wanted to get at. It is the fault of the employers because they do not do it. Do you use much sharp or flat for bringing up your work?—No.

954. Generally oil colour and varnish. In polishing that down with sandpaper, there is not a good deal of dust floating about?—No.

955. The particles stick to the surface of the sandpaper?—We do not use much sandpaper, as I have told you before.

956. In your establishment, no, but, taking the general rule of the trade, is it not the case that between coats the work should be sandpapered? It is only when you come to an enamel finish that you use the felt and pumice stone?—No. If we get it up in varnish colours we always use the wet process.

957. I am rather astonished. I am afraid that it is not a general rule in the trade. Paperhangers would be more apt to inhale dust than painters?—I quite agree with that.

958. Of course, it is a different class of dust?—Yes.

959. Is your sick fund a sick club or an accident fund?—No. It is merely a little fund; it is not much.

960. (Mr. Sutherland.) You have made a speciality of good work in your firm?—Yes.

961. You have a reputation for it all over the north of England?—I have.

962. You take a pride in it personally?—Yes.

963. So that that character which your firm possesses sustains what you have stated here?—Yes.

964. With regard to the difficulty that has been suggested in obtaining hot water on a job, is it not a fact that the men have control of the situation and they can, if they wish, get hot water?—Yes.

965. They have the buckets and they have the fire?—Yes.

966. And it really rests with the foreman or the men themselves, and if they wish to wash their hands in hot water they can do it?—Yes.

967. Then with reference to the general health conditions of a house painter, the daily work of 12 hours when working in the country is not 12 hours painting. It is 12 hours on varying jobs, is it not?—Yes.

968. Stripping?—Stripping and distemping.

969. And washing off, with open windows and pleasant surroundings?—Yes.

970. In the country jobs very often the meals are taken, as you suggest, in the cottages where the men lodge?—Yes.

971. Very often the cottages are near to the jobs in the country?—Yes.

972. And it is the wish of the men always on country jobs to work as long as they can?—Yes.

973. It is not imposed upon them by the masters?—No. They would not work on a country job unless they could work overtime.

974. Do your men complain of long hours at the instance of the masters?—No; the longer the better for them.

975. Another point that Mr. Parsonage asked you was about the stippling and flatting. The introduction of these non-poisonous paints in the way of washes and distempers has changed a good deal of the character of the work?—Yes.

976. And has done away with a good deal of flatting which was very injurious. If not poisonous it created headache and sickness?—I do not think we have flattened a ceiling once in the last six years.

977. The distempers are zinc paints, soluble in water?—Yes.

978. Have they superseded flatting to a very great extent?—Yes, and the operation of paperhanging as well.

979. Another point that bears on the question that Dr. Collis asked you about the Friendly Society's report of 1854 is this,—that the character of the men has changed very much?—It has.

980. Have they a very much higher character than the type of men we got 40 years ago?—Yes.

(Dr. Collis.) I gave you first the Registrar-General's most recent statistics, and then some of the oldest I could possibly get, to show that there was no difference in the last 50 years in the incidence of lead poisoning in the trade. I did not suggest that the painter of to-day was the same as the painter of 50 years ago; but I wished to give the extreme period over which I thought you might have experience—at both ends of your time.

981. (Mr. Sutherland.) The general type of painter is a very much superior man to-day?—Yes.

982. It used to be common years ago for half the men to be away on the Monday morning?—Yes.

983. Stopping off through drink?—Yes; 50 years ago it was a very common thing in the trade.

984. Less than that—30 years. It is not so now?—No; it was worse 50 years ago.

985. With reference to the Office of Works' experience of non-poisonous paints, do you think that four years is adequate to pronounce a judgment upon?—No, I do not.

986. What do you think would be adequate experience?—I do not know, I am sure.

987. (Lord Henry Bentinck.) For how long does your paint last in smoky cities?—I do not know. We have work now in Newcastle that we did fifty years ago in good condition yet.

988. Exterior?—I should think every three years an outside ought to be painted.

989. You say that an experience of four years by the Office of Works is no good?—I thought you meant with regard to the health of the men.

990. No. On the result of the work?—The weather would affect the paint.

991. If paint lasts four years, it has done fairly well on the outside?—Yes. I should like our customers to paint every three years, but four years would do perfectly well.

992. You said that the experience of the Office of Works which lasted over four years was not sufficiently long?—No.

993. You say that if paint lasts three years it does very well?—I say that an outside ought to be painted every three or four years. I should like it to be painted every three years.

994. In other words your lead paint is not calculated to last more than three years in a smoky city?—It depends on how many coats it has on and how it is done. If you give it one coat it will last for two years; if you give two it will last for three years; and if you give it an extra coat, it will probably last for five years. It depends entirely how the work is done. If it is carelessly done it will not last so long.

995. (Chairman.) You did not understand my question before, apparently. I will repeat it. If the Office of Works prove to the Committee that they have given non-poisonous lead paint four years' trial and it is proved to be in every respect as efficacious as lead paint, would you consider that that is a sufficient test and that the Home Office would be justified in prohibiting lead paint being used for exterior work?—All conditions being equal?

996. Yes?—All the results the same.

997. I put that as a specific and clear question with no equivocation or qualifications at all?—Well, I do not know, I am sure, what to say about that—the results being all the same and the conditions being all the same.

998. You surely could not, under the circumstances, object if it was proved to us on four years' trial that the non-poisonous paint was as good as lead paint?—What kind of paint would it be?

999. I do not care what it is. I simply call it non-poisonous paint; that is all?—Before answering that question I would like to know all the conditions.

1000. No, I want you to answer the specific question: If we are told that the non-poisonous paint is as good as the lead paint and that it lasts four years, would you say that this Committee were bound to prohibit lead in future?—Could you tell me what paint it was that was used?

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[Continued.]

1001. No. I do not want to go into that at all?—Well, I should say that four years' experience would not be sufficient.

1002. I say it with all respect that your answers to this question will not look very well in the evidence, because you told Lord Henry Bentinck that three years was about the average time that you liked paint to be renewed?—Yes, for outside work.

1003. When I tell you that the Office of Works have four years' experience you will not give me a direct answer?—I should like to know all the conditions.

1004. That is not a fair answer; with all respect to you, you decline to give me a direct answer to a direct question, and that must go down in the evidence and must be brought out in the report?—Well, I cannot help that.

1005. (*Mr. Sutherland.*) Do you think that there is any satisfactory substitute for lead as a paint?—I do not; I do not know of any. As I told you before, I have never tested these others. I have no experience of them.

1006. Is it not the fact that for the last 100 years chemists have been devoting their attention to the production of something that should take the place of lead?—Yes.

1007. And have they produced anything out of all the tests?—I do not know—not to my knowledge.

1008. I put this question because I do not think your answer should be characterised as unsatisfactory. You do not think that the four years' experience of the Office of Works without any knowledge of the conditions under which the work was carried out, is sufficient to set aside the practice of a hundred years?—No, it is not.

1009. Then you are in favour of enforcing some regulations in the practice of the trade to minimise the ravages of lead poisoning if it can be done?—Yes, I quite agree.

1010. But the difficulty is the difficulty of oversight, is it not? A staff of men are distributed all over the country and the employer is in the hands of his foremen, and he has to depend in the last resort on the character of the foremen for the enforcement of these things?—Yes.

1011. If no regulations can be devised and put in operation to mitigate white lead poisoning, what would you say?—To begin with, what I should like to see is the re-establishment of the apprenticeship system, by which boys could be trained up, not only in the trade, but in how to deal with paint and keep themselves clean and do their work in a cleanly manner. These boys would be trained up to be cleanly workmen, and precautions ought to be taken by all employers to see that their work is carried out in a cleanly way and to use the wet process as far as they possibly can. That would mean, of course, an increase in the price of the work, but that increased price has never stopped me from doing good work. The cost of the work has never been a question with me—as to whether I could save a little by using sandpaper for pumice stone and water. The wet process is the most expensive process, but it produces the best results and you leave your work to speak for your character after you have left it.

1012. (*Dr. Collis.*) The apprenticeship system was in vogue 50 years ago?—Yes. It was more in use then. I have indentures going back to 1812.

1013. I have already quoted figures of 50 years ago to show that this trade was one of the foremost of the dangerous trades then known?—I do not know that. I have no statistics.

1014. I have them here. I quoted them to you?—Yes.

1015. So that your remedy, perhaps, would only put things back as they were 50 years ago, when it was recognised as one of the foremost of the dangerous trades?—That is so.

1016. (*Mr. Sutherland.*) It is the practice for men to wash their overalls every week, is it not?—Yes.

1017. You would not allow a man to start with dirty overalls?—No, we would not allow him to start.

1018. The question of mixing does not apply much to the painters' shop, does it?—No.

1019. There is very little mixing done in the painters' shop?—Very little.

1020. It is done on the job?—Yes. The paint shop is a store shop.

1021. Is there not a provision in most of the working rules between the masters and the men that they shall have hot water provided? In the working rules between the employers and the operatives in towns, that is a specific rule that is put in?—Yes.

1022. They must have hot water provided and time allowed for washing?—Yes, in some of them.

1023. It is so in Manchester?—Yes.

1024. If it is not in Newcastle, it is the fault of the men in not providing for it?—We always provide it.

1025. (*Mr. Parsonage.*) There seems to be a tendency to put the blame on the foreman that he does not allow the men to get the hot water. If definite instructions were issued from the employer to the foreman that the men were to be allowed reasonable time to wash their hands, has the foreman any object in preventing the men having the hot water?—He could not prevent them.

1026. Would he have any reason to prevent them?—No.

1027. The reason why the hot water is not provided is that definite instructions are not given by the firm that at reasonable times hot water must be provided?—I do not know what other people do; I only know what I do myself.

1028. You would say that, if it is not provided in your shop, you would blame the foreman?—No; I say if a man wants hot water he can get it. If I want it, I can get it.

1029. But it is left to them to do it. If an employer came on a job, and he found the men two or three minutes to one washing their hands, what would he say to the foreman?—I do not know.

1030. What would you say yourself?—I am always glad to see them washing their hands.

1031. But I mean before the time. They have half-an-hour for breakfast, and have to go to the cottages to get breakfast in half-an-hour. You would not allow them to start at five minutes to eight to wash their hands to remove the paint. They must do it in their own time?—I would not object.

1032. In your time?—Yes, in my time.

1033. In nine cases out of ten, the employer would get on to the foreman and say: "What right have you to allow these men to be washing their hands before time?" That is a fact, is it not?—I know nothing outside. I do not know what other people do.

1034. But it is probable?—Yes.

1035. A foreman is a workman to-day and a foreman to-morrow?—Yes.

1036. He is a man just in charge of the work?—Yes.

1037. The inference is this—he is so anxious to further his employer's interest that he makes an enemy of all the men he is working with?—Those points are too fine for my comprehension.

(*Mr. Parsonage.*) You are trying to put the whole of the blame on the men put in charge of the job. I say that it is because the employer refuses to allow proper facilities to be provided and that is an undoubted fact.

1038. (*Chairman.*) I suppose there are a certain number of new houses you send your men to where there are no appliances for hot water or any water?—It does not matter where the men are they can get hot water, and they do get it.

1039. (*Mr. Parsonage.*) They would require that in the trade for melting size, and so on?—Yes.

1040. (*Chairman.*) They must have it?—Yes. Coal and firewood are sent on to all the jobs.

The witness withdrew.

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Mr. GEORGE DOBSON PATTERSON.

[Continued.]

Mr. GEORGE DOBSON PATTERSON examined.

1041. (*Chairman.*) You attend here to-day from the Office of Works?—Yes.

1042. What is your position there?—Clerk of Works in charge of the Western District.

1043. Can you tell us how long the Office of Works has been interested in non-poisonous paints?—For about nine years.

1044. Have experiments with lead substitutes been going on for that period?—Yes.

1045. Have you had to do with those experiments?—Yes. I have been in charge of them under the instruction of the principal architect, Sir Henry Tanner. I have personally carried out the painting of test boards in order to ensure the uniform application of the paints being employed.

1046. I suppose Sir Henry Tanner chose you to give evidence before these Committees because of your intimate acquaintance with the experiments which have been made?—That seems a reasonable assumption.

1047. Have you had a long experience of painting work?—I had a year in coach painting shops. I have had 20 years in the supervision of new buildings, and the last eight years in the maintenance of the Crown buildings in the western part of London, and special interest in paints.

1048. Can you give us some idea of the magnitude of the painting operations which the Office of Works has to deal with?—Yes. The contract for paints amounts to something like 5,000*l.* a year, and the cost of preparing for and applying the paints will run to about 17,000*l.* or 18,000*l.*

1049. Where is this painting done?—In all parts of the world.

1050. Mostly in the British Isles?—Chiefly in Great Britain.

1051. Will you tell us roughly what places the Office of Works has in its charge?—The Palaces, the Houses of Parliament, the Government Offices, the Crown Courts, Post Offices, and Inland Revenue Offices, in Great Britain; and the Foreign Consulates.

1052. Do the conditions in these widely distant places vary very much from the point of view of paint suitability?—Yes; we have to meet almost every conceivable condition.

1053. What quality of paints do you use?—Broadly, we have three grades.

1054. In what situations and for what purposes do you use the lowest grades?—For ordinary external painting, and for the lower class interiors.

1055. Where do you use the other qualities?—We use the medium enamels for general interiors, and the best enamels in the better class rooms only.

1056. What are the chief reasons why some paints are dearer than others?—The quality of the oil and the quality and the amount of the varnish, for instance, are important factors.

1057. Has the pigment—white lead, zinc oxide, lithopone, or barytes, or whatever it is—much effect on the price?—Yes. The pigment constitutes roughly half the paint, and as pigments differ widely in price, the price of paint is relatively affected.

1058. Are your remarks comparing zinc oxide paints with white lead paints likely to require modification according to the different grades of paint?—No. What I have to say applies about equally to the various qualities in similar shades of lead and zinc paints. They would be approximately the same, and we buy them at the same price.

1059. Are there any objections to lead paints apart from their poisonous effects?—Yes. The defects are discoloration by combining with the sulphur in the atmosphere, and chalking in chemical and seaside atmospheres. It has a great tendency also to blister and scale very much on hot pipes and surfaces.

1060. Have there been many difficulties in your quest of non-poisonous substitutes?—Yes.

1061. Have you had serious opposition from paint-makers?—No. They naturally lean a little to the lead, of which they have had long experience, but most of them now make zinc paints, and the qualities of these are improving with experience.

1062. Have the workpeople themselves appreciated the efforts made to lessen their risk of ill-health?—No. We have had little help from the painters, and much disinclination to face any change. They do not realise, it is feared, the danger to themselves in using lead.

1063. What substitutes for lead paints were available nine years ago?—Commercial enterprise had already introduced to the paint trade cheaper substitutes for white lead, such as lithopone, and others, but zinc oxide then, as now, is the only serious competitor with lead, though others are doubtless possible.

1064. Will you please describe the main characteristics of zinc oxide?—It is a fine, white, easily worked paint base, non-poisonous, and practically permanent in colour. It has been found particularly valuable in chemical and seaside atmospheres, and makes whiter and better enamels than were possible with white lead.

1065. Were the zinc oxide paints satisfactory when first tried?—No. When these paints were first used in 1902 by us they were too slow in drying; but their chief defect was lack of opacity, needing three or four coats to equal two of white lead paints. They were far from satisfactory when first tried.

1066. Where were they obtained?—From the usual paint-makers, or in some cases they were mixed by the ordinary painters, who were treating zinc oxide according to their experience of white lead.

1067. Did not zinc oxide respond to the treatment appropriate for white lead?—No.

1068. Then your earliest experience of zinc oxide was not very favourable?—No, partly because the workmen did not understand the material, and partly because we did not get good paint at first from the ordinary makers.

1069. Were you experimenting at about this time?—Yes. The principal architect was already having elaborate comparative tests carried out on the iron plates of the Patent Office roof in Chancery Lane in paints of various makes, some of white lead and some of oxide of zinc base. At his request a systematic study of the subject of a non-poisonous substitute for white lead was begun at the Savings Bank in 1906.

1070. Did you make up trial paints yourselves?—Yes, and it was soon discovered that when zinc oxide was mixed with refined boiled linseed oil, with the usual thinners, and a trace of litharge and borate of manganese driers, such paints dried quite well.

1071. Was the initial lack of opacity remedied?—Yes. It was further found that thicker zinc oxide paints could be used quite freely, in fact with as much as 60 to 70 per cent. of zinc oxide, and that when so used they were of equal opacity to the usual white lead paints. Moreover, while at least three coats of paint have generally been given on bare plaster walls, many post offices in the western district of London have been successfully painted with two coats of zinc paint.

1072. Then when you got to understand zinc paint a little better you were actually putting on less coats of it than you would require of white lead?—Yes.

1073. Did you use the same mixtures for finishing as for undercoats?—No. It had long appeared that the best paint for undercoating differed materially from that of a best finishing coat. After many trials, therefore, and much investigation, a specification of zinc oxide paint was drawn up, embodying the general results of our experience for undercoating, and finishing in white, brown, and green as representative colours.

1074. Have paints to these specifications been used on a large scale?—Yes. In 1906, as the paintings became due, the Crown buildings in the Savings Bank district were painted with these oxide of zinc paints, and since 1907 zinc paints have been used generally. Since that time systematic observations have been made, and records kept, of the various makes and compositions of paints used.

1075. Do I understand that you have complete records of all the paints used since 1906?—Yes, in the western district, with which I have had to deal.

1076. How much of the paints you have used in the last four years has been based on lead?—Only a

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Mr. GEORGE DONSON PATTERSON.

[Continued.]

small proportion for primings on new work, and red lead used on iron.

1077. What proportion of all the paint used in the last four years has contained more than 5 per cent. of lead?—Probably about 10 per cent. of the paints have contained more than 5 per cent. of lead.

1078. What quantity of lead did that 10 per cent. contain?—Some of it would probably contain, as, for instance, in primings, chiefly white and red lead, and the other part of it, for iron work, would probably be almost entirely red lead.

1079. What are the chief results of your experience of zinc oxide paints?—Our experience is that zinc oxide as a paint-base is a good substitute for white lead for most ordinary purposes in white and kindred shades. In colour and wear it has stood very well internally, and also externally where used on old lead paint, with slight exceptions.

1080. Have you not used zinc paints on new work at all?—Yes, on bare plaster walls we have used a good deal. We have also used zinc paints on wood and iron in both internal and external situations on new buildings since 1907.

1081. Why has most of your zinc painting been done over old lead paint?—Because most of the painting work needed was on buildings previously painted. The new buildings since we have been using zinc paints are, of course, only a fraction of all the buildings we paint.

1082. Have you used lead undercoats in your zinc painting?—No. In the case of old work we prepared the surfaces originally painted with ordinary lead paints, and then applied the full two or three coats of zinc paint. The undercoats were zinc paints as well as the finishing coats.

1083. What do you mean by "preparing the surface"?—Washing and rubbing down generally.

1084. The zinc painting on new work which you have done totals a considerable amount, I suppose?—Yes.

1085. Would you go so far as to say you are confident from your own knowledge that you can get as good effect from zinc oxide for white and kindred shades as from a lead-base?—Yes.

1086. Suppose there was any doubt in your mind on this question, would the addition of say five per cent. of lead compounds remove all shadow of doubt as to its absolute ability to take the place of lead?—Certainly.

1087. Do your remarks apply equally to white and to coloured painting?—Not as regards external work. The greatest difficulties have not been experienced in the white and kindred shades of paint, but in the total abandonment of white lead and lead salts generally in the dark colours.

1088. I want to get this quite clearly. Do I understand that you have purely zinc paints now which are perfectly satisfactory in all colours for interior work?—Yes, with a few exceptions in damp situations and dark colours.

1089. Are they equal to the lead paints they have displaced?—Yes, with the above exceptions, and these we find can be overcome by the addition of a little lead.

1090. What added quantity of lead do you suggest?—For stability, something like 5 per cent.

1091. Not more?—Not more—apart from colour.

1092. Now as regards exterior work, do the zinc paints in the white and light shades give full satisfaction?—Yes.

1093. But for the darker colours only in the case of exterior work your zinc paints are not at present all you wish?—No.

1094. Are these darker paints an important part of the work? Do they constitute a large proportion of the total or not?—They are not more than perhaps 15 per cent. of the whole.

1095. Are the deficiencies of this one particular paint very serious?—No, the deficiency was not very serious; it amounted to a softening after a winter's exposure to the weather, which had not appeared in lead paints, and our desire was to get as good results as we had been having.

1096. Have you been investigating the reason why this solitary result was not so entirely satisfactory as the others?—Yes.

1097. What zinc oxide have you used? Was it derived from the metal or direct from the ore?—Chiefly zinc oxide by indirect process from the metal, used, but a little by direct process from the ore.

1098. Have you taken any precautions as to the fineness of the grinding?—No precautions have so far been necessary, zinc oxide being generally very fine, but iron oxides, siennas, browns, and blacks are often coarse, and there is much to be desired in the way of agreement in the trade of a definite standard to which all pigments shall be ground.

1099. Was any oil other than linseed oil tried?—Yes; paints with Chinese Tung oil have been tried with success.

1100. Have you varied the driers used?—Yes; and, so far, the use of a litharge and borate of manganese drier has given the best results.

1101. What percentage of lead compound in the paint does this represent?—About 1 per cent. as drier, but great improvement has been found from the addition of lead oxides as pigments in dark browns and greens up to about 4 per cent.

1102. What is about the proportion of lead salts usually present in zinc oxide derived direct from the ore?—From one up to four or even more, according to the character of the ore used.

1103. If 4 per cent. of lead salts in the pigment is allowed, would your difficulty with the darker shades for outdoor painting disappear?—Five per cent. would dispel it so far as stability is concerned.

1104. Why do you qualify your answer by saying "so far as stability is concerned"?—Because lead compounds may be needed and may be found necessary beyond the 5 per cent. for the production of dark greens, as in lead chromates. They are rather popular, are the greens nowadays, and there is the difficulty.

1105. Could you use zinc chromates instead?—They would be more expensive, and so far they have not been found so satisfactory or so opaque or so fast, but that might be got over possibly by chromium oxide or other substitute.

1106. It is only in the dark shades of outdoor paint that you wish to have any lead compounds at all?—Yes. We can get very good paints in all shades with a maximum of 5 per cent. of lead except in the dark greens of which I have spoken.

1107. You have told us the present position of the Office of Works' paints, namely, that zinc oxide pigments practically free from lead are being satisfactorily used in all cases except for certain of the darker shades of exterior paint, in which you prefer lead compounds to a limited extent. Will you please give us your experience of the vehicle appropriate to the pigment?—The character of the medium by means of which paint pigments are spread and covered is of equal importance, we think, with any other. Refined boiled linseed oil is doubtless one of the best mediums for zinc oxide paints, both because of its colour and superior drying properties.

1108. Is this good both for under-coats and for finishing coats?—It is good for under-coats, but it makes the paint rather rosy and of uneven surface if used alone as a finishing coat medium.

1109. Can this royness easily be avoided?—Yes, it is effectively overcome by the addition of a certain proportion of good oil copal varnish, which improves the appearance and protective power of the paint, and gives it a flow. The proportion of varnish used may vary considerably according to pigment, quality of varnish and purpose of the paint.

1110. What proportions have you found to answer best?—In the tests carried out for exterior paints one part of varnish to three of oil were found to give the best results with zinc oxide, while for iron oxide and other dark paints, one of varnish to two of oil were found best for a protective gloss paint.

1111. Do you consider any other oils equally good with zinc oxide?—Yes; Chinese Tung oil is largely and successfully used in America, China, and Japan, and increasingly in England, as a paint medium. It

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dries with a hard, yet elastic, film, and our experiments show that paints in which this oil displaces linseed oil as a medium are superior to any other as protective paints, the pigments being equal.

1112. Then, to make a satisfactory paint, you attach considerable importance to the vehicle as well as to the pigment?—Yes, a good paint depends on many factors, not least on the quality and condition of the materials used, and an analysis, though helpful, gives little or no indication of the quality of the constituents, nor the amount or class of varnish or oil used. The physical test is the only one which can be regarded as reliable and final in estimating the worth of a paint.

1113. Will you please tell us the comparative costs of zinc and lead paints?—Zinc paints cost us the same as lead in the market.

1114. In the cases where you used two coats of zinc instead of, as formerly, three of lead paint, it would work out cheaper, I suppose?—Yes, about 2½d. per yard in the saving of a coat.

1115. If the use of lead paint were prohibited, should you expect the price of zinc paints to rise on account of increased demands?—No; I think there would be no difficulty on that score. There would simply be an increased production of zinc oxide, provided that due notice were given of the change to be made.

1116. Do you think there would be any supreme difficulty in the application of such a prohibition? Would there be great inconvenience in transferring from lead to zinc paints?—No, but there would be likely to be much prejudice to meet. But what other countries have done in this way should not be difficult for us to follow in the interests of the workers.

1117. Would you, from the point of view of the great Department you represent, consider it a dangerous thing to introduce the prohibition of lead paints?—No. I would rather welcome it within the limits previously stated. We have been expecting such a step for some time, hence the purpose of our experiments.

1118. To sum up your evidence, the Office of Works has for some years been using paints practically entirely free from lead?—Yes, with the slight exceptions named.

1119. On the whole these paints have been decidedly successful for interior work and also for exteriors, and the cost is about the same as the cost of lead paints?—Yes.

1120. You would prefer for the present, at any rate, to be allowed a lead content in some of your paints not to exceed 5 per cent.?—Yes, and if 10 per cent. could be allowed in the dark greens (that is the chromates) even that difficulty would be overcome. Chemistry, I think there is little doubt, will overcome that as it has done many other difficulties of the sort. They are all feeling after it.

1121. Are you of opinion, with all your great experience, that, except for this limit, the use of lead paints might very well be compulsorily abandoned?—Yes.

1122. What you have told us is the result of your own practical demonstrations?—Yes.

1123. (*Sir Godfrey Baring.*) You spoke at the beginning of your evidence as to a certain disinclination you had found amongst workmen to use zinc paint. Do you think that that disinclination comes from the fact that it is new or from any practical difficulties in manipulating the paints?—Probably from our inherent conservatism; and that, where we have had experience of a thing, we are more or less loth to embark on experiment unless we are impelled by some force—self or other interest. If the painter does not realise his danger, he is very apt to put any little failures down to new material.

1124. There is no special difficulty in using zinc paints?—No.

1125. No practical difficulty?—No.

1126. Do you find that zinc paints are specially adapted for exterior work in London and in manufacturing towns where there is a great deal of smoke and sulphur in the air?—Yes.

1127. You say you can get almost better results in manufacturing towns than from lead paints for external use?—Yes.

1128. Do you find that there has been improvement in the quality of zinc paints recently?—Yes, a steady improvement.

1129. Do you think that that improvement will probably continue in the future?—I think so.

1130. There are still improvements to be made in the manufacture?—I think the improvement will continue as we become more acquainted with it.

1131. Speaking generally, you think your experience has been sufficient with the zinc paints to speak with authority as to their value. You think you have had sufficient experience for that?—We feel convinced of that or we would not continue it. Ours is an intensely practical Department.

1132. (*Dr. Collis.*) Do you keep any statistics at all of the amount of illness that occurs amongst the work-people of the department?—No. The contractors take all responsibility for that under the conditions of their contract, and when a workman falls out of the ranks we know nothing of it. They have to take any burden in that way.

1133. So that you do not know what the contractors pay for insurance?—No.

1134. (*Mr. Sutherland.*) How would you define zinc oxide or zinc paints? For instance, if the Office of Works specified lead paint they would term it "genuine white lead." Could you specify anything parallel to that in referring to zinc paints?—Yes; we do specify it now—pure oxide of zinc with a certain amount up to, I think, in our present specification, half per cent. of impurity.

1135. Is zinc oxide paint genuine zinc oxide with no adulterant—no carrying matter?—It is a good deal a matter of percentage or chiefly a matter of the percentage of lead that goes down in the precipitation.

1136. I do not mean the structural percentage of lead—that comes into it.—but I mean the mixed paint. If I went into the open market and ordered zinc paint, I should get probably 70 per cent. of barytes or sulphate of barium in it as carrying matter?—Not if you stipulated or specified a pure zinc paint any more than with lead. You are no doubt familiar with the fact that you are getting, in the same spirit of adulteration, a good deal of barium sulphate in place of your white lead.

1137. Not if I specify genuine white lead?—If it is genuine white lead no, and just the same if it was genuine zinc oxide, within say, half per cent., or within say, 5 per cent. you would expect to get it. You would get it only if you saw you got it.

1138. There is a margin. Does the Government in its specification impose an absolute test of the purity of zinc oxide in the paint it gets?—Yes, we have been specifying that we should have pure zinc oxide when analysed with not more than half per cent. of impurity.

1139. Would you call 3 or 4 per cent. of lead salts an impurity?—I would extend it up to five, I would allow that in my definition of pure zinc oxide paint.

1140. I have had no experience myself, but I am talking of pure zinc oxide and adding something to get body to it?—I think the highest grades of zinc oxide come to within the half per cent. that I have been speaking of.

1141. I should take that as a pure zinc?—I think you may take that as a pure zinc. We have been using that and find we get very good results.

1142. Have you not to use it very stiff?—Yes, it is used stiffer. There is a greater bulk of pigment not weighing so much. It is perhaps a little stiffer to use, but the nature of the pigment is vastly different from lead and it goes on greasily and easily.

1143. Greasily and easily are distinct terms. It is the fact that it goes on greasily that the painter objects to?—I found no objection.

1144. I am not thinking of Office of Works painters; but where zinc paint has been introduced it is the very fact of it slipping over the wall that has created prejudice on the part of painters?—We have not found that that has been so. We have found they complain

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sometimes when we have increased up to 70 per cent. that it began to get stiff for the elbow; but for paint round and about 60 to 70 per cent. we have not had such complaints.

1145. Seventy per cent. of what?—Pigment.

1146. And the rest what?—Medium.

1147. What do you call the medium?—The oil or varnish, with turps as thinner.

1148. If you put lead in the hands of 50 men promiscuously gathered together, they can mix it from their general knowledge and familiarity and it will work right. That is the great advantage of it. If you put zinc and gave them all the materials to mix it, probably only one in 50 would mix it correctly so that he could use it?—Naturally, because the material is new to them. They have had experience in one case and not in the other; but time will mend that.

1149. That raises the question—provided the Government want to make this change and to enforce it, what length of time would you consider sufficient? We know that in France the men work this as simply as we work lead, but it is because they have been trained to it almost from apprenticeship. Our men, speaking generally, of the painting trade throughout the country have not been used to it. It is quite a new thing to them, and to force it on them would be not only a serious thing to lead manufacturers (we are not concerned with them) but it would prejudice the men themselves in their trade, though it might improve their health. It would certainly prejudice the position of the masters with their customers until they became masters of the material. What term do you think the Government ought to allow for the change?—I should think anything from, say, two to three years.

1150. You cannot change the habits of a trade and of men in middle life with confirmed practices in two years?—I said two or three.

1151. Or three?—But I would remind you that apprenticeships are usually for five-year terms, and when I remind you that this is only unlearning or learning something in a particular direction and not the whole of the trade and that you have all the assets of a man's experience as an advantage, whereas an apprentice has no knowledge at all, I think anything like two or three years would be sufficient to familiarise the paint trade with the new introduction. And I would remind you further that this familiarity or this experience has already begun. We are considerably advancing in that direction. Many of the paint manufacturers are using not the old lead but a mixture of the two things, and they are gradually leaning over to the other direction.

1152-3. Prepared paints for the last few years have come on to the market and they are mixed by the manufacturers?—Yes.

1154. I get six samples of non-poisonous paints, and the proportions are these: zinc about thirty—I am not confining myself to fractions—and carrying material in the way of sulphate of barium about sixty, and then the oil. The difficulty appears to me to be this, that if the Government insists on this in their specifications we should have to convince contractors and the architectural profession. As a rule it is white lead and pure linseed oil that is specified. It would have to filter down through those channels to the public before you could make a definite change, and I do not think it could be done in three years?—I do not quite gather the change you are hinting at. If the prohibition were only that there should not be more than a certain percentage of lead, that would leave the paint trade free to use any non-poisonous material there might be. It would allow chalk or anything you liked to put in so long as it was non-poisonous and the lead salts did not exceed 10 per cent. at the outside.

1155. I want to know, can they (either the Government or architects) by specifying "pure zinc oxide" get a satisfactory paint?—Yes.

1156. Without qualification?—If they specified definitely the paint they want. We have been specifying it. We did not find that either genuine white lead or genuine zinc was sufficient. We had to give some

more specific indications of what we meant in the composition of the paint.

1157. That is one of the difficulties that would ensue on any prohibition of white lead. I foresee that it would take time to educate the profession and the trade, and to be fair to the manufacturer?—It is all a matter of price and of letting people know what you want, and of paying for it. May I say that in making an estimate of the time it is fair to discount the fact that everybody has not been anticipating this as we have, and if the time is too short, that is for the Committee.

1158. (Mr. Gardner.) Do you think that the disinclination to use zinc oxide exists among employers or among the men?—We have not hitherto asked employers what they thought. We have put in our contract in the first place, lead and zinc, and then we have specified in the carrying out of our orders what the paint shall be, and we have left the contractor no option but to supply it.

1159. You found that the practical painter at once adapted himself to the new material?—Not altogether. We found that a certain amount of that innate conservatism in all of us was manifest in him also, and that he was perhaps inclined to blame for any fault that might be found, the new material rather than anything else.

1160. But not more so than if he was getting a new enamel to use?—I am afraid that his disinclination has arisen from the fact that he does not appreciate the poisonous nature of the material which he has been using and has been brought up to.

1161. It is not a great difficulty. He would not need to learn a new trade. Dr. Legge told us the other day that practically the painter would require to learn a new trade to use zinc paint. Do you agree with that?—No.

1162-3. What about a substitute for lead (either white lead or red lead) on stucco and ironwork?—That is a very important question. I have carried out a series of experiments upon tanks (inside cast iron tanks), and you probably follow me when I say that the line by the fluctuating surface of the water is one of the most difficult places for a paint to be got to stand upon, and in that case we have found red lead little better than many other things. Probably a mixture of several things is better than any one. We have found, and that was what my answer particularly denoted, that in the presence of water and on ironwork we have been driven to attach more importance to the medium than to the pigment.

(Mr. Gardner.) That just brings me to this; it is usually said that red lead is the best article to put on outside ironwork. I attach more importance to the medium. I experimented on iron in my own house with red lead made up in the usual form and with white lead made up with steam boiled oil, as we call it, instead of refined boiled oil. I found that the white lead lasted much longer than the red lead.

1164. Do you not think that in painting your walls two coats, the refined boiled oil also had a good deal to do with the wearing properties?—Probably, and also the way in which it was put on. Some firms in London here have been feeling after this for many years, and all credit is due to them.

1165. Have you not found that anilines are very dangerous for painting over afterwards. They strike through, no matter what you put on top? We do not find that in the reds. We get splendid reds now.

1166. But if you paint on the top with another colour, do you not find that they strike through?—We have not found any difficulty. This bleeding is no longer a difficulty.

1167. That is one of the difficulties a painter has to contend with just now?—It has been a very difficult matter. They have flown, they have done all sorts of things, but these last two or three years we have been getting very satisfactory reds.

(Mr. Gardner.) Our experience in the trade has been what I have put.

1168. (Mr. Parsonage.) A good deal of your work is sublet, is it not, the palaces and so on?—No. The

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contracts up to 300*l.* are all done under one general schedule. In the London district, for instance, Messrs. Mowlem have employed their own men.

1169. The work done by White and Allan at Buckingham Palace would come under this head?—There are special contracts over 300*l.*

1170. The best work?—Either best or ordinary; if it came over 300*l.* there is a condition in our contract which states that the Commissioners shall be able to call for competitive tenders above a certain amount, and those you refer to might probably come under that head.

1171. Do you specify zinc white in any of what I term the best work in Buckingham Palace done by outside firms?—I have not had Buckingham Palace under my charge, but the whole of our specifications now stipulate for zinc oxide paint.

1172. Would that apply to an outside firm that contracts for the work?—So far as I know that would obtain also with all contracts.

1173. Up to three years ago the best rooms of Buckingham Palace were done by outside firms and they were done with ordinary white lead. There were no requirements by the Office of Works that any non-poisonous substitute should be used; and I should have thought that as this was expected to be the best work in the best rooms, surely they would have stipulated for it being used if it is so much better. That was up to three years ago?—I have no personal knowledge of that so I cannot reply.

(*Mr. Parsonage.*) And Marlborough House the same; the stipulation there was for genuine white lead. I should have thought they would have stipulated for the other if it is so much better.

1174. (*Chairman.*) You speak of Government specifications. May we have a specification of such paint as you find satisfactory put in?—I submitted that in the following table:—

SUGGESTED COMPOSITION OF OFFICE OF WORKS STANDARD PAINTS, 1911.

| Description.                 | Zinc Oxide. | Chalk, Silica, or Barium Sulphate. | Lead Compound. | Lead Oxides Litharge. | Prussian Blue. | Iron Oxides. | Refined Boiled Oil, Driers, and Varnish. | Best American Turps. |
|------------------------------|-------------|------------------------------------|----------------|-----------------------|----------------|--------------|--|----------------------|
| Ivory white undercoat - - -  | 58          | 10                                 | —              | —                     | —              | —            | 17                                       | 15                   |
| Finishing coat - - - - -     | 56          | 2                                  | —              | —                     | —              | —            | 36                                       | 6                    |
| Brown T 12 undercoat - - -   | 20          | 10                                 | —              | 3                     | —              | 15           | 37                                       | 15                   |
| Finishing coat - - - - -     | 3           | 5                                  | —              | 4                     | —              | 22           | 60                                       | 6                    |
| Green No. 49 undercoat - - - | 20          | 10                                 | 6              | 2                     | 2              | 8            | 37                                       | 15                   |
| Finishing coat - - - - -     | 3           | 8                                  | 8              | 3                     | 2              | 12           | 58                                       | 6                    |

1175. (*Mr. Parsonage.*) Have you had any experience with zinc paint mixed with raw linseed oil. You have spoken of boiled oil all the time?—We have only tried it once, and we found that it did not dry at all. The drying properties of the oil are an immense factor; much more so than in the case of lead; and you have to unlearn the mixing of raw oil with the pigment in the case of zinc.

1176. It would therefore be no use in coach painting at all?—I am afraid raw oil and zinc oxide would be useless in coach-painting.

1177. (*Mr. Fell.*) Is the experience of the Office of Works based on London only, or have they any experience of seaside places or anything like that?—One of the questions already answered covers that, that we deal with the whole of Britain in our control, and the whole of the Government buildings accordingly at seaside and other places have been dealt with in this way.

1178. So that your standard specification is based on a sort of general experience and not local experience in London?—Exactly.

The witness withdrew.

Mr. THOMAS JORDAN examined.

1179. (*Chairman.*) You are attending here to-day to give evidence regarding the painting department of the carriage and waggon works of the Midland Railway Company, Derby?—Yes.

1180. What is your position there?—I am the chief foreman painter.

1181. What experience have you had in the painting of railway carriage and waggon rolling stock?—About forty-five years, on the London and North Western and the Midland Railways.

1182. Do the Midland Railway Company use any white lead for carriage or waggon painting?—Not at present.

1183. How long is it since the use of white lead was discontinued?—Six or seven years.

1184. What has been in use during the last six or seven years as a substitute for white lead?—White zinc.

1185. Do I understand that to mean zinc oxide and zinc sulphide?—Yes, both.

1186. Has this paint, in your experience, proved equally as durable and as good in other respects as white lead paints?—It does at present for our purposes.

1187. Has the substitution of zinc paints for white lead stamped out lead poisoning at the carriage works at Derby?—Not entirely.

1188. Have the cases been much fewer?—Much fewer. From 1900 to 1905 we had 30 cases. We

were then using principally white lead with a small portion of zinc. From January 1st 1906 to December 31st 1910 we have had four.

1189. How do you explain the fact that there are any lead cases now-a-days?—I cannot explain it, unless it was in the system and developed itself afterwards.

1190. Do I understand you to mean that some lead colouring matter is used sometimes?—No, we do not use that.

1191. Could you account for these cases of lead poisoning by the fact that old carriages and waggons, painted before white lead was given up, come from time to time to be scraped for painting?—No. I should attribute it more to this, that the cases were cases of men who had been employed and perhaps had been using lead paint elsewhere. I can give you an example, if you like.

1192. Yes, please do so?—We had two cases: one was that of a gas fitter who had not used any lead at all since he came to us a few months ago. And another was that of a painter who, previous to coming to us about nine months ago, had been engaged by a builder and had been using lead largely for the builder. Both of those men were scheduled as suffering from lead poisoning, but they had used no lead with us.

1193. I quite follow. You would naturally expect—in fact there can be no question about it—that if you discontinue lead your employees cannot get lead poisoning?—Certainly I do.



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1194. I understand that you are prepared to give evidence with regard to the various processes of coach-painting in detail, including the preparation of the woodwork?—Yes.

1195. Can you tell us, with regard to jointing, whether lead is still used in the Midland carriage works?—No, it is not.

1196. What do you use instead?—It is called jointing paste, and it is composed of zinc oxide and barytes.

1197. Is that satisfactory for the attachment of ironwork to the under-frames of vehicles?—Yes, quite so.

1198. Will you please describe the priming process?—That is two coats of colour prepared from zinc and vegetable black.

1199. Is there any difference between the behaviour of zinc and lead paints when used for priming?—None whatever.

1200. What are the next coats of paint called?—Filling up.

1201. What material do you use for filling?—It is an earth consisting of silica and alumina chiefly, with the natural adulterants that are found with it. It largely consists of silica and alumina.

1202. Do you find leadless filling to be entirely satisfactory?—Yes. We put zinc into the filling that we use, not lead.

1203. And it is quite satisfactory?—Quite satisfactory. It is a very good filling.

1204. Will you tell us what you understand by stopping?—That is a thick paste which is used for filling up holes.

1205. What material do you use for stopping?—White zinc.

1206. Do you find that it is quite as satisfactory as the lead stopping previously used?—Quite so.

1207. Will you tell us in what way the rubbing down between successive coats of paint is done in the Derby carriage works?—With sandpaper.

1208. Will you now describe the method of applying the finishing coats, and the materials used?—After the second or third coat of lead colour (I am not speaking now of lead but of the zinc tinted with black) is applied we give it a coat of what we term lake grounding; that is an iron paint consisting of about 97 per cent. of iron oxide; and afterwards we give it three coats of lake, which consists of cochineal and a paste which is alumina.

1209. And last of all does the carriage body receive a coat of varnish?—Four coats of varnish.

1210. Why do you varnish?—To preserve the paint and to produce a smooth surface for cleaning purposes.

1211. And I suppose that it improves the appearance?—Certainly it improves the appearance, but it is also a preservative.

1212. Would the paint be durable in bad weather conditions if you did not give it a protective layer of varnish?—No.

1213. Do you use leadless paints also for the lining and for decoration?—Yes; for lining we use vermilion, which is composed of mercury.

1214. Are you able to dispense with the use of lead even for sign writing?—Yes; we do not use lead at all for any purpose.

1215. I mean for painting on waggons not varnished?—We do not varnish the waggons. We rely on boiled linseed oil for protection there.

1216. Do you use much paint that is thinned with turpentine?—Yes, all the paint is thinned with turpentine for carriages.

1217. Is the grinding and mixing of the various paints entirely under your charge?—Yes.

1218. What are the principal colours used in the Midland carriage works?—White, black, brown, yellow, lake, vermilion; and umbers, ochres, and siennas. I think those would be the principal colours.

1219. Do you use any green?—No.

1220. And in all these cases are the Committee to take it that you have found it quite practicable to dispense with the use of lead?—Quite.

1221. Have you found the leadless paints as durable as those compounded with white lead?—Yes,

we find them so now after the experience that we have had with them in the mixing.

1222. Even when used on waggons and not varnished?—Exactly. We use nothing but boiled oil in the paint.

1223. You find it just as durable even on waggons which are not varnished?—That is so. We rely upon the boiled oil.

1224. In short, have you found the leadless paints equally satisfactory in every respect?—Yes, we have.

1225. (*Sir Godfrey Baring.*) You have experienced no practical inconvenience whatever from the abolition of lead?—We do not at the present time. We have had a long experience and have had to find out a very great deal for ourselves.

1226. Would you say six years' experience is sufficient to enable you to speak with confidence?—Yes. I have had 20 years' experience with this altogether.

1227. Yes; but I understood that you had only abolished lead altogether for six years?—Yes.

1228. Have you experienced any disinclination amongst the men to do without lead and to use these substitutes?—Not at all.

1229. They have not complained of any difficulties in working?—Not at all.

1230. (*Dr. Collis.*) Do you insure your men at all?—No.

1231. There is no different rate of insurance according to whether you use zinc paint or lead paint?—No. We do not insure at all.

1232. So you cannot tell us about that. With regard to the use of vermilion, what is vermilion?—Mercury chiefly.

1233. You are aware that it is an innocuous form of mercury?—No, I do not think it is.

1234. It has that reputation?—Yes, I know.

1235. Have you ever found any trouble arising from it?—No, we do not use sufficient for that. We only use small quantities, and it is never issued to the men dry.

(*Dr. Collis.*) I want to bring out the point that the vermilion is used as a substitute for lead, and that it is a harmless substitute.

1236. (*Mr. Fell.*) Do you use canvas on the top of your vehicles?—Yes.

1237. Do you bed that down with leadless paint?—No, we bed it down with jointing paste.

1238. Without any lead in it?—It is composed of zinc and barytes.

1239. Do you find that there is any difficulty arising from that powdering?—No. We find we get very good roofs.

1240. You find that the weather does not affect it?—No. Of course it is underneath.

1241. You do not have it at the top?—No, we do not use it on the top.

1242. Not on any of your waggons or anything?—No. We use zinc paint on the top.

1243. You said just now that you use three coats of varnish?—Four.

1244. How often do you re-varnish?—Every year.

1245. So that, practically, you never get down to your paint?—No.

1246. So when you rub down you only rub down to re-varnish?—That is so; we just rub the surface off.

1247. In the annual overhaul of your vehicles there would be no lead dust through using lead paint?—None whatever.

1248. How do you work your shifts in the shop?—We have only one, from six in the morning to half-past five at night.

1249. You do not work it with a single break?—No. We work from six to a quarter past eight; from nine till one, and from two till half-past five.

1250. There are no meals taken in the shop?—None whatever.

1251. Did you find before you used leadless paint that there was a great difference? I mean to say, did you have more cases of lead poisoning in the body shop or in the paint shop?—More in the paint shop.

1252. That was an ascertained fact?—Yes.

1253. Have you any figures upon that?—Yes; 18 against 12. In the first five years—18 painters and

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12 employed in other work, and in the second five years there were three painters and one bodymaker.

1254. Do you keep special men for working outside upon the vehicles and others for working inside?—Yes.

1255. Do you find that in the case of the men who work on the inside of the vehicle there are a larger number who have lead poisoning than amongst those who work on the outside of the vehicle?—There were 13 out of the 18 that worked inside. Five worked outside.

1256. Do you find that the bodymakers as a rule are more likely to get white lead on to their clothing than painters are?—No.

1257. Do you not find that men who are working partly on woodwork and partly joining up wipe their hands more on their clothes and so get more white lead on to their clothes?—No, I do not find that. They do not.

1258. Are the same washing facilities provided for the men working with white lead in your body shop as in your paint shop?—Yes, exactly the same.

1259. Do you supply overalls for the men?—Only for those who work in the colour room—the colour mixers. They have a clean suit of overalls every week.

1260. Do you have any systematic examination of the men when they go out to their meals?—No.

1261. As to whether they are clean?—No. We provide them with facilities for washing. The facilities are there if they like to use them.

1262. (Mr. Mason.) How do you find that the cost of your present painting compares with your old lead painting?—It is cheaper.

1263. Rather cheaper?—Yes.

1264. Is there the same amount of paint used?—Not the same amount of paint. It is specifically lighter.

1265. The same number of coats?—The same number of coats.

1266. I take it that there is no particular difference between the painting now and when you were painting with lead?—None.

1267. You spoke of four cases between 1906 and 1910, and you told us two of the cases. Could you tell me the other two?—Those occurred this year.

1268. Since you gave up the use of lead altogether?—This refers to a gasfitter. He went to a doctor after he had been away from work for a week. The doctor said that he was suffering from lead poisoning. That was reported to the medical officer who comes and inspects the works, Dr. Greaves. He says that he has been advised that a man has been suffering from lead poisoning, but, in his opinion, he does not think he had. The other case was that of a man who works for myself, a labourer who has never used any paint at all since he came to me. The doctor gave him this certificate, "This is to certify that ( ) is now able to resume his employment. He has been apparently suffering from lead poisoning." The doctor does not say that he has been, but he says, "apparently."

1269. (Dr. Collis.) Was the last case that you mentioned investigated by the certifying surgeon?—Yes.

1270. You do not know what the certifying surgeon said?—Yes. He said that he did not think that he was suffering from lead poisoning.

1271. I thought you said that he was apparently suffering?—No, that is the first case.

1272. Did the certifying surgeon examine the first case too?—No.

1273. He did not have to examine that case?—No.

1274. (Mr. Mason.) You were speaking of the first two cases?—Those are two cases that have occurred this year.

1275. I understand that from 1906 to 1910, those being the years in which you used no lead, you have had four cases?—Four cases.

1276. Of those, two you referred to are not included?—No. Those cases occurred this year.

1277. What were the other four?—Do you mean the occupations?

1278. Yes?—One was a coach trimmer, and how he got it I could not say. One was an outside painter,

one an inside painter, one a painters' labourer, and the other a bodymaker.

1279. In the 18 cases that you gave us between 1900 and 1905, you say that 13 of the 18 were inside painters?—Yes.

1280. Your experience points then to inside painters being more liable to lead poisoning than the others?—Yes, according to that, it is so.

1281. Can you advance any reason why that should be so?—They get dirtier. They are not such skilled men and they are more careless.

1282. An inside painter then is a different class of man from a coach painter?—Quite different.

1283. Would that class of inside painter sleep in the same shirt that he wore during the day, do you suppose?

I should think that many of them do, if not most of them.

(Mr. Mason.) He probably would, from my knowledge of that class of man.

1284. (Chairman.) Would you not rather say that the reason was that with regard to the inside painter the air was confined and the dust always adjacent to the worker, whereas in the case of the outside painter the air would be dispersed and he would not come into contact with it so much?—But there is no dust at all inside. They do not sandpaper the work at all. He gets dirtier in his work, he is more confined with his work, and he gets more on his clothes and more on his person, and he is not so clean in his habits.

1285. (Mr. Mason.) Would the inside painter during the five years use lead at all?—Yes.

1286. He would use lead on the roof, not an enamel or anything of that sort?—No, he would use lead.

1287. What do you use for bedding lights?—Felt soaked in boiled oil.

1288. Do you find that satisfactory?—Yes, as far as it goes.

1289. As satisfactory as lead?—No, I do not think so.

1290. Do your carriages come in for re-varnishing more than those of other railway companies do?—I do not know what the practice of other railway companies is. Our practice is that they are varnished once a year. They are generally repaired and painted the next year. We bring them in and clean them and give them a coat of varnish. The second year we do all the repairs that are necessary, thoroughly touch them up and give them one coat of varnish. The third year we clean them and give them another coat of varnish, and the fourth year we repaint them. We repaint them as nearly as possible to the fourth year.

1291. Would you be surprised to learn that with companies using lead paint and only two to three coats of varnish, a coach will last for three years before it is re-varnished?—But does it look as well?

1292. That is another point. You mean to say that the London and North-Western coach does not look as good as the Midland coach?—No, I do not say that; but I do say this, that I receive congratulations from all parts of the country and from all parts of the world, from people who say that the Midland stock looks as well as any in the country.

1293. It is very good stock, indeed—there is no doubt about that. Do you think that a zinc paint requires more varnish than lead paint?—No, I do not think so.

1294. Do you not find that with zinc paint the writing on the waggon tends to chalk?—Yes, but that is not so much because of the zinc, because white lead will do the same. That arose in great measure from turpentine becoming so dear three or four years ago. We were then trying to use a turpentine substitute in the place of turpentine, but it was a failure for practical purposes. That was the reason of the chalking. Lettering or white done with white lead chalked just as badly as when done with zinc, so it was no inherent quality of the zinc that caused that. But we have overcome that by a different mixing in using it, and it does not chalk now.

1295. Are you still using a turpentine substitute?—Oh, dear no.

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[Continued.]

1296. You have gone back to turpentine? Yes, and in addition to the turpentine we put varnish, which makes it adhere and it is satisfactory. Those are things that we have found out in practice.

1297. You have had no experience of zinc white in painting the outside of a coach? Yes, we use nothing else.

1298. Not as a white?—No.

1299. You have had no experience of white uppers?—Yes. When I was on the North-Western, it was white lead and Cremnitz white that was used then. I do not know what is used now.

(Mr. Mason.) It is much the same, but we have not a zinc paint.

1300. (Mr. Robins.) Do you find that the general health and vitality of the men, since you have introduced zinc white, is better than it was in the years when they used white lead?—I could not speak about their general health. I only give the cases of lead poisoning which we are obliged to collect and report on.

1301. But from outside observation, have you observed that the general health of the men and their vitality are better than they were when they were coming into constant contact with lead? No, I have not observed that.

1302. (Chairman.) Mr. Robins wants to know whether, although the men may not get lead poisoning, you have noted that the fact of inhaling lead dust pretty continuously in small doses rather impairs the constitution?—I follow.

1303. (Mr. Robins.) I have had over 30 years' experience, and I have noticed that the men have a more languid appearance when using white lead. Their vitality is much lower?—I could not say at all: I have really not observed that point. But taking the

difference between the two periods of five years that I have given, the health of the men has certainly improved, comparing the using of zinc with the using of lead.

1304. You have not observed carefully that those men who were not actually scheduled as victims of lead poisoning had better health?—No, I have not.

1305. With regard to filling up, do you find that zinc white in filling up is as good as white lead in binding the filling up together?—We do not rely on it for binding.

1306. In the filling up you use zinc?—Yes. We only rely on it to give it body.

1307. Do you find it quite as good for giving it body?—Yes, quite.

1308. Do you find any difficulty with regard to the coach painter in the introduction of zinc white?—No.

1309. Do you find that he readily applies himself to it? I speak as a painter myself?—He does not object in the least.

1310. Do you find that it takes a long time for a man to learn the difference of treatment between white lead and zinc white? As far as the painter is concerned, there is no difference. He simply has to put it on. We prepare it for him.

1311. You do not think that he would want two or three years in which to learn it?—No.

1312. If he could not learn it in a month he would deserve something, you think? Now you say that your coaches are repainted once every four years?—Yes.

1313. You have been using zinc white consistently now for six years?—Yes.

1314. Do you think that is a fair test?—Quite.

1315-7. Has it answered successfully?—Yes.

The witness withdrew.

Mr. JOHN I. STEINITZ examined.

1318. (Chairman.) Are you the manager of the Falcon Works, Loughborough?—Yes.

1319. What does your firm manufacture?—Amongst other things, tram-cars and rolling stock generally.

1320. Have you come here to tell us the experience of your company in the matter of lead poisoning?—Yes.

1321. What cases have you had?—Previous to the end of 1904 white lead was used for jointing materials on our cars, and a considerable number of cases of lead poisoning occurred. After investigation it was decided to stop the use of white lead, and from the beginning of 1905 until July 1910 we used a non-poisonous white paint, which we found quite as good for the purpose as white lead. During this period we built and delivered the equivalent of 4,000 cars and railway carriages, and in no case had we a single complaint from our customers in connection with jointing or roofing material where this white paint was used.

1322. Have you had complaints in other respects?—We have had complaints from time to time but nothing in connection with the use of the jointing material.

1323. What is the composition of this non-poisonous white paint which you use?—The makers will not tell us, but the works' chemist made an analysis. It is made up of linseed oil 20 per cent., barytes 72 per cent., and oxide of zinc 8 per cent.

1324. What is it called?—We know it as a non-poisonous white paint.

1325. Where do you purchase it?—Perhaps it would not be quite fair to say.

1326. You would rather not say?—Yes, seeing that the people will not tell us the composition.

1327. I will not press that question. Did you have any cases of lead poisoning at all in these six years?—Yes, we had two.

1328. What were they due to?—We could find no trace. They were men who had never had anything to do with any but non-poisonous paint or with the painting of the cars. They were entirely concerned with the inside finishing, so that if any men ought to have been safe they ought to have been.

1329. Do I understand that they did not come into contact with lead at all?—Absolutely not at all.

1330. Do you think that they must have had it in their systems when they came to you?—Presumably, but each man on starting signs a form saying that he is free from any of those diseases that are notifiable to the Home Office.

1331. Was there any doubt about the cases?—None. The medical people certified them as being cases of lead poisoning.

1332. They were submitted to the Home Office?—Yes.

1333. Do you paint these tram cars and railway coaches throughout, or do the purchasers themselves put on their special colours and designs?—We paint them throughout.

1334. Did you use any lead paints at all in any of the processes of coach painting in the six years which you mentioned?—Yes—only in the painting, not in the jointing. White lead is the basis of a great many paints, but we have never had a case of lead poisoning in the paint shop.

1335. What percentage of lead do you use in the paints?—I really do not know; it varies.

1336. What jointing materials have you been using since July 1910?—Genuine white lead.

1337. Why have you not used non-poisonous paints?—Because genuine white lead was specified.

1338. You mean that it was specified in the orders given to you?—Yes, it was specified in the orders given to us.

1339. But if it had been left to you to adopt any paint that you chose, would you have used non-poisonous paint?—Yes.

1340. Being quite sure that it would have the same effect?—Quite.

1341. Have you had any case of poisoning since July 1910?—Yes, we have had three actually reported, and we have several men at the present time under observation.

1342. How do you account for that?—Well, we are using white lead. The men undoubtedly handle it, and they have not been brought up to be as careful as painters, who are really warned from the time that they start their apprenticeship. The painter gets to be

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naturally a clean man, but a body maker does not wash, and you cannot make him do so.

1343. How many men do you employ who have to do with paint?—On the average I suppose about 250 in painting and jointing.

1344. How many of these come into contact with lead paints, or are in the same room, and so exposed to the same condition as regards lead dust in the air?—The whole of them.

1345. Do you use the aerograph?—No, I have never heard of it before.

1346. Do you do any dry rubbing down?—Not in connection with painting or jointing.

1347. How about curves and mouldings, are they sand-papered dry?—Yes, they are.

1348. Is practically all your work rubbed down or only a very little of it?—It is all rubbed down wet.

1349. Are all the coats rubbed down, or only some of them?—The majority.

1350. What general precautions do you take? Do your men wear overalls?—No, not necessarily.

1351. If they are using lead paints do you compel them to wear overalls?—No.

1352. If they like to bring them you do not mind?—No. Some men work in them.

1353. What about washing accommodation. Do you provide hot and cold water?—Yes.

1354. Soap?—Yes.

1355. Nail brushes and towels?—Yes.

1356. Are clean towels supplied daily? The towels are clean daily.

1357. How many basins are there to how many men? I would not like to be quite sure, but there are about 20 basins, I think, for 250 men.

1358. That is 12½ men to a basin. Is that not very few basins?—I may be wrong. The factory inspector was down the other day and said that we had more than were required.

1359. If the men all left off work at the same time and they had to wait in a queue with 12½, it would take a long time before they all got a turn?—We give them time to wash in our time.

1360. Do you give them an extra 10 minutes?—About 5 minutes.

1361. Out of your own time?—Out of our own time.

1362. That is very good. I am glad to hear that. Do you take any steps to see that your men use the washing accommodation?—In the paint shop, yes. We tried it in the body shop, but not very successfully.

1363. What shape have the steps taken?—In the paint shop we have a clock and the men book off. They turn a key in the clock when they leave off work, and the foreman inspects every man's hands, and if they are dirty he sends the men back, but the body makers will not put up with it.

1364. That is a very admirable system. I suppose that you do not do any scraping or burning off of old paint?—None at all.

1365. All your work is new work, is it not?—Yes.

1366. Do you provide a mess-room for your work-people?—No.

1367. Do you have a periodical medical examination in your works of lead workers?—No, only young persons.

1368. Not lead workers?—Not lead workers—only young persons are medically examined.

1369. Do you insure your liability under the Workmen's Compensation Act?—Yes.

1370. Can you tell us whether the rate that you pay is heavier for your painters than it is for your other workmen, for instance, your joiners?—No. We have one rate for all classes.

1371. (Sir Godfrey Baring.) Speaking generally, has your firm been entirely satisfied with the substitutes that you have used for white lead?—Yes, entirely.

1372. If it was left to your firm's choice, you would continue to use them?—Certainly.

1373. Have you found any disinclination amongst the workmen to use the substitutes?—None at all.

1374. They have not complained of any practical difficulties in their work?—None.

1375. (Dr. Collis.) With reference to the two cases that you had during the period that you were not using white lead, do you know for how long those men had been employed by you before they fell ill?—Probably for a couple of years. They certainly were not new-comers.

1376. Those cases, I presume, were notified to the factory inspector?—Yes.

1377. I suppose that you do not know whether the certifying surgeon agreed with the original diagnosis?—I do not know.

1378. In what years were the cases?—I have not the years with me.

1379. I am rather interested in those cases?—I could let the Committee have them.

1380. If you could send the names of the men and the years to the Secretary, I would like to look those two cases up to see whether the certifying surgeon agrees?—Very well.

1381. During the last year you had several other cases amongst men who were using lead?—Yes, three, and several under suspicion.

1382. Three up to January 1911?—Yes.

1383. Have you renewed your workmen's compensation policy since?—No. That comes up for renewal at the end of this month.

1384. I would like to know how much the company charge you?—We are an engineering firm too and we have many more accidents on the engineering side. We only have one rate, so that it would be very difficult to say why they put the rate up, but it goes up each year. Our insurance premium over the whole works, i.e., engineering and coach-building, has gone up 50 per cent.

1385. I notice, on looking through the figures, that there is a tendency for insurance companies to charge higher for painters?—Yes.

1386. (Mr. Fell.) I understand you built about 4,000 cars during the time that you were not using white lead in your jointing?—Yes.

1387. Could you supply the Committee with a list of places where you supplied those cars to?—Certainly.

1388. Do I understand that all the cases of white lead poisoning that you have had have occurred in the body shop?—All.

1389. They were either men who were jointing or men who were putting canvas on the roof using white lead?—Yes.

1390. Do you have the body shop swept up at regular intervals?—Yes.

1391. Therefore, every day you cause a certain amount of dust in the shop?—Surely.

1392. I suppose that there is a certain amount of white lead lying about on the floor?—Yes, undoubtedly there must be.

1393. Have you tried watering down the shop?—We always water down before sweeping up.

1394. To prevent the dust flying?—Yes.

1395. I believe that in your shop you work what is known as the one-shift system?—Yes.

1396. Perhaps you would explain to the Committee exactly how the men work?—The men work from half-past seven to half-past twelve and from half-past one until six. Probably your point is that the management wink at the men having something to eat about 11 o'clock.

1397. That is the point which I wished to make, that these men must probably in the long time between 7.30 and 12.30 want to have something to eat?—Yes.

1398. They eat it in the shop?—Yes.

1399. When they have that meal they do not wash, do they?—Most likely not.

1400. Have you not had any cases of poisoning in connection with white lead in your paint shop?—Never once.

1401. In the whole time that you have been there?—In the whole time that I have been there.

1402. Do you put that down to the fact that the men in the body shop come more into contact with white lead than the men in the paint shop, or to what do you attribute it?—I put it down to the fact that the painter, right from his apprenticeship as a boy, is compelled to wash. He is cuffed if he does not, and

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the foreman makes him wash, and it becomes second nature.

1403. Do you suppose that the men in the paint shop also have a meal in the middle of the morning? Undoubtedly, and they go and wash before they have it.

1404. That makes the difference between the two classes of men?—Yes, that is so. You see the one is continually using paint and the other is using it just occasionally.

1405. I understand that you provide exactly the same washing facilities for the men in the body shop as you do for the men in the paint shop?—Yes.

1406. So far as that is concerned, they have the appliances for use?—Yes.

1407. Do you supply overalls to these men?—No.

1408. In neither shop?—In neither shop.

1409. (Mr. Mason.) You said that there were 250 men in your works using lead, and the Chairman, I think, asked you how many of them were exposed to lead dust and you said the whole lot?—Yes.

1410. Do I understand that the jointing is done in the paint shop?—No. About equally they would be exposed to dust. There is a certain amount of lead in the dust in the paint shop and a certain amount in the body shop when we use white lead.

1411. What causes the dust?—It dries out.

1412. (Chairman.) Does it arise from splashes on the floor and so on?—Yes.

1413. (Mr. Mason.) It is not the same dust as the dust from rubbing down?—No.

1414. There would be more dust in the paint shop owing to the men rubbing down?—Yes.

1415. Do I understand that the non-poisonous white paint which you referred to is really a jointing paste and not a paint?—It is really a jointing material. It is not a paint.

1416. Have you had any experience of non-poisonous paints for the outside of tram-cars and carriages?—No.

1417. You have not used them at all for that?—No.

1418. (Mr. Fell.) In connection with sweeping down the shop, do you sweep down the paint shop as well?—Yes.

1419. I can understand your sweeping down the body shop, because you have shavings and so on amongst the cars, but in the paint shop there might not be that necessity?—We always do it regularly.

1420. At what time of the day do you do it?—In the evening after it is closed down.

1421. (Chairman.) So that the dust has all settled before the workpeople return in the morning?—As far as possible we have no one there. We have a certain number working overtime. We try to keep clear of it, but there are a few men there.

1422. (Mr. Fell.) How do you heat your paint shop?—By steam pipes.

1423. You have no fans?—No.

1424. No circulation of the air?—No. We have steam pipes in the basement.

1425. (Mr. Robins.) Do you use sandpaper stopping?—No.

1426. Your last remark was with regard to the sweeping of the body shop and the paint shop, I presume?—Yes.

1427. These are done at the close of the day?—Yes.

1428. Do you think it satisfactory to sweep a paint shop at the close of the day when the paint is drying?—You cannot very well sweep it during the day when the men are all about.

1429. In the afternoon or the latter part of the day men are painting and varnishing, and that is wet?—Yes.

1430. It would not be a great advantage to sweep the shop then and spoil part of your day's work?—I agree, but after all it is not the painting of broughams and private carriages that we are doing, where there must be no dust at all, but it is the average article of commerce.

(Mr. Robins.) Knowing a good deal about tram-car work and coach-painting work, some of your work

looks very superior, and does not look as if it was brought out of a shop where you sweep the paint shop at the close of the day. I am very glad to hear that you do not use sandpaper stopping.

1431. (Mr. Kinggate.) You stated that the men, when they are employed, have to sign a statement that they are not suffering from any complaint which brings them under the Employers' Compensation Act?—Under the notification to the Home Office.

1432. Do they have to supply a doctor's certificate?—No.

1433. It is only their own statements that you rely on?—That is all.

1434. And with regard to the number of cases of lead poisoning, is it not possible that many of those that suffer from lead poisoning do not assign the cause of their suffering to lead poisoning simply from fear of being discharged?—I do not quite see why they should be discharged. Do you mean when they have once suffered?

1435. Yes. Personally I know men who are employed by you who have suffered very much from lead poisoning. I think, perhaps, that one of the reasons why you have so small a proportion or no cases at all in the paint shop is the fear of being discharged?—Of course, if they left us, or stayed away, and did not get any compensation, we should not know what they suffered from. If they stayed away and got compensation we should. Unless the medical fraternity are not giving us true reports, I think that you must be wrong.

1436. It is possible that a man may say to the doctor: "Do not put down lead poisoning." Personally, I have suffered from gout through lead poisoning. If I say to the doctor: "Do not put down that I am suffering from lead poisoning; say that I am suffering from gout"; that is a perfectly true statement. To say that I was suffering from lead poisoning might prejudice me in my employment?—We should not pay compensation for gout.

1437. A man would forego compensation because of the fear of being discharged. You supply the same washing accommodation for body makers as you do for painters?—Yes.

1438. You do not allow them time for washing the same as you do with the painters, do you?—No; we have just started that.

1439. What is the objection on the part of body makers to washing their hands the same as the painters do? I understand that they are obstinate?—They are obstinate. They ought to wash, but I suppose that it is not a practice inborn in them, as with a painter from his apprenticeship upwards.

1440. As a matter of fact, the body maker is handling lead a great deal more than the painter?—But a great deal more seldom. He handles it less frequently.

1441. But everything that he puts together is put together with white lead?—True.

1442. He gets it on his hands, and it is quite as necessary for him to wash as with the painter?—Yes.

1443. Is not some of the priming done in the body shop?—Yes, occasionally.

1444. They sandpaper down the first coat. You sandpaper the panels?—It is rubbed down wet.

1445. Not the first priming coat?—Surely.

1446. No, they could not do it. If the first coat is lead, the air is impregnated after the rubbing down, and the man inhales that more than even the painter does?—It is rubbed down wet.

1447. It should be, but it is frequently done with sandpaper. I refer to hard stopping?—We have a sandpaper machine in the saw mill.

1448. (Chairman.) Do you find the cost of non-poisonous paint to be more or less than that of lead paints?—The actual material is cheaper, but there is more of it used. I think that the net result is that the non-poisonous paint is a little cheaper.

1449. Do you tell the Committee that your company would welcome the abolition of lead altogether?—Certainly.

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[Continued.]

1450 (*Mr. Robins.*) I should like to ask you whether I understand you to say that time is now allowed to the body makers to wash?—Yes.

1451. Have the men notice of that? Do they thoroughly understand that they are allowed to wash

in the company's time? Certainly, but it has only just recently been introduced.

(*Mr. Robins.*) I hope that it will have a happy result for good.

The witness withdrew.

Mr. D. WAIT examined.

1452. (*Chairman.*) Are you the works' chemist of Messrs. R. Gay and Co., Ltd., Paint Manufacturers? Yes.

1453. Does your firm make lead paints and also leadless paints?—Yes.

1454. Will you describe both and compare them?—Yes.

1455. Will you tell us which paint materials contain lead?—The materials containing lead are chiefly pigments, and the most frequently used are, white lead (carbonate and sulphate), red lead, orange lead, litharge, Brunswick greens, chromes, vermilionettes, fast reds, Chinese reds, sugar of lead, terebine, varnish, mastic and vulcan cements, and patent driers. Most of these substances are dry powders, but are supplied to the painter mixed into a stiff paste with oil and are thinned (or mixed) by him to a suitable consistency for application, the medium being oil, turpentine, &c. Many manufacturers now supply paints mixed ready for use.

1456. Do some painters have the colours and mix their own paints?—Yes, particularly red lead. This is dangerous for the workman on account of the dust given off.

1457. Do you mean that he is liable to be lead poisoned?—Yes; from the dust. My point is that this mixing of dry lead compounds is not necessary. It can be better done in the factory by the paint maker.

1458. Would you say it is unnecessary, apart from the question of ceasing to use lead paints, for the painter to have dry colours at all?—Yes. Ready mixed paints supplied by the manufacturers are now far in advance of those mixed by the painter. The use of such paints dispenses with the danger and risk involved when the painter mixes his own paints, both in the dry and paste forms. Such paints, being better ground and mixed, produce a surface which does not require so much rubbing down, thereby still further lessening the danger to the painter.

1459. By ready mixed paints do you mean paints quite ready for application?—Yes.

1460. Is not paint frequently supplied by the maker as a thick paste which can be thinned by the painter?—Yes, and when the paste is unduly stiff it is a fairly common practice for the painter to place his hand in the paint and break up the hard lumps with his fingers. White lead paint becomes stiffer with keeping, and some painters believe they get a better result with white lead in this condition. To meet that prejudice, manufacturers grind the dry lead with the minimum quantity of oil, and thus give the product the appearance of aged white lead, and the painter has to suffer by the extra labour entailed in mixing, and uses his hands willingly to mix such lead.

1461. And ready mixed paints avoid the danger from the dust that is occasioned by dry mixing, and also the danger from manual contact with lead pastes?—Yes.

1462. Can you suggest other dangerous processes in painting with lead paints?—Yes. Small drops of paint are atomised from the brush in the course of painting, especially when paints, which have been thinned with turpentine, are being used in order to produce a flat finish. The larger of these particles of paint can be seen on the floor where painting has been done and on the hands of the workmen, and no doubt the smallest particles float in the air and are breathed by and settle on the workmen. I wish to demonstrate that point to you. The witness produced a tin of white lead paint and demonstrated the formation of particles in brush work, showing how they fall on the workman when overhead painting is being done.

1463. Do the small particles dry quickly?—Very.

1464. Do you believe that this is a potent source of danger? Yes, particularly in confined spaces, as in painting ships with flat paints. There is a custom to give a coat of paint and then fling powdered cork on to it, and then paint on top of the cork with flat paints, and during that painting there is an enormous amount of these small drops.

1465. Are there any other processes you wish to mention?—Yes, rubbing down. The practice of rubbing down with sandpaper produces visible amounts of dust. This is done on old work to level the surfaces and produce a key for the fresh paint to adhere to; also on undercoats, to smooth down the brush marks. I might mention further that what are known as surfacers are made containing lead. These are applied to rough castings to level the surface and produce a smooth surface for the paint to go on, and in the sandpapering of these dust is also produced. These can be produced without the use of lead.

1466. Do you think that there is danger in connection with scraping and burning off?—I do not think there is much danger there—not from lead. From arsenical paint there is.

1467. You mentioned lead sulphate. Is that put forward as a non-poisonous substitute for white lead?—It is by some firms, but I do not agree that it is entirely non-poisonous. It is certainly less poisonous than the carbonate white lead.

1468. You would not call it quite harmless, then?—No.

1469. Can you tell us whether it makes a good paint?—Yes; it is useful in many cases. When this is mixed with the same amount of oil and turpentine as white lead it produces a paint which is thicker in consistency and works greasy, being rather difficult to spread free from brush marks, the coat of paint having neither the opacity nor whiteness of carbonate white lead. These points are accentuated by the addition of more oil, which is usually added by the painter, in order to make the paint more workable.

1470. How does the paint compare with white lead when it has been spread?—As a result of the large amount of oil absorbed in the grinding and mixing of basic sulphate, the film produced is more glossy than that of white lead; after an exposure of 15 months the film of sublimed lead has more gloss than white lead, is not quite so much discoloured, but contains numerous small cracks.

1471. Sublimed lead is lead sulphate I take it?—It is a basic sulphate.

1472. What is white lead exactly?—White lead is a hydrated basic lead carbonate.

1473. Will you tell us your experience of leadless pigments? What are they made of?—The principal white leadless pigments are lithopone and zinc oxide.

1474. What is lithopone?—A white pigment; a mixture of zinc sulphide and barium sulphate.

1475. Is it expensive?—No; it is cheaper than zinc oxide.

1476. Can it be used for both outside and inside work?—Not satisfactorily; only for inside work, because the film is not sufficiently resistant and it turns grey in direct sunlight.

1477. Is lithopone used only for white paints?—No, for colours also.

1478. Does lithopone make a good paint? Is it as satisfactory as white lead paints?—For outside use it is not suitable. It is useful for inside use, but not quite so satisfactory as lead paints.

1479. Please tell us about your zinc oxide paints. Do you make them both for interior and exterior work?—Yes, for both.

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1480. And are they as good as white lead paints?  
—Yes. For interior decoration, where purity of tone and permanence of colour are desirable, zinc base paints are highly to be recommended. These can be made to give any surface from a flat finish to the highest enamel gloss. For exterior work, zinc base paints applied on suitable zinc base under coats are equal in wearing qualities to white lead base paints and are more permanent in colour.

1481. Should you say zinc paints are as popular as lead paints?—No.

1482. Why not?—Zinc white is not such a favourite as white lead for two reasons. In the first place it is more expensive than lead, weight for weight, but gives a larger volume of paint on mixing, so that the mixed paints are of approximately the same cost by volume. In the second place, few painters have yet learned how to mix zinc paints to the same perfection as lead. In the best known book on house painting there are 24 mixings given for white lead paints, and zinc white is passed over by saying that it is mixed in the same way as white lead, which is not the correct way to produce the best results. In all cases zinc-white paste should be mixed for use with boiled linseed oil in place of the raw or refined oil generally used by the painter, and turpentine may be added to thin it to the proper consistency. Ordinary liquid driers may be used, but if the so-called zinc driers (consisting of manganese salts) are used they should be added just before the paint is applied, as they gradually form a double salt of zinc and manganese, which has considerably less drying power.

1483. Can you give us the name of any public offices where your zinc paints have been applied?—The following buildings have been painted with Gay's zinc paints with highly satisfactory results: Buckingham Palace, Home Office, Admiralty, War Office, new Local Government Board Offices, Savings Bank, General Post Office, also branch post and sorting offices in London and the provinces, British Museum, Science and Art Museum, National Gallery, Victoria and Albert Museum, St. Thomas's Hospital, &c.

1484. You say with highly satisfactory results. For how long have these different buildings been painted?—They are constantly being painted in different portions; in some cases for four years, to our knowledge, the paint has been standing outside, and is still in fair condition.

1485. Do you consider four years a good test?—No. Zinc paints have not been made long enough by us to be tested to the same extent as lead paints.

1486. But do you think that four years is sufficiently long to have tested the durability of zinc paints?—It is comparatively. If you put a lead and a zinc on, in two years you might give an opinion as to which is going to last the better.

1487. In your opinion, speaking of the various offices that you have referred to, the trial has been highly satisfactory?—Yes, they are still going on using zinc colour. People are gradually using it more every year.

1488. Have you had any complaints at all of any kind?—We have had some complaints, but no more complaints with zinc than with lead.

1489. They are used both externally and internally?—Yes.

1490. Both white and coloured paints?—Certainly.

1491. (Sir Godfrey Baring.) I understand you to say that there is a growing desire to use zinc paints, not only on the part of the Government, but on the part of private individuals?—Yes.

1492. Your orders for zinc paints tend to increase?—Yes.

1493. (Mr. Sutherland.) What is the composition of your zinc paints?—Do you mean the percentage composition? It varies for the undercoats and finishing coats.

1494. Will you give us the two. First of all, what is the under coat?—With regard to the under coat, I will quote from the Office of Works specification, because that is a paint which we have found to be entirely satisfactory. The undercoat contains:—Zinc oxide, 60 per cent.; chalk, silica, or barium sulphate,

10 per cent., refined boiled oil and copal oil varnish, 15 per cent., American turpentine, 15 per cent. For the finishing coat:—Zinc oxide, 56 per cent.; chalk, silica, or barium sulphate, 2 per cent.; refined boiled oil and copal oil varnish, 36 per cent.; American turpentine, 6 per cent.

1495. What is the price of that?—Per gallon?

1496. Do you sell it in gallons?—Yes, we sell it in gallons. It is 8s. 6d. per gallon at the present time.

1497. How does that work out per hundredweight? How many gallons to the hundredweight—eight?—In the last (1908) specification, the under coat was specified to be 21 lbs. per gallon, and the finishing 19.

1498. Was the 8s. 6d. for the finishing or the under coat?—Both.

1499. What is the formula for your own paint?—We have 101 different formulae. I cannot give you them all.

1500. I want to know whether there is a definite standard formula for zinc paint?—I do not know of any, except that it should be made as I have said.

1501. Every manufacturer has his own standard and his own formula?—Yes, and different standards for different work and different prices.

1502. That is not the case with white lead?—Yes.

1503. Genuine white lead is "genuine white lead"?—So is genuine zinc white "genuine zinc white."

1504. But you cannot use genuine zinc by itself. It has to be mixed?—It is used by itself.

1505. But not for large surfaces. It wants something with it to give it a body?—No, it is not necessary. It has body.

1506. It has spreading power, but it has not body?—It has opacity too, very considerably.

1507. Could they sell zinc white to a standard as genuine white lead is sold?—As a guaranteed paint?

1508. Yes?—Yes.

1509. Would it be serviceable to the painter?—Yes.

1510. Would it last like white lead?—Yes, it would last quite as well.

1511. Where did you get your authority for painters working with their hands in the paint?—I have seen them myself. I may quote to you from Pearce's *Painting and Decorating*, 1907 edition, page 11. Under the paragraph "Causes of Bad Health among Painters" it says, "Second, the filthy habit of putting the hands into colour when mixing, a habit as unnecessary and absurd as any in the trade, but clung to by ancient and thoughtless practitioners as a sort of fetish."

1512. (Mr. Parsonage.) Does that apply to oil paint or distemper?—Oil paint.

(Mr. Sutherland.) It is common enough when men are mixing whitening but never when mixing paint.

1513. (Mr. Parsonage.) I have never heard a more absurd statement made?—There you have it.

1514. It is taken out of a book. Is that what you call the best work on mixing colour and on painting?—One of the best.

1515. (Mr. Gardner.) I want to draw attention to the fact that through not knowing all the technical terms in the trade you have mixed up vastly different things. No painter would mix oil paste colour with his fingers. If he did he would be at once thrown out of the shop. Is your paint all supplied ready mixed?—No, we supply paste zinc and paste lead also. We specialise in mixed paints though.

1516. You say that it would be much better that red lead should be mixed in a factory instead of in a workshop. In what condition would a tin of red lead be after it had stood for a month in a shop?—Good condition. I have some that has been standing for over six months.

1517. The use of ready mixed paint would not obviate the spots falling?—Not at all, but the use of zinc paint would obviate poisonous spots falling.

1518-24. (Mr. Parsonage.) You say that you have seen painters put their hands into lead paint?—Yes, on two occasions I have seen it.

1525. Painters?—Yes.

1526. Where were they?—One was in Scotland and the other was in the north of England.

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1527. I am glad that they were a long way up north. But you would not attempt to say seriously that that is a common practice—for a man to put his hands into lead paint?—I quote this.

1528. I do not want you to quote that. Would you seriously contend that a man brought up to the trade of a painter, or in fact any man, would put his hands into white lead paint? You are not confusing distemper with oil paint, are you?—No, certainly not.

1529. Do you say that a man would put his hands into oil paint to mix it up?—I am not an authority on the way in which painters mix their paints. I know how we mix our own. The custom of the painters' trade is different from the custom of the paint manufacturers' trade, so I cannot give evidence on that.

1530. You think that paint ready mixed and sent you is better than paint mixed on a job?—Yes.

1531-5. Do you know any paint that stands for a time that does not require thinning up before you can use it?—If the can is not open there is no alteration.

1536. But when it is open, if you get a gallon can which you do not use right away, it has at all events a tendency to become fat?—Yes.

1537. Then it requires to be thinned by the painter?—If he keeps it for a long time.

1538. If he keeps it for a week?—No.

1539. When the air gets to it it starts to get fat?—Not if it is hermetically sealed with the lids which we supply.

1540. (Chairman.) With regard to the cost; supposing that I were to have the outside of my house painted (which I am proposing to do) and I employed your paint, would the builder charge more or less than he would if he used white lead paint?—We could supply a white lead paint exactly the same as the painter would make.

1541. So that my builder should not charge any more?—Certainly not.

1542. (Mr. Fell.) Has your paint been used for painting vehicles?—Ready-made paint is not used so much for fine carriage work—for coach-building.

1543. Has it been used for painting under carriages and trucks?—Yes.

1544. Can you say where?—Yes. Our paints are used abroad by several railway companies.

1545. Are they used by any tramway companies?—I cannot answer that offhand.

1546. Perhaps you would let us have a list of the places where they are used?—I will let you have a list of a few tramways and railways.

(Chairman.) And carriages, particularly motor cars.

1547. (Mr. Fell to the witness.) You do not know how it stands under those conditions?—It must stand as the best lead paint would stand or the best zinc paint would stand.

1548. With a great many of these things there is no must. They ought to, but they do not?—Are you asking about lead or zinc?

1549. I am talking about your zinc paint. You do not know how it stands under these conditions?—I do not know how it stands on motor cars.

1550. (Mr. Mason.) You spoke a moment ago about paint being mixed. Has not the red lead an action on the oil without the presence of free oxygen in the air? On linseed oil, yes.

1551. You cannot prevent it in any way?—It thickens to a paste. It goes into a solid hard lump.

1552. You say that you can keep it for six months?—Yes, ready mixed.

1553. You were speaking of lead sulphate a short time ago. What experience have you had of that beyond the test board which you painted?—Simply testing—that is all. I have made two or three of these tests.

The witness withdrew.

Mr. J. CRUICKSHANK SMITH, B.Sc., examined.

1554. (Chairman.) You attend here to-day as an expert in paints and painting?—Yes. I have had 20 years' intimate practical acquaintance with the manufacture, use, and properties of paints generally.

1555. What are your qualifications?—I am a Graduate of Aberdeen University, B.Sc., a Fellow of the Chemical Society, a Member of the Society of Chemical Industry, a Member of the International Testing Association, and a past President of the Paint and Varnish Society.

1556. Have you written various books and papers on the manufacture and use of paint?—Yes. Shall I enumerate them?

1557. You might mention them?—In 1901 I published a book on the Manufacture of Paints; in 1910, a book on Oxide of Zinc, its Nature and Properties; in 1904 I read a paper before the Royal Institute of British Decorators on Oxide of Zinc considered as a Paint Material, and I have written various other papers at various times.

1558. Are you at present actively associated with any manufacturing firm?—I am a Director of the Indestructible Paint Company. I joined the board about three months ago. I also act as their technical adviser.

1559. Your managing director is prepared to give evidence?—Yes. Mr. Depiorres, the managing director of the company is, I believe, coming before the Committee later on.

1560. For what purpose?—So far as I understand to give evidence as to the nature of the materials dealt in by the company, and his experience as a practical manufacturer in that company.

1561. Will he give evidence with regard to zinc paint, and also deal with the products of the company?—I understand so; but I do not know from my own knowledge.

1562. Will you give us evidence of a similar nature yourself?—No, I am not here for that purpose.

1563. Will you tell us, to begin with (it is a very elementary question) why paint is used?—Paint is used to protect surfaces and to decorate or adorn them.

1564. Please explain what you mean by protective painting?—Protective painting is painting, I take it, in which the first and, in some cases, the only consideration is the protection of the surface, quite apart from the final colour, and of course that applies chiefly to iron and steel, very often, and more and more every day, to cement and stone, and less frequently in this country to wood.

1565. And decorative painting?—Decorative painting is painting where the protection of a given surface is of less importance than adornment. I should place most ordinary internal house painting under this heading. A third class might be added, namely, coach painting, where protection and decoration are both required; for example, railway carriage painting and motor car painting.

1566. Of what constituents is paint, actually ready for application, normally composed?—Two essential parts, the liquid part, or the vehicle; and the solid part, or the pigment.

1567. What is the function of the pigment?—The pigment is the material which obscures the surface which lies beneath the paint and is the protecting material, and in many cases it also acts as the carrier or base for various tinting materials known to painters as stainers.

1568. And the vehicle?—The vehicle or liquid portion enables the pigment to be applied to the surface evenly and gives it coherence and durability. A necessary property of the vehicle is that it should harden within a reasonable time.

1569. In connection with driers have you anything to say?—The word "driers" opens up a tremendous subject.

1570. What does the painter call "thinners"?—What a painter calls thinners, as I understand the term,



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is a mixture of oil and spirit, which a painter would add to his stiff paste to bring it to a working consistency.

1571. What is volatile spirit used for?—The volatile spirit would be used as an ingredient of the vehicle to open out the paint and to make it dry with a more or less flat surface. That is the essential object of spirit in paint.

1572. What do the stainers do?—Communicate colour to the paint.

1573. They change the hue?—Yes, they change the hue of the preponderating pigments.

1574. Do the different purposes for which paints are used make it necessary to employ widely different materials?—Yes.

1575. Then no one paint could possibly prove suitable for every situation?—No.

1576. In what ways must the composition of paints be varied according to the use for which they are intended?—A range of paints suitable for somewhat different applications can be obtained by varying the proportions of the ingredients—the relative proportions of pigment and vehicle or the intrinsic parts of pigment and vehicle; but for other purposes again it will be necessary to include new substances or to omit certain ingredients altogether.

1577. What are the main substances commonly used for paint-making. First, as regards pigments?—White lead, red lead, and other lead compounds, and oxide of zinc in its various modifications, sulphide zinc white, leaded zincs, sulphate of barium, carbonate of calcium, under various names, such as whiting, Paris white, and so on, silicate of magnesium, oxide of iron, native or artificial, and native earths such as umbers, ochres, siennas, carbonaceous pigments, including bone black, lamp black, vegetable black, carbon black, graphite, and a very wide group of colours, commonly grouped as chemical colours, which includes the chromes, Prussian blue, ultramarine, lake colours, and vermilion.

1578. What do you mean by "sulphide zinc white"?—Sulphide zinc white is a convenient term to apply to the complex white pigment produced by the simultaneous precipitation of sulphide of zinc and barium sulphate.

1579. What do you mean by "leaded zincs"?—That is a convenient term to apply to a complex white pigment produced by the roasting under suitable conditions of ore containing both lead and zinc.

1580. What are the principal substances used as vehicles?—Oils, spirits, varnishes, and combinations of these.

1581. Are the vehicles used for zinc and lead pigments much the same?—Not as a rule.

1582. In what way do they differ?—First, as regards the proportion of the various constituents of the vehicle, and secondly, as regards the mode of preparation of the vehicle. That particularly applies to oils.

1583. What are the materials used as thinners?—I understand by the word "thinner," the vehicle.

1584. Are the thinners commonly used for white lead paints suitable also for zinc paints?—Sometimes, but in many cases the proportion and the mode of preparation of the vehicles or thinners should be different.

1585. What materials are used as driers?—Under the popular acceptance of the word "drier," compounds of lead and manganese are frequently employed as driers.

1586. Can the same driers be used for zinc as for lead paints?—They can be used, but variation in the proportion and mode of preparation is frequently necessary.

1587. Would you name some of the principal stainers?—Oxides of iron in various forms, Venetian red, umber, ochre, sienna, and carbon black.

1588. Are these in general equally suitable for lead and for zinc paints?—The ones I have enumerated are perhaps equally suitable, but there is a wider range of tinting colours which can be used only with certain pigments; for example, pigments which contain sulphur in a free form cannot be used under any consideration with white lead; also certain lake colours

cannot be used with white lead although they can with proper zinc white—oxide of zinc;

1589. To sum up what you have been telling us about the component parts of paints, there is a very wide difference in the treatments appropriate respectively to white lead and zinc pigments?—Yes, there is a difference due to the essential difference in the nature and character of the two materials.

1590. Has this fact been realised by painters?—Not very largely, I am afraid.

1591. To what do you attribute this?—Partly to the disinclination of the average working painter to deviate from stereotyped methods—in fact, largely to that.

1592. Should you say that it is easier to use lead paints than zinc paints?—Not so far as the actual painting process is concerned. At the same time, lead paints can be used in many cases under more disadvantageous circumstances than zinc paints can. But that again can be, in my opinion, frequently and usually corrected by a suitable adjustment of the vehicles and driers as I have already described.

1593. Is it a question of the painter changing his habits, then?—Yes, largely.

1594. What have been the practical consequences of the failure to understand the differences of character of lead and zinc bases?—I think the result in many cases has been that owing to the non-employment of suitable vehicles and driers, finished paint work in zinc pigments has not proved so successful as it might have done had the characters of the pigment and vehicle and drier been thoroughly understood. The enormous development during the last ten or fifteen years, perhaps twenty years, in the use of white enamel goes to prove that contention, because in the case of white enamel, which is based on oxide of zinc amalgamated with suitable vehicles and driers, on the whole perfectly successful results have been obtained, whereas had the painter been asked to amalgamate oxide of zinc with vehicle and drier, he probably would not have had a successful result at all.

1595. What is white enamel composed of, then?—White enamel, using the word as indicating a material of the best class, consists in the pigmentary sense of oxide of zinc with an appropriate vehicle, and the vehicle contains the necessary driers.

1596. To return to the painter and the differences of lead and zinc paints, what remedies would you suggest?—In view of the fact that the difficulty in using zinc paint seems to lie with the man who is using it, a very commonsense suggestion is that it should be supplied in the form in which you can use it, namely, in a semi-thinned form.

1597. How are paints usually supplied now by the makers?—Either a paste, in which form the painter has to add all the vehicle or thinner, or as completely ready mixed paint.

1598. What objections are there to supplying paint in both these forms?—The objection to supplying paint to the painter in the paste form is that as a rule the painter is ignorant of the composition of the paste, and he has to work in an unscientific, haphazard, and rule-of-thumb way in mixing his vehicle or thinner with the paste. The objection to the ready mixed form of paints is that it allows little latitude to the painter to vary the consistency or temper of his paint to suit the nature of the job he is working on. The suggestion I make, therefore, is in the nature of a compromise, namely, that the manufacturer should supply the paint in a semi-thinned form, which means that it should contain the necessary drier, but that the final adjustment with regard to the vehicle, especially the spirituous part of the vehicle, should be left to the man who is applying the paint.

1599. Is that never done now?—Yes, it is done.

1600. The plan you advocate is sending out semi-thinned paints which allow of final adjustment by the painter according to the weather and other conditions?—Yes. I think that my previous answer would rather cover this question.

1601. What can you tell us from your practical experience as to the comparative efficiency of white

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lead and zinc paints?—The answer to that question depends entirely on the meaning we attach to the word "efficient." So far as protective painting goes, painting on iron and steel, I unhesitatingly say that I have found from my experience zinc paints give very much better results than white lead. From the point of view of withstanding the action of the atmosphere, especially the atmosphere of large towns such as London, white lead has proved a disastrous failure. There is no building in London painted with white lead which retains its colour for more than a very few weeks.

1602. Then with regard to other kinds of painting, what do you say?—With regard to the painting of wood, especially in the priming and undercoating of wood (I am talking now entirely from the point of view of efficiency and leaving other matters entirely out of consideration) I consider that white lead holds its own.

1603. Would you say that paints other than white lead, for all practical purposes, in the treatment of wood, are as good as lead paints?—I would say this— it is possible to manipulate zinc pigments in such a way as probably to give as good results as white lead. But it is not so easy to do. It is a more difficult problem. White lead on wood is a most excellent priming ground. I am talking entirely from the point of view of efficiency. I am not dealing with poisoning or anything of the kind.

1604. That is what I wanted to get at. What do you say about ordinary plaster walls?—There I should say that lead was inferior to zinc, if the zinc is suitably prepared.

1605. May we take it that, with the exception of wood, you unhesitatingly affirm that zinc paints are much to be preferred to lead paints?—Yes, they are to be preferred; and with regard to wood, I say that zinc paints can be made to be practically as good as white lead, but it will be a more difficult problem.

1606. It is not a simple one?—No, by no means.

1607. Will you tell us in this connection what your practical experience has been?—In what respect?

1608. You have given us a very strong opinion in favour of zinc paints?—Yes.

1609. I want the Committee to know on what you base that opinion?—The opinion, so far as it refers to the treatment of iron and steel, has been based on the examination over a very great number of years of panels of iron and steel, and actual structures of iron and steel, treated comparatively with white lead and oxide of zinc. One set of experiments is being conducted now by an important railway company in this country. I am unfortunately debarred from mentioning the name of the company to the Committee, but I can mention it privately to any gentleman who wishes to know it.

1610. We had a witness here a short time ago representing a large railway company who told us that they had abandoned the use of lead for painting their carriages, and that the zinc paints were in every way as efficacious as the lead paints. You are not surprised to hear that?—No.

1611. Now, about the maintenance of colour, speaking principally of inside work?—It is a matter of common knowledge that white lead is very liable to change colour in the presence of impure atmosphere.

1612. And durability—first as to inside work?—If by durability you mean maintenance of colour, the question is answered. If by durability you mean the maintenance of a firm film, a hard surface, that depends on the suitability of the thinners or vehicles used with the pigments.

1613. Assuming that they are all in order, then what is your opinion?—Then I say that for inside work oxide of zinc or other suitable zinc pigment is superior to white lead.

1614. And for outside work, with due regard to the vehicle?—The same applies.

1615. As regards price, how do you find the lead and zinc paints compare?—The question of price opens up a very wide subject, and its effects press differently on the different persons concerned. The cost of raw material to the paint maker, the cost of the finished

product to the user, and the cost of the completed work to the property owner, are three separate propositions.

1616. But I want to know what are the net results as to cost with regard to zinc paint or lead paint?—The net cost to whom?

1617. Supposing you were to paint a house, would the cost of painting in zinc paint be more or less than if it were painted in lead paint?—At the present time I should say the cost perhaps in using zinc paints might be a trifle more. I am talking about the cost of materials.

1618. Take the case of a property owner. How is his interest affected by the use of lead or zinc paints?—The property owner first of all has to consider the maintenance of his property, and if the maintenance of his property depends on the using of a suitable protective paint, and the nature of his property is iron or steel or some of those surfaces on which zinc paints are superior to lead, then it is obvious that his interests are best served by adopting a zinc paint.

1619. How does the cost work out to the master painter?—I am afraid that is a question which, not being a practical master painter myself, it is very difficult to give any very valid judgment about. But I do not see how the cost per yard super of finished paint work can vary very much as between using white lead and zinc paint.

1620. For the paint grinder, which material do you estimate to be the more expensive?—What are the materials we are comparing?

1621. Oxide of zinc and white lead?—The dry oxide of zinc at the present time is more expensive than dry white lead.

1622. Would not the precautions required by the Factory Act have to be added in the case of lead?—Yes. I was talking of the cost of raw materials. When we come to establishment charges and things of that sort which must be faced, the whole of the incidental costs and outlays and outgoing, I do not know exactly how it works out, but from year to year the cost is increasing in connection with the grinding of white lead. I have not worked it out to-day.

1623. Would you go so far as to say that you have found in your own experience that zinc oxide paints can take the place of lead paints without increased cost and with improvement in results?—Yes, if you omit the word "oxide," and admit zinc paints generally.

1624. Have you any suggestions to make as to what steps might be taken conducive to the reduction of the risk of lead poisoning to workmen?—In view of the fact that a very large number of cases of lead poisoning amongst painters are reported to the Home Office when they need not be reported, it would appear to me that if some compulsory reporting of cases of lead poisoning were enacted, more precautions would be taken by master painters and by journeyman painters, and, therefore, failing the total prohibition of paint containing more than 4 per cent. of lead salts, I would suggest that the mixing of ground white lead or any stiff paint containing more than 10 per cent. of lead compound with linseed oil or turpentine should be deemed to be a manufacturing operation, and any place where such mixing is carried on should be deemed to be a factory and should, therefore, come within the scope of the Factory Acts.

1625. In order that the process might be regulated, I suppose, in the way that paint factories are at present?—Yes. In other words, every case of plumbism, however incurred, ought to be automatically reported to the Home Office.

1626. What other suggestion have you to make?—In order that persons using, either mixing or applying or having applied paints containing lead, should know that the material that they are using is a dangerous one, I suggest that packages containing stiff or mixed paints containing more than 10 per cent. of lead compounds should bear a label to that effect.

1627. You would label cans "poisonous," "containing lead paint"?—I do not go so far as to indicate in what manner they should be labelled, but they ought to bear a notice that they contain lead.

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[Continued.]

1628. Is it possible to your mind to invent practicable apparatus which would have the effect of removing this evil of the dust?—This is really a question for master painters to deal with, rather than a paint manufacturer. Cases of plumbism appear in many cases to result from the inhalation of dust containing large quantities of lead due to rubbing down or dry polishing of old lead-painted surfaces. It would appear, therefore, that some regulations in connection with dealing with such surfaces, either in the way of using hoods or masks or something of the sort, ought to be adopted.

1629. In connection with painting the inside of a room, is it possible to get any effective apparatus which would have the effect of removing the evils of dust?—I have not given my inventive capacity to dealing with that subject. I leave that to others. I deal with it from the theoretical standpoint.

1630. You have no practical suggestion to make on that point?—I have no practical suggestion to make.

1631. Then, either the men must go on suffering or the use of lead paints must be prohibited?—It must be prohibited or regulated.

1632. What do you mean by regulated?—In such a manner as I suggested before with regard to the deeming of places where they mix lead paint as factories and in the compulsory registration of cases of plumbism.

1633. (*Sir Godfrey Baring.*) I understood you to express a very strong opinion as to the value of white lead paint for external use in London and the manufacturing towns. You would say that it is absolutely unsuitable for external use, would you not?—From a decorative point of view.

1634. From the point of view of retaining its colour and that sort of thing?—Yes.

1635. Would it be true to say, speaking generally, that there is a growing appreciation of the value of zinc paint amongst the general public?—I think there is.

1636. (*Dr. Collis.*) You suggested that all places where paints are mixed should be considered as factories under the Factory Acts. Am I right in supposing that paints are very often mixed in the private house being painted?—Yes, perhaps it might be.

1637. You appreciate the difficulties of the factory inspector marching into a private house to inspect a painter mixing paints?—Yes.

1638. An Englishman's house is his castle?—Yes. I must leave it to the ingenuity of the Home Office to get out of that difficulty.

(*Dr. Collis.*) I can frankly say that the ingenuity of the Home Office is rather nonplussed at the prospect. If it were not for such difficulties we could deal with the whole matter.

1639. (*Mr. Sutherland.*) You were asked, could zinc oxide take the place of white lead without increased cost, and you said "Yes, if you take out the word 'oxide' and put in 'zinc paint' "?—Yes.

1640. Why?—Because by using the term "zinc oxide" we eliminate that very useful group of pigments known as sulphide zinc whites, which for undercoating and bodying up are in many cases quite equal to white lead.

1641. Can zinc oxide be used in absolute purity, or is it improved by carrying another body with it?—You mean, if you got approximately pure oxide of zinc would it be the best pigment you could get?

1642. Yes?—No, it would not.

1643. That is what I asked this morning, but I did not get a definite answer from the witness. What makes the best composition?—It depends on the purpose. If it is a question of making the very finest enamel, where colour is very important, in fact, a dominating factor, then you must eliminate as much as you can all other bodies and get as near as you can to chemically pure oxide of zinc.

1644. But considering it as a paint, what do you say?—As a paint the chief ingredient of commercial oxide of zinc would be about 4 per cent. of a basic sulphate of lead.

1645. And nothing else?—The other things would be so infinitesimal that they are not worth talking about. They would only be traces.

1646. Are not most zinc paints that are put on the market very largely charged with sulphate of barium?—That gets on to the sulphides. That is not oxide of zinc paint. That is why I eliminate the word "oxide" here. That is a different group of materials altogether.

1647. They come in as non-poisonous?—Yes.

1648. The commercial aspect of it is very largely a question of the carrying matter, like sulphate of barium?—Yes. The question was asked, "What is sulphide zinc white?" and I said "Sulphide zinc white" is the complex white pigment produced by the simultaneous precipitation of sulphide of zinc and barium sulphate." The two things are produced together, and the result is absolutely different from that which would be obtained by mixing mechanically exactly the same proportions of pure sulphide of zinc and pure barium sulphate. That is a very important point.

1649. Do not they hold the relation of something like 30 to 65?—Yes.

1650. One compound with the two constituents?—Yes. If you take ordinary barytes and mix 70 parts of that with 30 parts of zinc sulphide you get an absolutely transparent useless pigment, but if you take the material produced by the simultaneous precipitation of these two bodies you get a pigment which weight for weight equals, and in many cases exceeds, white lead in opacity.

1651. It is better than oxide of zinc in opacity, is it not?—Yes.

1652. (*Mr. Mason.*) When you spoke of the use of turpentine to open up paint, I did not quite understand?—That is a practical painter's term.

1653. We are not all practical painters on the Committee, and I thought it might be better if we understood?—I mean by that to make the paint work more easily, take away the drag from it, just to make it flow better, and spread better.

1654. In saying that zinc oxide was a better paint for metal than lead, do you mean by that white lead or red lead?—White lead. I understood that we were talking only of white lead here.

1655. No, not altogether. Is it better than red lead?—It all depends.

1656. Upon what?—That opens up a whole commission by itself.

1657. We always understand that red lead paint is as good as anything for ironwork?—Yes. I was basing my view on some comparative experiments recently made, most authoritative experiments. I cannot give my authority, but will give it privately to anyone who wishes to know. They are tests with regard to the prevention of rust on iron and steel structures by using paints made respectively on bases of lead and oxide of zinc. I have examined them, and I have found this: In the case of lead paint rust is beginning to form below the film, and is coming through in yellow and brown spots, but with the zinc it is not doing so. There are a great many different opinions about the use of red lead for the protection of iron. One cannot say it is better or it is worse. Everything depends on the mode in which the red lead is ground, and the vehicle with which it is used. It is possible to make a red lead for ironwork very good indeed, and it is possible to make a red lead for ironwork very bad indeed. The way that is adopted to make the red lead paint is to stir it into the oil, not to grind it into the oil, and if the oil happens to contain a proportion of free oleic acid you get corrosion below the film, and that leads to disaster.

1658. If the use of white lead were prohibited altogether, would zinc paints go up in price, or would there be any difficulty in supplying zinc paints?—Not the slightest. I think they would probably become cheaper.

1659. (*Mr. Robins.*) You mentioned the difficulty of the painter in thinning the zinc paint. With the abolition of white lead (and the wish is father to the thought) do you not think that the difficulty with regard to the house-painter would swiftly disappear? You do not think it would take long for a painter, if

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he had any common intelligence, to learn how to treat zinc paint as he would white lead? No, I do not.

1660. (*Mr. Parsonage.*) Is not paint mixed on the job, taken generally, better than paint ready mixed?—Very often it is.

1661. (*Mr. Sutherland.*) Why do you say that for primary coats white lead is better than zinc?—On wood it is.

1662. Why? I can only go by the results one finds. I make the proviso that it is not impossible, it is done every day, to make zinc coats which have as good priming properties as lead coats, but taking the ordinary commercial use of the two things, it is easier to make a good priming coat for wood from white lead than from zinc.

1663. (*Mr. Kinggate.*) What are the difficulties in making it equal the lead for priming coats?—It is a question of the relative affinity of the two pigments for oil. You can grind dry white lead in a little over 6 per cent. of oil. Most paint grinders cannot grind oxide of zinc in under 14 per cent. of oil. If you want to get a paint that will permeate a surface you want to get that oil reduced. That is the practical difficulty, but it is capable of being surmounted.

1664. Dry lead is very rarely used for priming coats, paste lead is generally used?—Yes, but I was only thinking of the pigment.

1665. Is it possible to obtain any other pigment apart from lead for use in priming?—Yes, it is possible. It is done very largely in America. It is a compound of a form of oxide of zinc with certain other pigments communicating tooth and bite.

The witness withdrew.

### THIRD DAY.

Wednesday, 29th March 1911.

PRESENT :

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. F. G. RICE.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER } (*Acting Secretaries*).  
R. U. SHAXBY }

Professor E. C. C. BALY, F.R.S., examined.

1666. (*Chairman.*) I should like to explain to the Committee that at a recent inquiry that was held at the Home Office in connection with the earthenware and china trades, the Home Office appointed Mr. Duckering, one of their inspectors, to collect the dust from certain workshops with a view to determining the presence of lead in the air of those workshops, and I understand that Professor Baly has endeavoured to obtain similar results by analysing the light passing over newly-painted surfaces, which he finds to throw off vapours which can be proved to contain lead. I want to preface Professor Baly's evidence with that observation, because it is quite a new theory; and, when I tell you that in making those experiments Professor Baly contracted lead poisoning himself, I think you will agree that this line of research is very important. (*To the witness.*) Will you please tell us your qualifications?—I am a Fellow of the Institute of Chemistry, a Fellow of the Royal Society and of the Chemical Society of London.

1667. Are you at present the Professor of Chemistry in the University of Liverpool?—That is not the exact title. The exact title is Grant Professor of Inorganic Chemistry in the University of Liverpool.

1668. Have you come to describe to us a research which you have made recently?—I have.

1669. When were your experiments carried out?—During the last three weeks.

1670. Will you state briefly what you sought to ascertain?—I undertook the work in order to find whether there was any truth in the statement, which I have heard at various times from painters, that there was a definite smell in white lead paint which was not possessed by other paints. It occurred to me that it might be worth while, in view of the interest in the problem, to submit the matter to a scientific investigation, and that is why I undertook the experiments. You ask me what I sought to ascertain. The object

was to ascertain whether there was any definite vapour or volatile compound coming off white lead paint which was not given off by any other paint.

1671. Why were your experiments undertaken? What gave rise to them?—My answer to that question is really covered by the answer to the previous question. It was through Mr. Hardwick happening to meet me in an official capacity as regards the Society of Chemical Industry in Liverpool to see the apparatus for determining absorption spectra, and the question at once arose in conversation whether there was any truth in the stories one has heard in regard to the smell of white lead paint. I at once suggested that we might put it to the test in the way that I have described.

1672. Will you now describe to us how your experiments were carried out?—If I may ask for the tube I will show you (*handed to the witness*). Perhaps I may explain to the Committee the fundamental method of working. I will try not to be too technical, but perhaps you will understand that one uses to a great extent in modern chemical research the absorption of light by chemical compounds in order to determine their nature and the amount of them which may be present. I have carried out a great deal of work in that direction during the past ten years. With regard to the method of experiment, if I might explain that to the Committee, I will endeavour to be as little technical as possible. It is a very simple method. One takes some source of light—it does not matter what source of light. One may take an arc lamp such as is used in the street, or an electric spark passed between any suitable metallic points so as to give a light which, when analysed by means of the spectroscope, that is to say, subdivided into its definite rays, is perfectly characteristic and easily recognisable at any time. The method of experiment is simply this: you take a photograph of all the various colour

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rays which are being given out by the particular source of light which you elect to use, and that serves as a standard of comparison; then you interpose, somewhere between the source of light and your photographic plate, a vessel containing the substance or gas which you wish to investigate. You take then a second and a third photograph or as many photographs as you wish. Then if the substance which is under investigation exerts any absorption of light (which a great many substances do) I think it will be understood that on comparing the photographs taken after the substance has been interposed with the photograph which is taken without any absorption vessel there, one can easily estimate and measure the amount of light which is being absorbed by the substance under investigation. That is the method. In the particular experiment which I wish to describe to the Committee, of course it was a question of looking for a volatile vapour, and so, as the Chairman has already mentioned in his introduction, we had to pass the light over a freshly painted surface. The first experiment which I did was to take a small tube about a foot long. We coated it inside with what I believe is known as stiff white lead—that is to say, white lead containing, I believe, 10 per cent. of raw linseed oil. That was smeared, as one might say, all round the inner side of the tube, leaving a clear passage through the centre of the tube for the light to pass, so that there was a very large surface of paint or material over which the light passed. This tube was gently warmed in order to increase the presence of the volatile material if such existed, and then these photographs were taken in the way that I have described, and we obtained certain results which, I understand, will be referred to in a later question. These were so interesting that I decided to do the experiments on a much more scientific basis, and if I may have that long copper tube I can explain it much better (*handed to the witness*). This is the tube in which the experiments were done. It is merely a copper tube. It is 1½ inches in diameter, and it is so arranged that it can be heated from about 20 degrees centigrade, which is just the temperature of an ordinary warm room, to any temperature one wishes, by electric current. One can slip inside the tube a glass tube which is coated on the inner side with any paint one wishes to use. This is simply put up in front of the spectroscopic, and one can measure the absorption due to any of the paints which one wishes to investigate. (*Other tubes were handed to the witness*.) Here are some tubes which have had three different sorts of paint in them. I need not go into them in detail at the present moment. You can see on looking down them that there is a perfectly clear passage for the light. That, I think, answers the question with regard to how the experiments were carried out.

1673. What results did you obtain?—The first experiment we did was to investigate the absorption, if any, produced by zinc white. I found that, on slowly increasing the temperature from ordinary room temperature up to somewhere about 50 degrees centigrade, no absorption whatever made its appearance. It did not appear until a temperature of 105 degrees centigrade, and then a very distinct and decided absorption made its appearance. That I assumed to be, and I wrote it down, the characteristic absorption which may be due to the linseed oil itself, because I did not think the question of any volatile zinc compounds could enter into the problem. Then I put an exactly similar tube containing white lead basic carbonate.

1674. Have you made quite clear what the result of the first experiment was?—I think I said that there was no absorption whatsoever until the temperature reached 105 degrees centigrade and that then a very sharp and strong absorption suddenly made its appearance, and that we ascertained to be due to linseed oil itself which was distilling off the zinc white. Perhaps I had better explain why it is that we knew that the absorption of light which began at 105 degrees centigrade was due to linseed oil. It is perfectly evident that owing to the fact that the windows, which were closed, at the end of this tube got all coated with linseed oil, the linseed oil was distilling, as we call it in chemistry,

volatilising away from the paint and condensing on the coolest surface like any ordinary liquid does.

1675. I am afraid that this is a little too technical for us, and that it will be difficult for us to embody it in the report. I want to know the precise results which you obtained in connection with the inquiry that we are holding. I understand that you made experiments with zinc white and white lead?—Yes.

1676. I should like you to tell us as shortly as you can what you found from those experiments?—I can do that in about three sentences. White lead gives a very strong absorption of light at quite a low temperature. Purex, which is a basic sulphate of lead, and zinc white are absolutely identical in the absorption which they give, that is to say, they give no absorption whatsoever except what is due to linseed oil. Perhaps I may put that less technically and say they contain no volatile compounds whatsoever, as far as I am able to determine, except linseed oil. White lead, however, does contain some volatile compounds other than linseed oil.

1677. (*Lord Henry Bentinck*.) What is the effect of smelling these volatile compounds in the air? Do they affect the health in any way?—I can only answer that in this way—that after smelling these tubes, as I did, I suffered at three distinct times, after smelling three distinct white lead tubes, from what is known, I believe, as sub-acute lead poisoning.

1678. (*Chairman*.) How many different substances did you subject to spectrum analysis in this way?—Only three in connection with this particular investigation—zinc white, white lead, and basic sulphate of lead.

1679. Did you repeat your experiments more than once for each material by way of verifying the results?—Several times. If I may extend the answer, I confirmed the volatile compound in the case of white lead by working at a very low temperature indeed, that is to say, one which could be easily reached on a warm summer's day, namely, about 80 degrees Fahrenheit.

1680. Did you use more than one make of white lead and zinc white, and so on?—As far as I know, not. I think it was all one make.

1681. Did you try any lead compounds other than Purex and white lead?—No.

1682. How were the coats applied to the insides of the tubes?—An ascertained amount of the paint was taken, and it was simply smeared round the inside of the tube by means of a wooden rod or a similar glass rod. It was quite simple to do.

1683. Were they allowed to dry before the observations were commenced?—No.

1684. Did you weigh the amount of each material put on, and did you know what proportion of each part was pigment?—In answer to the first portion of the question, I did not definitely weigh the substance, but I took as closely as possible the same amount. In answer to the second portion of the question, I am informed that there was the same amount of pigment in each, or approximately the same, of the samples of materials that I used.

1685. You say that you are informed?—Yes. Mr. Hardwick told me so. I did not analyse them.

1686. Did you arrange that these matters should be uniform in all cases?—As far as I possibly could.

1687. What were the lengths and diameters of the tubes which you employed?—They varied in different experiments from 1 foot long to 2 feet long, and from three-quarters of an inch to 1½ inches in diameter.

1688. Would you expect to get stronger absorption by longer tubes?—Yes.

1689. How many observations did you make at temperatures below 50 degrees centigrade?—In one experiment, which I referred to just now, I definitely observed the evidence of this volatile compound below 50 degrees centigrade. It was about 80 degrees Fahrenheit.

1690. Did you get no measurable emanations at ordinary air temperatures?—That is a very difficult question to answer. I got in one photograph evidence of a small amount of emanation, but it was very small at ordinary temperatures. I would not like to stake my reputation one way or the other upon it.

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[Continued.]

1691. Was it practicable to use tubes long enough to yield effects at temperatures lower than 120 degrees Fahrenheit?—I think my answer to a previous question really covers that. I had already got an effect with the tubes that I was using below 80 degrees Fahrenheit.

1692. Were you able from the character of the spectrum to determine of what the emanations consisted?—No.

1693. What absorption bands do lead salts show? Are they not definite and characteristic?—As far as I am aware at the moment, I think that lead salts have never been worked at all in solution, and I very much doubt whether they would have any characteristic absorption at all in solution.

1694. Is it not possible to compare, by the use of a reflecting prism covering half the collimator slit, light passed respectively through your experimental tube and through lead vapour?—Yes, it would be possible, but it would be a difficult experiment to do. I must say that it is possible to do it.

1695. Have you ascertained in any other way what the emanations from white lead paint were?—Yes. Chemical tests showed that lead was present in it.

1696. Will you please explain what the chemical tests were and how they were carried out?—The air in these tubes was drawn by means of a suction apparatus through, in one particular set of experiments, fuming nitric acid, which was then tested in the usual way for the presence of lead, and in a second set of experiments through what we call alkaline hypobromite of sodium, and we found the presence of lead in small quantities in every case.

1697. Then to sum up your evidence, it amounts to this, that you found no emanations from paints based on zinc until at high temperatures the oil began to manifest itself?—Yes. The answer to that question is in the affirmative.

1698. As regards lead paints, Purex gave the same negative results as zinc oxide, but you found considerable emanations from white lead, and these were chemically found to contain lead compounds?—Yes.

1699. Mr. Hardwick will tell us what conclusions he wishes us to draw from your experiments as regards the product he is concerned with, I suppose?—Yes. I think he will.

1700. I can only say that this is a most interesting line of research, and I am sure we all hope that you will pursue your investigations further and even more closely, if that is possible. Perhaps you will be good enough to communicate with us if you make further discoveries?—May I reply to that, that I hope you will understand that I look upon these experiments as only quite preliminary, and that I hope to be able at a future date, if I am to be allowed, to bring to the Committee the actual volatile lead compounds. I shall not feel myself perfectly satisfied until we have the volatile compounds of lead, so to speak, in our hands. I am perfectly convinced, as I think you will see, that there is something volatile from white lead, but I am not able to express any opinion about its nature beyond the fact that it appears to contain lead. I feel extremely obliged to the Committee—in fact I am honoured—for allowing me to put this evidence before them. It seemed to me of such interest that it ought to be at once reported to headquarters.

1701. The Committee feel that it is a matter of profound importance. If, by chemical demonstration, by analysing the light passing over newly-painted surfaces which are shown to throw off particles, you can prove clearly that the emanations contain lead, it is of paramount importance to this Committee's inquiry?—That is what I felt, and that is why I am so pleased to come here. Though I have spoken very strongly on the matter, and though I feel very strongly that there is something of great importance in this, I do not view the experiments as absolutely concluded. I want to make that quite clear.

1702. (Lord Henry Bentinck.) You will forgive my ignorance, but is a volatile compound of lead the same thing as lead dust? Has it the same effect as lead dust?—No, not at all. My opinion is that a volatile compound of lead would be an exceedingly toxic substance (that is poisonous substance), because in every

case that we know in chemistry of volatile metallic compounds like arsenic, mercury, and those things, they are always very much more poisonous than the corresponding salts of the metals.

1703. With regard to the sensations which you felt after smelling these tubes, did you consider them to amount to absolute poisoning?—I only have my medical adviser's opinion on that. I certainly felt uncommonly uncomfortable, not to say very seedy.

1704. For how long do you think the paint throws off these volatile compounds—only when it is fresh, I suppose?—I would say that it would go on throwing them off until the film of oil had hardened.

1705. (Sir Godfrey Baring.) For how long did you suffer from these disagreeable effects of the inhalation?—If I may describe the symptoms, I can explain at once. About a quarter of an hour after smelling the tube I developed very considerable localised (as we say) headache—just in one portion of the head. Shortly after that a period of very great lassitude supervened, when I could not do anything at all. I had to sit down. That, after dining, usually passed away. The next day there was an attack of diarrhoea. I did not think it was anything very serious, but I spoke to Dr. Goodbody, who at times has acted as my medical man in London, and he said at once, "It is lead poisoning." I thought that would interest the Committee.

1706. (Lord Henry Bentinck.) Is painter's colic the same thing as you experienced?—I understand that it is exactly the same, but I did not have the pain. It was not acute enough with me. I did not try to martyr myself in any way by smelling more than was necessary, but I wanted to know whether it smelt.

1707. (Dr. Collis.) Do you think that it would have been possible, if you used longer tubes than those that you have already used, to demonstrate whether ordinary white lead paint gives off this emanation at lower temperatures than 80 degrees Fahrenheit?—Certainly.

1708. You see the great importance of the point?—I do.

1709. It is at lower temperatures that painting is usually done, and we should like to know whether the painter using white lead paint is exposed to danger in this way at the temperatures at which he ordinarily works?—I think that it would be perfectly possible to determine, by using longer tubes, whether the same volatile compound is present at ordinary temperatures as you suggest.

1710. Another point which, personally, I should like to have information upon is with regard to heating old dry lead paint, if the experiment is possible, to the temperature at which paint is ordinarily burnt off?—I do not think that I can carry out the absorption investigation there, because, no doubt, one would get a very large amount of other materials coming from the burning oil, which I am afraid would rather confuse the issue.

1711. You mean that the burning oil would mask the lead?—I think that it would mask the lead. Would you be satisfied if one could carry that out in a tube like this and investigate whether any volatile lead was obtained?

1712. Yes. I would like to know whether volatile lead comes off when old paint is burnt off?—Very well. I was thinking that we had done the experiment, but we have not.

1713. Did you go higher than 105 degrees centigrade?—I went actually up to 150 degrees simply because there were a certain number of photographs that I could take. I simply went up, and up, and up, until I came to the end of my tether. Then in order to get everything parallel I used exactly the same temperatures all the way through the three experiments. Having found that there was a big absorption at the higher temperatures, I did not bother about higher temperatures afterwards. You see the three tubes that were used. Those have been carried up actually to 150 degrees centigrade. In the one on the right-hand side of the three (white lead) a definite reaction has set in. You notice that its colour has gone. It was perfectly evident when we took the tube out of this vessel here that some chemical reaction had set in at

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that temperature, which is not apparently evidenced in the case of Purex or zinc white. That all seems to fit in with the fact that there was some definite reaction.

1714. Did these two start at the same colour?—Yes, absolutely.

1715. They are not the same colour now?—The zinc is the blue one. They did not change during the experiment. That is all I can say. They may have changed a little bit since.

1716. There is less difference between the two leads than there is between the Purex and the zinc?—All I can say is that the Purex and the others were the same when we started, but they have been lying about my laboratory for several days.

1717. So that the possibility of basic lead sulphate giving off vapour at a higher temperature than 150 degrees has not yet been tested?—No, it has not.

1718. Could that possibly be tested in any way by eliminating the oil in the test? It could be tested very easily with regard to the question of detecting lead in the vapour in the absorption experiments.—I mean to say, in the analytical experiments for volatile lead, we found that the amount of lead which came off Purex was vanishingly small. I would not say there was none.

1719. It was only tested to 150 degrees?—No, it went to 200 degrees in those experiments.

1720. Would it be possible to use other lead paints?—Yes; I had forgotten to say that I have used litharge with linseed oil, and then I found that the reaction in the spectroscopy observation was more marked than I had ever seen it—far more marked.

1721. Ordinary red lead?—No.

1722. Black litharge?—I do not know what colour to call it. It was puce-coloured litharge, the ordinary colour of the lead which they use for glazing. They do not use red lead for glazing, do they? It is not what the plumbers use. It is litharge. One is PbO and the other Pb<sub>3</sub>O<sub>4</sub>.

1723. Plumbers use red lead?—Do they? I do not know whether you would care to see these photographs. (Photographs produced.)

1724. (Mr. Sutherland.) For how long were these tubes sealed up?—For two hours in the one set of experiments, but the low temperature ones were sealed rather longer—about three hours.

1725. The proportion of lead here is almost a hundredfold what it would be on an ordinary painted surface, is it not?—Certainly.

1726. So that the consequent proportion of volatile vapours given off would be very much greater?—For that area of surface, yes; but you will notice that that is only about 10 square inches, and is very small compared with the area of an ordinary room.

1727. It is more than 10 square inches?—My arithmetic is very bad, and I cannot calculate it.

1728. Sixty-six square inches?—Half a square foot, is that not?

1729. Very nearly, not quite. A painter would probably use a tenth or a twentieth, or considerably less, so that you would have to have a very large room to give off the vapours that you get from these?—I think that it is perfectly possible by increasing the linseed oil in the paint to increase the amount of volatile lead, because it is due, I believe, to a definite reaction between the pigment and the oil. That is one of the things that I want to ascertain.

1730. Was this an ordinary strength of paint?—Yes, the ordinary commercial material.

1731. But with regard to the thickness of it, is it stiffer?—It is the stiff stuff.

1732. Could you not paint a room and ascertain the vapours given off from that room? I think that I might, but it is rather a cumbersome experiment.

1733. That would bring the experiment very much nearer to practical conditions?—Yes.

1734. And would consequently be more valuable and more easily understood by normal men who are not chemists?—I quite see your point, but it is rather a cumbersome experiment to do. You have to get a room, and you have to paint it, and it is rather difficult to carry out. I hope you will understand what my

point is about the first part of your question—and that is that the stiff paint which is in those tubes is not what the actual painter works with his brush. He thins it down with oil first of all, does he not?

1735. Certainly?—I am not prepared to say that thinning it down with linseed oil would not increase the amount of volatile compound.

1736. But he would get less lead in it?—He might get more, because there might be a more definite reaction by increasing the linseed oil.

1737. You think there might be more lead in the volatile vapour, but there would be less lead in the paint?—Some members of the Committee might assume that if you decrease the actual amount of pigment in the paint that was applied, therefore there would be less volatile compound, but I think that that would be an unfair or unwise conclusion to come to.

(Chairman.) We want to approximate to the actual conditions that the workmen find themselves in.

1738. (Mr. Rice.) On the last question, do I understand the thinner the paint the more volatile compound there is?—No, I did not go so far as to say that. I said you must not *a priori*, so to speak, assume that if you decreased the amount of pigment in the paint, you would therefore get less lead coming off. I think that it is probable that it might be the other way.

1739. That is what you wanted to imply?—That is what I wanted to imply, but I have no definite evidence.

1740. That, I take it, is only an assumption?—That is only an assumption.

1741. Not from actual practice?—Well, I do not really assume it, but I do not want you and the other members of the Committee to assume the other thing. I am absolutely certain that, whatever it is, it is due to a reaction between pigment and oil.

1742. Linseed oil is the most likely to produce the volatile compound?—Certainly. May I explain why? We tried it with the dry pigment, and there was absolutely nothing given off from it.

1743. Nothing at all?—Nothing at all.

1744. From dry white lead, nothing?—Nothing.

1745. But with linseed oil in varying proportions, the greater the volatile compound?—I do not know about the greater. You must not try to get me to say that.

1746. I do not want to get you to say anything that is not the fact?—There is no reaction with dry pigment and there is no reaction with linseed oil, but mix the two together and there is, and something comes off.

1747. And the greater the proportion of linseed oil the greater the volatile compound?—No. You would have to get it in chemical proportions to get the maximum effect, and the chemical proportions would be very much in the nature of actual paint put on.

1748. I understand you to say that you suffered from lead poisoning as the result of these experiments. Are you usually affected by the smell of paint?—No, I never have been in my life before.

1749. You have been in contact with paint before, but you have not been affected?—No. A chemical laboratory is nearly always painted with white lead paint—I do not know why, but I suppose that is because it is clean and white.

1750. (Mr. Sutherland.) Is not a chemical laboratory painted with zinc white? (Chairman.) As the evidence is only in the experimental stage, we had better leave it, I think at what the Professor has told us, unless there is anything very important that you want to ask. He will make his further investigations and report to us.

1751. (Mr. Parsonage.) I consider this the most important evidence we have had up to now. I think it is vitally important to prove that the vapour that arises from lead itself is sufficient to cause lead poisoning. I should like to ask you whether you have any personal knowledge of the use of non-poisonous paints in Liverpool University on the work inside the building?—How do you mean?

1752. Non-poisonous substitutes for lead are used in Liverpool University on the interior portions of the

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building, in the Muspratt Laboratory of Electric Chemistry?—Yes.

1753. Is it not a fact that all the materials used for painting inside the building are non-poisonous substitutes?—I am afraid I cannot answer that question.

1754. But they are used there?—I do not know whether they are or not; I know nothing about them myself, you see I am quite new. It is a question for Professor Donnan. The Muspratt Laboratory was built long before I went to the University.

1755. Professor Donnan is at the University now?—Yes.

1756. He subjects to scientific tests all the material there is in the building. You would not know that?—No.

1757. (*Mr. Gardner.*) In carrying out your experiment you used linseed oil as the medium. As painters, we do not look upon that as being volatile, but we use a good deal of turpentine, which is a volatile medium. Do you think that that would have a greater effect in bringing out lead fumes?—I am afraid I could not answer that question until I have actually tried it.

1758. You might try that in your next experiment?—I will.

1759. (*Chairman.*) Would you make your experiments in the future by observing the same conditions which obtain in the ordinary painter's work-a-day life?—I quite understand the importance of that. I think that is a very fair criticism. If this is a very poisonous material, and it is given off in a big room, you will

The witness withdrew.

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1764. (*Chairman.*) Are you a consulting chemist?—I am.

1765. What are your qualifications?—I am a Bachelor of Science. I am also a Fellow of the Institute of Chemistry.

1766. I think you are the consulting chemist to Purex, Limited?—I am.

1767. What does your company manufacture?—A basic sulphate of lead.

1768. And have you come here to-day to describe the character of this product?—I have.

1769. Is it designed to take the place of white lead for every purpose?—It is.

1770. Will you please tell us the main uses of Purex?—Purex is a dry pigment, and may be used for all purposes—woodwork, ironwork, and plaster.

1771. Are paints both for coach painting and for house painting made up with Purex as a base?—Yes.

1772. Are they confined to white and the lighter shades, or are all colours obtained with Purex?—Practically all colours may be obtained with Purex, but naturally the darker colours would contain very little of the base.

1773. What do you understand by the base?—The base is, putting it one way, the greatest weight of material in the paint. That would be considered the base upon which the paint is built. Generally speaking, the pigment is considered a base.

1774. Are priming, stopping, and filling compositions all made up from Purex, or only the finishing coats?—All the coats.

1775. How does Purex compare with white lead for opacity?—Of itself and by itself, when applied with the ordinary brush or tool, it has not the same obliterating power as white lead. I may add, and I must add, that this is not because, weight for weight, it does not possess the power, but because the method of application and the tools used in applying it are not of a character to produce that obliterating power which it is really and truly possessed of.

1776. How does Purex compare with white lead for whiteness?—Purex, as it is made to-day, is unquestionably whiter than any white lead which I have seen on the market.

1777. Does it keep its colour better than white lead?—It keeps its colour very much better than white lead when the same conditions are observed.

get a very fair quantity in actual weight—quite enough to poison a man. In order to detect that you will have to investigate the whole air of the room, which is quite a big business. I am perfectly willing to try, and I will endeavour to do the best I can to get near to the actual conditions, but you realise I have to work from the end I started with. I have to get the actual evidence first of all, and then I have to get down and down and down nearer to the actual conditions.

1760. (*Chairman.*) Some of the Committee would like to visit the laboratory?—I should be very honoured if you would.

1761. (*Mr. Mason.*) There seems to be some misconception as to the application of the word "absorption." It is not absorption of lead fumes by the air, but the absorption of the rays in the spectrum that you refer to, is it not?—Yes. You have seen those photographs?

(*Mr. Mason.*) Yes.

1762. (*Chairman.*) We are extremely grateful to you. We will not detain you any further, but you will keep in touch with us?—I will. Shall I communicate with you whenever I am ready.

1763. (*Chairman.*) Yes, and some of us will make arrangements to come to your laboratory, because it is very important?—It would be very much more satisfactory if some of the Committee could come to see it, because it would save all this long, technical explanation if you could see the things being done.

1778. How does Purex compare with white lead for durability?—The durability of Purex has, as far as I have been able in the time that I have been connected with it to observe, given the same conditions, approximately three times the life of white lead.

1779. To what do you attribute the durability of your product?—Partly to its physical, and partly to its chemical, nature.

1780. Is there no tendency for the film of Purex paint to crack after exposure for some time?—There is not the same tendency for the film to crack after exposure with Purex as with other pigments, because the Purex pigment is a pigment which fortifies the oil film, and it is not a question of the oil film fortifying the pigment.

1781. What is the cost of Purex; is it dearer or cheaper than white lead or zinc oxide?—It is rather cheaper than white lead and very much cheaper than zinc.

1782. Does a house painter or coach painter using Purex material go through the same processes as he would with white lead?—Absolutely, if working as directed.

1783. What do you mean by that?—I mean that the want of obliterating power can be easily corrected by the addition of coarser material.

1784. Is Purex put on in the ordinary way?—Yes.

1785. Then why did you qualify your last answer? I asked you, Does the house painter or coach painter using Purex material go through the same processes as he would with white lead?—When the paint is sent out—if paint which would be applied in the ordinary way is sent—it is of a coarser character, mixed with a coarser material, to imitate the ordinary carbonate, which has been for so long established that the very tools that the workmen use are made to fit in with the carbonate, and not the carbonate to fit in with the tools.

1786. Would the ordinary house painter have any difficulty in using Purex if he had been used to white lead or zinc oxide?—Not if he allows Purex Limited to send him the material which they would wish.

1787. I do not understand that?—I know it is difficult. I feel that my position is very difficult indeed.



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1788. What I want to get at is this: Would the ordinary painter have any more difficulty?—If he were to ask for Purex, no; but then he makes various stipulations, "Genuine white lead" and a hundred and one other things.

1789. Is rubbing down required with Purex paints, in the same way as with others?—No.

1790. Is it as easy to spread Purex paints free from brush marks as with ordinary white lead, for example?—Yes.

1791. Do you mean that less rubbing down should serve with Purex paints?—Yes.

1792. Why does Purex require less rubbing down than other paints?—Because rubbing down is simply a process of selection of the finest particles, and since the Purex particles are the finest conceivable, the finest of the fine, that selection of the finest particles becomes unnecessary.

1793. Can all the necessary rubbing down be done by a wet method?—Yes.

1794. Not excepting curves, mouldings, and iron-work?—Yes, certainly.

1795. In repainting old work, would rubbing down be required? No, because Purex tends to wear rather than perish.

1796. Why does Purex tend to wear and not perish?—Because the ordinary white lead perishes owing to the fact that it is a carbonate, and all carbonates, being extremely unstable chemical salts, are liable to the action of the prevailing sulphuric acid of the atmosphere of towns particularly. It decomposes, and when decomposing cracks, and this cracking tends to cause a subcutaneous (if I may use that word) action on the paint film. That is the sense in which I speak of perishing. Purex, being a basic sulphate, is not liable to be acted upon by the acid of the atmosphere, and when the paint film (I speak of the oil) has become removed and the pigment itself has become exposed to the atmosphere, it presents a surface which is not acted upon as the carbonate is acted upon. The consequence is that if the paint deteriorates in any sense it is simply a deterioration which can be described as wearing rather than a deterioration, which is of a more subtle subcutaneous and perishing nature.

1797. Can burning off or scraping off be dispensed with in the case of Purex painting?—I could not tell you; I cannot answer that question at all.

1798. You are aware that a large amount of lead poisoning has occurred and is still happening in the painting industries?—Yes.

1799. What can you tell us about Purex from that point of view? Do you say that Purex is less poisonous than white lead?—Yes.

1800. Do you know the test for solubility laid down in the Earthenware Special Rules?—Yes.

1801. Can you tell us the solubility of Purex judged by this standard; in other words, what percentage of Purex is soluble in excess of dilute hydrochloric acid—0.25 per cent. solution?—That varies and has varied very much with our method of manufacture. We originally were making a material of an extremely basic character, that is to say a material which would contain a large proportion of oxide of lead. Since, however, we have got our plant tuned up, so to speak, we have produced what we set out to produce, and that is the much whiter and much more durable and less toxic Purex of to-day, which contains very much less oxide; not more than one-fifth of the whole probably.

1802. That is to say 20 per cent. of solubility?—Approximately. It is rather more, taking everything. It is about 25 on the average.

1803. What is the solubility of white lead?—One hundred per cent.

1804. You know that a 5 per cent. solubility standard was adopted in 1903 in the Earthenware and China Special Rules?—Yes.

1805. What you claim amounts to this—that Purex is four times less poisonous than white lead. You do not claim that it is entirely innocuous?—I do not. I should like to qualify that answer very much indeed. If you consider the poisonous action of a material, you have to consider all the points which are liable to

cause the poisoning, quite apart from the absolute eating or swallowing of the pigment.

1806. I do not agree. The standard quantity of lead in the earthenware and china glazes is approximately about 20 per cent., and that creates a vast amount of injury in that industry. If you claim that your paint contains 20 per cent. of soluble lead compound, you are in no better position than the vast numbers of earthenware and china manufacturers who have been proved by that standard to do an immense amount of harm?—Really, Sir, I beg to differ. In one case you have a powdery dry material, but with the Purex you have material which is to a certain extent, a very large extent, harnessed by the linseed oil.

1807. Can you tell us whether any cases of lead poisoning have been traced to Purex?—Yes. I remember that some two years ago, I think it would be, at Earlestown in Lancashire, in the North Western Railway Company's waggon works in fact, they were painting their wagons by the spraying operation, and they were using a non-poisonous paint—lithopone as a matter of fact (I analysed it)—and I recommended them to use Purex. The engineer at that time made such experiments as to satisfy him of the far greater durability of Purex. Having done that, I suggested that the spraying would be possible, provided that the men wore masks.

1808. How many cases of lead poisoning did you have last year?—None whatever.

1809. Have you heard of any cases of lead poisoning?—None whatever.

1810. Do I understand that, since your paint has been on the market, you have heard of no case of lead poisoning?—None, except what I mentioned.

1811. Was that only one case?—I do not know how many there were. As a matter of fact, I understand that the men who were working the machine were not poisoned, but cases of lead poisoning occurred in other parts of the works.

1812. To sum up your evidence generally, you claim that Purex has advantages over the old white lead, that it makes a better, more lasting paint, and is on the whole less poisonous?—Yes.

1813. Should the use of lead paints be restricted or prohibited in this country at any time, would this mean serious loss of business for your firm?—It would mean absolutely closing the works.

1814. If substitutes for lead paints can be found which will alleviate the sufferings of a vast number of people in the painting industry, you would think it not unreasonable, I suppose, if the Home Office should prohibit the use of lead paints?—If by practice they are shown to be dangerous, I should not. If by practice they are shown not to be dangerous, I should.

1815. (*Sir Godfray Baring.*) How long has Purex been on the market for sale?—I think two or three years; I do not know exactly.

1816. Do you find that there is a great demand for it?—Yes, rather.

1817. Would you give us the names of any big firms who are large users of it?—I do not want a long list?—Yes. Here is a picture of my native city, Liverpool. I thought it might interest you. I will show you exactly what we are doing. It has been tried by the leading architect in Liverpool, at my instigation, and, he having satisfied himself of its far greater durability, they are painting the Liver Buildings—there in the front of the picture—with Purex. The Liverpool dock offices are also painted with Purex—right on the pier head.

1818. Has it been used at sea?—It is particularly useful where salt water is concerned.

1819. If this Committee came to the conclusion to restrict or regulate the use of white lead in paints, do I understand you to say that a product like Purex should be specifically excluded from the prohibition?—Yes; I feel quite satisfied in my own mind about that. With all the precautions which painters are supposed to observe, I am sure there would be no case of lead poisoning.

1820. (*Dr. Collis.*) I understood you to say that Purex has only been on the market for two or three years. It has been manufactured for longer than that,

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has it not?—Yes, in small quantities. Spasmodic attempts to succeed in its manufacture were made 25 years ago really. As a matter of fact the problem was put before me as a chemist, and I at once said, "There is no possibility of its being a success, because of the supposition with regard to basic carbonate and the ordinary white lead," which I then proved was quite incorrect, and I took up the question of Purex four years ago, or perhaps a little longer, certainly before the inception of the company, Purex Limited.

1821. Any illness during these early times you would not consider showed in any way the noxious qualities of the material?—I see what you mean. No. I think that all attempts that were made to manufacture without getting the thing fully under control would hardly fairly show what could be done when the thing was properly running, but I must say that all the time we worked for instance with our coolers, and with the leaking of Purex out of leaky filter bags, none of the men suffered. Sometimes the place has been so thick that you could not see your hand before you.

1822. Do you know what happened at Wolverhampton?—No. I know nothing about Wolverhampton.

1823. You know what process was carried on there?—Yes, I went to see it. It was a development of that process that I followed.

1824. Do you wish us to understand that any damage that occurred to the health of the workers then was not to be put down to the finished product but to the process of manufacture or otherwise?—I did not know about it, but I have been told. If damage occurred, I should put it down to the fact that we were making an extremely basic material, and the more basic the material the more soluble it is, and the more likely to be toxic in its effect.

1825. So that the 20 per cent. solubility we have heard spoken of to-day does represent absolutely noxious qualities?—Yes.

1826. So that it is not impossible that cases of lead poisoning might occur from its use?—No; with proper use it is impossible, but with careless use it is not.

1827. With reference to the evidence we have had from Professor Baly, am I right in supposing that he has presented from one point of view only the painter's problem, namely, the possibility of vapour being given off by wet lead paint? The evidence we have already had before the Committee goes to show that the chief danger to the painters is from lead dust, so am I right in presuming that Professor Baly's evidence to-day, tending to clear the character of Purex from giving off vapour when it was wet, would not clear Purex from the possibility of causing lead poisoning when surfaces are rubbed down and dust is given off?—That is a big question. Here are two boards. You can see what I mean by the film. In my evidence-in-chief I tried to explain what I meant by the film.

1828. I am referring to the removing of old lead paint?—If you examine those two boards by the light you will see that the face of *this* is already prepared. The other paint is all perishing, and would have to be removed by the rubbing down process before the further application of paint. The elasticity of the film produced through the drying of the Purex admixture with the oil causes a result which does not perish but wears. When you want to put a fresh coat on old Purex you do it without attempting to remove the paint by rubbing down; in fact, rubbing down is an impossibility, it rolls up. You do not rub down. Here are micro-photographs, magnified a great number of times (*producing the same*). *That* is red lead. *That* is graphite; *that* is ordinary white lead; *that* is barytes; *that* is zinc; and *that* is Purex. (*The witness explained by pointing to the photographs*) *This* material has large rocks, as I call them. As a matter of fact, they are extremely fine. If you rub down you remove these big pieces, or cut them in halves, and just leave the little tiny particles, but in the case of Purex there are no big ones to remove. The temperature of combustion of metallic zinc is not as high. (*The witness further explains by photographs*.) *This* is 625 magnifications.

1829. Are they all the same?—No. *These* others are magnified only 500 times.

1830. Your point is that rubbing down with sand-paper is not necessary with Purex old paint as it is with white lead paint?—That is so.

1831. How about burning off?—I cannot speak of burning off, because really I do not know that Purex has ever perished to that extent. I have tried to get these fumes by heating a tube to a high temperature, and I have certainly got lead fume from the Purex, but to nothing like the same extent as with ordinary white lead.

1832. You, I am sure, quite appreciate the point that, should this Committee decide on any extent of abolition of lead paints, it would be very hard for them to put in an exception for a material which, when sprayed, has caused any lead poisoning?—I do not see that it is so. Nobody would dream of spraying Purex. It is tempting Providence to do so.

1833. I suggest to you that great damage was caused in the old days, when the Mander Hannay process was carried on at Wolverhampton?—You are speaking now of manufacture, which is a different thing. It is localised; it is under your control, so to speak, and you can see exactly what is going on, but when the paint is distributed throughout the length and breadth of the land you cannot possibly follow it. The two things seem to me to be so totally different.

1834. My point is this—that a material which, in the course of manufacture, has caused trouble, is likely to be dangerous in use?—I do not agree.

1835. Do you wish to contend that it was a different product which, in the course of manufacture, caused illness, and not the final product?—I think that is quite the correct way of putting it—that the product leaving our works is a different product from the product which could, or might, or has caused lead poisoning in course of manufacture.

1836. Could you establish that fact (which is rather your place than ours) and show that it was a different product which caused trouble in the works from the final product which went out of the works?—I do not quite see what you want me to say.

1837. I mean this—that we know that trouble has occurred in the course of its manufacture. As far as we are aware, it was due to the product itself. If your contention is that it is due to some product manufactured before you got to the final product, we require demonstration of that fact before we can accept the material as being non-poisonous?—My proposition is really this. If you take this pigment and allow the fumes to pass from the furnace into the atmosphere it will travel some miles before it comes to the earth, and although the specific gravity of the material is rather greater than that of ordinary white lead, you see the excessive fineness, in that it is able to travel as I have described. If you take that fine powder and keep it, so to speak, harnessed by means of bagging and so forth, until the oil is admixed with it, all that inherent danger, owing to its excessive fineness, is done away with, and you have, to all intents and purposes, a different material to offer to the public from the material of which I was speaking. To all intents and purposes, the toxic effect is really and truly different when bound by the oil from what it is when this is in a state of dry, as it is called.

1838. Allowing your point for a moment, you have already instanced to us the cases which occurred at Earlestown after the Purex had been mixed with oil?

Yes, because there again I contend that the system of painting at Earlestown was not to be considered as in any sense in accordance with ordinary precautions.

1839. No, but I want to make my point clear. Before this Committee could consider the question of giving exemption for any lead compound, it would have to be one which was capable of full proof. That is the way in which it is viewed in the Factory Department. You can hardly speak of Purex in that category?—No, you could not use it with a spruy.

1840. (*Mr. Sutherland.*) In what respect do they differ from the Mander Hannay process?—Less basic material. Mander Hannay had a process of smelting lead in his furnace, and he could not get any of the volatile products without a certain proportion of lead,

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which oxidised in the furnace. These quantities of lead oxide are, as you know, very very poisonous.

1841. How did that differ from the Glasgow white lead?—He got so much of the basic material that he had to deal with it by sulphuric acid. All the lead came together in great big crystals. It has no covering power whatever if you once get the particles wet with water or sulphuric acid. The pigmentary power is killed altogether.

1842. Would you make a distinction between that and the ordinary stack white lead? The ordinary painter applies the normal stack lead because of its biting power?—By the addition of an entirely innocuous substance you could get it so that he could not tell one from the other.

1843. By the addition of barytes or barium sulphate?—Yes.

1844. That would give the same stopping texture?—Yes, it coarsens it. If you mix the extremely coarse and the extremely fine you get what a man really wants when working with ordinary tools.

1845. I do not think that the insurance company would accept that lead as non-poisonous?—I do not see on what ground they should not.

1846. Twenty per cent. of solubility?—That is quite another thing, is it not?

1847. Yes. Twenty per cent. would be fatal in the eyes of the insurance company?—It might be if you took it just on those terms, but my contention is that the lead poisoning was due to constantly inhaling the vapour of which Professor Baly has spoken. I do not want to go into that, as he has dealt with it. When I smelt that tube I was very bad. The other tubes had no effect whatever. If a man was spending his life in such an atmosphere there might be something to say.

1848. The French have debarred the use of white lead inside?—I do not know what the idea is. I do not know whether it is founded on concrete knowledge or not. I take it that it is because, when freshly applied, it gives off these irritating noxious vapours.

1849. (Chairman.) In France it is prohibited inside and outside?—Do not they use white lead now?

(Chairman.) The French decree includes both interior and exterior painting, but it only comes into force in 1915.

1850. (Mr. Sutherland) (to the witness). The fact that your production is 80 per cent. less soluble than ordinary white lead is in favour of your particular make from the non-poisonous point of view?—If a man has to absorb four times as much, he probably gets poisoned four times more quickly. I think that is the proper way of looking at it.

1851. (Mr. Rice.) Purex is made as a paste ready for mixing and put on the market?—Yes.

1852. It is mixed with ordinary linseed oil and turps in the ordinary way?—No, linseed oil only. We talk of grinding, but you cannot subdivide those particles.

1853. It is sold in a paste to be mixed?—Yes.

1854. You were speaking of the difficulty of using ordinary tools. Would you explain that?—If I can I will.

1855. I ought to ask what tools should be used in applying Purex?—Very much finer.

1856. It is only a question of finer tools?—Yes. Well, not perhaps only that. If you have finer tools and a man has to get up into a corner, with a stiff bristle he can brush the paint in, but with a soft bristle he cannot. But that is quite overcome by the admixture, which has proved absolutely satisfactory. Since Mr. Mason brought the subject before me I have been telling the works to dissociate themselves from white lead. If people say they want genuine white lead, then we say, "This is not genuine white lead."

1857. (Mr. Gardner.) What you intend putting on the market would be a commercial product? I intend to put it on the market with just sufficient to add to its opacity and covering power. I am putting it on the market now.

1858. If you exposed your material to the heat of the sun for a number of years, would it not crack and blister?—No, it does not. The paint film formed

(there are chemical and other reasons which I cannot go into now) is very much like the skin of your own hand. My laboratory walls were painted with it two years ago, and the paint sticks at your touch like that, and it has all the nature of linseed oil left in it, whereas on the other side of the wall the carbonate is all perishing.

1859. Do you say that, if we sandpaper it, the dust would be absolutely non-poisonous?—But dust does not form. I want to make that quite clear.

1860. It must form?—It does not. That is the unfortunate part of it in one way. You have the elastic film which the painter does not like. The coachbuilders, Hooper's in Liverpool, are using absolutely nothing but Purex, and they do not rub down. They paint coat after coat with an enormous saving and a vastly improved finished article.

1861. (Chairman.) May we apply to them?—Certainly, with pleasure.

1862. (Mr. Parsonage.) With regard to the spraying machine, do you think that such things should be allowed to be used at all in connection with painting?

—Really, I could not answer that question. I know that they should not be allowed with Purex. It is tempting Providence to do that. I do not think that the atmosphere produced by a spray, even if the so-called non-poisonous paint were used, could be healthy to any man's lungs.

1863. And especially when using lead paint. A man would be literally smothered with the stuff?—Yes, literally.

1864. They may as well poison the man at once as allow such a thing to be used?—Yes.

1865. (Mr. Fell.) Would you say that, in connection with carriage work, they would not have to do any rubbing down or burning off. I understand it with a new vehicle, but unhappily it is not a question of simply the paint wearing out, but of repairing damage, and you must rub down or burn, to get to the bottom of that damage?—My answer to that would be that in the case of damage this paint film would be movable. It would be like paring organic matter, the nails of your hands and so forth. It adheres; the paint film becomes to all intents and purposes india-rubber. If you can imagine rubbing down india-rubber, you get very much at what is at the back of my mind which I have tried to explain.

1866. I fail to see how you can get out of rubbing down?—You must remove it but not rub down.

1867. (Lord Henry Bentinck.) How would you deal with a panel of a coach?—As I say, I have not had experience of rubbing down.

1868. (Mr. Fell.) My point is that, if there is any rubbing down, and your stuff is ground so much finer, there must be more dust in the air, and therefore there would be a greater tendency for people to breathe it?—If you look at those two boards for a moment you will see exactly what I mean. (Two boards were produced, and the witness explained.)

1869. Could you give us the names of some coach painters and other people who use Purex, so that we may inquire from them how they manage?—Yes.

1870. (Mr. Mason.) I would like to ask you whether it is possible to make this paint come down to a 5 per cent. solubility standard and still keep its properties?—No. If you put in 50 per cent. of barytes you would only bring it down to 10.

1871. (Chairman.) The Home Office accepts 5 per cent. as rendering a substance practically safe?—Yes. I do not want to labour the point. I think the poisonous nature of the material as swallowed is only a very small part of the question.

1872. (Mr. Mason.) Could you give us the name of any ironwork where your paint has been used?—It has been used largely in ships because salt water has not the same action on it as it has on zinc. Zinc is largely used, but the magnesium chloride, which is common to sea water, affects the zinc very rapidly, and when the oil has perished then the zinc is destroyed.

1873. (Mr. Sutherland.) There is a big bridge at Runcorn painted with it? Yes, quite three years ago. The bridge at Runcorn was painted with Purex and boiled linseed oil. The bridge was in a very bad

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condition, and it was painted with only one coat of the Purex and linseed oil, and this one coat has stood till to-day. I think they are considering the repainting of it now.

1874. (*Mr. Mason.*) That is considerably longer than white lead would stand?—Yes; nothing has ever stood it as long as that before.

1875. (*Mr. Sutherland.*) One coat only?—One coat only.

1876. I heard of it last November. I heard that it was standing well?—It has stood wonderfully well.

1877. (*Mr. Robins.*) As a coach painter, I can see certain impossibilities in the use of Purex, and although Mr. Hooper, at Liverpool, is using it, I would like to ask you if he is using it direct on the bare wood. Is he using it for priming? Is he using it for the nail and screw holes which occur? You cannot build a coach without them. Is it used for nail holes, screw

holes, dents in panels, and how does it suit the grain of wood? If you coat it ever so evenly there will always be holes. I do not know whether you claim that the Purex can be mixed into a stiff paint. If you do that, then there is an unevenness of the surface when that has set; if you coat it with another coat it would be morally impossible to produce an even surface on that coat without rubbing down?—That is a question for the users of the paint.

(*Chairman.*) Yes, I would reserve those questions.

(*Mr. Robins.*) The witness said that Mr. Hooper was using it, and I would like to say as a practical painter that I can see an impossibility about it.

1878. (*Mr. Kinggate.*) Can you use turps with it?—Yes.

1879. I understood you could only mix it with oil?—No, you can use turps.

The witness withdrew.

Mr. JOHN DIBBLEE CRACE examined.

1880. (*Chairman.*) Are you a master house decorator?—I was for 45 years, but am not now. About 10 years ago I gave it up—or 12 years ago.

1881. You are President, I think, of a Trade Society?—No, not of the Trade Society, but of the Institute of British Decorators, which includes employers.

1882. What was your business?—Decoration.

1883. What class of work did you do?—What may be called first-class sort of work. I decorated the National Gallery, the Houses of Parliament, and the Leeds Town Hall.

1884. You were in the trade 45 years, do you say?—Yes.

1885. Were you an employer all that time?—All that time.

1886. Were you apprenticed to the trade?—I was. My firm has existed for five generations succeeding from father to son.

1887. How many men did you employ during those 45 years?—It is impossible to say.

1888. Per annum, I mean?—It varied very greatly; from 100, sometimes to 200 or 300 probably.

1889. Were they all painters?—I had other men also, but I am speaking of painters now.

1890. Did you have an even run of business all the year round?—No. In the later years, it very much dwindled in the winter; always, in fact, all through, but much more latterly.

1891. What happened to your men in the slack time; were they discharged?—Yes, they went off according to the work. There might be 200 men one week and only 100 the next week on the completion of a large work.

1892. Did you employ the same men year after year?—To a certain extent. There were certain men who were practically always in our employ.

1893. Did they come to you as boys?—Some of them, but that was not so much the case in the later years.

1894. Did many leave you of their own accord?—I think they always left because there was not sufficient going on.

1895. What reasons would be given?—The engagements were never supposed to be for more than from week to week, but, as a matter of fact, when we found valuable men we always endeavoured to keep them and made work of all kinds.

1896. Did any of them leave the trade because of ill-health?—I would not say that they never did, but it never came to my knowledge. In fact, I might say that the painters that I have had in my employ were a more healthy-looking set of men than probably the joiners and carpenters.

1897. Did you take on and discharge your men personally?—All my work was conducted personally.

1898. Did you make enquiries when a man was away as to whether he was ill, and if so as to what was the matter with him?—Now and then I should; but unless a man went from the country I should hardly

know, because the number of men would have to be kept up to what was necessary. In country work I should know, but in work in London I should not probably know.

1899. Did all the paints which you used contain lead compounds?—All the white paints. Lead compounds are in a comparative minority for the stainers; umber and ochre, and so on, are not lead compounds.

1900. You did not use all lead compounds?—No, certainly not. I should say that was rather exceptional.

1901. What quantity of white lead did you use?—That varied too, very much. I have no longer got the books to refer to; but I found, since the question was raised the other day, that in the last five or six years it averaged about three tons a year.

1902. And red lead?—To a certain extent for outside work.

1903. Did you use much red lead?—No; comparatively a very small quantity, because it was only used for outside preparatory work.

1904. With regard to Brunswick green and other paints containing lead chromate, what quantities of those did you use?—Chrome yellow was used in a very small proportion.

1905. What quantity did you use of red oxide of iron?—That was used exclusively outside. I should say it would be only on iron work. It would not be very great.

1906. Did you use zinc oxide at all?—At one time we tried it, but we did not find it work satisfactorily, and the men did not like it.

1907. Did you give it up because the men did not like it, or because it was not satisfactory in other respects?—It is a long time ago. It was through the men's expression that they could not get on with it that it was given up. It was taken up quite experimentally.

1908. Did you use lithopone?—No, not under that name. I do not know what it is.

1909. Did you use carbon or graphite paints?—They are more recent inventions. I have used them of late years for outside work.

1910. Did you use any particular brands of leadless paints?—No. Leadless paints would only apply to the stainers, and would be comparatively small in quantity.

1911. Then, to sum up, have nearly all your paints contained lead?—All the white paint was white lead.

1912. Did you ever hear of any of your men suffering from lead poisoning?—I can only recollect one case, about 20 years ago. It was a man who had been a great many years with us, and had never been in really good health, and I think was constitutionally open to be affected by it. He was in charge of work, and was very earnest in his work, and very apt to neglect the necessary precautions really.

1913. Do you mean that your men did not, to your knowledge, break down on account of lead absorption?—It is a most exceptional thing. With good men it is a very unlikely thing.

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1914. But I want you to answer the question—do you mean to say that to your knowledge none of your men broke down on account of lead absorption?—I only knew of one man breaking down from that cause.

1915. In how many years?—Forty-five.

1916. Did your men have occasional days of sickness due to lead?—Yes. I should think I heard that perhaps six or eight, or five or six, who would be away for a day or two and come back.

1917. Five or six in the course of 45 years?—I should think that is about all I have heard of.

1918. Would all the cases come before you?—Yes, the foreman would always report them. In fact, in the cases I can call to mind, he would sometimes come and ask me if I could provide him with an immediate remedy.

1919. Did you have periodical medical examination of your men?—No.

1920. Then is it not possible that some of them were suffering from the slower and more insidious forms of poisoning?—I cannot express an opinion on that. The men that I knew best came to me year after year. In fact, when last I renewed the decoration of the House of Lords, I had a man in my employment who had been in mine or my father's employment when the House was originally decorated in 1847. It was 1893 when the House was restored, and I found that that man had been actually at the work when it was first done. I suppose there were a number varying from a dozen to perhaps 30 or 40 who were constantly with us, and among those I never knew a case.

1921. I suppose you took precautions to guard against your men being lead poisoned?—The precautions were that they were always to wash their hands on leaving work or before meals.

1922. Did you insist on that?—The trained painters knew it quite well.

1923. But did you have any system in your organisation by which the men were obliged to wash their hands?—They would have been found fault with if they were found not to have done it. The foreman on the work was responsible for it.

1924. Did you give them any extra time in which to wash?—There was always water and soap and towels provided, and it was a question of a couple of minutes.

1925. How many men to each basin?—There was a pail; we did not get to the refinement of basins.

1926. That is a more modern luxury?—I have often washed in a pail myself.

1927. Did you provide hot and cold water?—That would depend very much on whether the house which they were working on was an occupied one or not. If the house had servants in it they would make arrangements with them to bring hot water.

1928. When your men were working on a job outside, how did they get their towels and nail brushes and soap, and so on?—They were always provided on the premises.

1929. By you?—Yes.

1930. Did your men wear overalls?—Yes, they always wore Holland overalls.

1931. Did you provide them?—No; that was part of their kit.

1932. And they washed them themselves, I suppose?—They brought them with them and took them away with them always.

1933. Did you take any steps to prevent dust from getting into the air?—There is no dust in house painting.

1934. I will return to that point presently. Did you ever do any mixing?—Yes.

1935. Where was that done?—On the spot; at the work.

1936. At the place where the work was being conducted?—Yes.

1937. Was there no dust from that?—Certainly not; it is all in oil.

1938. But they must get it out first in a dry state?—No; they never had white lead in a dry state. It always came mixed all ready in oil—a stiff compound.

1939. It came from where?—The manufacturers.

1940. So that your men never came in contact with any dry white lead at all?—No. They might use it on some small scale for special purposes, but it would be only a few ounces then and quite an exceptional thing.

1941. With regard to house-painting, was much of the work rubbed down?—Yes, always.

1942. Did you use dry sandpaper for that?—No, except upon old paint sometimes which would be rubbed down, but the rubbing down generally was done with pumice stone and water.

1943. I have asked you whether you used dry sandpaper. You said that on some occasions you did?—Yes, it would be used on old work.

1944. Would there be no dust then?—I suppose there might be a little dust from that.

1945. Did you generally use a wet process?—Yes.

1946. Invariably?—Pumice and water.

1947. How many times did you rub down your work?—It is difficult to say. It would depend entirely on the condition of the work.

1948. Were all the undercoats rubbed down?—No.

1949. Did you rub down mouldings and curves?—Yes.

1950. Can the wet method be generally used throughout?—Yes.

1951. I suppose overalls were worn in this work?—Always.

1952. Will you tell us about your stopping. What did you use as stopping?—It would vary a little according to the work, but it would be white lead in Japan gold size or sometimes in varnish made into a stiff paste.

1953. How was that applied?—With a knife.

1954. Can a workman avoid getting his hands soiled with the stopping? No. He would probably get as much on his hands as he would in painting. He is not obliged to touch it, but he invariably does.

1955. Is the stopping easily cleaned off the hands?—Yes, if it is done properly before leaving off for meals.

1956. Was not the white lead handled dry in making the stopping?—It may have been sometimes, but I really do not recollect that it was. We always had our white lead in oil, and it was from that that the stopping was made. Very often some sorts of stopping would be made with very little lead at all.

1957. Do you think it is easy for the men to wash their hands in cold water with paint on?—Yes. You cannot get hot water in such a building as an unfinished Houses of Parliament or an unfinished National Gallery—it is not at hand—or in an empty private house.

1958. When you were repainting, how did you deal with the old paint?—On walls, it was slightly rubbed over with sandpaper.

1959. Did you scrape it off or burn it off?—Burning off would be the exceptional thing rather. In fact, it would not all be scraped off for ordinary work. It is only for such work as blistered paint, or where it has been unsoundly done originally.

1960. What is the proportion of scraping off to burning off?—It would not be often scraped off at all unless it was very bad painting and had to be replaced.

1961. Did you burn off interior work as well as exterior?—With such things as shutters, if the paint has to be removed. You generally use some solvent for interior work. Burning off makes a very disagreeable smell.

1962. When scraping off is done, is the paint hard or soft?—The scraping off, as I say, would only be an occasional thing. The paint may be assumed to be hard. It would be old paint.

1963. Do painters carry a dusting brush among their tools?—Yes; they are supplied by the employer.

1964. I suppose the application of wet paint involves soiling the hands?—Yes, almost inevitably.

1965. And the garments?—Yes, splashes on the garments.

1966. And on the overalls?—Yes.

1967. At what time did your men commence work in the morning?—When I first recollect, they began at six in the summer and seven in the winter, but during

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the later years the hours were very much changed by the trade union arrangements.

1968. Did they have breakfast before they began?—Very few did. I expect they generally broke off for breakfast.

1969. How long did they have for breakfast?—Half an hour, I think it was.

1970. Did they go home for that, as a rule?—No; they generally brought something with them.

1971. Did any of them take their breakfast in the paint-mixing shop?—No; they were supposed to find a place where there was not any paint, but we had not much control of that. Some of them would go to a coffee house or go to a public house.

1972. If they had their breakfast in the place where they were at work, what then?—In the country we always used to try to arrange with the owners of the house to set apart a room in which they could take their meals, and we generally provided a man to act as cook.

1973. A witness told us yesterday that the men invariably took the meals in the places where the painting was going on?—That is a mistake, if it is a well-conducted firm.

1974. Can you regulate that when the men are away from you?—You can do a good deal towards it by making some arrangement with the owners of the house that your men may use a certain room. I should say that they never took their meals in the place where the painting was.

1975. Yesterday a witness said that they always did?—They do not always do it. I never would let it go on if I saw it.

1976. What are the usual hours of work amongst painters?—About 52 hours a week I think it was latterly.

1977. Do they work overtime?—Yes, in emergencies.

1978. Are the men well fed?—To judge of their appearance; I should say there were some who were remarkably fine-looking men among my people.

1979. You told us that you did not adopt periodical medical examination?—No; it was never thought of in those days. It is a modern invention.

1980. When you were in business, there was no liability for lead poisoning under the Workmen's Compensation Act?—No.

1981. Have you ever studied the Registrar-General's report as to the lamentable amount of disease and illness in this industry?—No.

1982. You have never done that?—No.

1983. Do you know that there were no less than 284 deaths from lead poisoning amongst house painters in the last 10 years?—No, but I should say that, if that were inquired into, it would be found that all those men were men who had not been originally trained as painters; but had been brought in for a cheap job.

1984. Do you know that the mortality figures show for painters a death-rate considerably higher than the normal from troubles which are the frequent effect of exposure to lead, such as Bright's disease and nervous diseases?—I have never heard that Bright's disease was more common to painters than to other people.

1985. Would you be surprised to hear that it is very much higher amongst house painters than any other class of workers?—I should be rather surprised to hear it. They are exposed in outside work a great deal more than many men.

1986. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the last ten years?—I should be very much surprised. I have had thousands of men in my employ.

1987. But I want to point this out to you. You are surprised to hear it?—Yes, I am.

1988. I am sure you will agree with me that all this sickness and death is very deplorable?—Of course anything of that kind is deplorable.

1989. There seem to be only two ways in which this state of affairs can be remedied. One method would be to prohibit the use of lead compounds, or at least to restrict them to four or five per cent. of the whole

material used. The other method would be to regulate the trade very strictly?—I am not clear what is intended by lead compounds.

1990. Oxide of lead and carbonate of lead and chromate of lead—all compounds containing lead. When you were in the trade were you a member of your trade organisation?—No; there was no organisation.

1991. The master painters were not organised then?—They were in parts of the country, but I never joined.

1992. Now I have told you what I think are the lamentable conditions to which this industry is at present exposed. Can you offer any suggestions to alleviate the evils which these men suffer from?—I think it ought to be made compulsory that provision should be made for the men to wash, and, if omitted, the foreman or the employer, as the case might be, should be subject to some penalty.

1993. Are you cognisant of the position abroad with regard to this matter of lead poisoning?—No, I cannot say that I have definite knowledge of it.

1994. Do you know that in France a law was passed in 1909 which prohibited, five years from that date, the use of white lead in the interior as well as the exterior of buildings?—Yes, I know that they have such a law.

1995. And that in Austria the use of white lead for the interior of buildings has been prohibited since the 1st April 1909?—I did not know that that was so in Austria.

1996. Have you heard that many Government and municipal authorities in such countries as Switzerland, Germany, and Belgium have prohibited the use of white lead in work undertaken on their account?—For interior or exterior?

1997. Interior and exterior?—No, I did not know that they had.

1998. Or that in Germany and Belgium very strict regulations have been introduced for the use of lead paints?—I heard that they had regulations, but I do not know what they are.

1999. Do you not think it is regrettable that this country should be behind other nations in such a matter?—Yes. I think that regulations to a certain extent would be a very good thing. I think really that so far as there is mischief in the country it probably is largely due to the men not having been trained and to insufficient insistence upon cleanliness. Perhaps you may be able to tell me what the percentage of the deaths from white lead will be to the whole?

(Chairman.) That is a point we are going into later.

2000. (Lord Henry Bentinck.) You say that it is not necessary always to burn off, do you not? You can use a solvent?—Yes; it is very often done.

2001. And it is not really necessary to burn off always then?—No. It is rather an exceptional thing. They burn off paint from front doors.

2002. Why cannot you use a solvent there?—Because it is very unsatisfactory to use any water in the process because it is more liable to blister from the effects of the climate—particularly alternations of hot sun and rain.

2003. What means can you suggest of training the young painters in their work?—The good thing is apprenticeship; unfortunately, that is not always done.

2004. That is not in practice nowadays?—It is in practice but not in London. All the best painters come from the north where they are apprenticed. All the best men I had came from the north of England or from Scotland.

2005. Then you would like to see some technical schools, I suppose, in London or an extension of the technical school system?—I am on the managing committee of one, but I do not think that a technical school ever supplies the place of apprenticeship.

2006. Do you think it is impossible to revive the apprenticeship system in London?—That is a very difficult question and one that I am not prepared to answer. It would be a very good thing if it were revived.

2007. Failing apprenticeship, the only remedy is to have technical schools?—Yes, and I approve of having

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technical schools, but I do not consider they are a substitute for training in the workshop.

2008. I do not think that they themselves pretend that they are?—In technical schools a youth never comes across the accidents of practice that actually occur.

2009. (*Sir Godfrey Baring.*) How many years is it since you retired from business?—I retired at the end of 1899—at the end of the century.

2010. So your evidence relates to the trade conditions of some time ago, does it not?—From 1854 to 1899 altogether.

2011. What is your experience with regard to the average age at which painters have to retire from a full day's work? Do you find that men can go on to a good age doing a full day's work? Yes. I met one of my old hands some time ago, one Sunday, and walked with him to Regent's Park. He narrated to me how he had seen the troops come back from Waterloo.

2012. Was it your experience that men collapsed at an unduly early age?—No, not at all.

2013. You said you tried some experiments with zinc oxide paints some time ago, and those were unsatisfactory. How long ago was that? I should say it must be 40 to 50 years ago.

2014. Would you say that there has been great improvement in the manufacture of zinc paints since then?—Yes, I believe there has been.

2015. Did I understand you to say that, in your opinion, paint stains could be removed by cold water alone, effectually from the hands? Not stains perhaps, because some pigments stain very strongly, but when the colour is mixed they would be able to wash it off.

2016. In cold water alone?—Yes, with soap.

2017. On the whole it would be generally desirable to use hot water?—Yes. A man would use hot water probably when he went home if he at all regarded the appearance of his hands.

2018. On some jobs it would be impossible to provide hot water?—Yes. Very often it would be impossible to provide hot water.

2019. What kind of work is it necessary to rub down with sandpaper?—The walls of a room like this, for instance, if they have been painted. It is not to take off paint but to give a key for the new paint to hold. It is not to remove a lot of paint, but to give a surface not keenly smooth.

2020. Rubbing down with sandpaper would produce a considerable amount of dust, I suppose?—Not very much, because you do not want to remove what is on. You only want to make it fit to receive another coat.

2021. Speaking from your experience, would you deplore it if this Committee came to the conclusion that it was necessary to restrict the use of lead paint?—I should, very much.

2022. Do you think that it would be disastrous to the painting industry?—I do. I am speaking now as a disinterested witness because, as I say, I have not been in business this last 12 years.

2023. Do you anticipate that the prohibition will be disastrous in France?—Yes. I think interior decoration, where lead is not used, can never be so satisfactorily done.

2024. (*Chairman.*) In what way will it be disastrous if it is general throughout the country?—I was not thinking of it financially; I was thinking of effect.

2025. Of the artistic effect?—Yes. All the painters in the artistic part of it go on using lead now. It is only for the mechanical part that they have done away with lead.

2026. Would you be surprised to hear that the representative of the Office of Works told us yesterday that they made a great many experiments during the last nine years, and they have now arrived at a time when they much prefer zinc oxide, both from the artistic point of view and from the point of view of durability? Is it the artistic point of view in mixed colours?

2027. In all colours?—I am very much surprised to hear it. I do not know a single artist painter who uses white zinc in oil. The touches would not cover.

You use it in water, of course, but that is a different thing.

2028. Perhaps you may have lost touch, as you have been out of the trade 12 years?—But I have painted pictures in the meantime occasionally.

2029. But it is conceivable that you may have missed some of the more modern methods?—Yes, it is quite possible.

2030. (*Dr. Collis.*) Do I understand that you did not, when you were in business, take any special precautions other than other masters did to protect the health of the men?—No. I should say that probably our precautions were among the best of those who were working at the same time.

2031. So that your men would represent a fair sample of the ordinary painter and plumber?—Yes; a fair sample of the painters; I do not speak as to plumbers.

2032. You have given your opinion on the health of the men from your experience. Is your experience based on any accurate statistics?—I did not form statistical tables, but I was in contact with the men constantly.

2033. You have stated that you thought that your carpenters and joiners showed about the same health or rather worse than the plumbers, painters, and glaziers. May I draw your attention to the fact that your opinion is in direct conflict with the Registrar-General's statement when he speaks of carpenters and joiners, and says that at every stage of life the mortality of these workers is below the standard for all occupied and retired males, and as regards plumbers, painters, and glaziers, the comparative mortality is 11 per cent. above the standard?—I think you mistake my answer. I said that they were a healthy-looking set of men.

2034. But I only draw your attention to the fact that the statement is valueless unless it is based on statistics. I can always find a strong man in work that is very bad, and a very weak man in work that is very good?—Yes. I began life as a weakling. I am now 73.

2035. And you look very well too?—I have been in contact with paint all the time.

2036. One further point; you spoke of making washing compulsory. Could you give me any idea of how that could be carried out?—No, I am not prepared to suggest how. I never had any difficulty personally, but I know that a great many small employers employ men who have not been through the sort of training that leads them to be careful.

2037. You do not think it would be practicable to insist on washing accommodation being provided?—Yes, I do; I think that is quite practicable.

2038. In an unused house or building?—Yes. They can always get water, but cannot always get hot water.

2039. Can they get water where it is not laid on?—Yes; they are obliged to have water for the other work in the building. You cannot build a brick wall without water.

2040. Having got the water, how do you propose that you would be able to supervise and ascertain whether the men washed?—You could only do it through the foreman.

2041. I presume you appreciate that it would mean a large army of inspectors to go round to see that it is carried out, and then the inspector has to enter a private house?—Yes, I know, there are difficulties.

2042. They seem almost insuperable?—Well, I do not think that is insuperable. The only thing that I can suggest is that the master should be made responsible if it was not done.

2043. But how are we to find out, unless we have inspectors to go and see?—You would find men complaining, I imagine, if their health were so much affected.

2044. But the men are not going to complain if they have not washed?—They could complain if the means of washing were not provided.

2045. That might be. Our experience of factories is that we have to watch both men and occupiers to get regulations carried out, and then only by having an army of inspectors to watch things can we possibly do it?—Yes, I know men are very careless of their own health.

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[Continued.]

2046. You suggest that it is only the untrained men who really get lead poisoning?—No, I do not go quite so far as that, but I say it is only the untrained men who neglect the precautions.

2047. And you think that neglect does lead to lead poisoning?—Yes.

2048. (*Mr. Sutherland.*) When you say the men cannot get hot water on the job, they always make provision for water, pails, and so on, for ordinary purposes, and there is always water on the job?—There must be, of course.

2049. For the carrying on of the business?—Yes; in fact, it is very often made a condition of the contract—that the client shall provide water in case they are not living in the house.

2050. Coal is supplied by the employer, and sent on to the job, or coal is on the job. Even in new work there are facilities for heating water?—You cannot always get hot water.

2051. But you can always make it hot by using a bucket of water and putting it over a coal fire?—Yes.

2052. And that is very often done?—It is very often done. It is done more in the winter when the men feel the cold water very hard.

2053. Generally speaking, there are no difficulties in getting hot water?—There is no impossibility. It can be done without much trouble.

2054. Generally, there are provisions for obtaining hot water?—Yes. There are many processes in painting in which you must use hot water, like washing off old distemper.

2055. They can get it then for their meals or for washing the hands?—Yes.

2056. Soft soap is always sent on the job, is it not?—Always, but that is not what the men ordinarily wash with.

2057. No. Sometimes they soften the paint with a little oil and then they proceed to wash with soft soap?—Yes.

2058. You consider, from your experience, that there is no insuperable difficulty in getting the hands washed?—No.

2059. Do you attach much importance to the theory that, as far as our business is concerned, there is danger from the dust created by rubbing down?—There is very little dust. What is described as rubbing down the walls is merely glass-papering the surfaces. Rubbing down, as technically we understand it, is rubbing down woodwork where fine surfaces are required, such fine surfaces as painted columns, for instance, or where the work is going to be done in imitation of wood or marble. That is always done with pumice and water.

2060. Not much dust arises in that connection. Do you hold that there is much dust from rubbing down walls?—I do not.

2061. If there was any difference between your men and the average man, it would be in favour of the former. The better class of men sought to get into your shop?—Yes.

2062. The men brought their own overalls, and they were usually washed once a week?—Yes; they took them away with them in a little bag which they always brought.

2063. They brought clean overalls every Monday morning?—Yes.

2064. You would not have kept them on if they had not had clean overalls?—No. It would not have answered in good houses for people to see the men going about dirty.

2065. (*Mr. Rice.*) In your 45 years' experience, you only had one man who suffered from lead poisoning?—Who died from lead poisoning.

2066. But you had some who suffered from lead poisoning?—I have had some cases occur which a man has got over in a day or two. This has been quite exceptional, not one a year.

2067. They may not perhaps have been your regular men?—No. The case I have mentioned of a man dying is the only one I can recollect of my regular men. The other cases have been of men I had as additional hands, probably painters, but I have no intimate knowledge of the men.

2068. But were they sufficiently long with you to have acquired that complaint in your employ?—I can hardly say. I dare say some of the men were with me five or six weeks and that sort of time, from a week to five or six weeks. They would generally be people who were taken on and put on particular work in a busy time.

2069. They would not be your regular hands; they would be more chance men?—They would be men out of the societies.

2070. Probably qualified men, but chance men?—Yes.

2071. You would not be able to watch them the year through?—No. I would not be able to say what their history was at all.

2072. Probably they may have been out of work before you had them?—Yes, possibly.

2073. A proper painter always keeps himself clean?—Yes.

2074. That is his natural pride?—That is a happy result of his knowledge of the benefits of washing.

2075. He sees that the overalls are clean?—A good painter will always have his overalls decent looking; they will not be very clean at the end of the week of course.

2076. You said just now you thought there should be some penalty for not providing washing arrangements at works for the men?—Yes.

2077. Do you suggest any penalty for workmen for not using them?—That really ought to follow, but I do not know quite how you would get at it.

2078. You have not known cases, I suppose, where men have refused to use water. Have they always been anxious to use water?—Always. Directly the bell or the whistle sounds the men all rush to buckets of water and wash their hands before they do anything more, and it was so much the general practice that the man who did not do it would be rather noticed for not doing it, and probably if the foreman saw him he would send him to do it.

2079. You have never heard of cases where masters have refused to allow the men to wash?—No, I have not.

2080. (*Mr. Gardner.*) During your 45 years' experience, did you ever work as a journeyman; going out to a job and working from morn to night?—No, I never did that, but I was constantly visiting all the work that was going on.

2081. Some of the employers who are practical painters have served an apprenticeship. They have worked at the trade when they were boys and have put in time like other men. Your experience is simply from visitation of works. With regard to washing, did you ever send coal and firewood to a job for the men to heat water?—Yes.

2082. And towels?—Yes.

(*Mr. Gardner.*) I am very glad to hear it. It is quite an unusual thing.

2083. (*Mr. Parsonage.*) You are obliged to have heat to melt size?—Yes, you could not distemper a ceiling without having those means.

2084. (*Mr. Gardner.*) But what about unoccupied houses?—Then you must make provision for heating water.

2085. I understand that your work was largely work of a high-class nature?—Yes.

2086. If men went out to coat down a number of fronts and there was nothing else to be done on that job, would you send washing-materials for the men's hands?—Those would generally be domestic houses, and there would be water.

2087. Would the men get access to the houses for washing purposes?—Yes.

2088. Did you ever know of painters lifting white lead from a tub and mixing it with their hands?—No. I should not think any first-rate man ever did that. It would be great neglect not to have a wooden spatula to take lead out of the tub with.

2089. A gentleman told us yesterday that it was a common practice to mix it with the hands?—I never saw it done.

2090. You would be rather astonished to learn that when men are working out on a job, from 80 to 90 per



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[Continued.]

cent. take their meals where the paints are?—I should be rather astonished.

2091. What would you say was the average wage of an ordinary man? I do not mean the staff man who is on all the year round, but the ordinary man who comes on and goes off?—Per week or per annum?

2092. Per week?—I could not say. It would very much depend on the season. In some seasons, some exceptional public event may throw a great many men out of work.

2093. I want to know whether you can give us an idea to compare with information which we had before?—No.

2094. (*Mr. Parsonage.*) Your work was mainly decorating work?—It included a great amount of plain painting.

2095. But you could not compare it with the work of firms like Messrs. Maples, say. You said you used three tons of lead in a year?—That was in the later years when I was really shutting down.

2096. It would not be fair to take as a criterion the few lead poisoning cases that come to your knowledge, because the work you generally did was more in the nature of high class decorating work than ordinary house painting?—I dare say it was, but I did a great deal of ordinary house painting.

2097. There was generally more decoration, and in later years a great deal of your work was washing old decorated work of your own?—Some of it was.

2098. A great deal of it?—I would not go so far as to say a great deal.

2099. I would put it to you that you did more of that class of work in the later years that you were in business (washing and restoring your own old work) than any other firm in the west of London?—It may be so.

2100. I do not want to take any advantage. I am speaking from my own knowledge as being in the west end of London for about 30 years?—It is quite possible. In the case of clubs that would happen, because a club does not want to interrupt the course of business for longer than necessary. If they were having work done they would probably have as much as possible washed and touched up, and one or two rooms done.

2101. Taking another firm in the west end of London who employed 50 men, and supposing you employed 50 men in the year, your firm would use much less lead and do far less painting work than the other firm?—I do not know about that.

2102. I should say they would. Now, with regard to rubbing down with glass-paper and pumice stone,

you use pumice stone and water. Between the coats you would rub down with glass-paper?—Yes, very slightly, just to disturb the surface.

2103. You would not pumice stone and water again?—No.

2104. Did you provide nail brushes for the men?—No.

2105. Only water and soap?—Yes, and towels.

2106. If men have brushes for their own purpose, they keep them themselves. The brushes usually used are to dust down the work?—Yes.

2107. Not for men to use for the purpose of cleanliness?—No.

2108. With regard to apprentices in London, whose fault would you say it is that the apprenticeship system has died out?—I could not say.

2109. Would you agree that painting is a skilled trade, and that there should be a standard rate of wages for painters in London? You always paid the rate yourself?—Yes, I did, but I do not believe in it.

2110. You do not believe in it?—No, I think a man should be paid according to the quality of work he can do.

2111. Would you admit that a man requires to get experience to use paint?—Yes.

2112. And having given some years to get this experience, you think that afterwards he should be paid the same as a labourer who is picked up and put on?—Not at all.

2113. You do not agree with that?—No. What I mean is, that there are a great many men who can do very little except put on paint and who can go no further. The men who are really skilful in other ways in connection with painting ought to have a higher wage than the men who can do nothing else but lay on the paint.

2114. There should be a minimum rate?—I am not prepared to go into that. I have always paid the rate.

2115. When you took men on you used to send to the Painters' Society for your men?—Yes.

2116. And you used to give preference to Union men—Society men?—I always had the Society men, not from any conviction, but because it was the simplest thing to do. The foreman took the men. The best men, in fact, joined the Society.

2117. You used to send to the Society house for them?—Yes.

2118. You will admit that these men were generally very cleanly in their habits and very careful?—Yes, as a rule they were.

The witness withdrew.

Mr. C. COOKSON examined.

2119. (*Chairman.*) You attend here to-day as the representative of Messrs. Cookson and Company, Limited, Newcastle-on-Tyne?—Yes.

2120. What does your firm manufacture?—We desilverize, and we manufacture white and red lead, litharge, and also antimony.

2121. Are you one of the largest manufacturers of white lead in England?—Yes. We are, I believe, the largest.

2122. By which processes is your white lead made?—By what is generally known as the stack process, or the Dutch process, and also by the process which is known sometimes as the chamber process or the German process.

2123. Are there many other firms operating the chamber process?—No; I believe we are the only ones in the United Kingdom.

2124. Will you please tell me the main uses for your white, red, and orange leads and litharge?—They are chiefly used as a protective covering for different materials.

2125. Do you handle any substitutes for lead paints?—No, none.

2126. Should the use of lead paints be restricted or prohibited in this country, at any time, would it mean serious loss of business to your firm?—Yes.

2127. But as you deal in so many other materials not used in the paint trade, you would not feel this so severely as firms solely occupied in the manufacture of white lead?—It would mean generally that our white lead works would become worthless, and they represent a very large investment.

2128. But if substitutes for white lead could be found which would result in the alleviation of the sufferings of a vast number of people in the painting industry, you would think it not unreasonable, I suppose, that the Home Office should prohibit the use of white lead paints?—Provided there was some compensation or some form of recompense for the loss of our capital and the loss of employment to all of our men. White lead works cannot possibly be converted, and there are none of the so-called substitutes at present in use which could be made by white lead plant, and therefore the whole of our plant would become worthless.

2129. Supposing you had a very hard-hearted government in power who refused to give compensation, would you say that the workpeople should still suffer?—I do not say that they do suffer now provided reasonable precautions are taken; I do not admit that they do.

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[Continued.]

2130. But you will admit this; that the figures published by the Registrar-General show a most deplorable condition of suffering amongst house painters and coach painters?—Yes, but I do not admit that the whole of that is necessary.

2131. Have you any suggestions you would like to put before us as to precautions?—To begin with, I do not see why house painters and coach painters should not be inspected—medically examined—in the same way as other people who handle lead are, and I think there are certain precautions which could be taken which would very much minimise, if they did not entirely do away with, the danger.

2132. But medical examination would not by itself do away with the danger?—No, but it tends to lessen it. If the medical man sees the beginning of a case and the man is suspended or some precautions are taken, the case instead of becoming a bad one never gets any worse.

2133. That may or may not be the case, but medical examination would only enable you to deal with the case when it arose. It would not stop lead poisoning from taking place?—Not in itself, but it would make the cases much less severe.

2134. Do you think that washing facilities should be provided wherever the painter is working?—It is very difficult to do that in certain places unless you have a portable washing apparatus that you can take about. I consider that cleanliness is of extreme importance.

2135. Do not you think that hot and cold water and soap, and nail brushes, and clean towels daily should be provided?—I do not see how you can do it unless you have a washing place on wheels to take about from one job to the other. I presume you are referring to house painting?

2136. Yes?—I do not quite see how, at any rate, the small painter is to provide that.

2137. How, then, are we to obviate the evils which exist?—I think if he washes in cold water, it is as much as he can get and that should be insisted on.

2138. Do you think that cold water would get rid of all the paint on his hands?—If he washes thoroughly. He can use a certain amount of alkalis and so on in the water which will take up the oil and allow the wet lead paint to come off more easily.

2139. I heard a witness in a recent inquiry that I was holding state that cold water was better than hot, because if it was cold water he would have to scrub harder to get the paint off. The Committee I am speaking of laid it down as a cardinal point that in future hot water must be provided?—Where it can be provided I quite admit that it should be, but I think it is almost impossible for a small builder, when he is erecting a cottage in the country, to do it. I do not see how he can do it, although it would be desirable.

2140. Have you any other suggestions to make as to precautionary measures?—First of all, some men are much more liable to lead poisoning than other men. Another thing which affects it very much is the sobriety or otherwise of the men.

2141. I should not press that too far, because we proved in another inquiry that the women suffer a good deal more than the men?—Yes, but amongst men I think there is no doubt about it. There are two reasons for that; first of all if he takes drink in excess it does not do him any good, it lessens his resisting power; and once he gets into that habit, he gets slovenly and careless generally, and once he gets slovenly and careless he is far more likely to feed with dirty hands or chew tobacco touched with dirty hands.

2142. But you cannot legislate against that, can you?—No. Then I think that when they are using sandpaper or pumice or anything like that, if it is done dry they ought to use some form of respirator, something to cover their mouths.

2143. Have you ever heard of a respirator that was comfortable to wear?—At first they are exceedingly uncomfortable, but afterwards the men get quite accustomed to them.

2144. Have you ever known any set of men who have got accustomed to them?—They cease complaining

about them. I do not know that they get accustomed to them.

2145. Do they wear them?—Yes; our men always do, and they seem to wear them of their own accord. We hardly ever catch a man without one.

2146. For what periods do they wear them?—They wear them the whole time when they are in any place where there is likely to be any dust.

2147. For how long at a stretch?—We go on the theory of keeping our men at the work as short a time as we can.

2148. For how long at a time do they wear the respirator?—Do you mean straight on end without taking it off the mouth?

2149. Yes?—I do not suppose it is for more than an hour without taking it off the mouth to spit or something of that nature. But they always wear them.

2150. Would you allow dry rubbing down?—No, I would not.

2151. Would you make it obligatory that all rubbing down should be wet?—Yes, I would, because I think that anything that causes powder increases what danger there is.

2152. You recognise that the dust is the dangerous element?—Yes.

2153. Whatever form it takes?—Yes.

2154. Would you suggest how the wet rubbing down should be done?—I think it can be done by getting the sandpaper on some backing and then putting round the backing a wet flannel, or wet felt, sufficiently loose and damp to prevent any dust escaping. I should say that the whole thing is involved in the wet protection that is used.

2155. Is it practicable in every case to use wet methods for smoothing; for mouldings, curves and ironwork for example?—I would not like to say; I do not know sufficient about that to say.

2156. You see it is no use—I say so with all respect to you—coming before us and offering your opinion about precautions unless you can be pretty certain that they can be adopted?—In all cases?

2157. In all cases, or in the majority of cases?—What I have mentioned can undoubtedly, I think, be adopted in the majority of cases.

2158. What else do you suggest for instance, with regard to burning off; can you suggest any precautions with regard to that?—I do not think there is very much danger in the burning off; with the blowing and scraping you mean?

2159. Yes. There is a considerable amount of fumes and dust?—No, there is very little. The fumes which one sees coming off are not lead fumes but entirely oil fumes, and there is practically no dust, that cannot be avoided.

2160. There must be lead in the fumes?—But they do not get to the temperature at which the lead will begin to volatilise; you do not get the fumes until that temperature is reached.

2161. Do you base that observation on exact scientific experiments to determine what precisely the fumes consist of?—No, we have never analysed the fumes.

2162. We had a witness here this morning, Professor Baly, who stated that he discovered lead from the vapours arising from the drying of white lead paint. How do you think that is to be dealt with?—We tried some years ago taking what is known as a mash-tub when we used to grind the dry white lead with oil. Now we do not do that. When we used to do it that question was very much discussed, and we actually put an exhauster into the top of the mash tub while the mixing of the lead and the oil was going on. It gets to a considerable natural heat. We analysed that gas, and we could not find a trace of lead.

2163. Is it not probable that similar fumes to those I have referred to would arise in burning off old paint?—There might be chemical traces but I do not think there would be more than that.

2164. I think it has been demonstrated to us this morning that there is a considerable amount of lead in the fumes, and that is going to be considered by us very seriously. To sum up your recommendations,

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[Continued.]

you say washing apparatus, no handling of dry compounds of lead, and no dry smoothing?—Yes.

2165. Do you think that these measures alone would prevent all the suffering and loss of life that happen to painters now?—I do not know that they would entirely and absolutely stop it, because you cannot stop carelessness, and there are certain of these precautions which the men object to in a way, especially the more slovenly ones, and I do not see that any rule can always be carried out. It can be carried out in the majority of cases and so very largely lessen the trouble, but I do not see how any legislation is ever going to alter the habits of men.

2166. Do you realise the amount of lead poisoning amongst house painters which has taken place during the last ten years?—I read the Home Office report.

2167. You understand that there are about 2,000 cases of lead poisoning voluntarily reported to the Home Office in the ten years in question?—Yes, about 200 a year.

2168. And those figures by no means exhaust the number of cases of poisoning that must have happened?—Yes, but there is another thing which rather comes in there. Supposing a man complains of feeling ill; he has neuritis or something of that nature; one of the first things that the doctor does is to try to find out the cause of it. One of the first questions is, "what is your trade, or your profession." He says, "Oh, I am a leadworker" or "painter" or whatever he is by trade. So that is put down to lead poisoning. It may or may not be. If he was a pit man or a man in a steel works, it would have been ordinary neuritis and not lead poisoning.

2169. Is not that rather a sweeping accusation to make against certifying surgeons?—One has admitted it.

2170. One may have done, but the Home Office scrutinise with the greatest care every case that comes before them, and unless it is proved beyond question to their satisfaction, it is not recorded as a lead poisoning case at all. The 2,000 cases that were reported to the Home Office are cases that were reported voluntarily?—What percentage per annum does that represent?

2171. I have not the figures before me, but it does not matter what percentage it is. They are cases which could be averted if lead was prohibited?—Yes. If the stuff that took its place was not worse or as bad.

2172. Exactly. What this Committee have to deal with is a certain amount of suffering that takes place every year both in illness and in death. We are sitting here to try to propose some methods of obviating that. I suppose you will agree with me that the state of affairs being a very serious one, the question of lead poisoning amongst house painters cannot be lightly dismissed as being a mere bogey?—The statistics show lead poisoning; statistics show almost everything.

2173. Do you favour periodical medical examinations?—Yes, I do.

2174. And compulsory investigation of every case of lead poisoning?—Yes.

2175. Do you think that every package containing lead paint should be labelled "poisonous"?—I do not suppose it would make any difference whether you labelled it "poisonous" or not.

2176. Do you attach importance to the provision of properly kept meal-rooms warmed in winter?—It is desirable, but I do not see how you can do it when painting a small house and that sort of thing.

2177. Would you prohibit working men being allowed to take their meals in places where paints were mixed or where lead-dust was likely to be in the air?—Where lead dust is in the air, but not where lead paint is mixed.

2178. I will limit my question to that—where lead dust is in the air?—Yes, where lead dust is in the air.

2179. Where would you suggest they should take their meals?—Somewhere, as near by as may be, where lead dust is not in the air.

2180. I suppose you are in favour of all men wearing overalls?—Yes.

2181. It has been shown to us that overalls are a source of very great danger unless they are properly cleaned, because an accumulation of dirt gets on them and when touched sends up a dust which the men may swallow?—Yes, but is it not better to have the overalls in that condition than the men's own suits and so on, in which case they take the dust home.

2182. That is not quite my point. I was going to ask you whether you think that the overalls should be washed more frequently than once a week?—Where they are handling powder—dry lead, but not where they are handling wet lead or lead in oil.

2183. But the point is this—that the overalls get splashed with the paint which is used; the splashes dry on the overalls and form themselves into dust, and any touch raises a dust which the men swallow?—But if it is mixed with oil I do not think it is liable to go to dust. It sets in a hard skin.

2184. Do you not think it is so liable to go to dust as it would be in the case of lead glaze for instance. If you had a considerable reduction in the hours of work, do you think that would reduce lead poisoning?—I think it desirable that men should be occupied as short a time at their work as possible. If they can do the job that they have been given in less than eight or ten hours, or whatever it may be, they should be encouraged to do so, and allowed to go as soon as finished.

2185. What hours do they work now generally?—Are you referring to our men?

2186. I am speaking of ordinary painters. That you could not tell me, perhaps?—No, I cannot; we have none.

2187. (*Lord Henry Bentinck.*) I have here a lecture by Mr. Noel Heaton on "Alternatives to the use of white lead." He says "Why not use sulphate of lead in place of carbonate of lead known as white lead." What would be your objection to using sulphate of lead which is comparatively non-soluble, and therefore not so poisonous?—That I do not quite agree with. Sulphate of lead is soluble. If you refer to one of the Home Office Reports by Dr. Goadby, which I happen to have here, he gives certain statistics of experiments, and in one case he says that lead sulphate is actually more soluble than lead carbonate and in the other case practically as soluble. In a solution of lead it is difficult to precipitate the whole of the lead as sulphate of lead as some is liable to remain in solution even if an excess of sulphuric acid is used.

2188. (*Sir Godfrey Baring.*) How many men do you employ in your white lead works?—About 450.

2189. If lead paints were prohibited, do I understand you to say that you would practically have to scrap your works and your machinery and so on? Would not they be suitable for the manufacture of anything else?—Nothing else that is called a substitute at present.

2190. They could not be applied to the manufacture of anything else that you know of?—No.

2191. And I think you agree the chief danger to the worker is the dust proceeding from white lead?—Yes.

2192. Your men wear a respirator?—Yes.

2193. Was that respirator invented by your firm?—I believe we were the first to use this particular thing, and we have given samples of it to many other firms.

2194. How long has it been used in your firm?—I should say eight or ten years; I am not quite sure.

2195. The men wear it quite willingly? They do not object to wearing it in any way to begin with, do they?—It is uncomfortable because it covers up the whole of the nose and mouth with cotton wool, and flannel to keep the cotton wool in place.

2196. After a time they get used to it?—They get used to it after a time.

2197. And the men can wear it without inconvenience?—Yes.

2198. May we have evidence from some of your men to corroborate that? Could we secure the evidence of someone who has used the respirator in working?—Yes.

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[Continued.]

2199. (*Chairman.*) Would he say he liked it?—No, I do not think he would.

2200. In the pottery industry, there was great difficulty to get them to wear respirators at all?—Because it is an innovation, but once you get it introduced, then there is no great difficulty in getting the men to wear them.

2201. (*Sir Godfrey Baring.*) Did you say that sand-papering need hardly ever be employed in rubbing down?—No.

2202. In certain kinds of work?—It has to be employed in certain kinds of work, but you can use it with certain precautions which would practically entirely do away with the dust.

2203. What kind of precaution?—By keeping the thing properly enveloped with something to catch the dust.

2204. You think that that would obviate the danger?—It would to a great extent.

2205. (*Chairman.*) Do you think that that is practicable?—Yes, by putting round the pumice stone or whatever is used a soft piece of felt and keeping that damp.

2206. (*Dr. Collis.*) I am quite in agreement with you on the value of the respirators which you have been speaking of. I first saw them in your works, and I know that the men wear them and appear to wear them with comfort in a way that other respirators which have been suggested cannot be worn. Can you go back to the time when these respirators were first introduced? Do you remember whether you had much trouble in getting the men to wear them regularly?—No, I cannot tell you that.

2207. You have suggested the inspection of house painters in connection with the mixing of paints. I presume by that you mean inspecting them as closely as men are inspected in the manufacture of white leads. Is that so?—Yes.

2208. You think that would bring down the incidence of lead poisoning?—Yes, instead of being serious cases many of them would be stopped and not get beyond the stage of slight cases.

2209. You have in your works, I know from personal experience, taken great trouble in reducing the incidence of lead poisoning; but it has been a great trouble, has it not?—Yes, but it is a trouble that can be dealt with; you can attain your object.

2210. You have all your 450 men within the curtilage of your factory?—Yes.

2211. Would it ever be possible to exert such care as is exercised in your factory with house painters who are painting perhaps 20 miles off in the country at a private house?—No; I think it would be much more difficult.

2212. The impossibility of such inspection is a matter that is seriously before us, and is one of the reasons why this Committee is sitting here to hear evidence. Can you suggest any simple method by which such inspection could be properly carried out?—Would not the easiest plan be to do it on pay day?

2213. On pay day? You could not be at the place where the work was done and see that the respirators were worn, that the overalls were clean, that the washing was carried out, that the hot water was provided, and all the other numerous details which are necessary, as you know, in works to prevent lead poisoning?—But I thought you were referring only to the inspection of the men, and not to anything else.

2214. From your own experience you would not say that the weekly inspection of the men would be sufficient without the other precautions carried on inside the factory?—No, but it is a very important part of it.

2215. But it is not the whole, although it is an important part?—But half is better than none.

2216. We want the whole?—I daresay, but when you cannot have the whole, half a loaf is better than no bread.

2217. We have to consider the question whether we cannot get the whole. May I suggest to you that it would mean a large army of inspectors, and would cost the Government a great deal of money to carry out such inspection efficiently?—You would want

more inspectors than to inspect individual factories certainly.

2218. If it were reduced to a question of pounds, shillings, and pence, it would probably be cheaper to the Government to compensate white lead manufacturers than to set up this army of inspectors? I have no idea.

2219. Now you suggested that cases that appear to be lead poisoning are perhaps only some other transient illness, but when you leave such transient illnesses alone and find a man dying, say, of Bright's disease, that accusation would not lie, would it? There would be no tendency for a doctor to notify a casual individual among his patients for Bright's disease according to his occupation, because the ordinary doctor does not particularly associate Bright's disease with lead poisoning?—The ordinary country doctor does not, but if a doctor has had experience that is one of the things he looks for.

2220. You would allow, therefore, that a case of Bright's disease notified is a genuine case of Bright's disease?—If it is notified as Bright's disease, it is probably Bright's disease.

2221. Are you aware, leaving lead poisoning on one side, that the incidence of Bright's disease, which we look upon as one of the sequelæ of lead impregnation, as you justly say, is heavier among lead workers, especially among plumbers and painters, than it is among other employees in other occupations? I admit that.

2222. So that that does establish the fact that there are illnesses associated with lead poisoning not of necessity lead poisoning itself?—Yes.

2223. If lead is getting the credit of a few odd illnesses, so to speak, to-day, which it ought not to have, it is escaping the burden of Bright's disease? In some cases possibly.

2224. The incidence of Bright's disease is heavier among these men, as I say?—Yes.

2225. There are other illnesses which lead causes, in addition to that which is called white lead poisoning?—You mean that certain cases which ought to be certified as lead poisoning are certified as ordinary Bright's disease?

2226. Certainly? I think it is more the other way.

2227. (*Chairman.*) The number of workers who die of Bright's disease is three times as high among painters, as compared with other industries?—Then what I say is that only two-thirds of the Bright's disease cases amongst painters are lead poisoning and the other third are ordinary Bright's disease.

2228. (*Dr. Collis.*) Quite so, but for that quarter lead is escaping the accusation brought against it?—It may in that particular branch.

2229. So I think you must be prepared to allow lead to bear the brunt of the accusation which should be brought against it. These are deaths, and yours are only transient cases? I never hear the point brought strongly out on the other side by people who are talking of the ills that lead causes, although I hear frequently the accusation which you have brought.

2230. (*Mr. Sutherland.*) You said you did not see why the precautions enforced on makers of lead should not be extended to painters, but you see the many difficulties that there are in the way?—There are many difficulties, but I would try to enforce precautions as far as possible.

2231. You would have to put notices up in every shop or send notices to every job. A master painter who has 450 men might have them distributed in 50 or 60 different centres and not in one establishment as you do?—Quite so.

2232. It is not possible to extend the Factory Act to painters' operations?—It is difficult I admit.

2233. You do not think there is danger arising from fumes, I think you said?—I do not.

2234. I did not catch the point of your reason for that?—You are referring now to drying paint.

2235. To the fumes arising from burning off paint?—I think the possible danger there is vastly exaggerated because the smoke from the burning oil is so very visible, and when people see the stuff falling off

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the painter's scraping knife and lying on the floor all smoking they at once say "That is lead fumes," whereas if there is any it is in very very minute quantities.

2236. You set down a particular point where it did not get heated sufficiently to do something. I did not catch what you said?—If the lead is not raised to a sufficient temperature it will not begin to volatilise.

2237. What is that temperature?—It varies with all the different oxides.

2238. Do you attach any importance to what the Chairman says as to the poisoning from vapours from ordinary drying paints lead volatilising in the vapour? I do not think that that exists practically at all.

2239. You do not think it arises? No.

2240. (Chairman.) You do not know that experiments have been made in the last few weeks? You have not heard of that?—No, I have not heard of it.

2241. (Mr. Sutherland.) The experiment is new, but the complaint of the smells arising from paint is an old one. In your opinion, it is not poisonous necessarily?—No, not in my opinion.

2242. (Lord Henry Bentinck.) If I get stomach-ache from the fumes of lead, it is not due to lead poisoning?—I presume it would be if they were fumes of lead, but you have to make sure that they are fumes of lead and not fumes of turpentine and oil.

2243. (Mr. Gardner.) One or two questions with reference to rubbing down between coats. If you have a damp flannel behind the sandpaper, how would you keep the sandpaper dry? I would not have it extremely wet. It would not matter as long as it did not get more than just damp.

2244. The dust from sandpaper in rubbing down walls does not fly about all over the room, it generally falls down the wall on to the skirting board, so the felt would not be much use?—The felt would stop any dust before falling.

2245. But it would not take anything else than that which was at the man's hand? It depends.

2246. With regard to the inspection of the men you have admitted that it is extremely difficult. I suppose you are aware that a man may be working as a house painter for an employer and never see the shop from the time he starts to the time he is paid off?—Yes.

2247. There would be difficulty in examining that man? There would be a difficulty in examining him in the shop, but he might be examined elsewhere.

2248. (Chairman.) At whose expense should the examination take place? I think the person who institutes the examination should pay, namely, the Government.

2249. Would you not rather say the employer?—No; the employer does not institute it.

2250. (Dr. Collis.) Who pays for your periodical examinations? Unfortunately, we have to, but I do not consider that it is a fair principle. We are paying the piper and someone else calls the tune.

2251. (Mr. Gardner.) Do you think that, if you burnt off the old paint to cinders, you would not set up poisonous fumes? Do you mean as an experiment?

2252. No. You burn off paint from a door, and a vast proportion of that paint is practically burnt to a cinder. It has to boil up in many cases before you get a straight run?—It softens off.

2253. Do not you think that in that case poisonous fumes arise from the lead?—No; I think it is practically non-poisonous.

2254. (Mr. Parsonage.) Have you had any practical experience of house painting?—No.

2255. And your statements are only theory?—Yes.

2256. Then I do not think I need trouble to ask you about that, if you have no practical experience of house painting. I can only say that your propositions are absolutely impossible. Now you said that, if the use of lead was totally prohibited, you considered that your firm or any firm whose plant was rendered useless should receive compensation?—Yes.

2257. What would be the position of the workman who was examined and certified to be suffering from lead poisoning and prevented from following his employment; should he be compensated in any way?

The Government say at present that the workman is to be compensated.

2258. The man may be able to follow his employment all the same, but he may show the ordinary blue line and ordinary traces of lead poisoning and he is cast aside. Should he be compensated? A man is not cast aside for the blue line.

2259. But what would be the use of medical examination if he is allowed to remain at work?—In certain cases you get a warning, and if you get warning you take precautions, you have a much better chance.

2260. You are presupposing that the man does not take precautions until he is told by someone else that he must do so, and then he will keep himself clean? Many of them linger on as long as they possibly can.

2261. You know very little of house painters. What reason have you for supposing that the man will not try to keep himself clean if he knows the risk he is running? Why do you suppose that he would not be careful to prevent himself getting this disease? I am simply judging from our own men.

2262. In your own works?—Yes.

2263. I do not think that is a fair thing at all?—It seems to me that all men are about the same.

2264. The workman who knows his business and knows the dangers attached to it, is just as careful of his own health as the employer who employs him? That is not our experience.

2265. I do not think there is any reason to suppose that the majority of men who follow the occupation of house painting are not particularly clean. In your works they are lead paint makers, not painters. Speaking of compelling the men to be clean, would you compel the employers to provide materials for the men to wash? Where it is possible.

2266. Would you put the onus on the employer instead of upon the workman? Yes, where possible.

2267. Are there any cases where it would be impossible to provide soap and water?—Occasionally.

2268. Really, then, it is a matter for the employer to make provision for his workmen to wash. The workman could not keep himself clean if the employer objected to it?—No.

2269. It is really the fault of the employer, if a man is careless?—No, I do not admit that. You are assuming that the employer objects.

2270. I am assuming that if the employer gives proper facilities for the man to keep himself clean, the man would do it. I have just as much right to assume that as you have to assume that the man is wilfully negligent of his own health. You see you put the blame entirely on the workman. You say that the workman is wilfully negligent. I say, make proper provision for the workman to keep himself clean, and he will do it, and that the blame rests with the employer?—All I can say is that that is not our experience. If you do not take proper means to see that the provisions you make are used many of the people will not use them although many will.

2271. That is in your works, but that is not house painting at all? No.

2272. Your works are inspected by a factory inspector, and you are liable to compensate any man who is ill, so it is to your interest to insist that these men shall be careful?—Yes.

2273. With house painting it is not the case. My idea is that there is far too much said about workmen not taking precautions. I contend that the employer should provide facilities, and also allow reasonable time for a man to wash his hands? I quite agree, but he has to see that the reasonable time and the means provided are properly used.

2274. Now, with regard to a question that Dr. Collis put to you with regard to other diseases arising from lead poisoning, you say that neuritis might be ascribed by a doctor to lead poisoning, because he knew that the man was a painter, but the first thing a doctor looks for is the blue line round the gums?—Yes.

2275. In a case that did not arise from lead poisoning he would find no blue line? Possibly.

2276. Then he would not certify if as being from lead poisoning, simply because he knew the man was

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a house painter, unless he saw the trace of lead?—I do not know.

2277. Do you suppose that if a doctor saw no trace of lead there and could not find the first thing he looked for, he would certify him to be suffering from lead poisoning or from a disease which he would ascribe to lead poisoning simply because the man said he was a house painter?—He should not do it.

2278. But would he do it? Would it be the usual thing for the doctor to do it at the request of the man?—I do not say it would be the usual thing. Sometimes the doctor gets a bad name as a man who will not grant certificates. He gets a bad name amongst the workmen amongst whom the whole of his practice is. Very often he is competing with the doctor next door who may be inclined to do it, and he is consequently in a very difficult position.

2279. What difference would it make to a man whether he gave the certificate in accordance with the fact or not? The man would get his compensation just the same. You are implying that a certifying surgeon who examines the painter would give a certificate for lead poisoning when the man showed no traces of it?—I do not say no traces, but I say that a blue line is not an invariable sign of neuritis.

2280. But it is an infallible sign of lead poisoning?—I do not admit that; I do not think it is.

2281. (Chairman.) It is a very strong indication that there is something a little amiss, but we have found beyond question that you get a blue line without actual poisoning?—A man may have the blue line for years and years and years, and show no other indication of lead poisoning.

2282. Every doctor and every employer has the right to submit any questionable case of lead poisoning to the medical referee, so that if there are indications of lead poisoning reported which are wrongly reported, it is the employer's own fault. He can always appeal to that independent medical referee?—Yes.

2283. (Mr. Parsonage.) Either side can do that?—Yes.

(Mr. Parsonage.) So that I see no reason why a doctor should certify a man as suffering from lead poisoning when there is no evidence of it. In my opinion there are far more cases which are not ascribed to lead poisoning which are due to it indirectly.

2284. (Mr. Fell.) I want to know whether you send out large quantities of lead in powder?—Yes, considerable quantities.

2285. Would it not be possible to send that all out ground in oil?—Yes, quite.

2286. Do you know why people particularly specify that it shall not be sent in oil?—Because they have their own grinding apparatus at their colour works, where the powder mostly goes to, and they prefer to use their apparatus instead of our apparatus, and their apparatus is suitable for mixing dry lead with oil, and not for mixing the pulped lead with oil. It needs rather a different apparatus.

2287. Would it be a very serious matter to do away with all that outside your works?—It would mean the alteration of these colour makers' works to suit the new method.

2288. (Mr. Mason.) Do you consider that there is greater danger in your works to the men employed there than to an ordinary painter?—No, I do not, because our men are under so much better supervision.

2289. Could you give me an idea of the number of cases that you would get in your works of lead poisoning?—I cannot give you exact figures, but Dr. Collis can.

(Dr. Collis.) I have no figures with me, but I will let you know them. There have been very few lately.

2290-91. (Mr. Mason.) I do not particularly want them at the moment. Supposing the precautions which you suggest were adopted, do you consider that the cases of lead poisoning amongst painters would be reduced to a less degree than they are in your works?—I do not say that, because I think it is so much more difficult to enforce rules over scattered men than over men all within one factory.

2292. They might be enforced in coach works, for instance?—Certainly—where people are all under close supervision.

2293. Do you think that, provided those precautions were adopted and carried out, there would be less danger to painters than to men employed in lead works?—Yes, I do. The stuff, when they use it, is mixed with oil, and when it is mixed with oil it is not liable to get into this very fine state when it floats about in the air except when it is sandpapered, and so on.

2294. (Mr. Kinggate.) You stated, and I agree, that some men are more liable to lead poisoning than others, irrespective of their cleanliness and carefulness. What should be done with those who, however careful they are, are liable and are told that they must leave the work?—That is a very difficult question.

2295. You were speaking of the displacement of men employed in white lead works and also the loss to the company financially. Seeing that there are people who are liable, is it not better that lead should be prohibited than that a large number of men should suffer?—But I do not think that there is a large number of men suffering in our factory, if you refer specially to that.

2296. I am not referring specially to your factory, but to coach-making generally at the present time. I know several cases of men who, although they are careful in every possible way, are exceedingly liable to poisoning, and they are told that they must get away from that industry. What should you suggest should be done with those men?—I have no suggestion.

2297. (Mr. Robins.) You made a statement which I would rather not have heard mentioned in this inquiry at all with regard to the habits of the men. You attributed one of the causes to their insobriety and not only their dirty habits. Although lead poisoning in the coach trade has increased so much during the last ten years, my experience is that there is more sobriety amongst the coach painters of to-day than ever there was since I have come into contact with them, and that is about thirty years. So that statement has nothing whatever to do with it. The men are more sober than ever they were.

(Chairman.) Both statements are *ex parte*. We shall not notice either.

2298. (Mr. Robins.) (To the witness.) Then you said that no dust would arise from burning off paint?—Very little dust.

(Mr. Robins.) My experience is that, if you leave paint on a coach after it has been burnt, it is nearly all dust when you come to sweep it off. Seventy-five per cent. of it or more is perfect dust, and that is highly dangerous no doubt in the air.

2299. (Chairman.) You are aware that the manufacture of yellow phosphorus matches has been forbidden?—Yes.

2300. That must have imposed certain loss on those who made phosphorus matches?—I do not know much about the match trade, but all I can say is that it cannot have scrapped the whole factory, because they use the same shaped match and the same boxes and the same wrappers, and so on.

2301. It must have imposed a certain amount of loss upon them, must it not, and they received no compensation?—Perhaps they did not deserve it, because in that case it was simply an alteration of their present process and it left their present plant available. I do not see that they deserved it. I do not think it necessitated scrapping practically the whole or any part of the works. It was only an alteration of the mixture with which the match stems are tipped and did not entail any alteration of plant. This slight alteration and the proposed total abolition of white lead making are totally dissimilar.

2302. I will ask you about one further point: if the Government were to restrict the amount of soluble lead permissible in paint to, say, five per cent., would not that cause a demand for insoluble lead compound which your firm could supply?—You talk of insoluble, but insoluble to what extent?

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2303. I mean what is known as insoluble lead?—But for this purpose I do not know of any insoluble lead for paint.

2304. The point is this: supposing the Home Office were to restrict the use of lead to five per cent., would your firm still have a considerable amount of business to transact?—If we were to rebuild the works to make that particular compound which you are talking of?

2305. It would not be a question of that, but a diminution in the amount of lead used, would it not?—Do you mean mixing with other substances?

(Chairman.) It would be a question of minimising the amount of lead used. I will not press the point.

2306. (Mr. Sutherland.) You do not send out lead in powder to painters, do you? It is mostly to colour grinders?—Practically not at all to painters. We send out very small quantities of red lead to painters and white lead hardly ever.

2307. The dry lead is sent out to colour grinders?—Yes.

2308. It does not affect the painting trade?—We do not do it ourselves, but it is used in the house painting trade.

2309. The grinders grind it up into paste form, do they not?—It is used to a small extent in the house painting trade, but only a small quantity—not a very appreciable quantity—for fillings, and so on.

The witness withdrew.

Mr. ALAN E. MUNBY, M.A., A.R.I.B.A., F.C.S., and Mr. W. WONNACOTT, A.R.I.B.A., F.S.I., examined.

2310. (Chairman.) Have you come to-day to describe to us a paint investigation undertaken by the Royal Institute of British Architects?—(Mr. Munby.) We have.

2311. When was your investigation made?—From 1908 to 1910.

2312. What did your inquiry aim at ascertaining?—The properties and ingredients of commercial paints; I may say that the object of our inquiry was originally to formulate a standard specification for paints for the benefit of architects and reputable paint manufacturers. We found, however, that it was impossible to produce a specification because there were no standards upon which it could be formed, and therefore we put together this small monograph not with a view to producing actual standards, but to raise a general interest among architects and the trade in order that, later on, some consensus of opinion should be arrived at as regards a standard and subsequently a specification.

2313. Did this involve considerable research into the literature upon the subject?—It did.

2314. Have you had, in the exercise of your profession, practical experience of the different characteristics of various paints?—We have.

2315. Can you describe to us the use and nature of the several substances which go to make up a paint?—We can. The first essential is a base, which is the main part of paint. That must be associated with a vehicle, which is almost invariably linseed oil, which binds the particles of the base together. In all ordinary cases it is necessary to add a thinner in order that the paint may be suitably applied, and in some cases it is usual to add a drier (it is not always necessary) in order that the paint may dry more rapidly than it would in the ordinary way.

2316. That is an excellent way of putting it. Are you able to compare paints containing lead compounds with similar paints made on bases other than lead?—Yes, we can compare them as regards their durability and as regards their effect on the workmen.

2317. That comparison will be very interesting to this Committee, of course, but first I will ask you a few general questions. In what condition did you find the paint market? Is there much variation in quality and in composition between the products of different makers?—Yes. Standardisation is much needed.

2318. Do you find much divergence in the matter of fineness of grinding?—I believe there is a good deal of difference. I do not think that any actual measurements are made in the trade or by users of paints, but undoubtedly from microscopic investigation there is a great deal of difference in the sizes of particles, not only of different kinds of paint, such as zinc oxide and iron oxide, which must naturally differ a great deal, but also in one special kind of paint—in different kinds of white lead for example—as regards fineness of grinding. We cannot give you any data for that.

2319. Does the size of the particles of pigment exert much influence on the durability of paint?—Yes, a very considerable influence. For a given base the durability of paint increases with the fineness of the particles of that base, and a standard of fineness is much needed, and would probably remove many difficulties in paint specification. Some interesting experiments on

this subject showed that in the case of two similar paints possessing particles about 0.0080 and 0.0004 inch in diameter respectively, the life of the latter was at least twice that of the former under similar conditions.

2320. Has the size of the particle any bearing on the relative proportions of pigment and vehicle?—Yes. Does that question refer to the size of the particles of the pigment or the size of the particles of the base?

2321. The pigment?—Yes. The finer the pigment the lighter will be the colour.

2322. Then you consider the size of the pigment particles an important physical property of paint?—Yes.

2323. Is it very important?—The size of the pigment particles is most important as regards the tint of the paint, but the pigment is only a small part of the whole composition of the paint. If by pigment you mean the colouring matter added to the base, the size of the particles of the base I consider more important.

2324. Is this fact well known to the paint makers and painters?—No, I think not.

2325. Then you strongly recommend attention being paid to fine grinding as likely to improve paint quality. Does this improve zinc paints and lead paints to an equal extent?—The zinc paints are necessarily very fine. As regards the size of the particles, I think my colleague will bear me out in saying that the improvement in zinc paints is likely to be much less than in lead paints. (Mr. Wonnacott.) Yes. There is a little difficulty in the manufacture of the zinc oxide, the fineness varying according to which part of the condensing chamber the oxide is drawn from.

2326. (Chairman.) But your answer generally is that it would improve lead paint more than zinc paint?—(Mr. Munby.) Yes.

2327. How do architects specify painting—is it by the number of coats or by weight of pigment per square yard?—The number of coats invariably.

2328. Then you recommend standardisation also on the matter of the amount of paint laid on to the surfaces, and you think that weight is the best test of this?—Yes; we think that, if it is practicable to arrange that the paint work should be carried out in a suitable manner to enable the weight to be obtained, it will be very much better on the basis of weight than on the basis of covering. In the case of a piece of work which varied very much in character, to which pigments were applied very unequally in different parts, it might be impossible to specify in that way; but for a large piece of work, the specification of weight per square yard would undoubtedly safeguard a great many interests. (Mr. Wonnacott.) The best test of that would be the area; that would best govern that. We have no means of ascertaining otherwise. A certain amount of paint should cover a certain maximum area and no more.

2329. (Chairman.) Will you now give us the results of your experience in comparing zinc paints with lead paints? Do you find that the zinc paints are as suitable for interior work?—(Mr. Munby.) Yes, certainly for interior work.

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[Continued.]

2330. How does their cost compare with the cost of lead paints?—In answer to that question I would refer to my colleague. (Mr. Wonnacott.) From experience we find that there is no difference in the cost of the decorative contract. We are not interested in the details of the cost of a paint, but in actual work we find there is practically no difference.

2331. (Chairman.) Is the covering power of zinc paint as great as that of the white lead paint?—(Mr. Munby.) No, it is not. These zinc particles being so very much finer will spread over a larger surface and will therefore give a much thinner layer of actual paint material than will the lead paints, and therefore the covering power is less.

2332. (Mr. Sutherland.) The spreading power is more?—The spreading power is very much more, because you get a smaller number of particles, probably because the specific gravity of one is very much less than that of the other.

2333. (Chairman.) In the end, would you say that the zinc was more expensive because more paint has to be used?—(Mr. Wonnacott.) I should say less expensive, because it lasts better. (Mr. Munby.) But more expensive in first cost. (Mr. Wonnacott.) The cost of zinc paint *per se* would be more, but from a decorative point of view there would be, I think, an immense saving, because of its permanency and durability.

2334. Do I understand that you refer to permanency of colour and durability?—(Mr. Wonnacott.) Yes.

2335. Would you say that zinc paints could replace lead paints for interior work?—(Mr. Munby.) Yes.

2336. You say that without any qualification whatever?—Yes, they could replace them.

2337. Without any particular hardship to anybody?—There would be hardship on certain manufacturers, but otherwise there would be no hardship. There would be hardship on the workman if he was asked to do the same amount of paint work and produce the same effect for the same money.

2338. My next question deals with that. Is it your experience that workmen apply zinc paints with the same ease as they apply lead paints?—No.

2339. Will you tell us now why?—More coats are required to produce the same effect, and the labour is greater, therefore, to produce the effect which you get with lead paints. A painter expresses himself vulgarly by saying that zinc paint has no guts. It does not cover anything.

2340. Do they use the same thinners and driers?—Yes, I believe they do.

2341. Do the thinners and driers which are suitable for white lead give satisfactory results with zinc paints, or should the zinc paints be treated differently?—(Mr. Wonnacott.) I should say that zinc paint which is dealt with in the same way as lead paint gives a less satisfactory result, and that is the fault with regard to the workmen. They try to treat the zinc pigment exactly as they have been used to treating the lead.

2342. (Chairman.) Do you say that you think that the zinc paint should be treated differently?—Yes.

2343. That is only a question of arrangement?—It is a question of the education of the workmen.

2344. Would you say that there is no insuperable difficulty in that?—There is none whatever.

2345. Now, with regard to exterior work. First, as regards white and the lighter shades of colour, have you found that zinc paints can be used satisfactorily for this work?—(Mr. Munby.) No; they do not weather well. They do not stand the weather as well as lead paint.

2346. You will be interested to know that His Majesty's Office of Works has been using zinc paints for four years both for interior and exterior work; and their paints generally have contained no lead at all. We were told by their representative that none of their paints contain more than 5 per cent. of lead compound, except the dark green, where they were using lead chromate to get the colour. Can you say whether there are at present available zinc paints in

the darker colours which could be used as successfully for outside work as lead paints;—Not to our knowledge. Most of the pigments for the various shades of green are made up of chrome yellow and Prussian blue. The mixture of those two pigments allows an immense amount of latitude in the actual tint attainable; and it is very difficult to obtain such a great variety of shades without the use of lead.

2347. You told us just now that in your opinion zinc paint would not be as efficacious for exterior work as lead paint. Does the experience of the Office of Works induce you to alter that opinion?—(Mr. Wonnacott.) I have never had any opinion which did not coincide with that with regard to exterior work. I do not know what Mr. Munby's experience is. (Mr. Munby.) My general experience has been that the lead paint is the better. The theory is that the lead saponifies and with the linseed oil forms a compound, whereas the zinc does not, and that is supposed to confer additional durability on the lead.

2348. I think that at the beginning the Office of Works found that they had the difficulty which you have foreshadowed, but they gradually overcame those difficulties by grinding and additional driers?—Yes.

2349. Now they have got to what they consider perfection?—I turned up, if I may mention it, a translation of an interesting book by a gentleman of the name of Petit, in which he claims to have so arranged the grinding of zinc paints that they can be made really to combine with the oil. He says that in ordinary cases the zinc paints in commercial use do not combine with the oil at all, and he claims to have made it possible. Whether the Office of Works has obtained similar paint I do not know.

2350. Would you consider that the prohibition of lead or a limitation to 5 per cent. solubility would be a serious thing for the Home Office to impose?—No.

2351. I mean for exterior painting?—(Mr. Wonnacott.) If you limit the lead in a certain paint, I agree with the practice.

2352. Supposing the Home Office were to issue instructions prohibiting the use of lead paint altogether with the limitation, I will say, to 5 per cent., would that be of any serious account to the painting trade?—(Mr. Munby.) To the painting trade or to the durability of the material?

2353. I will put it in your way then—to the durability?—My colleague does not agree with me, but personally I think that that 5 per cent. may be rather valuable as regards durability as forming a compound with the oil which may make its nature felt through the rest of the material.

2354. Mr. Wonnacott, do you differ from this view of your colleague?—(Mr. Wonnacott.) I do not quite gather the drift of Mr. Munby's objection. It is certain that in the use of zinc paint a permissive percentage of 5 as a maximum is desirable on account of the chemical advantages, and therefore the limitation by the Home Office with regard to zinc paint only would be a desirable thing from every point of view, I contend.

2355. Then you practically agree?—(Mr. Munby.) Yes, I think he does. (Mr. Wonnacott.) Possibly, I did not quite grasp your question.

2356. What I meant to say was this: Supposing the Home Office issue an instruction to limit the use of lead in the future in paints to 5 per cent., would that be of any serious account with regard to the durability and the general effect for painting exteriors?—(Mr. Wonnacott.) No, I should say not.

2357. Then you really coincide now with the views of the Office of Works?—Yes.

2358. Now, will you tell us the chief failings of lead paints?—(Mr. Munby.) From the point of view of use, the very ready blackening in an atmosphere containing any sulphur; and, of course, the poisonous nature of it, from the point of view of the workmen and manufacturers. My colleague suggests the ease of adulteration also as an objection.

2359. What are the main infirmities of zinc paints?—Lack of durability.



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2360. For exterior purposes only?—Yes.
2361. Are these failings invariably associated with zinc paints? Is it not possible, by the use of suitable oils and driers, and so on, to overcome any weaknesses of the kind you mention?—(Mr. Wonnacott.) I should say that these failings are not invariably associated with zinc paint. Suitable oils and driers would remove the difficulty. In my own work I have found the chief difficulty has been what is called fissuring, and that I trace entirely to the method in which the paint has been mixed, rather than to anything else.
2362. Then with the addition of the 5 per cent. of lead, you maintain that all the difficulties would be removed?—(Mr. Wonnacott.) Yes.
2363. In speaking of zinc paint, have you had in mind paints made from the oxide of zinc produced by heating metallic zinc?—(Mr. Munby.) Yes, I have. (Mr. Wonnacott.) I have had in mind both the oxide produced from metallic zinc, and also from the ore and bye-products.
2364. Do any of your remarks require qualifying in the case of zinc oxide made direct from the ore, which, I understand, as a rule, contains from 2 to 4 per cent. of lead compounds, and is preferred for paint making by certain people on account of its reputed unctuous nature?—(Mr. Wonnacott.) I do not think my remarks require any qualification with the limitation to not more than 5 per cent. You usually get less than that.—(Mr. Munby.) Might I make one addition, and that is that the zinc ore invariably contains cadmium, which is very volatile, and spoils the colour, and therefore the zinc oxide obtained direct from the ore is usually inferior to that obtained from the metal.
2365. Can you tell us anything about lead sulphate?—Yes; I have personal experience in connection with lead sulphate. It has been made for very many years. A great many attempts have been made to produce it as a substitute for carbonate. Quite recently a firm have started on the outskirts of London to make this paint, and they have produced paint which very closely resembles carbonate white lead paint. I got some of that paint and put it in the hands of a trade firm with directions to hand it out to their workmen without saying anything about it, and to allow them to believe that it was ordinary Dutch white lead. I got them to mix it with the kegs of white lead, because so much was said in its favour as to its being exactly the same thing to work with as white lead. But the men found out at once that it would not work as easily. They went to the foreman and said, "There is something wrong with it; it is a bad keg." So that, even when prepared in the very best way, there is a difference with regard to the power of the workmen to lay it on, but as regards durability it is splendid; it is absolutely permanent, although it does not saponify with the oil at all and form an organic compound.
2366. Is barium sulphate used as a paint ingredient?—Yes, it is used, chiefly as an adulterant, but legitimately in special paints.
2367. Is this substance known by other names?—It is called barytes and heavy spar as a mineral, but I do not think that the latter name is used in the trade.
2368. Is it possessed of qualities to make it suitable for paint making?—If it is sufficiently fine it is absolutely permanent, and there is no reason why it should not be used like any other inert ingredient. The chief objection to it is that it is used, as a rule, in a crystalline condition, and is too coarse in grain to be suitable for paints.
2369. What are the materials commonly used for green pigments?—Chrome yellow and Prussian blue mixed.
2370. Is that known as Brunswick green?—That is known as Brunswick green in the trade at the present time, I believe.
2371. What should Brunswick green consist of?—This name was originally applied to oxychloride of copper. It is now always understood in the trade to indicate a green prepared by mixing chrome yellow with a small quantity of Prussian blue. Even in green of deep tint, less than 20 per cent. of the pigment consists of these ingredients, the remainder being substantially some inert base, usually barium sulphate.
2372. Are these greens permanent?—No; the oxychloride of copper which you mention would, I suppose, be preferable to the lead chromate from the point of view of the health of the worker.
2373. Can you tell us how the costs compare?—The oxychloride would be more expensive.
2374. Is zinc chromate able to take the place of lead chromate for green pigments?—I do not know that I can answer that question. I think it is little used. Zinc chromate is a fairly expensive substance.
2375. What is chrome green?—Real chrome green is chromium oxide, Cr<sub>2</sub>O<sub>3</sub>.
2376. Does it make good green paint?—Yes; but it does not admit of the variety of tints as the mixture of Prussian blue and chrome yellow.
2377. Is it capable of taking the place of paint prepared from lead chromate?—Yes, within a certain range of tints.
2378. Can you tell us how green paints prepared from chrome green compare for price with paints made from lead chromate?—They would be more expensive; I cannot say how much. Chromium oxide is absolutely permanent.
2379. Now I have asked you a good many questions about pigment, I want you to tell us something about the vehicle. To make a good paint is the vehicle as important a matter as the pigment?—Yes, I should say so, certainly.
2380. Is there very much choice in the paint vehicle?—No.
2381. What is China wood oil?—It is also known as Tung oil from the Tung tree in China. My colleague says that in his experience the use of it is growing in the trade considerably.
2382. Does it make a good paint vehicle?—(Mr. Wonnacott.) Yes, and it gives a good surface too.
2383. Is it known by any other names?—(Mr. Wonnacott.) No other than Tung oil, I think.
2384. Is it commonly used in this country?—(Mr. Wonnacott.) No.
2385. Has it any advantages over the linseed oil commonly used?—(Mr. Wonnacott.) It is cheaper, I should think.
2386. That is always important?—(Mr. Wonnacott.) Yes, that accounts for the increase in the use of it.
2387. Would you say it is necessary to suit your oils and thinners and driers to the pigments and bases that are being used?—Yes, but a great deal more work and research is necessary on that subject. There is such a small choice in the matter of oils, and one hardly knows how they should be apportioned, but undoubtedly the character of the paints must vary according to the way in which they are arranged.
2388. Are the same oils suitable for lead paint as zinc paint?—Yes, as far as we know.
2389. You are, of course, aware that the Registrar General's records show 280 deaths amongst house painters from lead poisoning in the last ten years?—I was unaware of that. I had some personal experience of a rather interesting character some years ago in connection with lead work. I did some work with a chemist in the north of England. We analysed in some cases the organs of lead workers in Newcastle and found lead in every organ. I have details which are at your disposal if you think them of any importance.
2390. Is it a common practice for architects to specify in their contracts that paints containing lead shall be used?—(Mr. Wonnacott.) Taking architects as a body, I think they have no choice.
2391. Why is this done?—(Mr. Munby.) I think it is partly a matter of custom. It is a matter of experience that the lead paint is the more permanent and is generally obtainable.
2392. It is want of knowledge of the two substances?—I think so. It is want of knowledge and experience of the use of other paints, because they are less easily obtainable.
2393. Do you think architects are alive to the serious dangers involved in the use of lead paints?—Undoubtedly, they are perfectly alive to them, but

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it is difficult to know what substitutes to adopt in specifying.

2394. Would they welcome the prohibition of lead if suitable substitutes could be found?—(Mr. Wonnacott.) They would, undoubtedly. (Mr. Munby.) They would certainly help in any attempt to check the use of lead paint, from the point of view of its evils, if suitable substitutes could be found.

2395. If the Home Office were to issue an instruction to prohibit lead in paints or to impose a limitation of 5 per cent. of solubility, do you think that the architects whom you represent would consent?—(Mr. Wonnacott.) Considering continental experience I should say that we should be perfectly safe in assenting.

2396. (Lord Henry Bentinck.) You said that the zinc paint was not so durable as lead paint?—(Mr. Munby.) That was for exteriors, so far as our experience went.

2397. Is your experience large in that respect?—No, I cannot say that it is.

2398. On what data is that statement made?—Only on general observation of paint work which one has seen.

2399. In cities or exposed to rough weather at sea?—I have had no experience with regard to the seaside.

2400. It is more with regard to cities?—Yes, general painting work.

2401. Has zinc oxide been improved of late years?—I believe it is improved by compression.

2402. You think it is susceptible of improvement?—I personally think that it would cover better if it was in an oil of a different specific gravity from linseed oil, if one could be found.

2403. Would that make it more durable or alter it from the colour point of view?—That I cannot say. I think it is a subject for research.

2404. (Sir Godfrey Baring.) Would you say that there is an improvement in the quality of zinc paints, say, in the last ten years?—Yes, I should say so. They are more widely used; there is greater demand for them.

2405. It is your experience that there is a growing demand for zinc paints?—Yes.

2406. And therefore the workmen are becoming more accustomed to using and manipulating the zinc paints?—Yes, undoubtedly, slightly more accustomed.

2407. Two witnesses told us yesterday that they found that zinc paint was specially suitable for external use in London and other large towns?—From the point of view of discoloration—yes.

2408. And from the point of view of durability?—As far as my experience goes I would say no.

2409. Your colleagues will agree with you in that?—Yes.

2410. (Dr. Collis.) Have you read the Dutch report on experiments with regard to this question?—No.

2411. When you were speaking about the grinding of zinc paints there was one point that struck me as interesting. The Dutch Commission found a great improvement by grinding their own zinc for their own experiments. You have not tried any special grinding of zinc paints yourself?—No; I have not any facilities.

2412. The suggestion that you made that grinding would not improve the zinc paints because they were already fine, seemed to me at the moment (perhaps I speak wrongly) to be a misunderstanding of the value of grinding. I was rather under the impression that it was a question of the amalgamation of the vehicle and the pigment rather than any attempt to grind down, by attrition, the pigment particles?—I would designate mixing from that point of view. Grinding and mixing are things that one cannot separate in practice. The greater the mixing of paints the better. Zinc oxide, being merely a name, does not want grinding; it wants compressing.

2413. There seems to be a misunderstanding of the word grinding?—My answer was given with the idea of the attrition of the pigment more than anything else.

2414. The Dutch experiments seemed to point to the value from the opposite side. Now, you spoke of

the presence of cadmium in zinc white made from ore. Is it not a fact that some ore does not contain cadmium—such as Franklinites?—(Mr. Wonnacott.) That is the most suitable ore for the direct process, I believe.

2415. That is difficult to obtain, is it not?—I do not think we have it in this country?—(Mr. Munby.) There are very few that contain no cadmium.

2416. (Mr. Sutherland.) You said that the size of the particles was important?—Yes.

2417. Did you say that this was not known to paint manufacturers, or did I misunderstand you?—Perhaps that was rather a sweeping statement on my part. I think that generally the paint trade is not alive to the fact, otherwise we should have some standardisation: It is impossible now to purchase paints, as far as I know, in which the size of the particles is in any way to standard, although they can be measured.

2418. But this is a common fact of chemical knowledge, is it not, the difference of the size of the particles in pigments?—I do not know. I have not come across any practical men who have shown appreciation of it. If you take a ground-up hematite the coarseness of the particles is immense compared with fine white lead.

2419. It is a sort of fundamental thing that all up-to-date paint manufacturers would be aware of?—One would hope so.

2420. If they are alive to their business they would be, and it is discussed commonly in the chemical papers?—We can only go by the kind of paints which are used. They vary very much in character without any difference in specification. I was speaking from the point of view of the architect.

2421. When you speak of the improvements that may be expected, do you mean in the way of finer grinding?—Yes.

2422. Most people have the most perfect machinery in that respect, and I do not think it possible to grind finer. They have the stack or chamber process. Then you went on to speak of standardisation with regard to the amount of paint laid on the surface and of weight being the best test?—(Mr. Wonnacott.) Area would be the best test.

2423. The best class of paint work has always the least amount of paint per surface, and the cheapest class has always the largest amount, so that your standardisation would break down on the ground of paint per surface?—(Mr. Wonnacott.) Yes.

2424. Our association experimented some years ago on this very question; it is common knowledge, and they worked it out that the thinner the coat the better the protection?—(Mr. Munby.) Does that mean that the less the depth of the actual particles on the surface the better the protection?

2425. The thinner a coat of paint is spread on, the better it preserves the work, and in that little book by Petit that you referred to you will find the point raised, I think, with regard to successive coats becoming a definite film. If instead of five thin coats you put on an equal quantity in one coat you would have a fine film at the top, but underneath you would have a sticky matter that would take years to harden?—We wanted to prevent a man getting a pound of paint and adding any quantity of benzine to it and running through his work in no time.

2426. Some meet a specification that says "two coats" by giving one thick coat?—Yes.

2427. You agree that the covering power of zinc is not as good as that of lead?—Yes.

2428. But the spreading power is more?—(Mr. Wonnacott.) The hiding power.

2429. (Mr. Sutherland.) Yes. You say it is no good for outside work?—I do not suggest that. The only difficulty I find in external work is traceable to the workman.

2430. A point that has been made time and again here is that, if zinc paints are adopted, sufficient time will have to be given to the working man to acclimatise himself to the use of them. Undoubtedly that is a serious matter?—(Mr. Munby.) Yes.

2431. You say it takes more coats and more labour for zinc paint?—(Mr. Wonnacott.) Yes.

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2432. Does not that increase the cost very much?—Yes, the labour does.

2433. For ordinary painting the labour is an element?—(Mr. Wonnacott.) Up to a certain point.

2434. It is something like 60 per cent. For decorative painting it is more?—For work in common colours 60 per cent. is too high.

2435. That has to be added to the cost of production?—Yes.

(Mr. Sutherland.) The ordinary proportion of labour to material, including paper and everything else in a decorator's business, is something like 50 per cent. The remainder is material of all kinds and profit.

2436. (Chairman.) Could we have something more precise than that? What would it add to the cost?—

(Mr. Wonnacott.) The cost of decorative contracts has not been materially increased. We are not able to go into the details of labour and materials at all, but speaking from practice, our decorative contracts are not more costly than formerly.

2437. In addition to that you have the advantage of the extra durability?—Yes.

2438. (Mr. Sutherland.) You say that zinc paint does not stand the weather as well as lead paint for outside work?—(Mr. Wonnacott.) I do not think I stated that.

2439. I thought one of you did?—(Mr. Munby.) I said that my experience was not large, but as far as my experience went, zinc paint did not stand the weather as well as lead paint.

2440. That is what I said. Now you always specify for genuine white lead in your specification, do you not?—Yes.

2441. You generally specify white lead, best linseed oil, Baltic or otherwise, and best American turpentine?—Yes.

2442. When you get away from those three ingredients you are landed in a difficulty. What would you substitute in a specification, if you wanted to specify other paints than genuine white lead? You do not specify a particular paint unless it is an enamel or proprietary article?—No.

2443. How would you enforce what you specify?—If I was specifying zinc white, I should say it should be composed of nothing but zinc oxide and best linseed oil.

2444. But that would not give you a serviceable paint. You must add something like barium to carry it. That is one of the difficulties?—One of my points about the grinding is the difficulty with regard to a standard of fineness.

2445. If zinc is going to be adopted, you would have to adopt some measure for including an inert matter?—Yes, I quite agree.

2446. The pure zinc of itself would not be satisfactory?—At the present time I should not dare to specify barium, because it is not in a sufficiently fine state. You get all sorts of crystals.

2447. Now, Mr. Wonnacott, you spoke of fissuring as the chief defect. Was that on a large surface?—(Mr. Wonnacott.) It was on external woodwork; that I traced to the workmen, and also to the unsuitable driers, which the workman knows nothing about at present.

2448. Would the Royal Institute of British Architects adopt the specification of the Office of Works?—(Mr. Wonnacott.) We are prepared to adopt before very long a specification, but we have drawn out this monograph for previous discussion. We shall endeavour to establish a standard specification which will include a zinc paint, but not at this stage.

2449. You do not think professional opinion is ripe for it?—It has practically not been before the profession yet.

2450. There would be difficulties in enforcing this. That is what I want to impress on the Committee. You, as representing your clients, would want to establish to your own satisfaction that any substitute for white lead was equally good in protecting property?—Yes.

2451. So the mere abolition of white lead and substitution of zinc, which might be done by Home

Office regulation or Bill in Parliament, would not solve the difficulty of getting a satisfactory paint. It might hasten it by the enterprise of our paint manufacturers?—(Mr. Munby.) It would hasten it.

2452. (Chairman.) You are satisfied, I understand, that an efficient substitute could be adopted for interior work and with the addition of 5 per cent. of lead for exterior work?—Yes.

2453. (Mr. Sutherland.) Do you think a zinc paint, with the addition of 5 per cent. of white lead, would be equal to white lead paint. Your answers seemed to imply that you did, but I was not sure whether you understood the drift of the question?—(Mr. Wonnacott.) I adhere to what I said.

2454. You think it would be equal?—(Mr. Wonnacott.) Yes—with a 5 per cent. maximum.

2455. (Mr. Sutherland.) Zinc paint made by the indirect process contains anything up to 4 or 5 per cent. of lead?—(Mr. Munby.) In what way are you speaking? Are you referring to the number of coats?

2456. I am speaking of the pigment. The number of coats you must settle among yourselves?—Do you mean, could it be worked up to be the same, irrespective of the number of coats and the question of thinness; is that what you mean? It seems to me the question raises some issues which are not dealt with.

2457. Why I put the question is, that if your answer goes forward as the answer I do not think it conveys quite what you intended—that a zinc paint with the addition of 5 per cent. of white lead is as good and as practicable as genuine white lead?—(Mr. Wonnacott.) I adhere to that. I can see certain advantages with that small percentage of lead. (Mr. Munby.) I would say yes if you want a crisp answer. But there are many more incidental points which should be mentioned.

2458. Then you quoted the view in that little book that zinc is held by the vehicle?—I was quoting the views held by many people.

2459. And never amalgamates with it?—(Mr. Wonnacott.) That is disputed.

2460. Everything in chemistry is challenged?—Theoretically, with regard to zinc oxide in linseed oil, it would be chemically about 14, but it is found to take up considerably more at a high temperature. Some of that must go in the form of an organic compound. That is how I should describe it.

2461. (Mr. Rice.) I understand that this inquiry by the Institute was made for two purposes, one with regard to the durability of paint, and the other with regard to the effect on the workmen. You have not told us about the result of the inquiry with regard to the effect on the workmen?—(Mr. Munby.) The original object was to formulate a standard specification for paints, which specification could be used by architects and reputable paint manufacturers, and would safeguard them and their clients.

2462. Was there a separate inquiry into the effect on the workmen?—There were not two inquiries. It was found that an actual specification it was impossible to prepare, because there were no definite standards in the paint trade, and therefore we drew up this little monograph with a view to interesting architects and the trade and those concerned in paints generally, in order that we might get more information, and that people might take up the question of standardisation of paint.

2463. I understood the inquiry was first of all as to the ingredients and secondly as to the effect on the workmen. Have you made any inquiries into the effects on workmen of white lead?—No. (Mr. Wonnacott.) We disregarded the workmen altogether, to put it in a nutshell. Our object was to supply architects with something which would correspond to the British standard with regard to steel, portland cement, and similar things. That was the object of the inquiry. The trade not helping us, we had to fish out information for ourselves, and we hope shortly to embark on experiments if our council has the good nature to assist us.

2464. This inquiry which has been held is in quite an embryonic state at present?—(Mr. Munby.) Yes.

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2465. You have issued no instructions to your members?—We have issued nothing but what you have in that little book.

2466. It is preparatory to the report to the council?—It is a preparatory feeler; that is all.

2467. It was the individual opinion of you gentlemen rather than of the council that they would specify zinc in lieu of lead?—Yes. We cannot commit the profession.

2468. Has the matter been inquired into not only by you gentlemen, but by a number of gentlemen?—A sub-committee of the Royal Institute was appointed which drew up that monograph, and that sub-committee still exists.

2469. So that until your committee are prepared to recommend the use of zinc paint instead of white lead paint, specifications will be continued to be prepared for the use of paints containing white lead?—Undoubtedly.

2470. Now with regard to the cost of zinc white, I take it there is very little used at the present moment. Mr. Wonnacott, you said that with regard to contracts, the cost was about the same. I take it there are not many specifications of zinc white?—(Mr. Wonnacott.) I should say there were not. I made an experiment in a large country mansion and compared the cost with that of a former contract on the same lines. The contractor was thoroughly aware of what I was doing, and I enlisted his sympathy. He naturally wanted as much as I did to get the information as to the durability and everything else.

2471. Now have you any information as to how many more coats are required to give the same effect?—It depends on the proportions of the ingredients.

2472. That is where you want standardisation?—Yes; we cannot say off-hand how many coats will be required to give the same effect.

2473. Take four coats of white lead, for instance?—(Mr. Wonnacott.) To substitute a pure zinc oxide, the result might be disastrous.

2474. Do you take any steps in your society for the education of workmen?—We cannot; we have no means, and apart from that, we are not in touch with the labour market at all.

(Chairman.) The Office of Works in their experiments, which have been so successful, have only used two coats instead of three.

(Mr. Sutherland.) One with 5 per cent. of white lead?

(Chairman.) No; Mr. Patterson told us that he did admirably without any lead at all; and he said, "I am quite sure that if we were allowed to go up to 5 per cent., we could make a perfect paint in every colour, with the exception of green."

2475. (Mr. Gardner.) If zinc oxide was sufficiently adulterated to give it body, you might get a commercial paint which would give as good a covering as white lead?—Yes.

2476. Manufacturers in the past have been putting out zinc white in too pure a state?—(Mr. Wonnacott.) Possibly; but I think the physical state of the zinc has something to do with it.

2477. With regard to outside ironwork and stucco work, how would you account for it not standing so well?—(Mr. Munby.) As far as our experience goes. We had a report of a series of American tests on bridge work over a considerable area, and the digest of that

report led me to suppose that the two materials were absolutely identical except as regards the size of the particles. Are you referring to the instance that we quote?

2478. No. You said that zinc paint on iron or wood outside had not the same durability as white lead. Do you know why that should be so?—(Mr. Wonnacott.) I should not be inclined to inquire as to the composition of the paint, but I should be rather inclined to inquire how the surface was prepared, and how it was put on, and so on. I think that is where zinc paint fails on ironwork. (Mr. Munby.) There is one very important question which has not been raised with regard to zinc paint. The discussion has turned on zinc oxide. There is zinc sulphide, which is very deleterious on ironwork. When mixed with oil there is a reaction, iron sulphide is formed with decomposition of the zinc sulphide.

2479. (Mr. Parsonage.) There is a vast amount of adulteration in white lead, is there not?—Yes.

2480. You would not expect to get more adulteration with zinc paint if you had a standard specification than you get in what is termed genuine white lead?—(Mr. Wonnacott.) I should expect far less. (Mr. Munby.) Certainly not more.

2481. There is more adulterant in white lead than in anything else used in the painting trade?—Yes.

2482. So that a specification now for "genuine white lead" really carries nothing with it?—No.

2483. With regard to the use of zinc oxide, you speak of its being mixed in exactly the same way as white lead. If zinc white was mixed properly, would it not cover coat for coat the same as white lead, supposing that refined boiled oil was used instead of ordinary raw linseed oil?—I should say not, because its specific gravity is much less; and it would float longer on the oil and be drawn out.

2484. I have reason to believe that mixed with a certain proportion of barium, it covers equally as well as white lead?—(Mr. Wonnacott.) Yes, when it has a small proportion of body to it.

2485. If a man is a painter, or whatever trade he is in, he can adapt himself. It would be only a question of the man. It would not be an insuperable objection or obstacle to the use of the material at all?—Not at all.

2486. It is really only a question of a standard of specific gravity?—(Mr. Munby.) Yes, as far as my experience goes I should say so. You say a certain proportion of barium.

2487. Yes. Then it could be used coat for coat with white lead?—I do not see why it could not be used.

2488. The only reason why it will not cover coat for coat to-day is that the zinc oxide must be absolutely pure, whereas "genuine white lead" can be adulterated to any extent. That is about the difference. If there was an equal amount of mixture with other materials one would cover as well as the other, and it would wear equally well?—My experience does not go sufficiently far to enable me to confirm that view, but I feel inclined to agree with it as far as my experience goes. That is all I can say.

2489. I think I shall be able to demonstrate to this Committee that what I state is true, and also that there are painters to-day well able to use the zinc white. If it is introduced, men will at once accommodate themselves to the conditions?—Yes.

The witnesses withdrew.

Mr. J. W. GARRON examined.

2490. (Chairman.) Do you represent Messrs. Lewis Berger and Sons, Ltd., paint manufacturers, of Hometon?—Yes.

2491. What is your position there?—Managing director.

2492. What paints do your firm manufacture?—We make a full line of paints, and we specialise for certain purposes.

2493. Do you make paints for coach work as well as for house painting?—We do.

2494. Do you make any paints on a zinc base without lead compounds?—Yes.

2495. Are your zinc paints as good as your lead paints?—In the matter of quality or durability do you mean? We make pure zinc paint and pure white-lead paint.

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[Continued.]

2496. I will put it in this way: for practical use, how do they compare?—For practical use, taking them individually, they are equal in quality. As to durability I would like to deal with that in another way.

2497. I will put the question again to you. I ask you whether your zinc paints are as good as your lead paints for all practical purposes?—Yes.

2498. Are they suitable for interior work?—Yes.

2499. And for exterior work?—We recommend lead in preference to zinc for exterior work.

2500. On what ground do you recommend lead for exterior work?—We find that it is more durable. It is more lasting as a surface coat and also as a protective coat.

2501. How does the cost of your zinc paints compare with that of your lead paints?—Compared with that of the lead paints, there would not be a great difference. Lead would be the cheaper.

2502. What are the covering capacities of your lead paints and your zinc paints?—The zinc would be probably 10 to 25 per cent. more than the lead.

2503. The covering capacity of the zinc would be 10 per cent. more than the lead, you think?—Yes, but it would not have the same opacity, in my opinion, as the lead.

2504. Do the zinc paints retain their colour for a long time unchanged?—They do.

2505. Are they better in that respect than the lead paints?—I think they are.

2506. Can they be used with the same vehicles and thinners as painters would use for ordinary lead paints?—Yes, but the proportions would have to be modified.

2507. To what extent?—A very small extent. Lead would take less drier than the zinc—a weaker drier, that is to say. Zinc would require more thinners up to about 25 per cent.

2508. Now, with regard to durability. First as regards interior decoration, can you give us a few particulars of some buildings where your zinc paints have been used for internal decoration?—I have not the details before me, but from our own experience I should say that for internal decoration the life of the zinc would be about the same as the lead.

2509. And secondly, with regard to external decoration, that is to say, surfaces exposed to all weathers?—I should imagine with regard to surfaces exposed to all weathers that zinc would only have about two-thirds of the life of lead unless it can be specially treated. If it is protected with varnish that would be different, but taking the zinc and oil, and lead and oil, I should say that the life of the zinc would only be about two-thirds. Zinc could be treated in such a way that it might have equal life with the lead.

2510. What special treatment would be required to accomplish that?—With the addition of varnish it would stand outdoor exposure longer.

2511. Would the addition of five per cent. of lead assist the durability?—It would.

2512. Would it make it equally as durable as lead paint?—Five to ten per cent. would bring it closer to lead probably, but I do not think it would ever equal lead unless by the special treatment which I speak of.

2513. Can you tell us whether your zinc paints were applied over former coats or priming coats of white lead or not?—Yes; it is mostly recommended that they should go over a flat coat which is usually prepared from white lead.

2514. Can you tell us of a few buildings where your paint has been used for exteriors?—I have not that information with me; I could procure it and send it on.

2515. Please let us know also the dates at which these exteriors were painted?—I will give you that information, too. You understand we only supply the painters.

2516. Do you make enamels?—Yes.

2517. Are they built up on a lead base?—No, on a zinc base.

2518. The Office of Works have been using, almost exclusively, for over four years, zinc paints both for internal and external work?—I am familiar with their formula.

2519. Does that in any way influence your answer to my last question?—No, I think not. Their formula is one specially prepared and is not in general use. It would not be adapted. Their experience has been that zinc, treated in the way that lead would be, is not so durable for outside exposure.

2520. My point is this, that the Office of Works have prepared a formula which has proved to be as perfect for exterior painting as lead paint?—I was not aware of that until now that you make the statement.

2521. That is the evidence we have received. That is news to you?—Yes.

2522. It shows, does it not, that the difficulty can be overcome?—I was not aware that they had arrived at any definite formula yet. They are continuing to improve it.

2523. It shows that by continuous experiment you can arrive at the perfection of paint without using lead?—Yes. They have modified their formula in the way that I have suggested. By employing a certain percentage of varnish you can improve it.

2524. You are aware, I suppose, that in France a law was passed in 1909, to take effect in 1915, which prohibits the use of white lead in house-painting?—Yes.

2525. May I take it that you know that in other countries the use of white lead in house-painting has been strictly regulated—in Germany and in Belgium, for example—while in Austria white lead was prohibited in 1909 as regards interior work?—I was not aware of Austria. I have heard that it was so in other countries.

2526. What is your view with regard to the prohibition of the use of lead in paint in this country?—As a paint manufacturer I am not interested. It would not affect our firm. Do you mean generally on the trade?

2527. What effect would it have generally?—The consumer and also the householder would readily fall in with any suggestion as to a substitute for white lead, and I think he ought to do so. It would have the effect of improving probably the present merits of zinc-white, or it would have a tendency for the manufacturer to look round for other substitutes than zinc-white. There are others. We have not mentioned lithopone, but that is a very good substitute.

2528. You mean to say that the prohibition would give an impetus to the manufacturers to seek for an efficient substitute and possibly a better substitute?—Yes, for something that would be quite equal to white lead at least.

2529. Do you think that that would be possible?—Yes; we and other manufacturers are experimenting on it at the present time. I have brought down some panels showing our own tests. There you see the merits of zinc and lead.

2530. (Sir Godfrey Baring.) Would you say that there has been an improvement in the quality of zinc paints during the last 10 years or so?—Yes, I think there has. Many of the zincs on the market contain a large proportion of lead that is detrimental. We are now able to obtain zincs which are quite free from lead.

2531. That improvement will probably be progressive in the future?—We have every reason to believe so. As far as that is concerned, the impurity of lead is quite eliminated now.

2532. Is it your experience that there is an increasing demand for zinc paints?—A very small increase in this country as far as my observation goes. In foreign markets there is a very large increase.

2533. In England there is a slight increase?—In England, I believe, there is a slight increase as far as my observation goes.

2534. Would you agree with some of the evidence that was given by two witnesses yesterday, that zinc paints are specially suitable for external use in London and other large manufacturing towns?—No; unless treated specially as the Office of Works has done.

2535. Unless so treated, they would not be specially suitable?—I do not think so.

2536. Would not they, so far as durability of colour, is concerned?—Yes, but on the question of

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[Continued.]

protective qualities I should say they are not equal to lead at the present time.

2537. You said, in answer to the Chairman, that with a slight admixture of lead, up to 5 per cent., it would be materially improved?—Yes, but it would still be deficient.

2538. But it would come nearer with regard to durability?—It would come nearer.

2539. (Dr. Collis.) At your works do you employ men entirely on making zinc paints, in contradistinction to the men employed on making lead paints?—I cannot say they are employed exclusively so. We have lead mills and zinc mills. We do not mix them up. We do not grind zinc with a lead mill.

2540. Do you separate the men?—We keep the same operators on each mill, as far as we can.

2541. Do you insure them separately or as a whole?—As a whole.

2542. Would it be possible for insurance companies to take them at lower rates if lead was eliminated?—I am sure we could get a lower rate than we do as lead grinders.

2543. You have to pay a high premium?—But our risk has been very small. I am glad to say we have not had a case to report since October 1909.

2544. That is a matter which has pleased us quite as much as you?—I am pleased that you have noticed it.

2445. (Mr. Sutherland.) It is quite immaterial to you whether you use lead or zinc, as a firm of paint manufacturers?—Yes.

2546. You have to produce it one way or the other?—We have to produce it one way or the other.

2547. A question was asked as to Tung oil. Is that a commercial product for paint?—No. It can be procured, but in very small quantities.

2548. There is nothing so good as pure Baltic linseed oil, is there?—That is the very best medium that is known at the present time. Although considerable research is being made for a substitute for linseed oil, no substitute has been found suitable.

2549. For external work you think that lead is better than zinc?—That is our experience.

2550. But for internal work zinc can be used quite as well as lead?—Yes, for ordinary purposes.

2551. Do you think that, if white lead is prohibited, the consumer (by that I presume you mean the painting trade) would fall in with it?—They would have to; they would have no alternative.

2552. Yes; but would they do it graciously, do you think?—I think the painter is really in the same position as the paint grinder. If he does not sell lead, he is going to sell zinc. It is only the lead corroder who would suffer.

2553. There is nothing, in your opinion, before the public that is equal to white lead for external work?—No.

2554. (Mr. Robins.) Do you send zinc paint abroad?—Yes, very largely.

2555. Are good results obtained from the use of it abroad?—Yes, I believe so. It is particularly suitable for the climates where it goes—South America, China, and Japan.

2556. I am thinking of the Continent just now?—Probably lithopone and other substitutes are very largely used, in France particularly. I do not know if zinc-white has taken the place there of white lead. The import duty is prohibitive, so it is quite a domestic supply. From my own knowledge, I know that lithopone is being used very largely there.

2557. The zinc-white you sell to the home market is the same as you sell to the foreign market?—Yes. We have various grades—one, two, and three.

2558. You, in common with other firms, are instituting research for substitutes for white lead?—Yes.

2559. Are you doing it jointly or separately?—Separately at the moment.

2560. Your particular firm is not working with any other firm?—No. We get together occasionally and exchange views. We have a federation of our own, but the matter has not been brought up officially yet.

2561. This is research on the part of your firm individually?—Yes.

2562. At the present moment you have nothing to offer as a substitute?—We have at the present moment on the market leadless paints composed of zinc and lithopone.

2563. (Mr. Gardner.) Could not you produce a zinc preparation for outside work which would stand quite as well as white lead?—I believe we could by manipulation.

2564. (Mr. Parsonage.) If zinc paint for outside work was mixed with mixing varnish, instead of raw linseed oil, would it not stand as well as white lead?—I am sure it would, but it would be much more expensive.

2565. It is a question of mixing with regard to its durability?—Yes.

2566. (Mr. Fell.) Have any of your zinc paints been used for carriage work?—In the form of enamels, yes.

2567. For ordinary motor cars or tramcars or anything of the sort?—Yes. We have supplied them in the form of enamels ready for use and also in Japan gold size.

2568. Not with regard to priming up?—No.

2569. Could you say where you have supplied these zinc paints?—I can only call to mind that it has been supplied in the form of enamel for ceilings and for decorative work.

2570. But not for outside work?—Never for outside work, as far as I know, or for filling up or first-coat work. That, as far as I know, has always been in lead.

2571. (Mr. Mason.) Would the addition of copal varnish to your zinc, so as to make it equal to lead, raise the cost of the paint to more than lead paint?—Yes.

2572. Would the cost of such paint as is supplied to the Office of Works be more expensive than lead paint?—As a matter of cost, yes; it would be more costly to produce.

2573. (Chairman.) They say not?—They are not manufacturers.

2574. But they know what they pay for it?—You have to take the question of competition into consideration.

2575. If I was asked whether zinc costs more than another article, I should judge of that by the price I was asked to pay, and if these people tell us that after four years' experience with a certain formula which has been used for four years it has cost no more for zinc than for lead, I should say that was conclusive?—They are in the peculiar position that they can always make their own price in the open market.

2576. (Mr. Mason.) Would not the contractor who put the paint on suffer?—Would it not have to come out of his pocket?—As a matter of fact it would cost more to produce, but if there was a universal demand for it we should find that there would be a universal price and it would come down to pretty near the price of ordinary paint.

2577. (Mr. Kinggate.) I believe you specially cater for the coach trade?—Yes, we make a speciality of coach colour.

2578. Have you applied the Masury self-bound process to zinc-white?—No.

2579. You have not experimented with regard to zinc-white in that respect?—No, not unless it is asked for. We have never made a speciality of it in preference to lead.

2580. You have never made Masury?—No.

2581. There is a difficulty with zinc-white as to drying?—No difficulty, but it takes longer time than lead.

2582. Coach painting, as you know, is entirely different from house painting?—I do not think with zinc alone you would get the hard undercoat, but combined with siliceous filling up ochre it is known to answer.

2583. With the Masury paint?—No; the finishing coat would be all right, but the undercoats, no.

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[Continued.]

2584. I am talking about building up from the filling, not from the priming?—Then zinc could be used.

2585. Building up with zinc?—Then zinc could be used satisfactorily.

2586. With the Masury patent?—Yes.

2587. (Mr. Gardner.) You supply in pulp?—We supply in all forms.

The witness withdrew.

Mr. WILLIAM A. HUMFREY examined.

2588. (Chairman.) Are you works manager of the Brimsdown Lead Company, Limited?—Yes.

2589. What does your firm manufacture?—Lead products of various kinds. The main product is white lead, the other products being more or less subsidiary to white lead.

2590. I think that you have a special process. Would you describe, very briefly, please, in what way it differs from others?—Our process consists of oxidising metallic lead in furnaces and after certain intermediate processes, converting that oxide into a basic carbonate, or white lead, while in suspension, in liquid, the white lead being afterwards filter-pressed and ground in oil in the usual way. The more general process is one in which metallic lead is cast into gratings or wickets, and corroded in stacks with spent tan and acetic acid.

2591. Will you tell us the main uses of your products?—Our use is almost entirely for painting; very little for anything else.

2592. House painting and coach painting?—I should say both.

2593. Do you handle any substitutes for lead paint?—None whatever.

2594. Should the use of lead paints be restricted or prohibited in this country at any time, would this mean serious loss of business for your firm?—It would mean practically the extinction of our firm.

2595. Have you any suggestions you would like to put before us as to precautions—short of providing substitutes for lead paints—which could be relied upon to abolish lead poisoning amongst both house painters and coach painters?—In answering that question I cannot speak as a painting expert. Being only a white lead manufacturer, my knowledge of the painting trade in its technical details is very limited, but I can speak as to the precautions which should be adopted in the handling of white lead, and which have met with some considerable success, and some of which might very well be carried out in a modified form by the painting trade, I think.

2596. What are they?—It appears to us that the first thing in the prevention of lead poisoning is the education of the workmen, and we have devoted considerable attention to that; that is to say, in taking on a new man, we first of all warn him in unmeasured terms as to the poisonous nature of the product he is going to handle, and then for some time keep him under inspection with further warnings, and watch whether he is negligent or whether he takes any notice of the warnings given to him.

2597. Who is going to do the watching?—In our case the foreman in the factory does it to some extent, and we also have one man who acts as inspector and takes general note.

2598. That applies to your own works?—That applies to our own works.

2599. But what would you suggest should be done where a man employs, say, 500 workmen, and they are scattered all over the country on different jobs?—I suppose such an inspection would be impossible in that case.

2600. That is exactly what we feel?—But I should think that in the trade generally there must be many instances where the men are not scattered; for instance, in large painting works.

2601. What some of us feel is, that we have to contend with a very serious and insidious evil which results in a very large number of deaths, and a still larger number of attacks of lead poisoning. Now we have been called together to find a remedy for that evil. Either we must prohibit the use of lead or we

must introduce such precautions as will check the inroads of this terrible evil. You have rather implied that with regard to house painting no precautions would be possible? No. May I correct that? I said that inspection of the men would be impossible in that case.

2602. How would you introduce precautions in the case that I cited of a man with 500 workmen scattered in threes and fours all over the place?—My own impression of the way in which painting is carried out by men working in twos and threes is that there are several things wanting, such for instance, as washing appliances. It does not form a regular part of a painter's kit always to have soap with him. He probably takes his meals with him, and has a very haphazard, if any, kind of wash at all before his meals, if he is on an out job. He, as a rule, is not an extremely cleanly person. He gets paint very much round his finger nails, and eats part of his food with his fingers. Naturally he holds his bread with his hand. That is one of the gravest risks painters suffer from on those small outlying jobs.

2603. Do not you think that with the lamentable state of affairs that I have depicted, if a substitute is found for lead, the Home Office ought to insist on its being applied?—I think that if a complete substitute for lead was found it ought to be applied.

2604. Notwithstanding the fact that it would do grievous injury to certain lead manufacturers?—That is a matter of very considerable import. If, as well as introducing a substitute, you also imply prohibiting the use of white lead, it would naturally create another evil by the harm it would do to those already engaged in the business.

2605. But it would be an evil that could be overcome by finding other employment, whereas the evil which exists to-day of men being poisoned would cease?—It is a matter on which I could not express an opinion without having all the details before me.

2606. We have evidence before us from the Office of Works that they have been using almost exclusively for the last four years zinc paints both for internal and exterior work with perfect satisfaction?—May I remark on that that the Office of Works is a branch of, shall I say, the Government Service (I do not know the right term to use exactly) which I have not any knowledge of. But we have some considerable acquaintance with both the Admiralty and the War Office, both of which branches of the Service are very large users of white lead still, and we feel in this way, we are in the position of simply supplying a demand. I take those two branches of the Service as being together probably the largest users of white lead in the world. Their need for white lead is shown by the fact of their buying it, and if they found that they could use a substitute, nothing that we could argue as regards the merits of white lead would be of any use.

2607. Supposing this inquiry results—of course I cannot say how it will result—in the Committee recommending the prohibition of the use of lead or greatly restricting the use of it, would that act as a stimulus to the whole trade to find a substitute? They would be obliged to use something else than lead, and then your firm and others in your position would suffer a certain amount of injury?—Yes; it would be an absolute evil to us.

2608. I suppose you realise, do you not, that this question of lead poisoning has been receiving very considerable attention in all foreign countries?—I have read that.

2609. In France, for instance, a law was passed in 1909 for prohibiting the use of white lead entirely in five years' time, both for interior and exterior work?—I believe that is so.

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[Continued.]

2610. In countries like Germany and Belgium the use of white lead for house painting has been strictly regulated, and in Austria it was prohibited in 1909 with regard to interior work. I only mention those facts to you because it is impossible in these days for England to be behind foreign countries in protecting workmen. You appreciate that, do you not?—I appreciate that. My own opinion on that point coincides more with the practice in the United States, where the use of white lead is much more confined to places where it is necessary and where it is suitable on account of its peculiar merits, and other paints are used where they are advisable and necessary, and not as in this country where white lead is used almost universally without any consideration of the merits of other pigments. There is no prohibition in the United States as far as I know.

2611. (*Sir Godfrey Baring.*) How many men do you employ on an average?—About 120.

2612. (*Dr. Collis.*) You mentioned the United States. You said that there was no prohibition?—So far as I know there is not.

2613. You are aware that factory laws in the United States are practically non-existent?—I know that they are much easier. I was under the impression that they varied in the different States very much.

2614. They vary in the different States; there is no uniformity; so we can hardly look to the United States as being an example to us in this respect as they are in other ways, perhaps?—I meant not so much as an example but as a reasonable way of treating pigments, instead of taking it that any one pigment can be used as a substitute or a universal paint or that you can wipe out any one.

2615. The United States have not collected any statistics of lead poisoning which occurs in houses or in factories where white lead is made. It may be that they are in the same position as they found they were when they came to look into the question of phosphorus?—The Chairman was referring to countries in which white lead was prohibited entirely or partially.

2616. The United States have made no inquiry whatever into the circumstances of the case. That is the only point I wish to bring out?—Why I mentioned the United States was that, as there is no country that I am aware of where white lead has been entirely prohibited for all purposes, one has had no experience of what the effect of entire prohibition is; and I think that the reasonable way of dealing with the matter is what has become naturally a system in the United States, of not using it unless it is necessary.

2617. I follow your point. I do not know whether it is necessary to question you further on the point of the difficulty of enforcing regulations on workpeople. You have already allowed that the difficulties are considerable?—I have allowed that they are considerable as far as inspection goes. I am quite of the opinion that other regulations might be enforced. I have not in my mind any exact regulations that are enforced in the painting trade, if any, on the working painter.

There are certain voluntary precautions, some of which we take, such as the provision of milk, the provision of sulphur tablets, the provision of medical advice and attendance.

2618. The medical examination is not voluntary?—No, that is not voluntary (that was my mistake), but the other two I mentioned are. They certainly have very beneficial effects. Then there is the selection by the employer of his men and knowledge of workmen. It is possible even with scattered workmen. They must be under supervision at some time.

2619. From your own experience of the past, even with that selection, you know that cases of lead poisoning have occurred in your own works, and that it took a considerable period for you to get the protection which you desired, and that elimination, on which you are now placing some stress, of the susceptible workpeople, so that you have now only a few cases?—Yes.

2620. You had that trouble even when it was within the four walls of your factory?—Yes.

2621. However strict the regulations, do you think that any such system could be applicable to house painters?—I do not think to such a degree, or with such ease, as within the four walls of a factory.

2622. (*Mr. Kinggate.*) How many cases of lead poisoning have occurred in your works during the last five years; how many cases of death and how many cases of illness?—I have no reliable record beyond three years—from the latter part of 1907. Practically the reliable records date from the time of the Compensation Act, and the number of cases that I have a note of here (which includes the whole of the cases known as "plumbism") were 17 in 1908, 15 in 1909, and 7 in 1910.\*

2623. Those were cases of illness?—Yes.

2624. What is the number of deaths?—There was one death in 1908, included in the 17 cases mentioned in previous reply.

\* The following addendum to this answer was forwarded by the witness in a letter dated 28th April 1911:—

"It is of considerable importance to emphasise the fact that no single case of lead poisoning has taken place amongst any of our workers who handle white lead in oil. Every case that has occurred in our factory can be clearly shown to be due to work in lead products other than lead in oil, and this fact and condition of affairs is borne out by the whole of my previous experience of over 20 years in the manufacture of lead products.

"As the condition in which lead is supplied to the painter is almost universally as an oil paste or paint, and in view of the fact that he (the painter) handles such a comparatively small quantity of white lead as compared with the actual worker in a white-lead factory, and further has every opportunity of doing his work with much more care and nicety than the factory hand, it does not appear to me that with ordinary personal cleanliness such handling of the oil paint and the application of the same to surfaces can really be responsible for 'plumbism' amongst painters.

"I am of opinion that the real cause is through dust in such operations as cleaning down, or rubbing off, in the dry, and with reasonable precautions in this work the total risk to a working painter should be very small."

The witness withdrew.



## FOURTH DAY.

Wednesday, 5th April 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

LORD HENRY BENTINCK, M.P.  
 SIR GODFREY BARING, Bart., M.P.  
 MR. E. L. COLLIS, M.B.  
 MR. F. G. RICE.  
 MR. W. G. SUTHERLAND.

MR. A. GARDNER.  
 MR. J. PARSONAGE.

E. A. R. WERNER } (*Acting*  
 R. U. SHAXBY } *Secretaries*).

Mr. J. PARSONAGE (a member of the Committee) examined.

2625. (*Chairman*.) You represent the National Amalgamated Society of Operative Painters, and you are a member of the present Home Office Committee?—Yes.

2626. What practical experience have you had in the house painting trade?—I was apprenticed to the trade. I have been in it practically all my life—35 years as a painter.

2627. Have you known many cases of lead poisoning among house painters?—I have known a great many cases.

2628. Can you give us the number of members in your society, and details of the lead poisoning cases which have come to your knowledge in connection with those members?—The average number of members of our society has varied from 15,000 to 18,000. I have tabulated particulars with regard to the numbers in our society. We have had a large number of deaths, and a still larger number of cases of blindness and total paralysis due to lead poisoning.

2629. What about attacks of lead poisoning which are not fatal or accompanied by blindness or total paralysis?—Such cases are extremely numerous. They are too numerous for us to keep any record or account of. In fact the funds of our society would be altogether insufficient to allow us to make any payment except in cases of death or total paralysis.

2630. Can you give us full details of the deaths and the number of cases of lead poisoning of all kinds?—I am only prepared to speak to-day of the very large number of cases which have come before my notice—deaths, cases of blindness, paralysis, and other cases of lead poisoning, which I have referred to. I can also testify to the excessive amount of Bright's disease which exists among house painters.

2631. Can you supply us with actual numbers and full statistics?—I can substantiate all my statements by actual figures; I have a number of them, but I have forwarded all the detailed information regarding these cases to Dr. Collis, and he has undertaken to sift them thoroughly, and present them to the Committee in a statistical form.

2632. Do painters often follow occupations other than painting at certain periods of the year, and thus minimise the risks of contracting lead poisoning?—No; I should say in very exceptional cases does a painter take up any other occupation except it is at seaside resorts, that is a painter who has been brought up to the trade as a painter.

2633. (*Lord Henry Bentinck*.) He paints at the seaside?—He follows his occupation of painter nearly all the year round.

2634. (*Chairman*.) Can you tell us how much of his time is occupied at full work in the course of a year?—It varies. I could not say what the average time is. I can speak from my own case.

2635. Would you say that the men are fully employed all the year round?—No, they are not fully employed all the year round.

2636. You cannot give us any idea as to the time that they are employed?—A painter may lose from six to eight weeks in the course of the year.

2637. Now what in your opinion is the chief cause of lead poisoning?—I should say the chief cause is the dry rubbing down with sandpaper. I would put that first.

2638. What do you mean by dry rubbing down?—The process of smoothing the wood or other work which is about to be painted or repainted.

2639. What methods of rubbing down are in common use?—The wet method, which consists of rubbing with pumice stone and water, and the dry method, which consists of rubbing with sandpaper.

2640. Which process is most common?—The dry method by far.

2641. What percentage of the whole work would be done dry?—At least 75 per cent.

2642. Is this method applied to newly painted surfaces on which the paint is already dried?—Yes.

2643. For what purposes is the wet method used?—It is applied almost exclusively to the smoothing of old painted wood before new paint is applied.

2644. Why is it used for this purpose?—Because the old paint is usually very hard, and the sandpaper would not touch it.

2645. Is the wet process much less dangerous than the dry?—Yes; it involves comparatively little danger.

2646. I will ask you then more particularly regarding the dry process. At what stage in the work of painting is it employed?—In painting interior work the surfaces are first washed, and woodwork is either rubbed down with pumice stone and water or dry with sandpaper. The latter is most general now, even before the first coat of fresh paint is applied to old work.

2647. Is this then where the principal danger arises?—No; the most dangerous sandpapering work takes place after the first coat is applied and dried.

2648. Will you describe fully the operations which are gone through before the second or further coat is applied to a surface newly-painted?—The painter carefully rubs down the newly-painted work when dry with sandpaper in order to remove all particles of grit from the newly-dried paint.

2649. Does this cause much dust in the air?—Yes, the dust is dry, and, even though it is formed of white lead particles it is still light enough to float for a short time in the air which the painter is breathing.

2650. Is there a sufficient quantity of it to be visible on surrounding objects?—Yes; it covers his clothing, it settles on every ledge of the room in which the work is being executed, gets into the grain of the wood, and into each joint of the floor boards.

2651. Is it easy to collect and get rid of this dust?—Even when the clothing has been taken off and shaken, and when the floor has been carefully swept, the fine dust is still to be seen; each waft of fresh air from the door or window stirs up small particles of it, and thus endangers the health of the painters working in the room.

2652. How rapidly does the dust collect on the floor?—It collects so rapidly that if a painter keeps his feet in one place for a few minutes when rubbing a door, and afterwards steps away from the place on

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which he has been standing, he sees on the floor a rough outline of his boot soles, caused by the white lead particles having fallen all round his boots when he was remaining still.

2653. Do I understand that this dusty process is not generally replaced by a wet process?—With one exception, the wet method is never applied to newly-painted surfaces when such are about to be repainted, where ordinary paint has been used.

2654. Has it not been stated from time to time that the wet process is applied in place of this dangerous dry rubbing?—Such a statement in connection with work where ordinary paint has been used would be quite ridiculous. No painter who values his reputation as a craftsman would dare to assert, in a meeting of practical painters, that it is in use; he would be laughed at, and any journeyman painter attempting to apply this process under the circumstances above mentioned would run the risk of being discharged for incompetency.

2655. You make that statement after considerable experience of the painting trade?—Yes. I have worked at the painting trade for over 30 years, and never during those years have I ever seen or heard of that process being applied in the ordinary way except to special work.

2656. You qualified one of your answers by saying that with one exception the wet process is not used. Will you explain this?—Yes. On a first-class job, where it is desirable that work should be finished with a high gloss, as in enamelling and varnishing, or work for hand polishing, which is extremely rare. The work in such cases may be prepared with ground pumice and felt.

2657. How is the wood or other work prepared for such a job?—Where the wood or other work is indented, cracked, or very rough, a coat of filling or stopping is applied.

2658. How is the filling made?—The filling can be made in various ways—with Japan gold size and white ead, or with ground slate mixed with some suitable vegetable.

2659. How is it applied?—This is applied in the form of a stiff paste, with either knife or brush, to the rough surface of the woodwork. It is generally applied with a broad knife, the painter taking the mixed material off a board. He holds the board in his hand. It is almost impossible for a painter to avoid getting this filling on his hands.

2660. Does this paste dry hard?—Owing to the nature of its ingredients this paste dries very hard—very much harder than the ordinary paint.

2661. Is it then rubbed down wet?—When dry the painter rubs this filling sometimes with pumice stone and water, but often with sandpaper. Of the two I should say more often with sandpaper.

2662. What is the object of the rubbing in this case?—In rubbing he has two ends in view—first, smoothness; second, the removal of as much of the filling as possible, consistent with the acquiring of a smooth surface, as the filling has no value except for the purpose for which it is definitely used.

2663. You have already told us that pumice stone and water are also used sometimes for rubbing down old paint. Why is it used for that purpose and for rubbing down filling in good jobs?—A painted surface rarely requires re-painting in less than three years. During the three years the paint has become very hard indeed, and all evidence of oil has become exhausted. In the mixing of filling little or no oil is used (usually none), therefore the filling, like the old paint, becomes hard and brittle. The brittle surface is most suitable for the application of pumice stone.

2664. (Mr. Sutherland.) Are you referring in that answer to paint or to filling?—I am referring to both the old paint and the filling.

2665. (Chairman.) The amount of oil used then is the important distinction between filling and old paint and ordinary newly dried paint?—Yes, oil, absent in the first two cases, is the most valuable medium with which paint can be mixed; one of its chief characteristics is its slow drying quality, which, within a certain limit, is, in itself, very valuable, as slowly drying or

slowly hardening paints are more durable than paints in which the drying quality is forced or rapid.

2666. How long is it before a coat of ordinary paint is ready for a further coat?—It depends on the mixture of the paint, the ingredients, and the vehicle used in them, but it is ready at the end of 24 hours' drying. But, though then dry, the hardening process would continue for some days, in fact long after the painter had completed his job.

2667. Is it not possible to rub such paint with pumice stone and water in between coats?—To rub such paint with pumice stone and water at any time during the hardening process would be very unwise, as the painter in doing so would run the serious risk of tearing the surface of the paint, thus doing serious damage.

2668. Could the painter overcome this difficulty by exercising great care?—It would be possible though it would be extremely difficult.

2669. Would it involve further difficulties?—Yes. The soft paint would get into the pores of the pumice stone and "clagg" it; in other words, hinder it from readily passing over the painted work, thus defeating the end which the painter had in view.

2670. Does this difficulty not arise with sandpaper?—In many cases sandpaper will "clagg," but not so soon as pumice stone. Sandpaper is the very best material known for the purpose now under discussion.

2671. Would it not be possible to insist on the wet process being used more generally?—We have not the least desire to see its use restricted. To seek to insist upon the wet process being substituted for the dry would be highly impracticable. It is not the rubbing which is at fault, but the material which is rubbed.

2672. You have now given us details regarding what you feel to be the most dangerous of the house-painting processes. What do you consider the second most dangerous process?—The painting of ceilings which have been covered with relief decoration, moulded or raised designs.

2673. Is white lead much used for such work?—As such ceilings are invariably finished in light colours (either white or cream) white lead is the chief material used.

2674. How many coats are generally used on such work?—This class of work (for ceilings) usually gets two coats of oil paint and one coat of flattening, but as the flattening process is now being displaced in many cases by the use of non-poisonous paints, we are concerned mainly with the ordinary painting in oil colours of these ceilings.

2675. Does much splashing arise from this operation?—In the painting of relief decorations (raised surfaces), owing to the fact that the paint has to be pressed with the paint brush into the background of the ornamental work, considerable splashing takes place, the splashes being very small in size.

2676. Does lead paint get splashed on to the face?—The painter must necessarily stand directly underneath the material which he is painting, having his face upturned; it necessarily follows that he catches on his face, and on his clothing, a continuous shower of very fine paint splashes; some of these splashes are on his lips, and, therefore, come very closely into contact with his saliva. The bitter taste of the paint is present shortly after commencing the process, and he is conscious of the presence of paint on the inner side of his lips for some time after finishing such work.

2677. Is the process called "stippling" similar to this in all respects?—Yes, it is. The paint is first applied with the ordinary paint brush, and then there is a square dry brush which is not put in the paint at all—it would be perhaps 9 inches square—and that is to hit the whole of the paint into the ornament, and the splashes, of course, fall down from that.

2678. (Mr. Rice.) Is stippling equally as dangerous as cutting into the ornaments of the ceiling?—I should say it is the more dangerous, because probably more splashes and drops fall from the stippling.

2679. (Mr. Sutherland.) Not from the stippling?—Yes, I should say it is so. It is a matter of opinion. Perhaps I should say that one splashes equally as much

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as the other—that there is as much splashing from the stippler as from rubbing in with the brush.

2680. (*Chairman.*) Could a man possibly wear a respirator when doing such work?—The wearing of a respirator would be almost an impossibility, for the following reasons: To carry out the process he usually has to stand on a plank, the two ends of which rest upon trestles or step-ladders, there being no support to the middle. The plank, therefore, oscillates while the painter is at work; the painter must exercise care to maintain his balance. In his left hand he holds the vessel containing his paint; his right hand is used to manipulate the paint; his face must be upturned to enable him to see his work. To further encumber the painter with a respirator under those circumstances would be an act of cruelty; not only that, but the suppleness of his neck would be lessened, thus making it difficult for him to move his head. I am of opinion that any unusual restriction of the moving of the neck muscles would positively lessen his power to maintain his balance on the plank on which he is standing.

2681. Apart from that, have you ever seen a respirator that was comfortable to wear?—Never. Even if the employer was compelled to provide respirators, we feel that he would have the utmost difficulty in compelling his workmen to use them.

2682. Would it be possible to secure a proper, clean place for keeping respirators?—When not in use these articles must, of course, be kept somewhere; if on the job where the painters are at work (certainly the likeliest place), then they will be kept in the room which is being painted, where the paint is stored, and where bad air is ever present. Under these circumstances I readily say that I would rather run all the risks which a painter usually runs of contracting lead poisoning than adopt such preventives. The respirators would most probably be kept in the box of the man who was in charge of the job, where he would keep a number of his brushes and probably the stipplers too, and they would smell very strongly of paint.

2683. Can anything be done to introduce ventilation which will remove the danger? I mean by that, exhaust fans and the like?—I should say not. In a factory specially constructed, or adapted, for the carrying on of any process in which white lead is introduced it is quite possible to provide the necessary air-shafts and air-currents, and thus furnish a maximum of fresh air, or to adopt some method of suction by which poisonous substances may be removed; but it must be remembered that a living room in a house is constructed for quite other purposes than that of providing prevention against lead poisoning. Even the ordinary method adopted by a family to purify rooms, that of throwing open doors and windows, cannot always be adopted by a painter when paint is wet. This is more particularly the case in large towns, where dust and soot would positively ruin the work in hand. I wish to impress the fact that the successful carrying out of a painting job positively necessitates the closing of the doors and windows when paint is wet.

2684. What hours do the men work in such confined rooms?—The hours generally would be from 50 to 56 in town work, but in the country they generally work from 66 to 70 hours per week. They are not at painting all that time.

2685. Have the men ever instituted any suggestions that the hours of labour should be limited?—Yes, frequently, and the hours have been reduced considerably. The hours have been reduced these last few years a good deal.

2686. The Committee which sat on the Earthenware and China Inquiry unanimously—employers and employees—decided that the hours of labour in certain processes should be limited to 48, because of the grave dangers which ensue from breathing lead dust?—The painter who goes away into the country requires to work long hours, or it would not pay him to go, having his home to keep in the town, and to pay for himself in the country as well.

2687. All the medical evidence at our late inquiry showed that the dangers of inhaling lead dust were so great, and that they impaired the constitution to such

a high degree, that it was absolutely essential to limit the hours to a certain number.

(*Lord Henry Bentinck.*) Are you counting the travelling to and fro in the 70 hours?—No.

2688. Actual painting?—I am counting from the time he arrives on the job.

2689. (*Chairman.*) My question was, What hours do the men work in such confined rooms? Do you consider that lead poisoning can be contracted by breathing contaminated air?—Yes, I do consider that it can be contracted by breathing the fumes from the paint when it is being used and when it is wet in the room. I could not enter into any system of analysis to support that contention, but as painters' work necessarily varies in some degree, even when working in one room, there is no means of demonstrating that breathing the fumes arising from the process of painting has, in any one case which we know of, caused lead poisoning, but I positively believe that fumes arising from the lead do cause lead poisoning.

2690. That is what Dr. Baly said?—Dr. Baly rather supported my idea, but I have always had that opinion, and I think that 99 per cent. of painters would hold that view.

2691. Is a painter frequently sensible of the taste of paint in his mouth?—When a painter is working in a room in which large spaces of ceiling, walls, and woodwork are being covered with lead paint he becomes conscious as the day advances of having a very bitter taste in his mouth; if he thoughtlessly licks his lips the bitterness becomes intensified. I wish to point out that it is not necessary for him to have splashes of paint on his lips to enable him to realise the bitter taste. It is a somewhat difficult matter to account for this, but I am certain that you can taste dust.

2692. Do you believe that the mixture of white lead, oil, and turpentine gives off different fumes from those which arise from these three ingredients separately?—Yes. If a keg of white lead stood in the middle of a room with the lid taken off the keg nobody could smell the lead. If a keg of linseed oil stood in the room there would not be an objectionable scent from that. A keg of turpentine would cause a strong but harmless scent. Now break up some of the lead in portions of oil and turpentine, then all persons who stayed for some time in the room would be aware of a very offensive scent. Some would become ill in the presence of it. As the day advanced those staying in the room, even though they did not touch the paint, would begin to taste the paint in their saliva. Our theory is that the oil and turpentine release a certain quality in the lead which has hitherto lain dormant. The air becomes charged with a poisonous substance which is dissolved by the saliva, and thus sets up lead poisoning.

2693. Can you tell us anything of the possible ill-effects arising from the burning off of old paint with a spirit or charcoal burner?—When paint has been removed by burning off with a blow lamp the surface of the work and all mouldings, &c., has to be sand-papered. This is very dangerous, owing to the dust which comes from the rubbing down.

2694. How and where are the colours usually mixed?—On ordinary jobs, the man in charge of the job generally selects the largest room, and the paint is usually mixed in that room. He has a bench fixed in the middle of the room.

2695. Is there much danger of its being inhaled in this operation?—There is not so much danger; not much dust arises from that. The lead is always in paste form. But I have seen many cases of men, who usually are kept to break up the lead in the paint shop, who have suffered from contracted muscles and dropped hands, as we call them, more than the painter who is ordinarily using the brush. How they got that I could not explain, but I have known the man that mixes up the lead to suffer from dropped hands.

2695a. (*Lord Henry Bentinck.*) Is the lead in the form of paste?—Yes. The lead is always supplied in paste form.

2696. (*Chairman.*) Is it a damp paste?—It is very stiff. It is ground with oil. He will take it out with a large knife and have a stick and break it up.

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2697. (*Mr. Sutherland.*) Not with his hands?—He will never break it up with his hands, but he will get the lead on his hands.

2698. (*Chairman.*) Is this a special job? Do men continuously work on this one operation?—Not generally. In large building firms the man in charge will have a labourer with him who will do this work.

2699. (*Sir Godfrey Baring.*) And do nothing else?—And do nothing else. There is no certainty that one individual will continue to do it.

2700. (*Mr. Bice.*) Is he a colourman?—Yes.

2701. He would be a labourer?—No; in many cases he will be a painter, but on building jobs the colourman will have a labourer to assist him, and then the colourman will put the finishing preparation to the paint.

2702. Who would suffer from dropped hands—the labourer or the colourman?—The colourman generally—the man who breaks up the paint. It is generally a painter who does that.

2703. (*Chairman.*) Is there any dust arising from the operation?—No, it is not dust. I cannot account for how they get dust.

2704. Do they get their hands much soiled?—They are bound to get the lead on their hands.

2705. Is there a very high percentage of lead in the dust; it is all lead, is it not?—It is all lead. The paste is genuine white lead.

2706. He gets a full dose very highly charged with poison?—Yes.

2707. (*Lord Henry Bentinck.*) Does the lead have a very strong smell?—Yes, there is a strong smell arising from the lead, and the man would be frequently leaning over the lid of the cask to get this very stiff stuff out with a knife. Then he puts it into a large "kettle," and he has a stick and breaks up the oil and turps into it to bring it up to the consistency required for use. It seems to affect the men in the muscles and in the hands more than generally.

(*Chairman.*) But that is impossible. It must go into the blood and affect the constitution.

2708. (*Dr. Collis.*) After how long at the work?—It would take some years, I dare say, to bring that about.

2709. (*Chairman.*) The most chronic form of lead poisoning is what is called "wrist drop"?—I know a case of a man, as healthy-looking a man as you would ever see, two years ago in London, who died in three days from lead poisoning. It was positively proved that it was lead poisoning. He was working night and day to get the job finished.

2710. Can you name any other processes in which there is a grave risk of the painter inhaling dust or fumes?—There is great risk from the dust that arises from scraping off old paint. Sometimes the paint is very old and brittle, and it can be scraped off dry, and that has very frequently caused lead poisoning. I consider that that is very dangerous.

2711. Do you think then that the provision and use of washing conveniences is important?—Yes, I do.

2712. Including hot water?—Yes.

2713. Is this always practicable?—I cannot see how it would be practicable to insist on such regulations being enforced. For instance, when the exterior of a house only is being painted the men are not expected to go inside for any purpose; and even inside, when a particular room, such as a drawing room, is being painted, it is not uncommon, particularly in London, for the men to have to go up a ladder to the window of the room they are working in, and to go down that way. On large building jobs particularly, or jobs where there are a large number of men, the men are not supposed to leave their work until the whistle blows for meals. They all rush to the paint shop and they are all wanting to wash their hands, and there is only one pail of water probably. That will become almost as thick as soup. They have to get out and get back again in half an hour.

2714. Is it possible for a lot of men like that to clean their hands properly in one pail of water?—It is impossible. Sometimes they try to get away a minute or two before the time quietly without being seen and wash their hands. A painter generally carries his own piece of soap with him. It would not do for them to

rely on finding soap provided at the job by the firm or the man in charge.

2715. (*Mr. Sutherland.*) You mean in a new building?—I am speaking generally.

2716. (*Chairman.*) Do painters usually wear overalls whilst at work?—The workman wears, generally, a white blouse or apron, or white jacket.

2717. How often are these washed?—They are usually cleaned every week.

2718. Where are they kept?—The workman will carry them with him in his bag with his tools, and on leaving off work for the day leave them in the room or place where the painter is mixed generally. That is where the man in charge of the job has his bench, and the painter's coat is usually hung up in this room during the day.

2719. There is, I suppose, some danger of dust arising from a dry overall that has been worn on a previous day, and this dust might easily be breathed?—Yes; the dust will probably remain. I have seen the painter many a time take off his blouse, take it outside and shake it when he is rubbing down a lot of work and shake the dust out of it.

2720. That is a good plan. I may tell you that in the earthenware trade we have recommended insisting on the men wearing an apron that can be washed every day, because it was demonstrated beyond question to me and to the Committee that the accumulation of dust that collected on the overall was a tremendous source of danger. One puff and a man breathed the dust immediately. With a view to meeting that we combined with overalls, cleaned once a week, a sort of mackintosh apron in front, that could be sponged down every day, so that there should be no dust there at all?—Yes.

2721. Is food always kept and eaten away from any possible contact with lead?—No. It is a common practice in large towns, especially in London, for the painter to carry his food with him from home, generally in his coat pocket, which hangs in the paint shop all day, and when he is able to make tea on the job the food is generally eaten in the paint shop.

2722. There, again, I may mention that we have recommended strictly prohibiting in the earthenware trade any meals whatsoever of any sort or kind, or any food being taken, in any place where lead dust arises. That is an absolutely cardinal law?—The food will positively taste of the paint. You can taste it in the bread, and smell paint in it.

2723. Is it not always practicable to arrange for a meal room to be provided so that no food should be brought into a place where painting work is being done?—No. They may possibly be doing only one room or two rooms, and all the rooms that are being done may be under paint at the same time, and unless the man went out he would have to sit in these rooms to eat his food.

2724. Do you consider that all the evils arising from eating with unwashed hands and from dirty overalls and the like are necessarily small in comparison with the dust and spray arising in the course of the man's actual work?—Yes, I do consider that they are much smaller than the dangers arising from the dust, because the painter himself tries in every way possible to keep himself clean, and particularly to keep his hands clean.

2725. How can the evils arising from such dust and spray be overcome?—I cannot see how it can possibly be overcome so long as the evil is in the material used, and it would only be by the prohibition of the material that it could be done away with.

2726. Is it quite impossible to apply exhaust apparatus for the removal of such dust and spray?—I should say it is quite impossible in the ordinary painter's work—in ordinary house work.

2727. Now, you have told us that it is not practicable in all cases to replace the dusty sandpapering by a wet method of rubbing down?—Yes.

2728. In cases where it is possible to do all the rubbing down wet, would this remove all the danger attendant on the use of lead paints?—No, it would not remove the danger entirely, but would greatly reduce it, but I never knew a job where it was possible to do

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all the rubbing down wet. I have never heard of a job where it would be possible to do it; it is an impossibility.

2729. (*Lord Henry Bentinck.*) Why? Is it not merely a question of time?—No. You may rub down a newly painted surface after it is first painted, with pumice stone and water, but you would simply be removing what you had just applied.

2730. It all depends on the time you give it to dry, surely. If you gave it an extra 24 hours that would do, would it not?—No, it would not. It would "clagg" in a fortnight afterwards. Directly you applied the pumice stone and water you would take off the new paint, and would simply be doing damage.

2731. (*Sir Godfrey Baring.*) It is absolutely impossible, in fact?—It is absolutely impossible in the ordinary way to rub down freshly painted work with pumice stone and water.

2732. (*Chairman.*) Could the painting processes which chiefly give rise to spray, such as stippling work, be prohibited, or at least so restricted as to remove the danger?—Well, this work could be done by non-poisonous paint; in fact, the patent distemper paints that have been introduced in these last few years are now largely used instead of lead paints for ceilings. That is the only way in which the danger could be prevented, by substituting a non-poisonous material, and in no other way.

2733. (*Lord Henry Bentinck.*) Do the distempers contain non-poisonous material?—The distempers contain no lead.

2734. (*Sir Godfrey Baring.*) Are the results as good with those distempers?—Yes, but they have not the durability, because they could not be washed again. One or two could, but the ordinary distemper could not.

2735. (*Mr. Rice.*) Do you call the ordinary distemper a non-poisonous paint?—No.

2736. (*Mr. Sutherland.*) You are not suggesting substituting the ordinary distemper for paint for ceilings?—No.

2737. You are speaking of some of the washable distempers?—Yes, I am speaking of some of the washable distempers. They claim to be washable distempers, but you cannot see a decent job after one of them has been washed.

2738. (*Chairman.*) You may probably be aware that in all industries where the use of lead is allowed by the Home Office a periodical medical examination is insisted upon?—Yes.

2739. And if at the end of this inquiry the Committee recommend allowing lead to be used in this industry in the future, such a system of medical examination should be employed in this industry?—Yes.

2740. Do you think that that would be practicable in your case?—I do not think it would. I think there would be so many painters rejected that really I do not know what would happen, for I believe that more than 50 per cent. of the painters would show traces of lead poisoning, and if they were cast on one side I do not know where they would find men to do the work.

2741. That is only your own opinion?—No, it is not only my own opinion. A little time ago I had to complain of a surgeon giving certificates. In February of this year I had a claim come in for a man suffering from paralysis, and he was certified to be suffering from chronic lead poisoning. He was only admitted into the society at the beginning of December last year. I wrote to the doctor and asked him how he came to pass a man who must have shown signs of lead poisoning at that time, and his reply was that if he had to reject all the painters who came that showed any trace of lead poisoning he would reject 90 per cent. of those that came to him.

(*Mr. Sutherland.*) That is an *ex-parte* statement.

2742. (*Chairman.*) Would he give evidence to that effect if he was called by the Committee?—That I could not say. I have not asked him that. I wrote objecting to his passing this man, and that was his reply.

2743. (*Chairman.*) We had better take his name and ask him to come and give evidence?—He is an

ordinary medical practitioner. He is not a specialist in lead, and that may have been his excuse for passing these men. But I believe myself the more than 50 per cent. of them would show traces of lead poisoning.

2744. (*Lord Henry Bentinck.*) They told me in Nottingham that they were not troubled very much with lead poisoning, because they kept themselves very clean?—I could bring you some newspaper cuttings referring to inquests held recently on our men who died from lead poisoning in Nottingham. I would like to answer a little further with regard to Nottingham. Nottingham is exceptionally favoured in one respect, that they employ more genuine painters in Nottingham than they do in any town in England. If a painter there goes to ask for a job the employer himself asks him if he is a painter, and if he is a member of the Painters' Society, and if he is not he tells him that he will have to become a member the first week or he cannot be employed. That ensures that he has men who have been brought up to the trade.

2745. Yes, that is what they told me?—That is why. The employer himself insists upon having a man who has learnt his trade and is a member of the trade union.

2746. (*Chairman.*) Does that imply that the men are more careful?—Certainly.

2747. How would you get over the difficulty that you have put before us of the impossibility of preventing men contracting lead poisoning from the spray and dust?—The difficulty could not be got over except by doing away with poisonous material.

2748. You rather inferred, I think, that the Nottingham men, being men of greater experience, were more immune because of their cleanliness?—I say that there would be less danger there because they ensure that they get good men—more particularly there than in any other place.

2749. But the very best man in the world would not be free?—He would not; but my contention is that thousands of men come casually into the trade in London, and they do not know the risks they are running, and they are more careless. A painter who has served an apprenticeship to the trade knows the risk he is running, and he is careful. I do not think that there is a more cleanly man than the painter as a painter.

2750. Is much compensation for lead poisoning claimed under the Workmen's Compensation Act?—We have a great many cases. We have cases every week. I have two cases here that came in yesterday. In one of these cases the man has received compensation for two years exactly, and at this time the insurance company are making application to reduce the payment. He has received a pound a week for two years. This is a Manchester case.

2751. Has your society paid much money to members?—Yes, in sick benefit to our members, and we only pay for total paralysis from lead poisoning. Dr. Collis has all the information. The compensation that we recover from employers on behalf of our members we keep no record of. I know up to thousands of pounds were recovered last year, but that would not be a tenth part of the amount that is recovered in the courts by painters from employers under the Workmen's Compensation Act. Hundreds of cases get paid without going into court at all. The cases that are taken into court are the only cases we get any knowledge of, because the men have to apply to our head office for legal assistance, and that is always at once given.

2752. (*Lord Henry Bentinck.*) You keep no record of those cases where compensation is given without any legal proceedings?—No, no record whatever of those where the insurance company will pay without it going into court.

2753. (*Chairman.*) Do you find men reluctant to claim compensation?—Yes, and that is becoming more general. I have a witness to-day who will be able to give you specific instances of insurance companies preventing men getting work again at their trade after receiving compensation, and the men prefer, in slight

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cases, rather than run the risk of losing their employment and being prevented from getting a job, to go on our ordinary sick benefit.

2754. Have you known men affected by other diseases which are intensified by the fact of their having lead in their system?—Yes.

2755. Even if they do not actually claim to be lead poisoned?—Yes. The majority of our cases are diseases that follow on or are consequent on lead poisoning.

2756. To sum up, then, so far as the methods of painting in vogue to-day are concerned, do you assert that it is impossible to stamp out the evil of lead poisoning without replacing the lead by some non-poisonous substance?—Yes, positively; it could not be.

2757. Have you yourself had experience in the use of non-poisonous substitutes for white lead?—No, I have had no experience of any value in the use of them. I have only seen experiments, but I can say nothing personally as to their durability.

2758. Have you formed any opinion as to their practicability for general use?—Yes, I have come to the conclusion that there are substitutes which could be used for white lead, and which could reliably take the place of lead.

2759. We have heard some suggestions of a reluctance on the part of some painters to adapt their methods of work to the peculiar requirements of zinc and other leadless paints. Did you find any difficulty in using such paints?—As I say, I have not used them, but I believe that the painter would readily adapt himself to the methods, as I consider that the principal thing is the proper mixing of the material.

2760. Do you think that such difficulties are not insuperable?—Certainly they are not.

2761. (*Sir Godfrey Baring.*) With regard to slack periods, I suppose there is a time in the year when painters are very slack indeed?—Yes, in the winter time generally.

2762. Is it your experience that they do not try to get any other employment during that time? I mean are they content to stand off?—They are not content to stand off. They are out every day looking for work. I might explain that my society pay unemployed benefit. Even last winter we paid out over 30,000l. to our members in unemployed benefit. But a condition of their obtaining that benefit is that they look for work every day.

2763. But as a matter of practice few of them obtain other work. Is that your experience? If a man is a regular painter he does not readily obtain other work during slack periods?—No, he does not. It generally depends on the man's ability as to the quantity of work he gets in the slack time.

2764. As regards cleaning, as far as your experience goes, would there be an objection by the foreman or by the employer to a man knocking off five minutes before meal times to wash himself in the employer's time?—Yes, he would get the snook if he was caught.

2765. You say that definitely?—Yes, I say so. I would qualify that by saying that purely painters' firms do allow time a little more than builders' shops, but on large jobs under large firms they are strict to time, and a man must wash in his own time.

2766. (*Lord Henry Bentinck.*) You said that they had to wash in the paint shop. The paint shop is the room in the house which they are painting, where the paints are?—Yes; that is generally where they would wash their hands. The paint is generally kept on the end of the bench where the foreman or man in charge of the job mixes up his paint. The soap is generally on the end of the bench.

2767. Would it be possible to have a legal provision to enforce the supply of so many pails for so many men on this class of job? Could you insist on that?—I cannot see how it would be possible to enforce that at all. The pails may not be required. There may be only one pail on the job if it is simply a painting job.

2768. But suppose that Parliament should lay it down that contractors' men should have so many pails, do you think it would be possible to enforce that?—I do

not think it would be possible to enforce a condition of that kind.

2769. Why not? If you had the right of objecting because there were not enough pails—the employer would be forced to provide them, would he not?—Yes, but I do not know how it would be carried out at all. There is so much difference in the size of a job; there may be half a dozen men on the job one day, and they may send another half dozen the next day, and they may be there for a day or two and then be drafted away again.

2770. Those men drafted away would not be in charge of the chargeman?—No.

2771. They would be on their own?—Yes, they would be workmen.

2772. Under the foreman?—Yes, under the foreman.

2773. Would it not be possible to ensure that the foreman provided the pails. If they have 20 men, they should have, I suppose, about four pails?—No. I have seen jobs where there have been 40 and 50 men and only one pail of water.

2774. But my point is, would it not be possible to make it a law that so many pails should be provided. If there were 40 men, there should be five pails, say. Would it not be possible to carry that provision out?—No, I do not think it would be possible. The pails would be used on the job for the purposes of doing the work, and when they were required for the men they would be found to be filled with distemper or some other material, and could not be used.

2775. If it was a legal provision that so many pails should be provided, the men could insist that those pails should be kept for their own purposes, could they not? They would not be so helpless as all that, surely?—You would require inspectors to go round. That would be the only way. It would not be fair to put it on to the workman to lodge the complaint.

2776. I see your point.

(*Mr. Gardner.*) I will give you an instance of why it would not work. Take a large house or a job near the painter's own workshop. There may not be a hurry. He uses that job as a "hospital." That is a trade term. One day you might have 20 men on the job, and the next day you might have none. The employer might send up a squad of men in the morning, and withdraw them again at breakfast-time. It is simply treated as a stand-by. If he has a big outside job on, and there comes a wet day, he would say, "You men had better go round to so-and-so's job."

2777. (*Lord Henry Bentinck.*) But the chargeman could carry the pail round with him, I should have thought?—I should like to see him do it.

2778. (*Sir Godfrey Baring.*) Is it your experience that on some jobs it is perfectly impossible to provide hot water?—Yes.

2779. In empty houses in towns?—Yes.

2780. We had evidence from the first witness, a gentleman from Newcastle, Mr. Laidler, that when there was no possibility of finding a fire in an empty house it was usual to send someone round with coals and wood to make a fire to heat the water?—That is when they require the wood and coals for the purpose of melting size or what is required for carrying on the work, but not for the purpose of providing hot water for the men, not for the men's convenience.

2781. You have never seen that done for the men's convenience?—No, I have never seen it done for the men's convenience.

2782. Speaking generally, is it your experience that men are ready to take full advantage of every kind of method for cleaning themselves that is provided?—Yes, they do.

2783. A good painter is anxious to keep himself clean?—He is, and he usually carries a piece of soap himself, and if he sees an opportunity of getting away a minute or two before time and washing his hands he does it; but he must not be seen doing it too often or he will be discharged.

2784. (*Dr. Collis.*) Have you ever seen paint applied with an aerograph?—No; is that a spraying machine?

2785. Yes. Have you ever seen paint applied with a spraying machine?—No. I have heard of them. We forbid our men to work with them.

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2786. I wanted to know whether you thought that the spray caused by the splashing of the stippling was as fine as that produced by the aerograph; but you have not seen it used?—No, I have not seen it used.

2787. With respect to the question of respirators, I think you recall Dr. Baly's evidence that it is possible that vapour comes off from drying lead paint?—Yes.

2788. You know, of course, or may I suggest it to you, that any form of respirator, which is, after all, only a mechanical filter, will not stop vapour or gas?—It will not stop it.

2789. It will only stop dust?—Yes, it will only stop dust.

2790. You agree then that if Dr. Baly's suggestion proves to be a fact, that lead mixed with oil gives off a vapour, no respirator would be of any value?—Yes.

2791. Have you ever yourself worked with zinc paints knowing you were working with zinc paints?—No.

2792. Have you never worked with zinc paints at all?—Oh, yes, I have used zinc white.

2793. Can you tell me, when you were using zinc paints did you notice the same taste as you did when you were using a lead paint?—No.

2794. In what way does it differ?—I did not notice any particular taste in using zinc, but in using lead there is always a bitter-sweet taste.

2795. And that is distinctly absent when you are using a zinc paint?—Yes, it is.

2796. I think you also stated—I wish to have the matter certain—that the stiff paste as it comes in a paint pot also has the same smell?—The paste lead has a peculiar smell in the keg, but it is a smell peculiar to itself different from when it is mixed with the vehicle for applying it for use.

2797. One point as regards the medical examination. You instanced a doctor who stated that it would be impossible to pass any people as painters if he refused all in whom he saw traces of lead. You are aware, I presume, that it is possible to detect traces of lead absorption in the human body without the individual who shows those symptoms having lead poisoning?—Yes.

2798. So that it is possible that this doctor was speaking of such cases, showing, we will say, a light blue line, when he made this statement that all painters would have to be refused?—No, he did not say that all painters would have to be refused.

2799. The greater proportion?—Yes. I have his letter here.

2800. The greater proportion; that will be sufficient?—In fact, he said that this man did not show signs of chronic lead poisoning at the time he passed him, but he would show a trace of lead absorption.

2801. As a matter of fact, in medical examinations conducted in lead trades we do not expect medical men, perhaps you are aware, to refuse men who show such slight traces?—No.

2802. So that the wholesale rejection and bringing to an end of the whole of the painting trade by the doctors rejecting all the men submitted to them would not really occur?—It would not if they were only going to reject the severe cases, but if they were going to reject every man who showed a trace I do not know where we should be.

2803. Personally, I do not think that this would be a reason for rejecting the medical side of the suggested precautions. They have to be used in the other trades, and we have not found that trade is suspended in consequence. It rights itself?—Yes.

2804. Can you suggest any way in which, if it were insisted upon, such medical examination could be carried out; where, for instance?—I could not say what would be the best way, because a man is so often changing his employment from one firm to another.

2805. Do you think it would be possible for a painter to be treated as the stonemason in Holland (I think I am correct in stating), having to get a trade certificate, which has to be submitted to a doctor periodically for his signature?—Where does he get the certificate?

2806. From a doctor. It is supplied by the State, and he has to get it countersigned periodically during

the course of his life's history. It is a trade-health certificate. There are certain supervisions, and up to 21 he gets dismissed from his trade entirely if his health breaks down. After 21 they watch his health. They consider he has learnt his trade then and they cannot turn him out. Later on it acts in his own interests as telling him how he is. He gets examined for nothing. Do you think that if such a trade-health certificate was kept by painters it would be possible to catch them when they did not go and submit themselves to medical examination?—I do not think it would; I do not think so at all.

2807. Because they are scattered so much about at their work?—Yes.

2808. It would really be impossible to find a man always who had submitted himself to medical examination?—Yes.

2809. Do you think it is likely that a man would submit himself, if he was feeling a little ill, and wished to earn full wages, for medical examination, thereby running the risk of being put on half wages?—Not unless the law was altered with regard to compensation so that he would not suffer in any way by submitting himself to medical examination: under present conditions he certainly would not submit himself.

2810. You think he would voluntarily withhold himself from such examination, and it would be practically impossible to catch him?—Yes.

2811. Those are the real difficulties, from my point of view, on the medical question. With reference to Nottingham painters, you consider that one reason why painters there do not suffer so much from lead poisoning is that they are all apprenticed?—I consider generally that the painter who has been apprenticed to the trade as a painter does not suffer so much as the man who casually comes into the trade, as unfortunately many of them do, especially in London.

2812. Your suggestion is that the men who have been long in the trade do not suffer so much from lead poisoning as men who have come into it recently?—That is so.

2813. You have suggested that cleanliness is one of the reasons?—Yes.

2814. May I draw your attention to the answer to Question 277, asked of Dr. Legge when he was examined: "My colleague, Dr. Collis, has brought out "the fact that attacks of lead poisoning are commonest "in the first and second years of employment"?—I remember that.

2815. The point that I would suggest on that is not absolutely a proven one, but perhaps you might agree that men, by prolonged exposure, get a certain immunity, apart from washing?—That is a statement by Dr. Legge that I agree with. I asked Dr. Legge about it at the time. I am referring to men who come into the trade, and, not having been brought up to the trade, they do not know the risk and danger they are running, and they do not take the precautions that a painter does.

2816. I understood that was your point of view, but I wanted to see whether you would possibly agree with another point of view or explanation of the same phenomenon, namely, that a man who is long exposed to lead gets a certain immunity to the influence of lead. I suggest to you that there is medical evidence to support that. I wish to bring the point out because I think too much reliance is being placed upon the possibility of providing for the house painter, washing accommodation and means for cleanliness. Personally I think we can hardly touch the question of lead poisoning in that way, and I only wish to know from you whether you would be inclined to agree that there is this other method of explaining the phenomenon?—Well, I think it all depends on a man's constitution. I have known the most cleanly and careful men suffer continually from lead poisoning. I have had lead poisoning myself. I had it for three months. I attended Westminster Hospital for three months, and I was always extremely careful and extremely temperate in every way. But my constitution rendered me more liable to it, and I do not think there are any

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two men alike in that way. So far as cleanliness is concerned, I believe that any man is liable to take it, however cleanly he is.

2817. That is the point I wish to make clear, that so far as cleanliness is concerned any man is liable to take it?—Any man is liable to take it.

(Dr. Collis.) With that I myself practically agree.

2818. (Mr. Sutherland.) I would like to clear up the point raised by Lord Henry Bentinck and Sir Godfrey Baring about the provision of washing accommodation. In the rules between your men and the employers, in some cases I know that it is so; is it not generally a rule that provision shall be made for hot water for meals?—No, it is not.

2819. It is in Manchester?—Possibly, but every town makes its own working rules.

2820. But what obtains in Manchester can surely obtain elsewhere. It is so in Southport?—I know it is so in Manchester, but it certainly is not followed out; I would not like to say that it is. I do not think it is in their rules that hot water shall be provided.

2821. Yes. When the arbitration was before Mr. Hudson it was a point that was made a good deal of, and it was included in the working rules. Wherever there is water for the purposes of carrying on a job there is also the convenience for getting it hot, is there not?—There generally is.

2822. Speaking broadly?—Except in empty houses and those kinds of places.

2823. Even in empty houses if it is a job of any importance the employer sends coal and wood?—Yes.

2824. Fuel for fires?—Yes, for the purpose of heating the size.

2825. But it is there for the men to use for their own purposes, for making hot water for their meals and for washing purposes?—They do not generally get hot water unless in the winter time they want it, because cold water is too cold.

2826. They get hot water for their breakfast and for their dinner?—Yes, for making their tea.

2827. Then if they can get it then they can get it for washing purposes?—They would not be allowed to get it.

2828. It is no good making the case difficult, is it?—No; I am not trying to make it difficult.

2829. Because in the great majority of cases there may be occasionally a case where through some extraordinary cause the difficulty of getting hot water does exist you cannot accept that as a working rule at all. How do you account for this, that in Scotland, where there is just as much lead, probably more lead, used per man, per operative painter, than in England, and where the work is thoroughly done, lead poisoning is a very much smaller element of disease in painters than it is in England?—If the cases are so much smaller there I cannot account for it.

2830. They are very much smaller?—If you take the population of London and the population of Scotland—

2831. I am taking the percentages. They are very much smaller?—Have you any statistics to show that?

2832. Dr. Legge's statement in this report, that Scotland is practically immune from it, and he attributes it to the stone buildings. But I do not agree with him there?—Even admitting that, I think I can explain it. If you take the percentage you must take the radius where you get the percentage from. In London there are 6,000,000 people within a radius of 12 miles. You will not get 6,000,000 of people within a radius of 50 or 100 miles in Scotland.

2833. But if lead and oil and turps are poisonous in London, the same things must be poisonous in Scotland, and if they are not, why are they not?—We will take a large hotel in London that is being painted. You will get 100 painters on it, and they are all confined in the rooms of the hotel, and the windows must not be opened or the paint will never dry. The window is painted first and closed up. The paint would never dry if there was a draught of air. In Scotland you would go a long way to get 100 painters; they would be scattered.

2834. But there are big hotels in Scotland, the North British Hotel, for instance; and they are under

pressure just the same?—In spite of what you say, I would say that the percentage of lead poisoning cases in Glasgow is as large as it is in London. But you are taking Scotland generally.

2835. Yes?—Take the area of the South of England. There are very few lead-poisoning cases in the South of England in the agricultural districts, Wiltshire, Berkshire, and all through there. I would compare that with Scotland. I do not think it fair to compare London or Manchester with 7,000,000 of people within a radius of 20 miles. You cannot compare London with great open country like Scotland.

2836. But, speaking generally, these men are amongst the best-trained men in the business, are they not?—Yes.

2837. Scotch operative painters are well trained?—Yes.

2838. They use lead very extensively?—Many of them come to London and get lead poisoning.

2839. The conditions of a lot of Scottish painting where they go to gentlemen's mansions are just the same here in England, and why is there a difference? They are out in the open country?—I do not know whether the Scotch are hardier or what it is. I have known men go from London to country jobs in Scotland and be sent home to London with lead poisoning. I have known four men sent back from one large job.

2840. From Scotland?—Yes.

2841. (Chairman.) Is there as much lightly-tinted painting done in Scotland as there is in England?—I could not say, but I believe that in Glasgow it is generally white lead. The more confined the space the more likely they are to get lead poisoning.

2842. (Dr. Collis.) Dr. Legge's figures are these; in the whole of Scotland only 20 cases, 12 of which were in Glasgow?—There you are.

2843. That is an important point. That is the point that you were making. All the figures here given are absolutely voluntary notifications, and it entirely depends on the doctors as to whether they happen to notify them. I cannot find that Dr. Legge gave us the deaths which occurred in Scotland, which are absolute figures. These voluntary figures really cannot be taken as much to go on, but for what they are worth, the 12 in Glasgow bear on the point that you were making?—Yes.

2844. (Mr. Sutherland.) Then with reference to the dust in rubbing down. It would have to be a very severe rubbing down, and a very special case that would cover a man with dust, and leave the marks of his feet surrounded by white where he had stood?—No; in my experience it is not so. It has been my own experience many many times that I have glass-papered a door down, and after I have dusted the door down I have swept the dust up, and there has been a considerable amount of it, and I have thrown it in the fireplace. The white dust which lies about would positively show your footmarks.

2845. Cannot you rub down with sandpaper and a little turpentine?—No.

2846. It is done?—It could not be done in ordinary cases.

2847. It could not be done with water, as a witness suggested last week, but you can do it with turpentine?—You agree that it could not be done with water.

2848. Quite?—It could not be done with turpentine either, I think, because you would be softening the paint again.

2849. You suggested that there was equal danger with regard to stippling. Does not the danger arise when you are applying the paint on to the broken surface of a ceiling and not from the distributing which the stippler does?—The man will get his hand and arm completely covered when he is using the stippler, even more than a man who is laying it on.

2850. Has not the coming of washable distempers like Duresco and other things very largely superseded the painting of ceilings with poisonous material by the application of a material that is not poisonous, and which is put on with a large brush? It has done so in the Manchester district?—I admit that it has come more into use.



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2851. Very much more?—Yes, very much more, and it is coming more into use for ceilings.

2852. So the danger is diminishing?—It is diminishing, but it will never be entirely done away with. There are many places where they would never think of using washable distempers—where there is more heat.

2853. For ceilings?—Yes.

2854. It is perfectly sound in that respect. Now with regard to the closing up of the rooms, that is only done when the process of flattening is on, and after that the windows are opened?—No, you could not paint rooms in London if you had open windows.

2855. After you had painted them you could?—No.

2856. Why not?—Because the draught would not allow the paint to dry. You would have wet patches wherever the paint caught it, and the soot coming in would cover the paint. You must keep the room closed, and the window is the first thing painted when a painter starts in a room.

2857. You do not think that the use of a respirator is possible?—No.

2858. Do you think that the men would not submit to them?—Even if the men submitted to them, where would they be kept? They would be kept in the box where the foreman painter kept his stipplers and all that.

2859. Each man would keep his own respirator?—If he kept his own respirator he would keep it in his box where he kept his blouse and apron with paint all over them. The finest thing out to give a man lead poisoning would be to give him a respirator.

2860. You think that there is danger from the odour or vapour given off from the paint?—That has always been my opinion. It is only an opinion. I have no means of proving it except from experience.

2861. Did you think there was any danger from dust before Dr. Legge stated it?—Most decidedly. I have always known that the principal danger is from dust. Every painter should know that.

2862. Your information results from your experience as secretary of your trade union, I take it. Is it your own experience?—It is my personal experience as a working painter. I have worked at the trade for 35 years.

2863. I understood you to say that you represent 15,000 to 18,000 members of the trade union?—Yes, I am the general secretary of the trade union at the present time.

2864. Have you any experience of men outside the union?—Yes; for 28 years I worked in the West End of London for the principal decorating firms, so that I have a very large experience of non-society men.

2865. When you say that it is very exceptional for painters to take other occupations you not only refer to members of your own society but to non-society men as well?—I am referring to painters, whether non-society men or society men. I mean men who are painters. I am not referring to the men who are introduced as painters generally, in the West End of London—particularly, by building firms upon places like the outside of Regent Street to do outside work in the spring of the year, where they manufacture scores of painters, unfortunately. Those are the men who will take lead poisoning quicker.

2866. (Mr. Rice.) Do you seriously say that painters are manufactured?—I do not say that they are painters, but they are employed by builders to do painters' work.

2867. They themselves claim to be painters?—I suppose they do.

2868. You rather suggest by your evidence that builders go out into the street and find men and say, "Come and be painters." Is it not a fact that these men apply for work as painters, and they are put on as painters?—Yes.

2869. And paid the trade union rate?—No. What is the trade union rate, if I might ask the question?

2870. The trade union rate of wages for painters is 8½d. an hour?—May I ask whether your firm would pay the trade union rate to all the painters they employ?

2871. We pay 8½d. an hour to every painter and 7d. an hour to every labourer?—Whom do you term a painter?

2872. A man who paints?—Would you pay that to every man who uses a paint brush?

2873. We should pay that money to every man who was a qualified painter in our foremen's opinion?—One foreman's opinion.

2874. We have several foremen; I mean, men employed as painters. Do you distinguish between painters and painters' labourers?—My distinction is between a painter and a man who uses a paint brush and applies paint. Now to every one of those men would you pay the standard rate of wages?

2875. Yes, 8½d. an hour?—To every man who uses a paint brush, whatever he uses it for?

2876. I do not say to every man who uses a paint brush, whatever he uses it for, because I can conceive of a painter's labourer smearing on a bit of paint for some purpose who would not be put to what we call painting?—How is it, then, that the Master Builders' Association in London refused to sign the workmen's rules?

2877. I am not going to enter into that discussion. It is not a proper question to ask me.

(Chairman.) It is not material.

2878. (Mr. Rice.) I am quite willing to give any experience of my own firm, but I cannot discuss any questions with you with regard to why London master builders refused to have any rules with regard to the painters in London. That is not a fair question to ask me?—I asked your permission to put questions to you.

2879. Now your experience is founded on society and non-society men, and when you say it is very exceptional for painters to take other occupations you refer to all men working as painters?—No. I refer to men who have learnt their trade as painters, and those are the men that I term painters.

2880. Does the information about the deaths, blindness, Bright's disease, and paralysis only refer to those men who have learnt their trade as painters?—So far as I am concerned, it only refers to men in my society.

2881. We have two classes of evidence—your own experience on the one hand, and your information from your society on the other?—The information with regard to the number of deaths and disease and all that must necessarily be from members of my own society. If you could possibly get statistics with regard to men outside you would find, I should say, that the condition of things would be ten times worse.

2882. We have not your statistics yet. We shall get those, I take it?

(Chairman.) Those will be all compiled and brought out very clearly later on.

2883. (Mr. Rice.) The chief cause of disease, you say, is the dry rubbing down?—I have always put that down as being the most dangerous in my opinion because of the dust.

2884. You say that 75 per cent. of the work done is dry rubbing down?—Yes.

2885. And the wet process involves comparatively little danger?—Yes.

2886. Are you familiar with the specification of the London County Council for their painting work?—No, I am not familiar with that. I have mainly worked for the principal decorating firms in the West End of London.

2887. Are you aware that the London County Council specify wet rubbing down, and insist upon it being done?—I should say that they do nothing of the kind. After the first coat do you mean?

2888. I mean in their painting work. Take the outsides of county council schools, for instance. They are all rubbed down with water, and no glasspaper is used at all?—Before any paint is put on?

2889. Yes. With two coats of paint there is not much rubbing down wanted, as you know?—I know that. I know the way in which council schools are done.

2890. I also know that they are done in the most expensive and most excellent way possible. I only say

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that to correct any impression that council school work is scamped?—I know as a fact that it is allowed by the Council that a man may be taken on as a labourer on school work, and he is paid the labourer's rate of 7*d.* an hour, and the same man is put on to do painting. The only stipulation made by the County Council is that he must be paid the painter's rate when he does the painting. They do not mind whether he is a labourer or painter as long as he is paid the rate.

2891. I agree, but that does not concern the County Council; that is a matter of the arrangement of the work?—That is the County Council regulation, that the labourer shall be allowed to do the painting, and we have fought against it all along. The same man who washes and rubs off the dirt and so on, whether he is qualified or not, is allowed to do the painting, because school work is generally rough work.

2892. That is irrelevant to my question. You say that 75 per cent. of the work is done dry, and I only want to point out to you that there are instances of public bodies who insist on the work being rubbed down wet?—I grant that readily, before the work is painted, but after the first coat is applied it is dry rubbing, either by the London County Council or anybody else. It is not rubbed down wet except it is old work. With regard to the council school work, it is broad work generally painted with dark colours in the dado. The labourer goes round it with a piece of pumice stone, washes it down, and takes off the big lumps, and there it is. That is not rubbing down, as you would term rubbing down generally.

2893. But will you explain to the Committee the actual practice? We do not want to imagine cases. Now, wet rubbing down leaves a lot of water on the floor?—Yes.

2894. Assuming that there is a little rubbing down required after the first coat, there is plenty of water to lessen the dust. I do not say that no dust comes from it, that is not my point; but I ask you to explain to the Committee the actual condition of things. When the labourer has done the surface all over and the paint is applied to the work there is plenty of water on the floor?—On the floor?

2895. No doubt there is?—How is it possible for him to paint when the water is lying on the floor?

2896. He would dust up the edge. I want the Committee to see the actual conditions of work?—He would certainly clean up the water from the floor before he commenced to use any paint.

2897. But there would be water about the floor?—No.

2898. Your answer is, No?—Yes, I say there would be none.

2899. Now with regard to sandpapering; if so much dust is caused a quantity of sandpaper must be used on the job?—Yes.

2900. You have worked on jobs?—Yes.

2901. Have you seen sandpaper arriving in huge quantities?—Yes.

2902. You have seen huge quantities of sandpaper arriving?—It all depends on what you term huge quantities.

2903. If you have so much dust that ladies go about with their heads covered there must be a considerable amount of glasspaper used?—Yes.

2904. How much glasspaper, for instance, would be sent for 30 painters for a month's work. You have worked with 30?—Yes. I could not say exactly. You may use a dozen quires. It depends on the job. In a private house, do you mean?

2905. Take for instance an hotel. There would not be 30 in a private house for a month?—No.

2906. You have no information as to how much would be used?—I do not know the quantity. I do not know whether you exactly understand. I am a practical painter, and I can tell you that I have been foreman for a large firm in the West End of London and carried out very large jobs in the West End of London myself.

2907. I only want to point out to you that it seems very surprising that there is so much dust about unless there is a considerable amount of glasspaper sent?—

There would be a considerable amount, but how much glasspaper would you require to rub down a door?

2908. That is what I am asking you. What have you seen sent for 30 men for a month's job?—I cannot say definitely.

2909. Not so much as I think you want to suggest?—It is not a question of the quantity of sandpaper.

2910. You think wearing respirators almost an impossibility?—Yes.

2911. You do not think it possible that a respirator could be carried about in a man's pocket as I carry my spectacles. If there is a desire for the painter to be cleanly, should he not carry his own respirator?—I do not understand much about respirators. I thought that he would probably put it in his bag. If he carried it inside his pocket he would require a leather case to keep it in.

2912. He could take the same care of his respirator as I take of my spectacles?—I do not think it is practicable.

2913. But you do not think it is an impossibility?—No. You wipe the spectacles every time you put them on.

2914. Yes. I do not want to wear dirty glasses. I want to see out of them?—A man would not want to wear a dirty respirator.

2915. In view of the limitation of the number of hours, is it customary for a workman to work 60 or 70 hours?—It is 66 in the country—it used to be 70. It is generally 66 now.

2916. In London it is 50?—And 56.

2917. Ten hours a day?—Ten hours a day is the general rule in the decorating firms in the West End of London. It is customary for builders to work for 50 hours a week. Other firms work for 10 hours a day, if it is a purely painting firm or a large firm like Maple's.

2918. Do you think that master builders and master painters are responsible for the deplorable conditions under which the painters work?—No, I do not. I do not say that either side is responsible. I would say that the competition for work would prevent their observing these regulations. It is the competitive system that forces the employer to get as much as he can, and not to give any more facilities to the workmen than he can help.

2919. Do you think that the employers give a fair amount of facilities considering the competition you have mentioned?—No.

2920. In what way do they not?—Especially building firms. They expect a man to remain at his job on a building until the foreman blows the whistle. Is that not so?

2921. Yes?—He has to come to the paint shop from perhaps the top of the building. He will find only one or two pails of water with 30 or 40 men on the job. He has to go to a coffee shop and be back again in half an hour.

2922. For breakfast?—Yes.

2923. He has an hour for dinner?—He has an hour for dinner, and he washes his hands quietly before that time if he has an opportunity. But on a building job he would be very soon discharged if he was caught before the whistle blew. This is a fact, is it not?

2924. I quite agree. To sum up, as our Chairman says, you do not think that employers are responsible for the deplorable conditions under which you say the men work. Could you answer yes or no?—If I had to say definitely yes or no, without being allowed to qualify it in any way, I should say yes. I would say I would put the blame more on the employer than on the workmen. It is a fact that they could give more facilities even under the present system of competition than they will do. Mr. Rice will admit that his own firm would not allow a man a minute before the whistle blew, and other firms will not. I know one exception. I have known a decorating firm to allow a man to wash his hands in their time.

2925. (Lord Henry Bentinck.) You think that employers could do a great deal more than they do?—They mostly could do a great deal more than they do.

2926. (Mr. Rice.) You are not speaking of individual employers, but you are speaking of the custom of the

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[Continued.]

trade?—Certainly. I would not think of selecting individual employers. It is more usual in building firms than in decorating firms for the men not to be allowed to go to wash until the whistle blows.

2927. You know it is usual for building firms to provide a mess room?—Yes; it is more usual than for the others.

2928. And to provide a mess labourer?—Yes.

2929. The mess labourer has a fire provided for the men?—Yes.

2930. And the men have seats in the mess room to sit down upon?—Yes.

2931. And a table as a rule is provided?—Yes.

2932. There is a mess labourer who cooks the meals. It is the custom, is it not?—There will be a labourer who will heat the men's cans for their breakfast, but in London I do not think that it is the general custom for them to cook the men's meals on building jobs.

2933. You have been on building jobs, I take it?—Yes, but my experience there has been little compared with the other.

2934. But you have been on building jobs?—Yes.

2935. And you have been in mess rooms?—Yes. At Buckingham Palace there was a large mess room built out on the terrace for the men.

2936. You admit the existence of mess rooms?—Yes, but not generally. On large building jobs there are mess rooms.

2937. And a fire for cooking meals is provided by the employer?—Not for cooking meals but for heating the men's bottles.

2938. The same fire could be used for heating water?—It could be used for heating water, of course.

2939. Have you known cases where men have been refused hot water?—It is in very very few cases that I have known hot water provided.

2940. But have you ever known it refused? If the foreman painter were to say to the general foreman, "My painters ought to have hot water to wash their hands," have you ever known a case where it has been refused?—It is very little used.

2941. Have you ever known it refused?—I have not known it asked for definitely in that way, because it is a thing that is not recognised on a building job to ask for hot water. The labourer will get hot water in preference to cold for the men if it is to be had, but I have not known it stated that there must be hot water provided for the men.

2942. I am not asking about that, but have you ever known it to be refused?—Not where it can be got.

2943. The foreman painters are generally trade union men, are they not?—There are many who are not.

2944. There are some?—Yes.

2945. They would probably be in sympathy with the men?—Yes.

2946. They probably would see that some facility should be given for washing?—Yes.

2947. Have you had complaints from those foremen that the employers have refused facilities?—Yes, I have been in charge of work myself where my employer would not allow it.

2948. That is years ago, I take it?—Not so many years ago.

2949. That is the only instance?—No. The instances are far too numerous to recall or mention.

The witness withdrew.

Mr. WILLIAM PICKLES, examined.

2950. (Chairman.) What practical experience have you had in the house painting trade?—About 32 years, directly working at the trade.

2951. What branch of the National Society of Operative House and Ship Painters are you connected with?—I am under-secretary now. The particular branch that I have been most concerned with is the Huddersfield branch.

2952. Have you had any experience of lead poisoning among the members of your branch?—Yes, both from amongst my own workmates and through being an executive member of the National Society of Painters.

2953. Have you devoted yourself to studying the dangers to which painters are exposed and have you published papers on this subject?—I have written one article in the "Journal of Decorative Art"; I have written in the quarterly circulars connected with my own trade union, and lectured amongst the branches of which painters are members, on the question of lead and relative questions.

2954. Will you name the principal causes which in your opinion contribute mainly to the prevalence of lead poisoning among house painters?—I regard the chief cause as being dry rubbing, that is the rubbing of paint that has been applied and has dried. It is then rubbed with sandpaper before another coat is placed upon it.

2955. Do you regard stippling also as a source of considerable danger?—The stippling is merely a name for a process. What you may be using when you are stippling may be good or bad, but I take it that you refer to poisonous substances and probably to flattening, though not necessarily so. I would try to put my answer to your question in this way: when one is flattening a ceiling or painting a ceiling in oil, the ceiling has previously been papered with a raised paper, known in the trade as relief paper because of the fact that the ornaments stand out. In such cases there is brushing in of the colour and afterwards stippling, both of which are processes which splash; but the former, the brushing in, the more than the latter. The splashes fall on the painter, who must necessarily stand underneath. That applies more directly to

ceilings, because he does not stand underneath walls to work.

2956. As regards the dangerous process of dry sandpapering between the application of one coat of paint and the next, is it quite impossible to dispense with this and replace it by wet rubbing with pumice stone and water?—It would be very highly impracticable. The workman would endanger the work upon which he employs such a process, and no practical workman would think of doing such a thing as that.

2957. Filling coats and also old hard paint work are sometimes rubbed down wet, I believe. Why cannot this method be applied to newly painted work between the coats?—Because of the hardness of the substance you are coating. One need not point out the fact that old paint gets very, very hard during the years of wear. Filling is mixed in such a manner as to cause quick and hard setting, and the hard brittle surface can be rubbed down with pumice stone and water just as with sandpaper; in fact, the hardest of these substances would not be touched by the cutting of the sandpaper, and you require something like pumice stone to do the work with.

2958. Is it because sandpapering is cheaper?—No. The price of the work need not be considered; it has no effect on the question under consideration.

2959. Would the pumice stone and water method tend to destroy the film of newly dried paint which has not had time enough to harden completely?—You mean the paint itself by the word film, probably?

2960. Yes?—I would not expect that a man would try to do that. It would tear the paint as the pumice stone passed over it; it would damage it.

2961. Would the newly dried paint clog the pumice stone very quickly and so render it useless?—That would be one of the first effects; that would be an additional danger. The first danger would be that of tearing the paint, and the clogging would make it highly impracticable for the workman to employ such a process.

2962. Next as to the danger of stippling. When you are painting ceilings with moulded or relief work to what extent does the painter inhale fumes or spray? What is the particular danger that he encounters then?

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[Continued.]

—In addition to the fumes, which is one of the chief dangers, there is the fact that the paint is falling on his face and necessarily on his lips. The saliva tends to act as a solvent, and he feels the result of it in his mouth in the bitter taste.

2963. Can you tell us anything of the danger arising from the burning off of old paint with a spirit or charcoal lamp?—The painter becomes conscious of heaviness in the head on such occasions. Whether that arises from the fumes of the material he is burning, or whether lead is the chief cause is a matter upon which I have not any strong opinion. The fact that the painter feels the inconvenience is one of which I am aware.

2964. Sandpapering very generally follows this operation, I understand?—It must necessarily do so.

2965. Is not that dangerous?—The dust must necessarily be breathed by the painter. It is one of the dangers; but I should not put it in the foreground as one of the chief dangers.

2966. How are colours generally mixed?—That depends on the size of the job and the number of rooms to be painted. If a painter was only painting this room in this building he would have all his things in the room. If he was painting every room in the building he would have one cistern in which to keep the paints; and he would mix them in that particular room.

2967. Where does he keep the colours when he is painting the outside of a building?—In the gardener's tool house, or anywhere where he can get a place.

2968. Supposing it is a town and there is no such accommodation?—I have not worked in a city. I have worked in a town with 100,000 people nearly all my life. When we are on the outside of a house we take any outhouse we can get at our disposal.

2969. But supposing there were none?—I have not had any case where we could not find a place of some description. I not having worked in a large city, where there are restrictions with regard to building, the answer to a question like that would come better from a man who had worked in a city.

2970. Is there much danger of the workmen breathing dust in the operation of mixing colours?—No, not from mixing, because the lead has been ground in oil beforehand. He gets no dust in that case but only the smell of the paint.

2971. Can you name any other process in which there is grave risk of the painter inhaling dust or fumes?—In every process in which he is using white lead (supposing that it is a wall or woodwork) there is the danger. He must necessarily be inhaling the stench from the material which he is using, whatever he may be covering with it. In the case of ceilings his head or face is upturned, and he catches more than.

2972. You think the danger is in the fumes only?—Yes, in such cases.

2973. The paint gets on to his hands and clothes, and is not that a source of danger?—Yes. I had not that in my mind just for the moment. My point was rather on the question of application for the time being.

2974. The paint drops on the floor and dries and creates dust, does it not?—Yes. If he is a clean workman he will have a rag and remove it. If you want me to continue in respect of the question of the clothes, I would like to.

2975. Yes, go on?—You mentioned the hands. A painter necessarily must get his hands daubed with the paint. If there was a sore on them naturally he would run some risk. Painters usually try by wearing a finger, cut from an old glove, to ward off such dangers, but anyhow the fact that he must necessarily handle paint during the day brings him within the scope of danger while his hands are dirty. They are only washed at meal times and the close of the day, and unfortunately not always at meal times.

2976. Do you think that the provision of washing conveniences and the regular cleansing of the hands is important?—It is very, very important. It is highly important.

2977. Should hot water always be available?—Hot water is very rarely available.

2978. But I asked you, should hot water always be available?—Hot water is desirable—yes.

2979. Is this generally practicable?—Naturally to have a fire and a pan is an easy matter.

2980. For example, if you are painting the outside only of a house, are you allowed to go inside to wash?—No.

2981. How would you provide the hot water in that case?—We should have to ask for hot water, get a pail and carry it outside.

2982. You have no experience in painting the outside of a house in a large town. How would the men get the hot water, and where would they wash their hands if they were painting the outside of a house in a town?—In a large town I am afraid it would be difficult. I mention the fact that my experience has been in a small one, where we do not run the same risks.

2983. Is food often kept in the pocket of a working coat and eaten in a place where paints are being used?—That is quite the rule.

2984. Is it frequently impracticable to have the use of a separate place as a mess room?—I do not suppose that anybody would allow us to have that. I have never known such a case. For example, when you are painting only one room in a house you must use that room for all purposes.

2985. For meals too?—Yes.

2986. Do you generally wear overalls while at work?—Yes.

2987. How are they kept clean?—They are washed once a week.

2988. You frequently have to carry them in your tool bag, I believe?—Always.

2989. There is no doubt some dust from a dry soiled overall, and you would be likely to breathe this, would you not?—Yes, necessarily, as the week gets advanced.

2990. I have asked you questions about all such precautions as washing, mess rooms, overalls, and the like, because they are carefully insisted on in the pottery and other trades where there is a risk of contact with lead; but they would be difficult to carry out fully in house-painting, would they not?—Very difficult.

2991. Do you, however, consider that all the evils arising from eating with unwashed hands and from dirty overalls and the like are necessarily small in comparison with the dust and fumes arising in the course of the man's actual work?—I should put it in about the third position of order of danger.

2992. The other two being what?—Of the other two the first being dry rubbing, and secondly the association with the wet paint in the day's work.

2993. How can the evils arising from such dust and fumes be overcome?—They cannot be very well overcome.

2994. Is it quite impossible to apply an exhaust apparatus for the removal of the dust?—I do not see how it could be applied in a place that had been constructed for living purposes—a place other than a factory.

2995. You have told us that it is not practicable in all cases to replace the dusty sand papering by a wet method of rubbing down?—Yes, I explained carefully the technical conditions.

2996. In cases where it is possible to do all the rubbing down wet would this remove all the danger attendant on the use of lead paints?—Yes, in relation to that process.

2997. Is it possible to remove all the danger, do you say?—No. I say in relation to that process only.

2998. But I want you to answer the question and only the question. I am not asking anything else. I want to know whether it would remove all the danger?—No, it would not.

2999. You said it would at first?—I said only in relation to the one process.

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3000. In cases where it is possible to do all the rubbing down, wet would this remove all the danger attendant on the use of lead paint?—Oh dear no.

3001. Taking that one process, what do you say?—I am trying to make it quite clear. I agree that with that one process there is no danger connected with it.

3002. That is what I wanted. In that case there would be a certain amount of dripping on to the floor?—Yes, but I would not attach much importance to that.

3003. But would not that dry and become dusty as the men walked about?—Usually a man has a brush and a pail of water by him, and if he is a clean workman he will take up the material from the floor and rinse the brush in the pail.

3004. You understand that in all industries where the use of lead is allowed, a periodical medical examination is insisted upon. Could this be applied in the house-painting trade?—Yes. In such a case, though the examination would be beneficial, if the fact became known that the man suffered from lead-poisoning it would be detrimental to his chance of getting work afterwards.

3005. How would you suggest that the men should be examined?—By a doctor, say, in each quarter of the year.

3006. Once a month?—I should have no objection to that, but I am merely saying at least once each quarter in the year.

3007. Then do you assert that it is impossible to stamp out the evil of lead-poisoning without replacing the lead by some non-poisonous substitutes?—Yes.

3008. Have you had any experience yourself of the use of non-poisonous substitutes for white lead?—Yes, I have used such substitutes.

3009. Have you formed any opinion as to their practicability for general use?—I am strongly of opinion that they can be used and that we can abolish the use of white lead absolutely.

3010. We have heard some suggestion of reluctance on the part of the painters to adapt their method of work to the peculiar requirements of zinc or other leadless paints. Do you find any difficulty in using such paints?—I find that when one speaks to a painter about these processes he is rather inclined to stick conservatively to the older system, but that can be gradually overcome.

3011. You think that the difficulty is not insuperable?—I do decidedly.

3012. Have you made any experiments with substitutes for white lead?—I have.

3013. Do you consider that it would be possible to prohibit the use of lead for all house-painting work?—Yes.

3014. Or at least to restrict it to not more than five per cent.?—I should prefer its total abolition.

3015. (Lord Henry Bentinck.) You have no experience, I suppose, as to the durability of zinc oxide paints?—Yes, I have painted rooms in my own house and kept them under view daily, and at the end of two years' time (that is the time that my experiments extended over in my own house) I found them to be in good condition. The paint had stood well.

3016. Were they in as good condition as if the paint had been lead paint?—Quite.

3017. Have you had any experience of this with regard to outside work?—I painted the outside of my own house for the same purpose. The difficulty was to know any difference in two years' time between the lead paint and the other kind.

3018. You noticed no difference?—I noticed no difference.

3019. Has anybody else you are acquainted with carried on the same experiment?—One firm in the same town carried out a job, a pretty good-sized job, for the corporation, of which I was then a member, which job I had partly under my care as a member of a certain committee. That gave me satisfaction. It was the painting of the inside of a wooden pavilion which was in very bad condition.

3020. Where is your house—in Huddersfield?—Yes.

3021. It is a rough climate. I suppose?—Yes. It is an industrial centre.

3022. There is plenty of rain and smut, too, I suppose?—Yes.

(Mr. Sutherland.) It is a very clean industrial town.

3023. (Lord Henry Bentinck.) But still it is the north country and it is wet. That is a good test I should think?—Yes.

3024. (Mr. Sutherland.) You do not attach great seriousness to the process of stippling as a danger?—Not to the process. It is the material the man uses that I attach importance to.

3025. And you do not think that it spreads or sprays the paint so much as the actual painting?—No, not by any means.

3026. You think that dry sandpapering is a fruitful source?—I do—the most fruitful.

3027. You made the point that in rubbing down the door by the wet process the man would wipe up the floor if he were a good workman?—He would wipe up the wet.

3028. And the material that he had rubbed off the door?—Yes.

3029. Do you think that much splashing comes on the man when stippling a ceiling?—Yes, but I should think that more came on to the man who was brushing the ceiling.

3030. Do you think that sufficient would come on him to get into his system through the saliva?—In the stippling or the brushing?

3031. In either or both?—In both, but more in the brushing.

3032. The same men do the two processes at one time or another?—Yes.

3033. Do you think that we could abolish the burning off with lumps and substitute solvents entirely?—We could, but I think it would not be desirable to do it.

3034. Would you think there is much danger in connection with the use of the burning-off lump?—Yes, but not so great as in the other processes which I have mentioned.

3035. Have you found any difficulty in your experience in getting hot water on a job?—Yes.

3036. For meals?—Yes.

3037. What kind of job was it where you had the difficulty?—In cases where we work in a room, and they compel us to enter the room by a ladder and insist that we must not go near the domestic part of the house. In those cases one cannot get hot water.

3038. That is not normal, is it?—In my case, no; but I should like to say that we work under very favourable conditions in our town.

3039. If you are working at a house where the people are in possession it is usual for you to get facilities from the servants, is it not?—In a limited sense, yes.

3040. Sufficient to enable you to get hot water for meals, and, if necessary, for washing?—Yes, generally, but there are exceptions.

3041. If the house is empty you can provide your own?—Yes.

3042. There is no difficulty on that score?—Not with us. Might I answer that by saying what I find in comparing notes with colleagues who work elsewhere in larger towns?

3043. I am only asking you your own experience?—If I answer yes or no it is not a good answer. I find usually that the larger the job, the larger the town, the greater the difficulty.

3044. Are you speaking of domestic work?—Yes, I mean by that, where there is an enormous number of painters working on a job there is a tendency for the employer to insist that they work to the last minute.

3045. What do you call enormous number?—20, 30, 40, and upwards.

3046. I should call that a good number, but not an enormous number. Does not the foreman always tell off the apprentices to get hot water for the men?—Usually for their breakfast, yes.

3047. For meals generally?—That applies merely to the scalding of tea and other liquids.

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[Continued.]

3048. There is always hot water available for the purposes of the business?—Yes, usually.

3049. For the melting of size and the operations that are being carried on. That can be managed?—Yes.

3050. If it is available for one purpose it is available for the other. The men insist on it. Why cannot they get it for washing?—The two points to note are that you must have the necessary water, soap, and towels, and time to do it. You do not always have that.

3051. What would you call time to do it?—I think that a man might leave off, say, five or seven minutes earlier to do that kind of thing.

3052. That would only apply where there is a short break. You would not ask for that in the dinner hour?—But why not, if it is necessary to remove the paint from your hands.

3052A. But the man is paid for working up to the time of the hour that he is allowed for dinner. Surely in the interests of his own health he can spare sufficient time to clean his hands?—But if there is a limited supply of washing facilities and a large number of men, it becomes a rather serious matter. I agree so far as to say that he ought to do it, but my desire is to encourage him to do it. The more you discourage him the less he does it.

3053. You agree that he ought to do it?—Yes, I agree that he ought to do it.

3054. You agree that it is his duty to do it?—He ought to do it.

3055. (*Lord Henry Bentinck.*) But it is not the duty of the employer to give him facilities for doing it?—(*Mr. Sutherland.*) I believe that it is in our district. They give facilities for it, but within the compass of an hour the man has sufficient time to have his meal and wash his hands.

(*Lord Henry Bentinck.*) I should think that within the compass of 50 to 60 hours a week the employer would have time to allow for washing.

3056. (*Mr. Sutherland.*) It becomes in some cases a very big drain on the job. (*To the witness.*) The clothes are washed each week in the case of decent men?—Yes.

3057. Is there any danger of a spot of paint which he gets on his clothes drying and becoming dangerous towards the end of the week?—If the paint was splashed on his clothes it would powder by the rubbing process.

3058. By when?—Towards the end of the week if he got it on in the middle of the week. There would be danger because of the powder on his clothes.

3059. What experience have you had of non-poisonous paint?—I purchased about 50 or 60 pounds of non-poisonous paint last year to use mainly for experimental purposes. I have used it in this manner; I have had three rooms to finish with enamel. I have painted one room with white lead, one room with one kind of substitute, and another with another, to see which was the best job when I had finished.

3060. Did that prove satisfactory?—I preferred the non-poisonous to the white lead because I could get a whiter finish.

3061. Have you had any experience whatever of it for the outside of buildings?—Mainly in relation to my own house, but not so wide an experience as would justify me in speaking at length upon it.

The witness withdrew.

Mr. J. WALSH, examined.

3085. (*Chairman.*) What practical experience have you had in the house-painting trade?—I have been a painter since I was fifteen years of age, and am now thirty-six, practically twenty years.

3086. Have you had any experience of lead poisoning among the members of your branch?—Yes.

3087. Will you name the principal causes which in your opinion contribute mainly to the prevalence of lead poisoning among house painters?—Chiefly in

3062. You think the only remedy for lead poisoning would be the total abolition of lead?—I can see no means of adopting preventive methods which would be satisfactory, and therefore abolition is the only thing.

3063. Do you think that cleanly habits would mitigate it?—Decidedly, but you know that it is not necessarily the dirty workman who gets lead poisoning.

3064. Do you think that some men are exceptionally susceptible to it?—Yes. I am.

3065. That would point to their having selected the wrong trade?—That is highly probable, but they had been committed to the trade long before the susceptibility began to manifest itself.

3066. You are susceptible to it personally?—Yes.

3067. Your susceptibility has not been affected or diminished by cleanly habits?—No, by no means, nor temperate habits either.

3068. (*Mr. Rice.*) You said it is customary for painters to carry food in their pockets?—Yes.

3069. By whose orders do they carry food in their pockets?—It is the only convenient vehicle they can carry it in.

3070. That is not an instruction from the employer?—Not by any means.

3071. You said it is difficult to have clean overalls?—No, I did not say difficult—pardon me. I said we do it once a week.

3072. I have a note here that you said it was difficult to have clean overalls?—No, I did not mention that.

3073. It is not difficult?—No.

3074. Do you think if they have dirty overalls it is the men's own fault?—No. It is the fault of the process largely.

3075. But if a man has more than a week's dirt on his overalls it is his own fault?—I agree to that.

3076. You have had experience in all classes of work, have you not?—Yes, I have had experience in all classes, though I specialise in graining.

3077. You are really a grainer?—Largely so.

3078. Do you work for yourself?—For about 18 months I have worked for myself, but 30 years of my life has been spent as a journeyman.

3079. Have you been with many firms?—About four.

3080. Large firms?—Firms that in the main would employ say 20 or 30 men. The last firm I worked for for 11 years. Their average would be over that.

3081. In your town, Huddersfield, you have not had any difficulty in getting hot water, if you have asked for it?—It is a most unusual thing; we have occasionally.

3082. Generally people are sympathetic and tell you you can have it?—Yes.

3083. Do I understand that it is the custom in your town to allow time for washing?—Yes; you can get it always in our town. I carefully pointed out that I find that in accordance with the numbers the difficulty becomes greater, and I have found that invariably in discussing this question with my colleagues.

3084. My point is whether hot water is ever refused you, if it is possible to get it if you ask for it?—You are refused permission to go to the place where you can get it in some cases, but that is not the rule.

preparing the work for the next coat of paint, sandpapering or glasspapering. Also I think a lot of it arises from dry scraping of the old paint.

3088. As regards the dangerous process of dry sandpapering between the application of one coat of paint and the next, is it quite impossible to dispense with this and replace it by wet rubbing with pumice, stone and water?—I think so—when you consider that most of the work is done in a hurry and it is the simplest and easiest way to produce a very level surface.

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3089. Would the pumice stone and water method tend to destroy the film of newly dried paint which has not had time to harden completely?—Yes, I am positive of that.

3090. Now next as to the spray from the brush. When you are painting ceilings with moulded or relief work and when you are doing stippling, to what extent does the painter inhale such spray?—He cannot help inhaling quite a lot of it, because as a rule it is mixed rather thinly in order to get into the crevices of the relief material, and in stippling, the stippler being a short haired brush, the hairs, generally between two and three inches long, throw the paint out all over his face and hands, and I do not see how he can avoid it.

3091. Can you tell us anything of the danger arising from the burning off of old paint with a spirit or charcoal lamp?—Yes. I think that a man must absorb quite an amount of old lead into his lungs. He is bound to be close to the lamp, and the draught round the work blows it on to him. I know from practical experience that after a long day at burning-off a man feels about fixed up.

3092. Does sandpapering generally follow this operation?—Yes; sometimes the wet process is adopted.

3093. Is sandpapering very dangerous?—Yes, because there is always a certain amount of old dry paint left after the lamp has gone over it.

3094. How are your colours generally mixed?—There is generally a place set apart on each job that they call the paint shop. It may be a corner in a room simply. The mixing is generally done on a bench.

3095. How does the danger arise in this work of mixing paint?—My own opinion is that it is largely from the fumes arising from the mixing of the paint with oil and turpentine.

3096. Can you name any other processes in which there is a grave risk of the painter inhaling dust or fumes?—I have already mentioned dry-scraping, and it is quite possible that a man might absorb a little through the wet process. He might absorb a little—not inhale it—by the use of sodas or sugar soaps for softening the paint, and that drying on his fingers or on his clothes might get into the body.

3097. There are no doubt many processes in which the painter cannot avoid getting his hands soiled with the paint or stopping material?—I do not know that that would altogether make much difference.

3098. But it does get on his hands?—He might avoid it.

3099. Do you think that washing conveniences are very necessary?—Undoubtedly.

3100. And that hot water should always be available?—Yes, if it is possible, but there is the difficulty that you cannot always get it.

3101. It is not always practicable, you say?—No, it is not.

3102. Mr. Parsonage has given us evidence on the main questions of this Inquiry. I suppose you generally accord with his views?

(Mr. Parsonage.) I have not had much to say to the witness because I desired him to give his own opinions. I do not often see him.

3103. (Chairman.) If you are painting the outside of a house, are you allowed to go inside to wash?—As a rule they do not care about it. There is a mistaken notion that the man who does the painting outside is a different type of animal altogether from the man who does the work inside.

3104. Is food often kept in the pocket of a working coat and eaten in a place where paints are being used?—Very often you cannot avoid it. If you are doing only one room in a house, you certainly do not like to put the people to any inconvenience.

3105. Is it frequently impracticable to have the use of a separate place as a mess room?—Yes, very often.

3106. When you are painting one room in a house?—Yes. I am working at a house at present where there is a large family. They can only give us one room at a time, and we are forced to get our food in the same room.

3107. Do you usually wear overalls while at work?—Yes.

3108. How do you keep them clean?—They are washed each week. We have an alternate suit.

3109. You frequently have to carry them in your tool bag, I suppose?—Yes.

3110. There is no doubt some dust from a dry soiled overall. Would you be likely to breathe it at any time?—Yes, you cannot very well avoid it. You take your overalls off at night and shake them then or shake them the next morning.

3111. How can the evils arising from such dust and spray as you have told us about be overcome?—The only real way, in my opinion, of overcoming it is to abolish white lead altogether.

3112. Is it impossible, in your opinion, to apply exhaust apparatus for the removal of such dust and spray?—No, I am afraid not.

3113. Is it impossible?—I am afraid it would be most impracticable.

3114. You have told us that it is not practicable in all cases to replace the dusty sandpapering by a wet method of rubbing down?—No, not when you have to follow the work up so soon as you have to do to-day.

3115. Would it be a good thing to have periodical medical examination by a surgeon with powers to suspend men who were afflicted with lead poisoning in its early stages?—I do not know what good that would do. My own opinion is that almost every painter has more or less lead in his system.

3116. Is much compensation for lead poisoning claimed under the Workmen's Compensation Act?—There is very little, I think, compared with the lead poisoning that is actually taking place, because men are almost terrified in many instances against taking advantage of the Act. They are afraid of losing their employment.

3117. You are interested, I understand, in ship painting?—Yes.

3118. Are the conditions similar when men are painting state rooms and other internal parts of a ship?—That is a portion of our trade that I do sincerely hope that some little attention will be paid to, because there are hundreds of house painters who have served their apprenticeship to house painting who work on the liners in the various seaports during the winter months when the boats are lying up, and the whole of the work, almost without exception, is rubbed down with glasspaper or sandpaper. There is no possible means of ventilation—that is by the air being continually changed. The usual means of ventilation, the port holes, are closed.

3119. Men working in ships come under the Factory Act to-day?—The difficulty is that the men I have in mind are not men who usually follow ship painting, but men who are taken on to do a particular class of work—state rooms and that sort of thing.

3120. Directly a man is taken on to do work in the state room of a ship he *ipso facto* comes under the Factory Act, and so he is protected?—The trouble is that he is far less protected than a house painter is at house work.

3121. (Mr. Parsonage.) The Factory Act is not carried out then?—No, not at all. I can honestly say that there are no means of washing hands or that sort of thing, and even if the washing of hands were carried out it would be of very little use. A man working in state rooms is eating dry lead.

3122. (Chairman.) Do I understand that some of your men periodically work in the state rooms of ships, and the clauses of the Factory Act are not put into force?—No, they are not. At the various periods when I have worked on ship work I have never seen a factory inspector looking over our work.

3123. (Mr. Sutherland.) How do you know that the men are terrified to make claims under the Workmen's Compensation Act?—I could specify one particular case if that would have any bearing. A man claimed compensation from a firm and got it, of course, through the insurance company, and, after getting a weekly amount, he settled for a lump sum on the understanding that it was not to interfere with his livelihood. On applying again to the same shop he was advised by his

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employer that he had very good chances of employment, and that it would be much better if he went and worked somewhere else for a little while, as the extra premium demanded of him by the insurance company was an item to be considered. He went to work at another place, and on the second day of his employment he was asked to sign a paper. This paper he at first refused to sign, but the foreman told him it would make very little difference to him. This paper was to the effect that he had received compensation for lead poisoning. An hour after he had signed it he was discharged.

3124. After he had signed the paper?—Yes, after he had signed the paper. Of course, it was common knowledge that this man had received compensation. That I know is the absolute truth.

3125. Did he succeed in getting work elsewhere?—Very intermittently. The man has had to practically live on ship work, work which any man who values his health tries to get away from.

3126. Did he settle his compensation claim through the courts?—No, not through the courts; outside the courts.

3127. (Mr. Parsonage.) He received 16s. 5d. compensation?—Yes, for about eight months.

3128. (Mr. Sutherland.) Was he well then?—He was getting pretty well. He felt that he would, in a short time, be able to resume employment, and he settled for 50l. This man's experience, of course, has warned quite a number of men, who feel that they would like to claim compensation, from claiming it. That is the only circumstance I know of, but there may be others.

3129. (Mr. Parsonage.) There is a particular case in my Annual Report this year, for instance, where the courts said that if the insurance companies were going to do this they would take that into consideration in deciding the case, and award heavier damages to the man; and they are doing so all round the country, because it is preventing a man from reporting himself?—I can give you this man's name, because he has suffered so much that he feels he cannot be any further injured.

3130. Have you had some experience in the use of a non-poisonous substitute for white lead?—Yes.

3131. We had a Professor Baly here last week, from the Muspratt Laboratory, Liverpool University. Have you worked on that building?—Yes.

3132. Are all the paints used there absolutely non-poisonous?—Absolutely non-poisonous, that is to say, as far as we know they are non-poisonous; zinc white and Charlton white.

3133. The material is tested by a professor of chemistry there before it is used?—Yes. Each time I have worked on the job the professor in charge of the laboratory has taken samples of the zinc white; and when they used Charlton white he took samples of that—samples of the driers and samples of the oil.

3134. Did he examine it each time before it was used on the work?—Yes.

3135. Were you personally employed in this work?—Yes.

3136. How long is it that this has been used? I want to find out the durability of it?—Charlton white was first used about three years ago, and it was used on the raw plaster, but this laboratory had been in use for four or five years before the walls were painted. I know there were some tremendous chemical experiments—of course I do not understand the nature of them—carried out in this building, so the plaster would be saturated with chemical fumes, and the chemical experiments have been carried on since, but the white remains pure white. Last year, in September, I worked on the same job, and the room was being painted again for the first time then. The work can be seen there at any time.

3137. In your opinion, is it in better condition, and is it a better white than white lead?—Yes, I am positive of it.

3138. I understand this is interior work, where chemical experiments are carried on?—Yes. Of course I have not any knowledge of science, but I do not think any material can be put to any severer test than

it has been at this laboratory. There being a large amount of it obtained to do the work there, a lot of it was left at the shop, and it has been used on several occasions. My own opinion of it is that it is far better than lead—that is Charlton white and zinc white.

3139. Is the General Post Office all done with non-poisonous paint?—That is painted with non-poisonous materials, but it is not zinc white. I mean to say it does not come in bulk like zinc white does. The paints they use are Gay's Patent and Etruscan. I do not know the makers of the Etruscan, but it comes in bottles, ready made.

3140. With regard to the mixing of the ordinary zinc white, have you had experience in mixing that when it comes in paste form, the same as white lead generally comes on to a job?—Yes.

3141. With your own knowledge and experience, you have used it in the ordinary way?—Yes.

3142. And you know the quantities for mixing it and all that?—Yes.

3143. In your opinion, when the paint is properly mixed, would there be any difficulty in the painter applying it to the work?—No. It is just like all new things. A man wants to approach it with sympathy and with brains, and he wants to apply himself to something new. At the first go off, he mixes it as he has been mixing white lead, and it does not turn out a success with him, but it can be made a success. It only needs to be approached in the right spirit.

3144. (Mr. Sutherland.) Are you speaking of zinc white now?—Yes.

3145. (Mr. Parsonage.) If the manufacturers sent out this, you would get proper quantities, or the necessary oil to mix with it, and also they would send out a special drier that would be different to lead drier?—I will just briefly give you my own experience. The thing can be used with the ordinary materials, that is the thinners, that we use to-day, if the man will only take the trouble to think out what he is doing. The average man gets hold of, say, a drum of zinc white, and starts to let it down with turpentine in the usual way, and he begins to get it down, but, if he would only think it out a little, something else is necessary, either a little varnish or a little Japan gold size, and that makes the thing workable.

3146. When it became well known what was the proper thing to mix this with, the painter would not mind using it?—That is so, and I think when it became more popular the manufacturers of zinc white would make it almost ready for use, in the same way as white lead is made. I may say that we have used it on occasions for all classes of work, for woodwork and for ordinary flitting, friezes and ceilings, and that sort of thing, and it is far better—that is, once you understand how to mix it and use it. Of course, most men just get hold of it, and they find it works a bit sharp, and they do not make any attempt to alter it properly.

3147. That is a matter of experience?—That is all.

3148. But it would easily come into use?—Yes.

3149. In your opinion, these materials could be introduced and used commercially in the place of white lead generally?—Yes, in my opinion it is just the want of thought and sympathy.

3150. Leaving out specialties, like Charlton white or Gay's patent, or those kind of things, if a standard commercial quality, to take the place of what is termed general white lead now, were introduced on to the market, it would be equally as good as or better than white lead?—Yes, that I am confident of. The reason that white lead has lasted so long is that everybody takes white lead for granted.

3151. (Mr. Gardener.) I think you have worked a good deal in ship work?—Yes.

3152. Have you used much zinc white in ship work?—Very little. It has only been used for finishing coilings on account of its whiteness.

3153. (Mr. Parsonage.) Supposing that it was decided to recommend the abolition of white lead, how long would you propose to allow for white lead to be entirely done away with so that other substitutes could



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be properly introduced and brought on?—I do not know. The employer that I usually work for, quite fell into the use of it right away. He does not use it always. Of course we use white lead nearly always now, but he is quite ready to be adapted to zinc-white.

3154. (Mr. Sutherland.) Who is your employer?—Mr. Cubley.

3155. (Mr. Gardener.) Have you used zinc-white outside?—It was used on one job, and it was a failure. I readily admit that.

The witness withdrew.

Mr. FREDERICK WILSON examined.

3158. (Chairman.) Do you live at 3, Tanfield Terrace, Birkby, Huddersfield?—Yes.

3159. What practical experience have you had in the house-painting trade?—Twenty-four years' experience with one firm.

3160. What branch of the National Society of Operative House and Ship Painters are you connected with?—The Huddersfield branch.

3161. Are you speaking for yourself now or for the men you represent?—I am speaking for myself, from my experience in the firm I am employed by.

3162. Have you had any experience of lead poisoning among the members of your branch?—To tell the candid truth, I have had trouble myself.

3163. But have you had any experience of lead poisoning among the members of your branch?—Yes.

3164. Will you name the principal causes which, in your opinion, contribute mainly to the prevalence of lead poisoning among house painters?—My experience in the trade (and I have vast experience for a young man) is that it is the rubbing process in the preparation work.

3165. As regards the dangerous process of dry rubbing and sandpapering between the application of one coat of paint and the next, is it impossible to dispense with this and replace it by wet rubbing with pumice stone and water?—No, it is not possible.

3166. Would the pumice stone and water method tend to destroy the film of newly dried paint which has not had time enough to harden completely?—Yes, it would be detrimental to the work he was carrying out.

3167. Then as to the spray from the brush, when you are painting ceilings with moulded or relief work, and when you are doing stippling, to what extent does the painter risk the inhalation of lead paint?—The worst of it is that when you are laying it on raised materials there is a certain amount of splash comes from the brush as it spreads out. You hold your head off, but you cannot avoid it. It covers your face and lips and everything. Then with regard to stippling, when you are going across the ceiling and back it sprinkles it so fine that you cannot see it, but you inhale it, and it drops on to your lips, and you naturally feel the taste of this lead.

3168. Can you tell us anything of the danger arising from the burning off of old paint with a spirit or charcoal lamp?—Ours is a firm who do a lot of burning off, to secure a good finish to the work, so that there will be no bad coating underneath, and nearly every man I come across has complained to me on the job about it. I have even had to stop a set of men and put another set of men on because the burning-off has been so bad. They have all suffered and have not felt well after this burning-off process.

3169. (Mr. Sutherland.) Is that with the lamps?—Yes.

3170. (Chairman.) Does sandpapering very generally follow this operation?—Yes.

3171. Is not that very dangerous?—There is a lot of dust and old paint and so on, and it is awful.

3172. Where are colours usually mixed?—We have a bench in every job we do.

3173. Is it usually in one of the rooms?—Yes, in one room which is convenient to the job we are carrying out.

3174. How does the danger arise in the work of mixing colours?—Of course some people may think it

3156. Was that due to mishandling?—I think so through not thoroughly understanding it. It turned black after it had been applied for some time.

3157. (Mr. Parsonage.) If it was mixed with varnish or boiled oil, do you not think it would stand?—Yes, I cannot see myself why it should not.

(Chairman.) I do not see the use of asking these questions, because we cannot use this evidence. We must have the actual experience of the people who have tried it and tested it.

is a dirty man, but I pride myself on being a very clean man.

3175. That is not the point. How does the danger arise in the work of mixing colours?—I think with continually working amongst it, with your hands touching the cans, and so on, and boxing one can, and mixing these colours, and handling the can, and always being over it; you cannot get it from the pure lead, as it is, but as soon as you commence to mix it with turpentine and oil the fumes are a lot stronger. You will find in working in people's houses that people who never touch the lead complain that the smell, and so on, makes them feel ill.

3176. Do you think the danger arises from the fumes when it is mixed with turpentine and oils?—Yes. The fumes do not do a man any good. I think it tends against his health.

3177. Have you known of cases of particular men receiving injuries from it?—Yes, if they do the work.

3178. Have you known many of them?—Yes, men I have tackled—but I have done most of the jobs; I do nearly all the mixing.

3179. Does it affect you?—Yes, it affects me very much.

3179A. In what way does it affect you?—I have had five doctors that I could refer you to if you wish, and it has always been lead poisoning.

3180. From this particular operation of mixing?—Yes, the mixing.

3181. Is your work confined principally to mixing?—Yes, in charge of jobs, mixing all the stuff for the other men.

3182. Do you get any of this mixed stuff on to your hands?—As I tell you, I am very careful indeed.

3183. Do you wash your hands immediately after you have mixed this lead with the oil?—Many times a day I go to the wash basin or bucket, with the soap, and wash my hands, particularly if I have been doing a big mixing job.

3184. Do you wash your hands immediately after?—Yes, I do, because I have been warned for years on that point, for the good of my own health.

3185. Do you think it necessary to have hot water?—It is not always handy to have it.

3186. But do you think hot water is better?—Yes, you get a better effect. Of course we use soft soap, which is very searching stuff.

3187. How can the evils arising from such dust and spray as you have told us of be overcome?—I will tell you one way in which I think it can be overcome. I have a privilege which few men enjoy. I am very pleased to say I work for an employer who is very much in favour of this idea of doing away with the white lead, and we have used, this last five years, more non-poisonous paint than I dare say 20 firms you could name. I have had the privilege of experimenting for years on panels alone, and trying it with three or four different pigments that we have used, and I find they are all right, and I find as years go on that I am improving in health every day.

3188. Does your employer know that you are coming up to give evidence to-day?—Yes, I have had to ask off from the work.

3189. Did he know that you were going to make that statement?—I do not think he does know, because he has left everything to me.

3190. (Mr. Parsonage.) Would he object to you making that statement?—Not in the least. What I

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say here I am perfectly justified in saying and anybody can write to him.

3191. (*Chairman.*) Do you believe it is impossible to stamp out the evil of lead poisoning without replacing the lead by some non-poisonous substance?—I believe it can be stamped out.

3192. Do you believe that it can only be stamped out if lead is prohibited?—If lead is prohibited altogether.

3193. (*Lord Henry Bentinck.*) Can you give any reason why mixing should be so unhealthy?—My reason is that when a man is continually over the mixing bench he is inhaling those fumes and disagreeable smells which arise from the paint.

3194. Do you consider that the unhealthiness is caused by the fumes more than anything else?—I think so, as far as I can tell.

3195. (*Dr. Collis.*) How many attacks have you had that you have attributed to lead?—I should say about 10.

3196. Are you chiefly occupied in mixing?—Yes.

3197. Can you remember whether any single one of those attacks has followed when you have been doing mixing only, and have not been doing any other work whatever?—It is rather a peculiar question for me to answer.

3198. It is a difficult one, possibly?—I am not engaged mixing all the day through.

3199. That is the point I want?—I sometimes break off and do a little papering and other work.

3200. But do you do painting?—Yes, I do a little painting as well. I may tackle the door of a room and carry it through myself. I could not say definitely that it has all arisen from the mixing.

3201. I only want to know if at any time you have been doing mixing only and not any other painting work?—My biggest work is mixing.

3202. I understand you have used a large amount of non-poisonous paints?—Yes.

3203. You have mixed those?—Yes.

3204. What is your experience in mixing those, as regards the smell of which you speak which comes off them during the mixing?—I find I have no difficulty whatever. We are using them now on nearly every job; in fact I commenced a job on Monday. A keg of zinc white was sent on to the job, and there was never a mention about any lead. As I tell you, my health is getting better every year.

3205. If you were given two sets of paints of which you knew absolutely nothing as to what they were, and you had to mix those paints ready for use, could you tell which was lead and which was not?—Yes, I could tell it was zinc white or Charlton white or Dixon's.

3206. (*Lord Henry Bentinck.*) Does your employer use this zinc on outside jobs as readily as he does on inside ones?—No, not on outside work.

3207. He does not use it at all on outside work?—Yes, if it is going to be enamelled with china gloss enamel on the outside work he will use it.

3208. What do you mean by "if it is going to be enamelled with china gloss on the outside"?—If he specified a job to be enamelled with china gloss. If he was going to paint the outside of that window, and he was going to have a gloss surface on, he would have no hesitation in using it.

3209. If he was going to paint one of the London houses with white paint, would he?—The china gloss would answer all the effects of washing and everything else.

3210. It is a preservative?—It is an enamel.

3211. Would it add greatly to the expense?—Yes, it is a fair expense. As regards conversations I have had with my employer, he has said that if they made this non-poisonous lead universal and abolished white lead altogether, he is with us to abolish it and use nothing else.

3212. Would he use white enamel and varnish on the top of it?—Yes, and for the outside too.

3213. (*Mr. Sutherland.*) Which is your firm?—Messrs. Lunn and Cardno.

3214. How long is it since you had an attack of lead poisoning?—About three years ago, a severe attack.

3215. Is it since then that you have been using these zinc and non-poisonous paints?—Yes.

3216. Before that, or within the last three or four years?—The last three or four years I have used a lot.

3217. You said that you thought the principal cause of lead poisoning was rubbing down?—Yes.

3218. But still you say that so far as you are personally concerned it is the mixing?—Years ago I was not in the position that I have been in this last eight or nine years. Years ago I used to be mostly employed in rubbing down and doing the work generally myself, and I was at my worst then. I did my own mixing, practically. I did minor jobs, and did my own mixing paint, and everything, and preparing all the lot.

3219. But ordinary painting work, moderately cheap work, does not have much rubbing down, does it?—On a cheap job you cannot spend the amount of time.

3220. It does not get much rubbing down?—No.

3221. Whatever rubbing down there is, is just the dry rubbing with pumice stone, just to give a pretence of rubbing?—Yes.

3222. So that with cheap work it would not give much trouble with sandpapering?—No.

3223. Have you much complaint on the part of customers from the smell? You said that customers complained in your experience?—Yes, I went to a certain doctor's place, and he said I shall have to go away. We were doing all the burning off on a staircase. It was not in a room.

3224. Is that a very unpleasant process?—Yes.

3225. Turpentine will, if it is used, upset people sometimes?—Yes.

3226. With some people it is a restorative or a stimulant?—Yes.

3227. And tar is a stimulant with some people?—Yes.

3228. So that that is really a personal idiosyncrasy, is it not?—Yes.

3229. You say you mix a lot of paint?—Yes.

3230. And you wash your hands frequently?—Yes.

3231. So there is no danger comes through negligence on your part?—No. I am very pleased to say that they allow all of us to wash, everybody on the job, and there is boiling water and a lump of soft soap, or something, to wash your hands in before you have a meal.

3232. (*Mr. Parsonage.*) That probably only applies to that particular place?—To our shop in particular.

3233. (*Chairman.*) How many men use this one bucket of water which you have described?—If there are 12 men on the job they will all dive into it. They do not allow us to use the lavatory in a private house as a rule.

3234. What is the state of the last man's hands when he puts his hands into that water?—The last man will not be as clean as the first man; that is evident.

3235. And do you all use the same towel?—Yes, we do not get so very many fresh towels.

3236. (*Mr. Sutherland.*) Do you not carry your own towels?—No.

3237. Do you not think you should, as clean men?—It would be better, no doubt, if we did.

3238. Do you not think that all the men should each carry a towel?—It would be very difficult, sometimes, to put all these things into your bag. I carry a bag, and sometimes I cannot get my jacket that I work in, in the bag.

3239. Do you carry your food in your pocket?—No. I am placed so that I get home to nearly all my meals, unless I am working out of town.

3240. But even then, you do not carry your food in your pocket, do you?—No.

3241. Do you put it in a bag or basket?—No.

3242. Do you leave it at your lodgings?—Yes. I do not believe in having any food in the room where I am working. If I took it with me I should ask for it to be put in the cellar, if they would allow me.

3243. Have you any facilities on a job for getting hot water for washing?—Sometimes.

3244. But generally speaking?—I think if you ask people properly they will not object to it.

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[Continued.]

3245. (*Mr. Parsonage.*) With regard to durability of non-poisonous paints, how long is it since you first used these?—I should say five years ago.

3246. And you would think that it stands quite as well as the lead?—As far as I can gather. We have had tests made on the jobs that we go back to, and we have never had any complaint. I have done panels, and they are all in our shop to-day, and they have been exposed to the weather, and to the light, and so on, on the window side of the room. The panels have been done with four or five different materials, and if you did not know which was which you could not tell the difference in the materials; I am quite sure of that.

3247. (*Lord Henry Bentinck.*) Is the competition keen in Huddersfield among the painters?—Yes, it is very keen.

3248. Do you think your employer loses one job because he does not use white lead?—I could not tell you.

3249. (*Mr. Sutherland.*) He does use white lead, does he not?—Yes.

3250. (*Chairman.*) You told us just now that you generally go home to lunch?—Yes, I am very fortunate.

3251. Do many men go home to lunch?—No.

3252. Where do they generally have their meals?—Sometimes in the kitchen of the house, or where they can get them, and sometimes in the outside places.

3253. Do they ever have their meals in the place they are working in?—Yes, sometimes they cannot help it.

The witness withdrew.

Mr. FRANK LOWE examined.

3254. (*Chairman.*) Do you live at 81, Radnor Street, Hulme, Manchester?—Yes.

3255. What practical experience have you had in the house-painting trade?—I have been in the trade a matter of 33 years.

3256. What branch of the National Society of Operative House and Ship Painters are you connected with?—I am connected with the Manchester No. 1 Branch as a member, and I am organiser for the Manchester district.

3257. Have you had any experience of lead poisoning among the members of your branch?—Yes, in the Manchester district I have had 30 cases come under my notice.

3258. In what period?—Since the Compensation Acts have taken effect in reference to lead poisoning—since it has been brought in as an accident.

3259. That is since 1907?—July 1907 the Act was brought into force.

3260. Have those cases that you have referred to been fatal cases?—In some cases they have been fatal.

3261. What state of severity have the others been in?—We have had five deaths out of 30.

3262. Have the other 25 been serious cases?—Serious cases. Some have received compensation and been bought out; that is, they have received a lump sum and they have gone back to the trade and have again contracted lead poisoning.

3263. What, in your opinion, are the principal causes which contribute mainly to the prevalence of lead poisoning among house painters?—One of the principal causes is the rubbing down with glasspaper of the preparatory coats of white lead, and, again, the rubbing down with glasspaper of what we call hard filling or stopping, which is white lead. Bruises in the woodwork and uneven surfaces are filled with a hard filling of white lead and gold size, and in rubbing it down the dust from that is, in my opinion, one of the principal causes of lead poisoning.

3264. Do you believe that there is any injury caused from the fumes?—Yes, I do. One of the principal items, I consider, in my experience as a painter, is embossed ceiling work, which is flatted, and in the process of flattening you use purely a spirit colour, nothing but lead, turpentine, and a flattening with a gold size or varnish. With regard to the process of putting the colour on, it is laid on by one set of men, and stippled by another, with a large stippler. With regard to the man who is stippling, his head is always in that position, and his hands up there (*illustrating*), and his face and hands are covered with a fine spray of particles of lead. I have examined men when they have finished the process, and I have found that their faces were covered with miniature spots or specks of lead; and I have found the teeth and gums covered with lead. From the inquiries I have made and records I have taken, with regard to the principal persons who have suffered from lead poisoning, I have only found one man in the whole of my experience with a heavy moustache: he is the only one who is suffering to-day

from lead poisoning. The principal cases of lead poisoning that I have discovered have been men with either a slight moustache or no moustache at all. I have taken these statistics as I have gone along, and I have put it down that those men who are clean shaven find particles of lead getting on to the teeth and gums and the saliva of the mouth dissolves it, and they take it into their system in that way. When you see a man with a heavy moustache, after a day's flattening work, you find it is actually saturated, and soap and water have to be applied to remove it from the moustache. I have experienced that myself.

3265. As regards the dangerous process of dry sandpapering between the application of one coat of paint and the next, it is impossible to dispense with this and replace it by wet rubbing with pumice stone and water?—The process of wet rubbing is not in practice to-day in any painter's shop in the city of Manchester. Some 20 years ago they used to rub down, at one time, towards the finish of the coats, with ground pumice stone and felt as a finish, but those days have gone.

3266. Would the pumice stone and water method tend to destroy the film of newly dried paint which has not had time to harden completely?—It would be impossible to rub it down with pumice stone and water in the ordinary way, without it was ground pumice stone and felt, and then the colour would have to be hard drying colour all the time.

3267. Would not the newly dried paint clog the pumice stone very quickly and so render it useless?—Yes, you could not use it. It would tear it to pieces.

3268. Can you tell us anything of the danger arising from the burning off of old paint with a spirit or charcoal lamp?—Yes; the danger of burning off with a spirit or charcoal lamp is that the flame of the lamp close on to the work softens the old material, and the man applies a scraper to get it off, and all the while his head is over it, and therefore he is inhaling the fumes of the burnt material, oil and lead, the whole of the time he is doing that process.

3269. Sandpapering very generally follows this operation, I understand?—Yes.

3270. Is not that very dangerous?—It is.

3271. Do you know anything about mixing colours?—Yes, I was a mixer.

3272. How does the danger arise in the work of mixing colours?—The danger arises from the mixer standing over the "kettles" he is using. If it is on a bench his head is over it all the time, and, of course, he is inhaling the fumes from that the whole of the time. Then, again, a mixer may not be burning off in the ordinary sense, but he is all the time getting what they call stook cans ready in his leisure time in the shop. He throws a dash of turpentine in it, sets fire to it, and then takes his palette knife and scrapes it round. Therefore, he is bringing out the dry lead from the sides of the cans, and he is inhaling that as well. That is why a good many of the mixers, not at actual work in burning off and flattening work, are hooked in their hands. The majority of our

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mixers are hooked in their hands, and I put that down to no other thing than the scraping out. You might find a man who is a mixer, the whole of his life, perhaps, not applying colour himself, or sandpapering in between coats. He stands with the can hot, with a sheet of paper over it, and he takes his knife and swirls round the whole of the loose lead in the can with the turpentine and there comes out a sheet of dust. I put that down as one of the principal reasons for the mixer having hooked hands.

3273. Do I understand that that process which you have described greatly increases the dangers to the mixer?—Yes, to the mixer. If the cans were pickled or burnt out with a slow process, there would not be that danger.

3274. Do you think that the provision of washing conveniences and the regular cleansing of the hands is important?—It is important.

3275. Is hot water always available?—It is not available—and very seldom cold water in the Manchester district. It has been made compulsory in our working rules that the employers should supply boiling water for meals. That had to be put in the rules because it was nearly impossible, in large centres of industry like Manchester, to get hot water.

3276. (Mr. Parsonage.) It is not for washing hands?—No, it is for meals.

3277. (Chairman.) With regard to your meals, where do the men generally have their dinners?—Taking it on the whole, on new property (and I cannot account for this), what we call the jerry property, where there are plenty of rooms, I have found the men actually having their meals in the lock-up where the paint is kept.

3278. Why do they use that room?—For the reason that the other rooms are not protected by closing them and locking them up. There is nothing compulsorily provided for the men to have their meals. They are scattered over a job the whole of the morning or afternoon, and they put their clothes in this lock-up, and when the place is not actually being used by the foreman it is locked up, so they do not run the risk of losing their clothes. Their food is there, as well, in that room.

3279. Do the men usually wear overalls while at work?—Yes, always a jacket and an apron; and sometimes trousers.

3280. How are they kept clean?—The men take them home weekly to be washed.

3281. Do you frequently have to carry them in your tool bag?—Yes.

3282. Is there any risk in that?—If the man puts his food in the tool bag there would be.

3283. Does he often do that?—In changing jobs he does.

3284. Why is he not more careful?—He simply packs the lot into one bag. I did not do it myself. I always had a bag for carrying my food, but I have seen men put food into the bag with their overalls.

3285. How can the evils arising from the dust and spray which you have described be overcome?—In the first place, the only way to overcome them is to absolutely prevent the use of white lead in the painting industry.

3286. Have you yourself had any experience in the use of non-poisonous substitutes for white lead?—Yes, where I served my time. I served my time in New York.

3287. Have you formed any opinion as to their practicability for general use?—Yes, zinc-white is just as good as the white lead. There is a slight prejudice against it, but it is simply because the workers do not seem to understand the use of it.

3288. Do the workmen that you represent find any difficulty in using such paints?—They find no difficulty in it. They use it successfully in Manchester.

3289. (Dr. Collis.) Did I understand you to say that there is a definite smell given off when you are mixing lead paints?—Yes.

3290. You spoke also of fumes coming off when you are burning old paint off?—Yes, there are.

3291. Is there any similarity in taste or smell between those fumes and what you get when you are mixing paint?—They are about the same.

3292. You think they are about the same?—They are. When you come to burn paint, you get almost the same fumes from the burnt paint.

3293. Have you ever had to burn off leadless paints, zinc paints?—I have never burnt any off myself.

3294. There is one point I want to get quite clear in my mind with regard to the cleaning of the cans. Do I understand you to say that you put turpentine into the can and set it alight?—Yes.

3295. Where would the man be after he set it alight?—He would be just by it, waiting till it goes out, and then running a knife round the can.

3296. Could he not stand a yard away?—He could if he liked, but he has to stand close to it, because he keeps revolving the can to stir it.

3297. So he must be close to it?—Yes.

3298. Have you done this process yourself?—Yes.

3299. Have you noticed any taste or smell coming off from that?—Yes, there is a foul burnt smell.

3300. Is that anything like the smell that comes off in the mixing, or the fumes from burning off?—Yes, it is exactly the same; the fume of the lead is there.

3301. I want to get it from you whether you recognise the smell?—Yes, it is exactly the same smell.

3302. Then afterwards do you turn out the dust and shake it aside?—Yes, we turn out the dust.

3303. (Mr. Sutherland.) Do you say that rubbing down by the wet process is absolutely obsolete in Manchester?—Yes, except in the first commencement of preparation on a job.

3304. That is the rubbing down of old work?—Yes.

3305. How long is it since you actually worked at the trade?—Twelve years.

3306. In reference to the case that Dr. Collis has spoken of, the burning out of cans, have you ever known that affect anybody?—I have known men complain of the fumes.

3307. But it is a common practice, is it not?—It is a common practice in the trade to burn them out.

3308. It is an everyday operation, is it not?—Yes, it is, among the trade.

3309. Your reply seemed to show that the mixer did it; it is not necessarily associated with the mixer, is it?—He generally does it.

3310. Whom do you call the mixer?—The man in charge.

3311. The foreman?—Yes.

3312. The foreman would not clean out the cans, would he?—He does it.

3313. He may clean out a can now and again, but would he not set a boy to clean out the cans?—It just depends upon whether the boy is there or not. Boys are not very plentiful in the trade.

3314. Then he would set a labourer to clean it out, would he not?—Labourers are not very plentiful in the trade at Manchester. You might have a labourer on a large job, with 500 men, or something like that.

3315. You think a moultache prevents the danger, do you?—Yes, I do. It prevents it getting into the mouth, at any rate.

3316. You were asked whether rubbing down with pumice stone and water would be permissible on new work, and you said "No"?—No, except with hard material.

3317. But rubbing down with pumice stone and water and felt is done in the best work to-day?—There is no felt used in the Manchester trade to-day.

3318. You must not tell me that, because I know there is?—I have a decent experience.

3319. On what you call the jerry work, the cheap work, there would be no rubbing down with anything, would there?—Sandpaper.

3320. How much?—They do it.

3321. It would be a pretence of it, would it not?—They generally do the doors.

3322. But that would not be much, would it, because they want to leave the paint on?—They want to get smooth surfaces.

3323. They do not get smooth surfaces on jerry-built jobs, do they?—You can class most jobs as that now.

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3324. There are plenty of good jobs, but with jerry jobs they do not rub down with sandpaper to any extent, do they?—On all jobs there is some done.

3325. But that would not be enough to affect the health of the painter, would it?—There is some danger in it.

3326. If you are dealing with nice work, with varnish and enamel, you rub down; but on cheap or jerry work you do not get the rubbing down that would produce dust which causes the poisoning?—I am not in a position to say how much dust would cause the poisoning, but what I am going to say is that on all jobs, let them be rough or good jobs, a certain amount of preparatory work is done.

3327. It is done with lump pumice stone on cheap work more than anything else, is it not?—It is done with sandpaper, in my experience.

3328. What I want to establish is, that the jerry work forms a very large proportion of painters' work. You know the large proportion of jerry property that is put up, and therefore there must be a large proportion of jerry painting. My contention is that rubbing down there is a negligible quantity; it is more honoured in the breach than in the observance?—But still it is done.

3329. Very likely, but is there anything in that that would seriously prejudice the health of the painter?—The majority of lead poisoning cases that I have dealt with up to now have originated in the best shops. I have not had many from what you call the jerry property—perhaps 3 out of 30.

3330. (Mr. Parsonage.) The better the work the more the danger?—The better the work the greater the danger.

3331. (Mr. Sutherland.) A man does not, when he is burning off with a lamp, hold his head over the lamp, does he?—The lamp is in one hand and the knife is in the other, and they are both close together, and there is only the length of his arm to keep him away from it at any time.

3332. He could not keep his head over the lamp or he would get it scorched, would he not?—He must be in that position. He cannot get the lamp far enough away from him to avoid the fumes. He is all the time on top of his work. There is only the length of his arms.

3333. You could rub down with pumice stone after using the lamp, could you not?—It is not quick enough.

3334. Could you not rub down with pumice stone and water just as quickly?—No. They do not do it, and for this reason, that the pumice stone would have to be shaped for the moulds, and with regard to the rubbing down and burning off of the jerry property, they simply tear it to pieces with sandpaper.

3335. (Mr. Parsonage.) If the paint is burnt off clean, you could not put water on it, because the water would get into the grain of the wood, would it not?—Yes, in some cases it would.

3336. In some cases you could, but generally you must use glasspaper. Is not that so?—Yes.

3337. (Mr. Sutherland.) Now about the washing conveniences. There is invariably water on the job, is there not?—Yes, you can generally find water of some description.

3338. And the working rules provide that hot water must be given for meals?—Yes; and that had to become compulsory.

3339. These rules were mutually agreed upon, were they not?—Yes; the Arbitrator decided them.

3340. But there is no compulsion on one side or the other: it is mutual agreement?—Yes.

3341. If they can get hot water for meals they can get hot water for washing, if they want it, can they not?—It just depends. If the employers were to make that part of the conditions when they took the work, they could get it, but if the men went and asked for a kettle of hot water, without there was a hot water tap, they might not get it. If there was a hot water tap in the house they would not object to giving you a bucket of hot water, but in these warehouses and offices and property of that sort there is no hot water tap.

3342. There is nothing to prevent the man from boiling it in a bucket on the fire, if he can get a fire, is there?—No, but take the large number of staircases that are done, where you are simply allowed to come in and go out, and you do not get near anything else.

3343. Do you mean warehouses?—Yes, and office property, which is a big item in Manchester.

3344. Where do you get the hot water for your meals, then?—They generally have to go to a restaurant and pay for that. They send a boy out to the restaurant, and he gets hot water and pays a halfpenny a can for it. You have experienced that on your time sheets, I know.

3345. What experience have you of zinc white?—At the commencement of my career the standard in America was 60 of zinc to 40 of lead. We used nothing else.

3346. But that would not be accepted as a non-poisonous paint?—No, it was not done for that purpose at all. The experience in Manchester with zinc is very limited. We have the Government stipulating that no lead shall be used upon their work, so far as the post offices are concerned; zinc is used there; and we have the Manchester School of Technology, each floor of it, and the whole of their work now is being done with zinc.

3347. Do you know what kind?—A firm in Liverpool supplies it. I do not know the name. It is guaranteed to be pure, and it stands the analyst's test.

3348. You say that the workmen find no difficulty in using it?—Not in using the material. We had 160 men in one department on this technical school last August, and the August before we had 280 men; 175 for the contractors, and the rest was made up from direct employment.

3349. That is on the School of Technology?—Yes.

3350. Do you know that the employer who did that contract was ignorant of the process of working zinc, and he lost a very heavy amount of money on it?—Yes, and I know the reason he lost it. I was one that appealed on his behalf. There were a lot of matchboarded ceilings, and the joints had to be caulked with cotton and filled up with zinc stopping, and then he tendered for a certain amount of machinery that he knew nothing about at all. He did not get underneath to see it.

3351. He lost it because the men were unfamiliar with the process, and could not get a satisfactory job to satisfy the clerk of the works?—I could tell you exactly why he lost it. He lost it because the man in charge of the job put the wrong men in the wrong places.

3352. I am asking this because you say that the workmen find no difficulty in using it?—No difficulty in using it.

3353. Is it not a fact that they do?—In my experience I have painted perhaps 80 or 90 figures with the zinc white, and I never had any difficulty myself. You can get just as decent a finish and just as quick or quicker than white lead.

3354. Have you any experience of it on outside work?—No. I have seen some work where it has been experimented with, and where it is fastened or varnished with gold size it stands just as well as other work.

3355. (Mr. Parsonage.) With regard to this school where they used all this zinc white, was there any other trouble with the contractor besides the material he was using?—Yes.

3356. Was there any trouble about the rate of wages he was paying?—Not on that occasion.

3357. But you had trouble with him?—Yes, trouble with non-society men—inferior men.

3358. Inferior men that he brought into Manchester?—Yes.

3359. He had to replace those men with others, had he not?—Yes.

3360. That would cause him a loss, apart from the materials, would it not?—On jobs when you have to take a large number of men on, when they know they are only on for that job, you do not get the same out of them as you would from a regular staff. He had a man on at the time who was not fit to organise the job, as I

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told him at the time, and I tried to assist him at the time, because I realised that the employer was fair, and if we could help him we would do it. I suggested an alteration in the organisation of the job.

3361. It was not the material?—No, there was no difficulty of that sort. These other men have worked at the other school themselves and have applied this material, and there has been no difficulty with them in doing it. There is a difficulty when the man first starts breaking it up until he knows how to break it up; but there is no more difficulty with this material than with lead or anything else. There is difficulty with enamels until you get to know them.

3362. (Mr. Gardener.) Do you think that personal cleanliness has anything to do with lead poisoning?—I think it has a lot to do with it. There are three out of the 30 cases that I have here that I would expect to have lead poisoning.

3363. Why?—Because of their dirty habits. The others have been exceptionally clean men.

3364. You have 27 out of 30 exceptionally clean men?—Yes.

The witness withdrew.

Mr. HENRY ALEXANDER CAMPBELL examined.

3371. (Chairman.) Are you a master house-decorator?—I am.

3372. Where is your business?—Our office is 25, Newman Street, Oxford Street.

3373. How long have you been engaged in the painting trade?—I have been engaged in it about 35 years.

3374. Have you been an employer all that time?—Yes. I joined with my brother in business, after he had been established about 10 years, as a partner.

3375. Perhaps you can tell us about the number of men you employ?—Of course, it varies very much, but I have taken as an average about 60, generally, through the year, as near as I can tell. It goes up to 100 or 120, and sometimes it drops down to 20.

3376. Now, about lead poisoning or painters' colic, have you known any cases of it?—Some slight cases I have known, but nothing serious. In all my experience I have never had anyone die of it, and none of my regular men have ever suffered from it. Cases that have occurred have been casual.

3377. Do you mean that you have paid no compensation?—None whatever.

3378. Or that your men have not, to your knowledge, broken down on account of lead absorption?—That is what I mean.

3379. Have your men had occasional days of sickness due to lead?—Not that I know of, due to lead. Of course, they stop away at times, but they have never reported that it has been due to lead.

3380. How do you know that it is not due to lead?—I do not know that, when a man stays away for a day, unless he reports it to a foreman. Perhaps he says he was not feeling well, or it might be only laziness or disinclination.

3381. Do you have a periodical medical examination of your men?—No.

3382. Then is it possible that some of them may be suffering from the slower and more insidious forms of the poisoning. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—Yes, it is possible, but highly improbable.

3383. I have an impression from your answers that you hardly realise the magnitude of this lead poisoning evil. Do you know that the Registrar-General has recorded no less than 28½ definite deaths from lead poisoning amongst house painters in the last 10 years?—I have heard of it.

3384. And that his mortality figures show, for painters, a death rate considerably higher than the normal, from troubles which are the frequent effects of exposure to lead, such as Bright's disease and nervous diseases?—May I take it that that is connected with my part of the trade, that is, house painters and decorators?

3365. And yet you lay great stress on cleanliness as a preventative?—If a man is cleanly in his habits it will help him in his health in all senses.

3366. I understand you to say that your employers at Manchester supply you with hot water for meals. Did you ever know of an employer supplying you with coal in an empty house for providing hot water for washing purposes?—Yes, I have got it and charged it myself.

3367. Is it a customary thing?—It was principally to melt the size that he supplied the coal.

3368. (Mr. Parsonage.) Not specially for the men washing their hands?—No.

3369. (Mr. Gardener.) If you had no size on the job which required to be melted, would the employer supply you with coal to make hot water?—I do not think any employer would object to finding a reasonable amount of coal to boil water.

3370. In practice is it customary for them to do it?—No, it is not done as a custom.

3385. Yes?—I was not sure whether it was applying to coach building, and what I call the more risky forms of painting.

3386. You are not aware of that?—I am not.

3387. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever, in the last 10 years?—I do not.

3388. Do you realise that these cases, reported voluntarily, as I have said, are only a fraction of the whole, inasmuch as the Home Office have no legal right to pay for such reports, and have, therefore, been bound in the past to discourage reporting to some extent?—No, I do not know that.

3389. I am sure you will agree with me that all this sickness and death is very deplorable?—Very.

3390. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes, I do. I have heard of it in France particularly.

3391. That the use of white lead has been prohibited to an appreciable extent abroad?—Yes, I have heard so.

3392. And that the work of painting has been most strictly regulated in several countries where the use of white lead is still allowed?—Yes, I have heard that it is—not in many countries, but in several countries I have heard that it is.

3393. Do you not think it is regrettable that this country should be behind other nations in this respect?—Of course, I think a certain amount of legislation is necessary.

3394. A good many small dangers attend the use of lead. For instance, the risk of contamination of food by unwashed hands?—Yes.

3395. Do you attach importance to personal cleanliness on the part of the men?—Very much importance.

3396. Do you consider lavatory accommodation essential?—Most essential.

3397. Including the supply of hot water for washing?—Yes.

3398. Is it generally practicable for the men to have hot water to wash in?—Very generally—in fact, mostly so. We take special care that it is so. They could scarcely carry on their work without a certain amount of hot water.

3399. For example, when the exterior of the house only is being painted, and the men are not expected to go inside for any purpose?—In any case they must have a collar, or some place where they can make hot water.

3400. But not necessarily?—They could not mix their paint and get on with their work without it.

3401. But they do that in a certain place away from their work, do they not?—I do not see how they could.

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[Continued.]

My men are always instructed to take pails, and they would ask for a cellar or an area, and if they could not get anything else, they would take a few bricks and stack some wood and make a fire and make some hot water to wash in; that is, if they could not get access to a fire.

3402. Do you advocate definite rules regarding the wearing of overalls?—Yes.

3403. How can you ensure these being kept in a cleanly state?—If a painter was to come on any of my jobs on a Monday morning without a clean one he would be either sent back or discharged.

3404. If the workman has to take his overalls with him in his bag, will they not be in contact with his tools?—He does not carry his tools in his bag.

3405. The men who have been here to-day say they do?—If that refers to paint brushes and things I say no, certainly not.

3406. (*Mr. Parsonage.*) His own tools?—A painter has no tools except a putty knife, or something of that kind.

3407. Has he not?—No, his employer finds him in all tools.

3408. Does he find him with a broad knife and filling knives and a board?—With a board certainly. Painters very often have a knife of their own, a palette knife, when they are going to mix paint, but the ordinary painter does not need it.

3409. Do you provide a stripping knife and a broad knife, and so on?—Yes, with many of them, but ordinary painters would not want those, and they do not have knives which would convey very much white lead on to their overalls. Some of the painters have knives, but they do not have anything that would spoil the overalls by contact.

3410. Some of your men would carry a few fitches too, would they not?—They may do, but they are not their own, if they do.

3411. (*Chairman.*) Where can the overalls be kept from day to day when they are working continuously on one job?—The foreman has a box which he puts in a room, and if there is not room in the box they would hang them round the walls of a room that was not being used.

3412. Can you always provide a place for the painter to hang up his coat?—We have to ask for it.

3413. But can you always provide a place where there will be no risk of dust falling upon it?—It is nearly always arranged that one room shall be set apart till the last.

3414. Do you advocate also a rule regarding meal rooms, so that no man shall eat his food in the place where paint is being handled?—Most certainly.

3415. But the witnesses who have been here to-day on behalf of the men have told us that invariably they have to eat their meals in mixing shops and places where they are working?—It is not my experience. They cannot work for very good firms.

3416. Supposing a set of men are painting in one room, where are they to have their meals then?—If there is only one room, do you mean?

3417. Yes?—We should ask, on their behalf, that they should have another room.

3418. Who would ask?—I should ask the clients, through my manager or my foreman. If we are sent on country jobs a room is provided the whole time for the men to have their meals in—outside the house generally or in the kitchen—certainly not where the painting is going on.

3419. All these precautions, which I have enumerated, are insisted on for the mitigation of lead-poisoning risks in potteries. Would not it be exceedingly difficult, from your point of view, to carry them out in the house-painting trade?—I do not think so, if the foreman had proper instructions.

3420. Even supposing that is the case, such precautions would not deal with the most important risk, namely, the risk arising from dust and spray which the workman is inhaling during the whole of his working hours?—No, that would not affect that, but that is pre-supposing that the risk always exists to the workman. We contend that it does not so much.

3421. I will take you through the processes then. First, as regards the dry rubbing down with sandpaper.

I understand that this process is indispensable?—It is indispensable to a certain extent. We rub down principally with pumice stone and water all the old lead, and where there is rough joinery, or anything of that sort, we use glasspaper. Then if the work is not smooth enough we may allow a man to give it a coat of fine glasspaper, but in that case he is advised to use it with a little turpentine and moisten his glass paper.

3422. Is the dry method not applied invariably to newly-painted surfaces on which the paint is already dry?—No, I should not allow one of my men to use the glasspaper indiscriminately.

3423. Is the dry method not applied invariably to newly-painted surfaces between the coats?—To a very limited extent, or else he would take off what he has already put on: he must not do that. I say he might just take a little where he sees any slight roughness in the surface, but it would be very small. He certainly could not go with a large sheet of glass paper and rub that all down and cut off what he has just put on, or else we should be very great losers by it.

3424. I understand the wet process cannot be substituted for dry rubbing between the first and second coats when ordinary paint has been used? That is so, is it not?—Yes.

3425. It is only on high class work which has to be enamelled or varnished that the dry process can be dispensed with, is it not?—Yes, where they felt it down.

3426. But a fresh coat of paint which has dried, say, in 24 hours, but not yet thoroughly hardened, would be spoilt by wet pumice stone, would it not?—We should not pumice stone that; I have said so.

3427. That would be dry rubbed?—Yes.

3428. I suppose the pumice stone would clog?—Yes, it would spoil it.

3429. Where dry rubbing down with sandpaper is indispensable, how can you prevent the worker from breathing the lead dust?—For one thing, they are generally in rooms where the windows are open, and we contend that there is not a large quantity of dust, but what little dust there is can go out of the window.

3430. The workpeople who have been here to-day have told us that the windows are always closed under those circumstances?—In rubbing down, certainly not.

3431. (*Mr. Parsonage.*) When the paint is wet?—Yes, to dry the paint, but we are presuming that the paint must be, to a certain extent, dry, before they could commence rubbing down.

3432. (*Chairman.*) But you think that the mere fact of opening the windows would get rid of all the dust in the room?—All the dust that there is. I contend that there should not be much dust if the painter is doing his work in a proper manner.

3433. But there would be a certain amount of dust?—Yes.

3434. Let us take it that there is only a small amount of dust; how do you suppose that that could be obviated?—I say that if the glasspaper which he uses is moistened with turpentine that minimises it a good deal, because he uses his paper wet instead of dry, and that obviates the dust to a very great extent. Then, again, as regards what dust there is on the floor, we set a labourer to take it up. It would settle on the floor.

3435. But the Home Office have laid down in other industries that every particle of dust must be removed from the worker, either by exhaust draught or some other method?—Yes.

3436. Could that be applied to rubbing down in the case of house painting?—I am not prepared to answer that right away.

3437. At present you think it could not?—No, I scarcely see how it could be done.

3438. So that the amount of dust arising from this sandpapering could not be mitigated?—I say it can be mitigated by what I have said.

3439. But you have agreed that a certain amount must still remain?—Yes.

3440. And that the amount which still remains could not be removed?—No, I do not see how it could; it must be in the room, of course.

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3441. We have been told by one of the witnesses that this dust covers his clothing as well as the floors and surrounding objects. How is it possible to save the workman from this very serious danger involved in breathing this dust?—Of course, I do not agree that there is enough dust to cover himself, or there ought not to be enough dust.

3442. The next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

3443. This gives rise to splashes which must frequently fall even on the face of the worker. How can you deal with the spray which arises in this operation?—Of course a good painter would not splash very much if he is a man who understands his work.

3444. Supposing he is not as good a painter as you picture to us, what do you say then?—I should not care to go into a room and see a man splashing about like that.

3445. Do you mean to say that a good painter would make no splashes in the work?—I do not say that he would make none, but he should not make many; I should not like to see him make many.

3446. You said there was very little dust in the operation I was asking you about just now, and now you say there is very little splashing in the operation of painting the ceilings?—No.

3447. But there is a certain amount?—Yes, there must be a little.

3448. That falls on the face of the worker, I take it?—It may fall on his clothes, and that sort of thing.

3449. He has got his face looking up at the ceiling, has he not?—He is working with his arms a certain distance away from his face. I have not observed it, at all events.

3450. But when he is painting the ceiling he could not cover his face with his arm, or he would not see the ceiling, would he?—No, but he would have the brush a certain distance away.

3451. He would be working like this (*illustrating*) so that it fell on his face, would he not?—I have not found it so.

3452. You have never found it fall on his face?—I do not say I have never, but not often. It would not be much.

3453. But there would be a certain amount, would there not?—There might be a certain amount.

3454. Do you think that you could use an exhaust draught to catch the spray?—No, I do not think you could.

3455. Then there is no remedy to remove the evil?—I cannot think of one for the moment.

3456. You think there is no remedy for the evil of the spray which falls from the ceiling?—No, I cannot think of any for the moment.

3457. Precisely the same considerations apply to the process of stippling, do they not?—Yes.

3458. Do you have old paint burnt off with a spirit or charcoal burner?—No, I do not very often. It is often taken off with strong acid—a wet process.

3459. But do you ever have old paint burnt off with a spirit or charcoal lamp?—I have had one or two cases in years.

3460. But it is not the custom of the trade to work in that fashion?—It is the custom of a good many, but I think it is gradually being done away with.

3461. Suppose it is the custom in some cases, how can you prevent the worker from inhaling the fumes which arise from this process?—You cannot prevent it, I think, unless he wears a mask.

3462. Do you think that would be practicable?—No, I do not think so.

3463. Where and how do your men mix their colours?—They have a paint shop, a place set apart on every job, for mixing it. We send the raw materials and they mix it there on the job.

3464. Do you adopt any precautions to deal with the danger that arises when colours are handled dry?—We do not, but nearly all ours are sent out in oil.

3465. It appears from your evidence that there are certain indispensable processes in carrying out which a painter must necessarily inhale some dust, some spray or some fumes containing lead?—Yes.

3466. I want to ask you how these dangers can be met?—It is a difficult question to answer; I do not know that I can answer it right away.

3467. Is it possible to remove the danger entirely in any other way than by using a substitute for lead?—I suppose it is, but I cannot for the moment think of anything to absolutely do away with all possibility of danger.

3468. Various witnesses have told us about non-poisonous substitutes for lead as a paint base. Have you had any personal experience with such substitutes?—Yes.

3469. Have they been successful?—We do not care about using them entirely as a substitute, but we use them very often in conjunction with lead.

3470. The Office of Works and several other people who have been before us have succeeded in obtaining efficient non-lead paints. I suppose you agree that if an efficient substitute can be found the use of lead should be prohibited?—If we could all be put upon exactly the same basis; I mean if it is proved to be efficient, and if the architects and others would get in the habit of not specifying the use of lead, we should not object at all.

3471. Supposing this Committee were to recommend unanimously, or by a majority, the prohibition of lead entirely in this country, and it was to apply to every user of paint, would the master painters support that?—I think so. I should cordially recommend them to.

3472. You mean to say that putting them all on the same basis would remove any evil as regards that?—Yes, always providing that an efficient substitute can be found. I think you said it had been tried for four years.

3473. I did not say so, but you have probably heard that from outside?—I may be mistaken.

3474. Have you been in communication with anybody in connection with that? Who told you four years?—I thought you said so.

(*Mr. Sutherland.*) I think I am responsible for that.

3475. (*Chairman.*) You realise that if a free use of lead is allowed to continue the Home Office will have to insist on the most rigid observance of all precautionary measures, in the same way as in other industries, where the workers handle lead?—I should be very pleased if they did so.

3476. And you realise that the hours of labour would probably have to be reduced, as has been done in other dangerous trades?—That also we should be very glad to do, but the workmen would be the first to find fault with it.

3477. All this would involve an extremely complicated and elaborate code of regulations?—Yes, it would.

3478. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess rooms, washing accommodation, avoidance of dust, limitation of hours, and all other such matters?—Provided we are all put exactly upon the same level, and if it can be efficiently carried out, yes.

3479. Do you think it is possible to subject painting operations to systematic and thorough inspection?—I am afraid not. I cannot think that it is.

3480. Then in your view such precautions or such a code of regulations would become a dead letter?—I am afraid so. The distances are so far apart that periodical and constant inspection would be almost impossible.

3481. Then do you think, in view of your opinion, that the Home Office should institute a code of regulations which they could not put into operation?—No, I think they could only perhaps give penalties where it was found that men were not working according to the rules. We should be very glad of a code of efficient rules; I should like to put on every time sheet, for instance, that was sent out, instructions to the foreman, or a notice hung up in



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every paint shop. I have thought a good deal about the best manner to do this. It is not like going to factories, because one would have to send notices of every job to the Home Office everywhere there was a bit of work going on. It would mean an immense amount of labour, I think, and it would open up such a vast prospect.

3482. But you do not think it would be best for the Home Office to make regulations in the case of using lead?—Yes, I see no objection to it.

3483. But from what you say yourself as to the immense amount of labour and the almost insuperable difficulties which would ensue if the code were introduced, and the almost impossibility of enforcing the rules, do you not think it would be much better for the Home Office to say, "The evil exists, we cannot remedy it, we shall prohibit the use of lead altogether"?—By all means I think so—in that case.

3484. (*Dr. Collis.*) Do you employ any people except painters, such as paper-hangers and plasterers?—Yes.

3485. Do you insure your men?—Yes.

3486. Do the insurance company ask you to pay any different premiums according to the employment of the men?—No, not ours. They take the average workmen all through—anybody connected with our trade.

3487. They take the painting trade as a whole?—Yes, they take the painting trade as a whole. We pay one universal rate.

3488. Do you know how that compares as regards any other industries, such as builders, for example?—Some contend that painters and decorators are more liable to injuries than builders.

3489. I want to know whether you know whether insurance companies ask a higher premium from your trade on behalf of your operatives than they do from builders for builders' operatives?—No, they do not from us. There are certain firms that pay higher rates than others. I think they take a firm according to the class of work they do.

3490. Do you know how much building masters pay?—No, not regularly. I believe they pay about 30s. I think that is about the rate, but I do not know.

3491. (*Mr. Sutherland.*) A jobbing builder is at a lower rate than a painter and a decorator. Is not that so?—Yes.

3492. And lead poisoning is a big element in the rate?—Yes, it is.

3493. (*Dr. Collis.*) That is the point I rather wanted to get out?—Yes, I can answer that.

3494. (*Mr. Sutherland.*) You do what we call a very high-class trade?—I believe so.

3495. You do a good decorative trade?—Yes, a good decorative trade.

3496. Do you see any reason why the hours of labour should be reduced because of the use of white lead, even supposing the Government do not prohibit it?—No.

3497. Do you attach any importance to a man working 10 or 12 hours? I am speaking of the average painter. Do you think a man is more immune from lead poisoning if he works 10 or 9 hours a day than if he works 11 hours?—Not a bit.

3498. The usual conditions of the man's employment and the surroundings are wholesome, are they not?—Yes, very, generally speaking, for a class of business such as we do.

3499. (*Mr. Parsonage.*) Would that apply to working in a theatre?—Yes.

3500. You do a good deal of that, do you not?—Yes, we do.

3501. (*Mr. Sutherland.*) For instance, in private houses the rooms are wholesome, fresh, and clean, are they not?—Quite, as a rule.

3502. There is no foul air in them?—No; there is ventilation, and the windows are kept open.

3503. The dust which would arise in an ordinary rubbing down is of a very minute character in quantity, is it not?—Yes.

3504. Do you generally provide washing arrangements, or do you see that they have facilities, such as

soap, and so on?—Yes, always; soap and towels are all provided and sent on to the job.

3505. Do your men complain of any lack of facilities in that respect?—No, I have never had them complain. The difficulty is to keep them up to the mark, and for the foreman to see that they use them.

3506. You were asked about tools. The man does not carry his tools, does he?—Not as a rule.

3507. They are sent on to the job, are they not?—Yes, and he hands them to the foreman, who puts them in the box at night.

3508. What he carries with him would be personal knives?—Yes, something that he fancies in the way of knives.

3509. Would he keep those in a clean condition?—Yes, or else he could not work with them.

3510. A clean man would not think of putting his knife away dirty, would he?—No.

3511. And any fitches, or anything of that sort, would also be put away clean, would they not?—Yes.

3512. So there would be no contamination in them?—No. If he did not clean them he could not use them; they would get hard.

3513. Have you any personal experience of any substitute of the same virtue as lead for general painting?—No, not quite.

3514. Do you know that most substitutes—zinc compounds—have to be specially mixed, and they are not mixed with the ready facility with which lead is?—Yes.

3515. And that lead has held its own against all competitors for the last 120 years?—Yes. We always like to put a basis of lead. We use zinc oxides, and others, afterwards.

3516. Do you feel that the decorating trade has no prejudices against these non-poisonous paints?—I do not think so, whatever.

3517. And that the consideration that they have is purely one of service to their customers?—Yes.

3518. And that if a paint with an equal value of protective qualities and facilities of application to lead were promulgated, the painting trade would accept it for their own interest, because it would reduce the cost of insurance?—Undoubtedly. We should be only too glad.

3519. Your men do not often take their meals in the paint shop, do they?—Scarcely ever.

3520. Except in occasional cases?—They may do, but very rarely.

3521. Do you use much of these paints, like Duresco, and water paints, for ceiling work and relief work?—Yes.

3522. Has that very largely supplanted the use of flitting for ceiling work?—Yes, very much.

3523. On the ground of cost and on the ground of quickness?—Yes, the majority of ceilings are done with those sort of things now.

3524. Do you think that anything like a general inspection of painters would be impossible?—I do not see how it could be carried out.

3525. You think it would clash with the privacy of your customers, and it would also involve an enormous staff of inspectors to follow it up?—Yes.

3526. (*Mr. Rice.*) In the course of carrying on your work I take it you have to visit your various works?—Yes.

3527. And do you sometimes go into the room where the rubbing down is carried on?—Very often; of course we must.

3528. Have you ever noticed the dust from rubbing down settling on the window ledges to any great extent?—Very slightly. A man has his dusting brush with him as a rule, and he just carefully brings it down on to the floor and puts it into a paper or duster or something. He collects it as he goes along very often.

3529. Have you ever had occasion to put your foot into the dust that has been caused by rubbing down?—No.

3530. So that when you made the next step you left the imprint of your foot in the lead dust?—No.

3531. With regard to the use of towels and water, which you generously supply your men with, do you

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have any difficulty in getting the men to use them?—No. The men will go to a pail of water. If there is any difficulty in getting hot water the labourer will get pails of water, and you will find the men, when one o'clock comes, go and wash their hands.

3532. And when the dinner bell rings they go and wash their hands in the ordinary way?—Yes.

3533. You do not have any complaint from your foreman or men that there is none provided anywhere they go?—No. I have notes from three of my very experienced men and they would be glad to come down if they were required.

3534. (Chairman.) We would take any evidence that is available, of course?—They said they would come down and support all that I have said. They have given me their notes.

3535. Their notes alone will be no use, I am afraid?—They have signed them.

3536. (Mr. Rice.) Now, with regard to the amount of painting work done, there is the outside painting, where there is no rubbing down with glasspaper, or very little, where it is washed off by the wet process, and there is the inside work, where the rubbing down process with glasspaper is sometimes used?—Yes.

3537. Can you give me any idea of the proportion of the dry rubbing down process compared with the wet rubbing down?—It is infinitesimal as compared with the other. It would be very very small.

3538. Do you mean the water process would be small?—No, the dry process.

3539. The dry process would be very much smaller than the water process?—Yes. For instance, in here he would immediately commence to rub this paint work down with water and pumice stone, and when he has got his first coat on he might, as I say, have to take his glasspaper and smooth down any inequalities that there were.

3540. Would you be surprised to hear that 75 per cent. of the work is rubbed down by glasspaper?—It is not my experience.

3541. Can you tell me anything about the proportion?—No.

3542. Would you be surprised to hear that 75 per cent. of the work is rubbed down with glasspaper?—It would be a very large bill for glasspaper or sandpaper if they did.

3543. You would be surprised to hear it was 75 per cent.?—Yes.

3544. That is not in accordance with your experience, is it?—It is much less.

3545. (Chairman.) How much would you say?—Not more than 10 per cent., I should think. I should not really think more—without consideration.

3546. (Mr. Rice.) Is there a process known as felting down?—Yes.

3547. Do you do much of that?—That is only used principally for front doors, or where they want a very nice coach surface, as we call it. It is hardly used for any other surface.

3548. There are three processes of preparation, are there not? There is the dry process, which you say is about 10 per cent.; there is the wet process, and the felting?—Yes.

3549. (Chairman.) When you say 10 per cent. are you speaking of your own particular high-class business, or of painting generally in the trade?—I was speaking of my own business. I really cannot answer so much for the others, but I do not see that it would pay them to do it.

3550. (Mr. Rice.) On the question of the messroom, it is customary on all jobs of size to find a messroom for the men, is it not?—Yes.

3551. They are not bound to hang their overalls in that messroom, are they?—No, they would not hang them in the messroom; they are generally found a room for that purpose—a lock-up room.

3552. That is probably the same room where their brushes are kept?—Yes.

3553. The men will keep their brushes and overalls in the colour shop, will they not?—Yes.

3554. So there would be no need to put them in the messroom where their food is?—No.

3555. I understand it is customary for the men to bring their food in their pockets?—Occasionally.

3556. There is no need for the men to put that food in the colour shop?—No. It is very seldom they bring it in their pockets, now, I think. They generally go out and get it, or in the country, where they mess together, one acts as caterer, and they get on exceedingly well.

3557. (Mr. Parsonage.) They do not, in London, as a rule, bring their bread and butter, but they go out to the coffee-shop, do they not?—Yes. In London, of course, they might bring their bread and butter.

3558. (Mr. Rice.) With regard to the possible use of a substitute for white lead, do I understand you to say that the trade would have no objection whatever to any efficient substitute being found?—No, I think not, none whatever.

3559. In fact, they would rather welcome it, would they not?—Yes, I think so, because it would lessen our insurance.

3560. I know what your experience is, but from what you know of employers, are they not generally fairly careful of the health of the men?—Yes; they have to be. We do not want rickety men or men who are unable to work. It is best for us to keep our men up to a high standard of health.

3561. Have you had many cases of lead poisoning among you employees?—No, hardly any. We have paid no compensation, as I have told the Chairman, and as far as we know, although men stop away sometimes for a day or so, it has never been brought to our knowledge that it was from lead poisoning.

3562. Would you be surprised to hear that about 50 per cent. of your men have lead poisoning?—Yes, very much surprised.

3563. You would be surprised?—Yes.

3564. You do not think it is possible?—No, in fact my oldest foremen always contend that it is not so.

3565. (Mr. Parsonage.) With regard to lead poisoning cases, your foreman takes on the men?—My manager does, as a rule.

3566. Of course, he takes on the men for the time he wants them, and then they are discharged again; is not that so?—Yes.

3567. Probably in the winter you will not have half a dozen men on at all?—We very seldom go down so low as that, because we have to keep a nucleus.

3568. Of how many?—We keep always, perhaps, 20 men, who are, perhaps, foremen, and we have to find them work somehow or another, and draft them out.

3569. Is it as much as 20?—I will not say 20, perhaps 12, but I do not think we ever drop down to less than about 12 men.

3570. They are on in the winter time?—All the time. Absolutely I find them work, for maintenance, and different things. Even if we had not got a job, I should find them something to do, rather than let them go, because of the difficulty of replacing them.

3571. The other men, we will say, are men taken on casually as they come along, is not that so?—Not as they come along.

3572. Mr. Macdonald would generally take them on, I suppose?—He would know the men and have their addresses. They would not be casual strangers.

3573. With regard to men that he knew, who had worked for him before, he would give them the preference, naturally?—Yes.

3574. Many of these men would be working nine months in the year in the other shops?—Of course they may.

3575. And might they not easily have lead poisoning without it coming to your knowledge at all?—Yes.

3576. You say that you provide towels?—Yes.

3577. Do they not usually use the wash leather instead of a towel?—We do not want them to do that if we can help it. Towels are always provided by the foreman, but we do not want them to use the wash leathers. We cannot always guarantee that they do not use the wash leather, of course.

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3578. With regard to the rubbing down, you say that 10 per cent. of it is dry?—It might be 10 per cent., I said.

3579. Then the 90 per cent. would be pumice stone and water?—Yes, I should think it would be. I do not know. I would like perhaps to amend that. I ought to give a little more consideration to that. But it is not so much more than 10 per cent. We have very little dry rubbing.

3580. You cannot use pumice stone and water on newly painted surfaces, can you?—No.

3581. The pumice stone and water is used on the hard paint before the first coat is applied?—Yes.

3582. After the first coat is put on and rubbed, between coats, it is always glasspaper?—Yes.

3583. And the work has got to have probably four coats of paint. Yet you say in face of that statement that 90 per cent. of it is wet rubbing?—Yes.

3584. How can you explain that. If a door has to have four coats, and it is rubbed down once with pumice stone and water and three times with sandpaper, how can you say that 90 per cent. of it is wet rubbing?—No, I suppose I shall have to amend that. I have not considered it.

3585. Supposing you put it 90 per cent. sandpaper and 10 per cent. pumice stone and water, would not that be nearer the mark?—Oh, dear no. It might be a third of it dry, but I should say not more, if I went as far as that. I would like to give that a little more consideration, because it is a point I have not studied sufficiently.

3586. I have never worked for your firm, but I can tell you of firms in the West End of London that I have worked for for 28 years every one of which you would know, who are equally as high class as your own. I am speaking from personal knowledge of many of your men. I understand you always pay the rates?—Yes.

3587. It is true that you always pay the standard rate of wages to all your men, and you generally get the best men, is it not?—It is more than the standard rate. We pay 9d., and the standard rate is 8½d.

3588. (Mr. Rice.) May I interpose. My question to Mr. Campbell was bearing in mind the outside work. Mr. Parsonage's question about a door is one thing, but what I pointed out was with regard to outside work?—(Witness.) I was thinking of that proportion when I answered.

3589. (Mr. Parsonage.) But I am talking about the work you generally do. You do not do so much outside work, do you?—No, we do not. Then, of course, that minimises it considerably, if you confine it to inside work.

3590. That would be so, but the great danger from lead poisoning is the interior work?—Yes.

3591. And in that work the proportion of dry rubbing to wet rubbing is far greater?—I do not think so, because we have particular work to do which must be thoroughly rubbed down first with pumice stone and water, and when that is once done the dry rubbing is not much between the coats.

3592. You say you fill it up and rub that down with glasspaper?—Yes.

3593. And between each coat, if you are going to work with enamel, you have always got to glasspaper it?—Yes, and then, as I say, we use a little turpentine with the glasspaper, so that that is not dry rubbing.

3594. You very seldom use turpentine in rubbing down with glasspaper, do you?—We give instructions to have it done.

3595. In my experience it is very seldom done. It is about as often done as felting down is done. You were speaking of the man keeping his coat in the lock-up room where the foreman keeps his brushes. That is the same room where he will keep his coat?—Yes.

3596. And he will keep his food in his coat pocket all day, sometimes, in the room where the paint is mixed? That is so, is it not?—I cannot say, I really do not know. He is not obliged to do it, but men may do it, of course.

3597. I have known many men that have worked for you that have suffered from lead poisoning, but I

cannot say that they have actually contracted it on your work?—We are liable if they have contracted it previously, as you know.

3598. I have had it this last year with several firms, and there have been several cases with Maple's of lead poisoning?—Yes, my idea about lead poisoning is that it has a great deal to do with the physique of the men; and that it is the man who comes on casually who is the man who gets it more easily.

3599. I quite agree that the man who is brought up to the trade and introduced into it and who understands the dangers is more likely to be careful?—Yes.

3600. But it is the man who is introduced at a cheap rate who is more liable to get it?—Yes, and perhaps the ordinary common house painter, who is only a house painter eight months in the year.

3601. We do not call them painters?—I should not call them painters either, but those are the men who would be given in as painters when they are counting up lead poisoning cases. I say they are not painters, the same as you do.

3602. (Mr. Rice.) But they are known as painters when they work, and they are taken on as painters?—Yes, of course; in times of great pressure there are a lot of men taken on as painters as long as they can hold a brush.

3603. (Mr. Parsonage.) That is so in London, and especially in the spring season, is it not?—Yes, that is so.

3604. Many men that work for you, and have worked for you for years, may have lead poisoning without it coming to your knowledge at all?—They may, if there is no complaint made.

3605. At the present time, in the spring season, you will have more men on than you will have at any other time of the year, will you not?—Yes.

3606. At other times, if your work drops off, they go somewhere else, and they come round again to see if you have anything; is that so?—Yes.

3607. So that they are always migrating from one shop to another?—That is so.

3608. So that, as a matter of fact, no individual employer could positively state as to the health of his men?—No, only the cases that come before him.

3609. (Mr. Gardner.) Are you a practical painter, that is to say, have you served your time at the trade and worked at the trade?—No, I have not.

3610. You have been asked about the technique of the job. Is what you have said purely from observation in going through the works?—Yes.

3611. You have not executed any work yourself, have you?—No, except at home, only as an amateur.

3612. In speaking of the work in your firm, do you know whether you use sharp or flattish colour, or oil colour in bringing up the work?—We use oil colour in bringing up the work—yes, we use mixed sharp colour. It is a question of time.

3613. Do you use principally mixed sharp?—Yes.

3614. I suppose you are aware that sharp colour is much more brittle than oil colour and flattish colour?—Yes.

3615. And there would be a great deal more dust, even with giving it a slight rub with sandpaper, than if it were flattish?—Yes.

3616. Are you of opinion that a man working nine hours, say, in a confined room, is as healthy as a man at the end of a day who has worked 12 hours. Which is the healthiest man at the end of the day?—The man who works nine hours, undoubtedly.

3617. Then you said you thought there was no special need for adjusting the hours of labour?—No, I find the great obstacle to that are the workmen themselves.

3618. That is a point as to the means of earning a living and the necessity of having a certain amount of money to keep their families and themselves, of course. I take it your establishment is one of the first-class establishments in London, and, therefore, you do not do much jobbing work, do you?—Yes, we do at times.

3619. Do you go out to do one or two rooms in a house?—No, not if you call that jobbing work.

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[Continued.]

3620. That is what I call jobbing work?—No, we do not do that.

3621. In supplying your men with brushes, you do not supply a man with a set of brushes, but all your brushes are sent to the job. Is not that so?—Yes.

3622. You remarked that a man never carried tools in his bag. I suppose that you would be astonished to learn that men in many districts carry dusters and carry a papering brush, and in many cases they carry oil brushes and varnishing brushes in their bags, and that they have specially brought up these brushes for special jobs?—Yes.

3623. Lead in past years has held its own in the trade, but was that not because zinc white was not known and properly understood?—I think it was, in past years, certainly.

3624. Then if zinc white was better known it could take the place of lead quite well, could it not?—I do not admit that—not at present.

3625. But if it was as well understood as lead, why should it not take the place of lead?—It takes three coats of zinc, in my opinion, to equal about two coats of lead.

3626. I suppose you would be surprised to learn that we have been told that two coats of zinc paint are equal to three coats of lead?—I am not surprised at anything you have been told.

3627. (Chairman.) The Board of Works told us that by practical demonstration?—We have not been able to prove it ourselves.

3628. Have you tried it?—We have tried it many times.

3629. (Mr. Gardner.) If that could be proved, would you not admit that zinc white could take the place of lead quite well?—If it could be proved, of course I would.

3630. (Chairman.) May I take it that if the Board of Works' evidence is accepted by the Committee you would fall in with it?—Certainly.

3631. (Mr. Sutherland.) Would you think that that would be sufficient evidence?—Not at present. I think we ought to go into it in a much larger manner before deciding on such evidence as that.

3632. The evidence is good, as far as it goes?—Yes, but I do not think it goes far enough.

3633. Would it satisfy the Institute of British Architects?—No, I do not think it would.

(Chairman.) The Institute of British Architects have demonstrated to us here beyond question that you can have a substitute for lead.

(Mr. Sutherland.) But the two witnesses were only giving their two individual opinions. They did not commit the Council or the Institute.

The witness withdrew.

Mr. H. VIGURS HARRIS examined.

3639. (Chairman.) Is your business at 70, George Street, Plymouth?—Yes.

3640. Are you a master house decorator?—Yes.

3641. How long have you been engaged in the painting trade?—I am the third generation in the business. I have been in it about 41 years; I think you can call it 40 years.

3642. Have you been an employer all the time?—Yes.

3643. Perhaps you can tell us how many men you employ?—Of course, in the painting trade it varies.

3644. Will you give me the variations?—Last year we had, men and boys, 64. I took May as being the highest and January this year as the lowest for the 12 months. We had 36 in January; that would mean an average of 50.

3645. Now, about lead poisoning or painters' colic, have you known any cases of it?—Yes, very few.

3646. I suppose you have paid a certain amount of compensation?—It is only lately that compensation has come in.

3647. Have you paid compensation since it has come in?—We had one case, the case of a man called Dawe. He came to us and I think he was with us about 10 days. He was working about 16 miles away

(Chairman.) I think you will find that they will. They had been selected with others to make the experiments.

3634-5. (Mr. Sutherland.) Yes, but it is only in a tentative state at present. (To the witness.) That would relieve the tension very much with regard to the master painters, if the Institute of British Architects said that, would it not?—Yes.

3636. (Chairman.) If the prohibition is ordered, they would all have to fall in with it, would they not?—Yes.

3637. You seem a little uncertain in your answer as to the percentage of men employed in dry rubbing and the percentage of men who are employed in wet rubbing with pumice stone and water. Perhaps it is because you have not had an opportunity of thinking it over, but you have ranged from 10 per cent. to 33 per cent. already. Would you like to give that further consideration and to communicate with the secretary as to what the result is with regard to the percentage of work?—Yes, I would like to think it over, because I have not given it consideration.

3638. Of course, you realise that it is very important?—Yes.\*

\* Under date 13th April 1911 the witness wrote as follows:—

I beg to enclose amended reply to the question left over last Wednesday, to which I have given my very close attention.

Enclosure:—

Question.—What is the proportion of the whole of the labour in preparation (per cent.) of dry rubbing down paint between coats with glasspaper, as against cleaning off with water and pumice stone to prepare for repainting?

Answer.—Taking the standard of repainting as two-coat work, I say 33½ per cent. at the outside, but probably less. (I consider two-coat work as the general standard, for in my view there is much more two-coat work done than three or four coats.)

There would be double the amount of lead got off the work from the wet preparation with pumice stone to what was got off in the dry rubbing down with glasspaper.

In three- and four-coat work the proportion would be of course somewhat higher; but would never, I am sure, exceed 50 per cent.

In my opinion this entirely begs the question whether any powder or any appreciable quantity is formed during the dry rubbing down between each coat.

In modern conditions, the time given for painting is such that each coat has never time to harden sufficiently to form a powder when rubbed down with the glasspaper, but, on the contrary, it mostly adheres to and fills up the glasspaper.

Then, again, there is not anything like so much lead taken off in the dry rubbing down process as there is in the wet preparation, when the paint is actually cut into.

in the country. He scarcely touched paint at all while he was with us. He was stripping rooms and washing off ceilings, and he suddenly developed lead poisoning. We paid compensation, but he had acquired the poisoning somewhere else, not in our shop, because he scarcely ever touched the paint while he was with us.

3648. How many cases have you known in the last five or six years?—That would occur to me as the only one. Within the last 20 years altogether I should think four in our shop.

3649. Have they been serious cases?—One was rather serious. He was advised to leave. Two of them occurred with storekeepers and two with operatives.

3650. Have your men, in addition to that, had occasional days of sickness due to lead?—Not that I know of.

3651. Have they broken down in health at all?—Almost the only thing that I can remember is that when influenza has been raging in the locality our men have fallen victims like other people, but I think on the whole the health of our men has been extremely good.

3652. Do you have a periodical medical examination of your men?—No.

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[Continued.]

3653. Is it possible that some of them may be suffering from the slower and more insidious forms of the poisoning?—I do not think so. I was suspicious of a boy during the last 18 months. He was very heavy and dull, and I wrote to his father, and I found out afterwards that what was making him dull was not any poisoning but that he had contracted a tremendous habit of cigarette smoking, and it was not lead poisoning at all. I really cannot say that we are much troubled with it, or have been.

3654. But do you recognise the magnitude of this lead poisoning evil in the country?—Yes, I recognise it since it has been spoken about in the Press, but I could not recognise it from our own experience.

3655. Do you know that the Registrar-General has recorded no less than 284 definite deaths from lead poisoning amongst house painters in the last 10 years?—No, I was not aware of it. I did not know the number. I knew it was larger than one would like to think.

3656. And that his mortality figures show for painters a death rate considerably higher than the normal from troubles which are the frequent effects of exposure to lead, such as Bright's disease and nervous diseases?—I should not admit it in our shop. I should simply say it has not happened in our shop.

3657. Do you also know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the same 10 years?—Yes, but I should say against that on the other side that it is just the same as this: my experience is that when a medical man says he does not know what is the matter with you he says you have a touch of influenza, and so with regard to any man who is in any way connected with the painting trade and has anything the matter with him it is at once suggested that he has lead poisoning. I think influenza and lead poisoning have been a god-send to medical men. I am not speaking from experience; now but from observation with regard to influenza, and our men tell us the same about the lead poisoning.

3658. Perhaps you would be surprised to hear that these cases, which are reported voluntarily, are only a fraction of the whole, inasmuch as the Home Office have no legal right to pay for such reports and are, therefore, bound to discourage reporting to some extent?—I have not misunderstood the magnitude of the evil. At home we have always been fighting against it. One of our apprentices was handling lead in the way of cementing lights and I said, "Do not let that boy go on with that, and see that he washes his hands every time he leaves off in sulphuric acid and water and, if necessary, drinks a little of it."

3659. I am sure you will agree with me that all this sickness and death is very deplorable?—Yes, very.

3660. Do you know that this lead poisoning evil has attracted the most careful attention in many foreign countries?—In France I know it has. I thought that the use of white lead in paint was practically forbidden in France.

3661. Do you know that the use of white lead has been prohibited to an appreciable extent abroad, and that the work of painting has been most strictly regulated in several countries where the use of white lead is still allowed, and do you not think it regrettable that this country should be behind other nations in this respect?—I should not like England to be behind in any humanitarian thing. I think any trade should suffer a good deal of difficulty rather than endanger the health of the operatives.

3662. I felt sure you would think so?—Quite.

3663. A great many small dangers attend the use of lead—for instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—I attach as much importance to that as anything. I have had interviews, with a view to your inquiry, with several of my older men, and they have always wound up by saying, "There is no danger to the health of the men at all if they would only keep clean, if they would only wash properly."

3664. Then you consider lavatory accommodation essential? It is essential from one point of view, but how can it be provided? We are not a factory.

3665. We will come to the difficulties presently. You have told us just now that your own men informed you that they consider that cleanliness is indispensable?—Yes.

3666. And as a corollary of that I ask you whether you consider lavatory accommodation to be essential?—Most certainly, but I do not know whether it would be used.

3667. That is not the point?—I quite agree with you that washing is essential.

3668. Including a supply of hot water for washing?—No, I should not have thought that was essential.

3669. You cannot get paint off your hands easily with cold water, can you?—Yes, I think so, if you wash and add a little petrol or turpentine.

3670. Have you tried it yourself?—I have not.

3671. Must it not be more easy to get paint off the hands in cold weather with hot water than with cold water?—Yes, naturally.

3672. Is it generally practicable for the men to have hot water to wash in?—No.

3673. For instance, I suppose when they are painting the exterior of a house the men are not allowed to go inside?—They would not be allowed in. Sometimes they ask for hot water for tea. When they go to some houses it is refused, as if it were a liberty to ask the thing; others are very very kind.

3674. Do you know, for instance, that even when painting the inside of some particular room it is not uncommon to require the men to enter by the window?—Certainly. We have not a great number of cases in our district like that, but it is so sometimes.

3675. Do you advocate definite rules regarding the wearing of overalls?—No. I rather insist upon it personally for what I call discipline. If a man is not properly clothed I tell him he is not fit to go to a nice house. I should not have thought overalls were imperative.

3676. The great evil with regard to lead poisoning is the dust which the men breathe. That is proved beyond question?—I must accept it if it is a statement of yours.

3677. You may accept it not from me only but from the evidence that I have taken on another committee on lead poisoning in potteries. There it was laid down beyond question that the great prevalent evil was the dust which was created?—Yes.

3678. As these men must create a certain amount of dust in their work, do you not think that a definite rule should be put forward regarding the wearing of overalls?—I should like the rule with regard to inside work, but I do not like a man being hampered with too many things when he is working on ladders.

3679. I have told you that the great prevalent evil is the dust which accumulates in the room and which settles on the men, on their clothes, and on their face and hands, and so on. If that is the case do you not think that it should be imperative that they should wear overalls, which they can take off and leave behind when the work is finished?—It would not occur to me now as imperative, I should not have thought it was so serious as you make out. You may be right, but from practical observation I should not have thought so.

3680. (Mr. Parionage.) Possibly the Chairman is referring to the ordinary white things that the painter wears—the jacket and apron.

(Witness.) I thought the Chairman meant the trousers. I should be very glad if it were made compulsory. I think it shows discipline.

3681. (Chairman.) How can you ensure that the overalls would be kept in a cleanly state?—You could not possibly ensure it unless the Government insisted on all employers providing jackets and aprons for the men; and also that they should wash them. I do not think you could be sure of the men doing it.

3682. Do you think that they ought to be washed frequently—at least once a week?—If a man comes with a dirty jacket or apron on Monday morning I speak to him at once.

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[Continued.]

3683. Do they often come with dirty overalls?—No, they do not.

3684. Then you do not have to speak to them very often, do you?—No, not very often. Perhaps it is fair to say that our shop is not a model shop, but it is not a dirty shop, and perhaps it is better than the average.

3685. You take personal care, probably, of your workpeople?—Yes, and I like the men too.

3686. My point is this. As I have told you, dust collects either on the men's clothes or on their overalls that they wear. If the men are allowed to take their overalls home with all the accumulated dust on them that is a source of danger. Do you not think that ought to be prevented?—Of course I must accept your dictum, but I should not have thought it was much source of danger.

3687. I think in the pottery trade it was found to be one of the great sources of danger?—It might be there.

3688. Because it collected the dust?—Except in a few cases, I do not consider that we have a very great deal of dust. In some cases we have.

3689. I will come to that in a moment. Then, with regard to meals, where do your workpeople have their meals?—A certain proportion of them have their meals at the houses where they are working, that is to say, if they are a mile and a half from their homes they would have it in that way. Sometimes they would have it in the room where they have been working. In many places they would be allowed to have it in the servants' hall, or, if there was an outhouse, they would rather go there than have it in the room.

3690. Do they ever have their meals in the place where the work is being done?—Constantly; as often in the room that they are working in as elsewhere.

3691. Is not that a great source of danger?—I should think it was not at all nice. When they are in our shop we have a separate room, our porter's cottage, where they go and have their meals.

3692. You have a separate mess room?—Yes, a separate mess room. But then, of course, most of the men are out. It does not apply to more than half a dozen.

3693. Do you mean that the difficulty of providing a mess room is insuperable?—Yes, only a very small proportion can avail themselves of it.

3694. Do the men who go out to work frequently have to take their meals in the rooms in which they perform their work?—Yes, very frequently. That would not be advisable, of course.

3695. Now, all these precautions which I have suggested (and all these rules are insisted on in other industries that are liable to lead poisoning with a view of mitigating the risks which the workers run), would it not be exceedingly difficult to carry them out faithfully in house painting operations?—I should say it would be difficult.

3696. Then, at the best, such precautions would not deal with the most important risk, namely, the risk arising from dust and spray which the workman can inhale during the whole of his working hours?—No, I think none of those you have suggested would deal with it.

3697. First, with regard to the dry rubbing down with sandpaper; I understand this process is indispensable?—It is indispensable, but I should have thought that the danger was a minimum from that cause in house painting, because what we rub down is nearly always oil coats or half-and-half coats. When we come to the finishing coats and flatting, it would powder a great deal more, but we very rarely do it except sometimes for getting up white enamel work, and where we have to use things for flatting. In the ordinary way the under coats have a large proportion of oil; in fact, we would rather flat upon a good oil wall than we would upon a dead wall.

3698. (Mr. Parsonage.) That is necessary, of course; to get a good effect?—Yes.

3699. (Chairman.) Is the dry rubbing down not applied invariably to newly painted surfaces on which the paint is already dry?—I suppose we would have to divide the work. I suppose the major part of the work

in England is cheap work, and there probably they might pass the glasspaper. I think you would find that with regard to two-thirds of the cheap work the men do not see a sheet of glasspaper from week end to week end, but on better work they would use glasspaper, and on the best work they would use pumice stone and water, and there would be no dust.

3700. Is there not a certain percentage of rubbing down which is done in a dry state?—On good work mostly, in getting up woodwork.

3701. I understand the wet process cannot be substituted for dry rubbing between the first and second coats when ordinary paint has been used?—No, you cannot use wet on that at all, because it would, of course, discharge the paint again.

3702. And you have told us it is only on high class work which is to be enamelled or varnished that the dry process can be dispensed with altogether. Is not that so?—No, I did not mean to convey that. I meant to say that on high class enamel work it would be more dangerous, that is to say, there would be more powder there, because it is essential for good enamelling work that you must use scarcely any oil at all; you must have it more flat work, and of course flat work requires more turpentine than oil, and there would be more dust in the high class woodwork.

3703. I suppose you will admit this, that in dry rubbing with sandpaper there is a certain amount of dust which ensues?—No, I should not admit it. I am prepared to accept it if you say it has been said in evidence, but it would never occur to me that there was, in rubbing down paintwork that was being nicely done, because in flatting we have a strong binder; we always put in a varnish to bind it, or else what we do one day would be lost when we rubbed it down two days after. It would powder too rapidly.

3704. Filling material dries very hard, and therefore can be rubbed down with pumice stone and water, can it not?—It depends what you use. Sometimes you have a distemper filling, and then you have glasspaper used. There are certain fillings now which scarcely want any rubbing down, but as a matter of fact we rub down filling with pumice stone and water.

3705. But a fresh coat of paint, which has dried within 24 hours, say, and not yet thoroughly hardened, would be spoilt by wet pumice stone and water, would it not?—It would.

3706. And would it not also tend to clog up the pumice stone?—It would.

3707. Where dry rubbing down with sandpaper is indispensable, how can you prevent the worker from breathing the lead dust?—I do not think you could prevent him breathing it at all, unless he had a mouth and nose mask.

3708. That would be very uncomfortable, would it not?—I do not think he could work properly with it, and I should not think it was feasible.

3709. Can you use an exhaust draught to remove the dust?—No, I should not say so. I should think that it would stir it up more.

3710. The amount of dust arising from this sandpapering, according to the evidence that we have before us, is very considerable. We have been told that it covers the man's clothing as well as the floors and surrounding objects. How is it possible to save the workman from the very serious danger involved in breathing this dust?—Are you referring to the ordinary rubbing down of paint work?

3711. Yes?—I have never seen such a case. I have seen it when we have been rubbing down filling, or scraping old paint, when we have not burnt it. When the glasspaper gets clogged, the man rubs two pieces together, and then I have seen the man rub dust off the paper.

3712. The amount of dust arising from the sandpapering is very considerable where the man is working. Would you agree to that?—No, I would not agree to that unless you qualify it. It is only when you are getting up woodwork very sharp. It may happen there, but that would not be in the South of England.

3713. Then would you say that that dust so created would cover his clothing as well as the floors

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and surrounding objects?—If it covered the floor I think it must stand to reason that it would adhere to his clothing. I think it is a point in favour of the overalls. It would cling to woollen, of course, more.

3714. How is it possible to save the workman from the very serious danger involved in breathing this dust?—If I had to say what I really believe, I do not consider in our shop it is a serious danger.

3715. I am not asking about your shop just now. I only want you to tell us what is really in your own mind. I think you have admitted to the Committee now that there is a considerable amount of dust from this sandpapering and this particular process?—Yes.

3716. What I want to ask you is: How is it possible to save the workman from this particular dust?—I do not know that you can save him. For instance, suppose you had a veil, which might seem a very good suggestion, I think that it would be more injurious probably. I think that the mesh would get clogged. It would be a permanent source of danger, I fancy. I have here some remarks which one of our men made about a man who was in our employ for a number of years. He was subject to lead poisoning, and whenever he was doing any of this rubbing down he would put a cloth around his nostrils and over his mouth, but he is the only man I have known to do it.

3717. (Mr. Parsonage.) If there was no dust the man would not want to do that even, would he?—No.

3718. (Chairman.) The next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—I take it you are referring to cornices, and so on.

3719. (Mr. Parsonage.) Anaglypta ceilings?—Yes, that is so.

3720. (Chairman.) This gives rise to splashes which must frequently fall even on the face of the worker. How can you deal with the spray which arises in this operation?—I should be inclined, on the spur of the moment, to say you cannot deal with it.

3721. Could you use an exhaust draught to catch the spray?—No, I think any use of an exhaust draught would aggravate the complaint. That is my feeling about it. It would just set it going all over the place.

3722. Then again we are confronted with the problem of how to save the worker from the grave danger involved in breathing this spray?—I should not have thought he did breathe it. I should have thought he got some of it on his face perhaps, but I must say that when our people are doing it there is very little of it. Some people will do it and they will not have any marks when they come off the scaffold.

3723. A witness told us that if he was working, as he described, with his face up to the ceiling and his arms above him, there would be a considerable amount?—I think a good sensible workman would do all he could to save himself. He would work more in this way (*illustrating*). As a rule with work like that we put our best men on it, and as a rule I do not notice it very much. Then, again, I suppose it does happen to a certain degree, and sometimes badly. Anyone who knows anything about house painting knows that some people will put as much on the floor as they will on the work.

3724. This Committee has been formed to suggest some practical alleviation of the evils which ensue. If all the workmen were practically machines that could be worked upon, no doubt we could recommend some regulations which could be carried out; but they are human beings, so that the difficulty is this, that we realise the danger exists and we have to sit here as practical men and suggest some remedy. It is no good our saying that some men are more careful than others. We know that this evil exists to an overwhelming amount, and we hope to get some suggestions from witnesses like you. Precisely the same considerations apply to the process of stippling, do they not?—

No, I should not think so. You would not get paint on the face through stippling.

3725. You do not think you would?—No, I do not.

3726. (Mr. Parsonage.) Would he get it on his hands?—No, I do not think so. The stippler only distributes; it does not send paint flying abroad. It rather prevents it flying.

3727. I suppose he would get paint on his hands, would he not?—No, he would not get the paint on his hands through stippling. All the splashing and the contact of lead with the clothes or with the face is with the putting on of the paint, not with the stippling.

3728. (Chairman.) Do you have old paint burnt off with a spirit or charcoal burner?—It is spirit now; of course, charcoal is out of date.

3729. How can you prevent the worker from inhaling the fumes which arise from this process?—You cannot prevent it, I should say.

3730. Do your men mix their colours in the paint shop?—A great number of people do not do it there, but I have it done in the paint shop, because then I have greater control over it. We send it out ready tinted with just a little alteration to be made on the job when I or my deputies go round. I prefer mixing it in store.

3731. Do you adopt any precautions to deal with the danger that arises when colours are handled dry?—No. I do not know what precautions you can adopt. There is only one thing I have had under consideration for some time, and that is that I have a row of three or four mills on a bench and a motor, so that we shall not have any breaking up by manual force, but it shall go straight into the mill and shall be run through the mill and be mixed in that way. That is the only precaution that I know that can be taken.

3732. It appears from your evidence that there are certain indispensable processes in carrying out which a painter must necessarily inhale some dust, spray, or fumes containing lead. How are these dangers to be met?—I suppose any straightforward person would say that if you meddle with poison you have to take the risks. There is no doubt that lead is a poisonous matter. It would be foolishness to say that it was not, but I should not have thought that it was as poisonous as your statistics give, from my own experience.

3733. You admit the evil exists but you can suggest no practical remedy?—No, except the enforcing of practical cleanliness, and if I am in one place and my men are on a staff perhaps 100 miles away, no one except the foreman can enforce it.

3734. This is the point. Is it possible to remove the danger entirely in any other way than by using a substitute for lead?—Of course it has been discussed for a long time.

3735. I am speaking now of these dangers which you admit exist, and I ask you, is it possible, under the circumstances, to remove the danger in any other way than by using a substitute for lead?—No, I do not think it is. On the spur of the moment I should not think so. If you deal with poison, and it has its legitimate effects, you must do away with the poison.

3736. Various witnesses have told us about non-poisonous substitutes for lead as a paint base. Have you had any personal experience with such substitutes?—Do you mean as a first coat or altogether?

3737. I am speaking generally?—I have had some experience of zinc and also of some of the materials that are now sent out by the enamel people as under-coatings, which I believe have a zinc basis.

3738. We have had a representative of the Office of Works here, as a witness, and several other people, who have succeeded in obtaining efficient non-lead paints. I suppose you agree that if an efficient substitute can be found, the use of lead should be prohibited?—I do not know that I agree with that, unless it could be very much limited. I think there are cases in which lead might be almost a necessity—for outside work, I mean.

3739. Would you go so far as to say that it should be limited?—Yes, very much limited.

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[Continued.]

3740. Would you say that it should be limited to this extent, that they should be permitted to use 5 per cent. of lead, a standard which the Home Office have treated, in one or two industries at least, as substantially free from danger?—I think 5 per cent. is a very low percentage, because suppose it is necessary to use it outside on exterior work; if you took a master painter's pigment bill, you would find that what runs away with colour tremendously is the outside painting. For instance, in a place like Plymouth there are a great number of stucco houses, a great quantity would be used on the stucco.

3741. What I mean is that no paint should contain more than 5 per cent. of lead. I may tell you that the Office of Works accepted that as their solution of the whole trouble. They said you could do it very well without any lead at all in a great many instances, but if it was decided not to allow more than 5 per cent. of lead to be used in any given paint they would accept that willingly?—I think it is quite possible that if you had more than 5 per cent. you would defeat your object, and people would not be immune from poisoning. I quite see that, but you are suggesting that no one should be allowed to use pure lead on a building, and I think that is rather a serious thing, as I say, because of climatic conditions.

3742. Of course we want to protect the trade as far as possible; but primarily our purpose of meeting is to protect the workpeople?—I do not see why you need protect the employers at all, because, if they are all put on a level, they cannot any of them use it, but if you say you are protecting the white lead manufacturers it would be different. It does not matter to me if we are all on a level.

3743. Instead of the precautions which I have enumerated against the evil which undoubtedly exists, would you welcome, if it were a general order to apply to the whole of the trade, the prohibition of lead?—I do not know that I can answer that, because, although I have had a long experience of zinc, for instance, I am not sure whether we could easily do without lead in every case.

3744. Now I want to put the converse point to you. I want you to realise that if the free use of lead is allowed to continue the Home Office will have to insist—they are bound to do it—on the most rigid observance of all the most precautionary measures that could be devised in the same way as in other industries where the workers handle lead?—I shall be very glad for every precaution to be taken that would save life if the precautions can be taken and the regulations administered.

3745. It may be necessary that the hours of labour would have to be reduced, as has been done in other dangerous trades?—In which case I think it would be distinctly for the advantage of the country that you should prohibit the use of lead, because I find that through the increased price of painting work not so much work is done at present, and houses are not painted as frequently as they used to be. I have noticed that rooms and houses that used to be done every five or six years run now for 10 or 12 years, and customers say, "We cannot stand the cost this year; we must wait a year or two." There is a considerable looking to the cost of things at present. I would much rather see lead prohibited than that there should be an arbitrary raising of the cost of the thing. I am not speaking of the workmen's wages being raised now; that is another point altogether.

3746. I will put another point to you. It would necessitate a minute examination of every worker perhaps once a month, at the expense of the employer, which is done also in other industries, and it would involve the most rigid factory inspection. It would further involve a complicated and most elaborate code of regulations. Would you be prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess rooms, washing accommodation, avoidance of dust, spray, and fumes, limitation of hours of labour, together with periodical medical examination?—I am an individualist with socialistic ideas, and I think the less hampered any business is with rules and regulations enforced by

an outside authority the better. It would be infinitely better for the painting trade to have white lead absolutely prohibited than to have administration which would be exceedingly difficult for the master painter to fall in with.

3747. Then it comes to this, that if, as I foreshadowed, it became necessary to introduce those regulations, you, as an employer, would prefer the abolition of lead?—I do not know personally about the regulations. I am not keen or sweet on white lead at all, personally; I am the other way about. In fact, I very much admire zinc painting, to speak plainly.

3748. But you were speaking just now very strongly and antagonistically against inflicting on the trade all these burdens?—Yes; I do not know how we should carry them out.

3749. Do I understand you to prefer the abolition of lead entirely to the strict regulations?—Yes, I much prefer it.

3750. (Dr. Collis.) You were speaking of the fact that the medical profession was rather inclined to notify or declare to be lead poisoning what might otherwise be a transient illness?—Yes, that is my experience. Whenever a foreman comes and says a man is suffering from lead poisoning I always say I should prefer him to see another doctor.

3751. Are you aware that in this industry a larger number of people than in any other industry die of Bright's disease?—No, I am ignorant on these points.

3752. A point occurs to me, that if lead poisoning is charged with certain transient illnesses which are not due to it, perhaps it is escaping the extra number of deaths from Bright's disease amongst the number of people employed in the painting trade?—If you say so I will accept it. I do not know it, but I can quite understand that it manifests itself in different ways.

3753. My point being, after all, that if lead bears the blame for a few transient illnesses, it escapes the blame for certain deaths?—Yes. May I just run over a few instances of my men? Here is one man, aged 60, who has been with our firm nearly 30 years, but has never had lead poisoning or colic, and never feels the bad effects except from the fumes of turpentine.

(Chairman.) I do not think it is necessary to give those details.

3754. (Mr. Sutherland.) You are past President of the National Association?—Yes.

3755. The National Association is not taking up any position antagonistic to the use of substitutes, is it?—My opinion is that if it were brought before the body of the National Association they would all begin to fume against it, and would all say that they only wished for what was the best. I mean to say they would have a prejudice against any change, but I do not think they are taking up any antagonistic position.

3756. They would simply want to be satisfied that what is substituted is equal to what is to be dispensed with?—That is so.

3757. That the substitute for lead would be as efficient?—That is so.

3758. Then there is the other question of the effect on the general public. We have not sufficient data at present that there is anything equal to the wearing capacity of white lead, and if by any precipitant action it was prohibited, and the cost of painting was increased, and the wearing qualities were diminished, it would impose a very heavy cost upon both public and private property owners?—I should think that we were further on than your suggestion seems to show. I have great confidence in zinc, and so had my father before me, for its durability, because we found that if we did, say, a staircase with zinc flatted and put a fair bit of varnish in it, for 20 years we could wash that staircase and it would come up as new paint.

3759. I am not speaking of interior work at all; I am speaking of exterior work, which represents a very large proportion of the painting trade?—Yes, half of it.



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[Continued.]

3760. Do you think that we have information enough to-day to put aside a valuable pigment like lead?—I think I shall have to tell the Chairman that our experiments have not reached this stage of absolute certainty, and the experiments are not limited to this country, but are going on in America, and so far the opinion in America is more in favour of lead, but it is not final.

3761. That does not meet my question. It must be either total abolition or nothing?

(Chairman.) Plus the regulations.

3761A. (Mr. Sutherland.) I think the regulations would break down from their own difficulty?—They may break down, but they would break down the employer with them, and I should be very much humiliated if I were hal up for evading the Act, which was propounded for the sake of saving the men. I do not think they could carry out those suggestions.

3762. I am not thinking of firms like your own, but I am thinking of the average master painter, who would probably never look at the regulations, he would set them aside. It would be difficult to enforce them, and it would land everybody in endless confusion. What I want to know is: Do you think that at the present stage we have got sufficient data to work upon to set aside white lead?—I think we have sufficient data for inside work, interior painting, and decoration. I am not quite clear about the exterior, but I would rather risk it than have these regulations.

3763. As to the dry rubbing down, do you think that in the process of dry rubbing down a man who was working on a door rubbing down would cover his clothes and his shoes so that when he stepped from where he was standing it would leave the impression of his feet?—I have not seen it like that. I should not have thought from one door you could do it.

3764. Can you imagine it?—No, not rubbing down paint. If you rub down filling, that is a different thing.

3765. I mean rubbing down paint—sharp colour even?—Supposing it was a third coating; I should not have thought it was possible.

(Chairman.) Did you mean that, Mr. Parsonage?

3766. (Mr. Parsonage.) I was referring to the work done in London (to the witness), where it is all sharp colour?—My answer is that the way we do our work, if it is sharp colour, there would be powdering.

(Chairman.) The witness ought to know that Mr. Parsonage, who was in the witness box this morning, gave us that suggestion.

3767. (Mr. Parsonage.) My experience is obtained in the West End of London, where we have to use all sharp colours, and we cannot use oil colour on account of the atmosphere. (To the witness.) I did not distinctly say what the thickness was. My statement was that if you were standing rubbing down the door, when you moved your feet away you would see the impression. There would not be the dust there that there was round where you were standing. I did not say that there was one-sixteenth of an inch of dust or any thickness of dust. You can understand that when you move your feet away there would be none there, and you would be able to see it on the floor, and you would dust it up with your duster on to a piece of glasspaper?—I do not think it would be so to the extent that you describe. We are not so sparse as some people are. I like to put a fair amount of varnish in the flattening, and then I do not think you find powdering.

3768. But if you follow up one fast colour with another, there would naturally be more powdering than you would get with the oil?—Yes, there would be a certain amount of powdering.

3769. It is one sharp coat on top of another that causes it?—Yes.

3770. (Mr. Sutherland.) What do you say with regard to taking meals in the paint shop and on the job?—I never allow that. I do not think it happens.

3771. It does sometimes, does it not?—It is a very serious thing.

3772. Do you think it would be poisonous?—No, I think it would be injurious.

3773. It might be nauseating and unpleasant, but do you think it would be injurious?—I think it might be.

3774. Do you think it is not practicable to get hot water?—Not always, but you can get it in a gentleman's house.

3775. Where do you have your paint shop?—Perhaps in a coal cellar.

3776. Not in the coal cellar, do you?—Yes, sometimes the coal cellar.

3777. Or the wood cellar?—A cellar, yes.

3778. An outbuilding. Very often the coach house is set aside for that?—Sometimes, yes.

3779. The doors are open and the men could have their meals there. It is not a hurtful process. Sometimes they have them in the stable, do they not?—I do not say you would detect anything, but I should think it was not good for a man's vitality.

3780. But generally provision is made that the men shall have their meals apart from the paint shop, is it not?—I consider that in working away from the shop, where the men must have their meals upon the job, half the time they have it in the room where they are working.

3781. If you are taking a house right through, that would not be the case, would it? There would be one room probably set aside and left to the last?—Yes, but unfortunately you do not have many houses to do right through. Nowadays it is generally two or three rooms which people can afford to have done at a time.

3782. Now, with regard to the filling and rubbing down. If the filling is done with the knife, like the French do it—stopped with the broad knife—it does not need much rubbing down, does it? Very often it is left as it is?—When that is done I find the men like to use the glasspaper, and I prefer them to use the pumice stone and water then.

3783. On the hard filling?—On the hard filling. It is a little more troublesome job to do, only they get it smoother and they get it level.

3784. You do not mix much dry lead, do you?—No, I do not think we use half a hundredweight of dry lead in the course of the year. The only thing we use it for is when we use American filling, which is a very fine and expensive filling to work. We use it for walls and woodwork, and coachmakers' filling, but then it is bound by japan very strongly. We could not rub down American filling and dry white lead with glasspaper, it must be water and pumice, or something like that.

3785. Have you had any experience of zinc paints for outside painting?—No, but I am going to give myself a good deal of experience, because I am utterly weary of the effect in our climate of white lead. It chulks and powders so easily.

3786. Can you give us any opinion upon that point?—No, but where I have used one-third of white lead and two-thirds of zinc it has stood very much better. I have done it in conservatories.

3787. Do you think that the use of lead necessitates the reduction of the hours of labour of painters? Do you think painters run any risk to health by the present hours of labour?—I do not think that would save them from poisoning at all. I think it would mean very little difference. The difficulty in the painting trade is this, that you would never exactly overcome it by working altogether through the masters, because customers employ a lot of men direct more than they used to, and we are faced with this difficulty sometimes—and when I find it out I discharge the man, even if he is an old man—that a man will work so many hours a day for me, and then he will go off and work for my customer or somebody else's customer so many hours in the evening.

3788. (Mr. Parsonage.) Is not that dealt with in the rules?—Yes, but you have not half the men in the union.

3789. But is it not the fact that in the rules between your society and our men in Plymouth it is provided that the men shall not take on work?—Yes, I think it is, but I have not had occasion to read the rules lately.

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[Continued.]

3790. In sandpapering work down, do you ever use turpentine with the sandpaper?—Scarcely ever.

3791. Very rarely?—Very rarely. I would say almost not at all is so rare.

3792. I would like to bring this point out, because it is a point that has been laid stress on by a previous employer who gave evidence this afternoon. He said, in the whole course of his experience he did not think he had seen turpentine used more than 20 times in the last 30 years. Would that agree with your experience?—The only occasion on which we use turpentine is in rubbing down with glasspaper.

3793. Do you use pumice stone and water?—Yes, a great deal.

3794. For rubbing down before it has its first coat?—Yes.

3795. After that can you use the pumice stone?—No, except on hard filling.

3796. The main rubbing down is really sandpapering, is it not?—Yes, glasspapering.

3797. What percentage would you put of sandpaper to pumice stone? Which would you consider was the most used, taking interior work?—I do not know, and I do not think ours is a typical shop either, because we use a great deal of both. I know it is rather a byword in the town, the amount of pumice stone we use.

3798. Do you use an exceptional amount of pumice stone?—I think we use an exceptional amount of pumice stone.

3799. But still, for inside work, you would agree that there was more glasspapering done in rubbing down than pumice stone?—I do not think the men are so many hours on the glasspapering as the pumice stone.

3800. But a door is rubbed over two or three times with sandpaper where it is never rubbed once with pumice stone. Is not that so?—That is so.

3801. (*Mr. Gardener.*) I take it you are a practical painter, and you have worked as a painter?—I have not worked as a painter. My son has, but I have not.

3802. Then your evidence is only the result of observation?—Yes, always being in it.

3803. You mentioned, with regard to the lead-poisoning cases that you had, two storekeepers who had suffered from lead poisoning?—Yes.

3804. What is the storekeeper; is he a shopman?—The front part of the store, the front bench, is a

The witness withdrew.

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3817. (*Chairman.*) Are you a master house decorator?—Yes.

3818. Where is your business?—98 and 100, Oxford Road, Manchester.

3819. How long have you been in the painting trade?—Myself about 23 years.

3820. Have you been an employer all that time?—No; perhaps 18 or 19 years.

3821. Were you apprenticed to the trade?—Yes, as a student, not a bound apprentice.

3822. How many men do you employ?—Our numbers range from 15 to about 74, but the average comes to about 45.

3823. Perhaps you can tell us about the average yearly number of painters you employ?—It varies, 45 is the average.

3824. Now about lead poisoning or painters' colic. Have you known any cases of it?—Yes, several.

3825. Do you mean that you have paid a certain sum of compensation?—Yes, we have paid compensation in three cases.

3826. Have your men, besides that, had occasional days of sickness due to lead?—We have not had any other complaint than those three.

3827. Do you have a periodical medical examination of your men?—No.

3828. Is it possible that some of them may be suffering from the slower and more insidious forms of

mixing bench, and he is responsible for nearly all the mixing of the shop.

3805. Is that man a painter?—In these two cases he was not a painter.

3806. He is just a man you employ for colour mixing?—Yes.

3807. How would you account for him contracting lead poisoning?—I think that is by excessive contact with it.

3808. From the fumes arising from the paint he was mixing?—No.

3809. You think not?—No, I think, without knowing it, it gets about his person, however clean he is. The man I have now is very clean, and he always has sulphuric acid and water to wash in, and he drinks a certain amount too.

3810. Was the man who contracted poisoning uncleanly in his habits?—He was uncleanly to this extent, that the men would say that if Williams had not got a knife handy he would put his hand into the lead tub and take it up. Sooner or later that man was bound to have it, but I do not think it is normal.

3811. In working with the stippler you said you thought there would not be many spots thrown about?—I do not think so.

3812. In working with a stippler on a wall, have you not seen the end of the wall and the back of the stippler covered with spots?—I do not think I have noticed it in working. Generally when there is any stippling I am on the job, but I am very particular about the stippling.

3813. I have used a stippler very frequently, and I have found the back of my hand all covered with small spots often?—Possibly that was the result of your brushing or somebody else brushing after the stippling. With stippling the stippler generally follows the other man, I think.

3814. I do not believe in a man leaving a stippler to distribute the paint?—No, nor do I.

3815. The stippler should merely put the surface on, should he not?—Yes, but I do not think what you are complaining of on the back of your hand comes from the stippling process, but from the other man.

3816. You are going to experiment with zinc outside. Up to now you have just tried it as an admixture. You have not tried it by itself, or with refined boiled oil, have you?—Yes, I have. What I have done is this: I have given the first coat of lead, and then two coats of zinc. I should not like to speak dogmatically upon the result.

the poisoning?—It is not apparent; it might be; I have not observed any symptoms.

3829. But you know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—Certainly.

3830. I gather from your answers that you realise the magnitude of this lead poisoning evil?—Certainly.

3831. Do you know that the Registrar-General has recorded no less than 284 definite deaths from lead poisoning amongst house painters in the last 10 years?—I had not known it till yesterday, I think it was, when I heard it stated.

3832. And that his mortality figures show for painters a death rate considerably higher than the normal from troubles which are the frequent effects of exposure to lead, such as Bright's disease and nervous diseases, and that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same 10 years?—It is my conviction that things are ascribed to lead poisoning which are not really lead poisoning.

3833. I said that these were voluntarily reported by surgeons?—Undoubtedly they would be so.

3834. Do you realise that these cases, reported voluntarily, as I say, are only a fraction of the whole, inasmuch as the Home Office have no legal right to

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[Continued.]

pay for such reports, and are, therefore, bound to discourage reporting to some extent?—Yes.

3835. I am sure you will agree with me that all this sickness and death is very deplorable?—Undoubtedly.

3836. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes, I am aware of that.

3837. And that the use of white lead has been prohibited to an appreciable extent abroad?—Yes.

3838. And that the work of painting has been most strictly regulated in several countries where the use of white lead is still allowed?—Yes, I am read up in that pretty well.

3839. Do you not think it regrettable that this country should be behind other nations in this respect?—I think there should have been legislation before.

3840. A good many small dangers attend the use of lead. For instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—Undoubtedly.

3841. Then you consider lavatory accommodation essential?—Washing accommodation is certainly required.

3842. Including the supply of hot water for washing?—Yes.

3843. Is it generally practicable for the men to have hot water to wash in?—Yes.

3844. Can they always get it wherever they are working?—Pretty nearly always. It is very seldom you get a case where you cannot get hot water.

3845. For instance, when the exterior of the house only is being painted, and the men are not expected to go inside for any purpose, where are they to get the hot water?—They get the hot water for washing and for meals from the people belonging to the house.

3846. Supposing the people in the house will not supply it?—We should have to make some arrangement to have a stove for boiling the hot water for washing and for the meals.

3847. But you could not have a stove outside the house, could you?—We could put it in the yard.

3848. Supposing it is a London house with no yard, where would you put it then?—I have not experience of that class of house. My only experience of London painting has been interiors.

3849. The difficulty would almost be insuperable in the case I have cited, would it not?—There is always an area in a London house. They must have a place where they are to store their materials, unless they go backwards and forwards to the shop.

3850. Do you know that even when painting the inside of some particular room it is not uncommon to require the men to enter by the window so that they do not have access to any part of the house?—That is so.

3851. Do you advocate definite rules regarding the wearing of overalls?—Yes, they should all wear overalls.

3852. How can you ensure these being kept in a cleanly state?—They are supposed to have them clean once a week at least, or we want to know the reason.

3853. If the workman has to take his overalls with him in his bag, will they not come in contact with his tools?—Not with wet paint brushes. His other tools would be clean, such as knives, and that sort of thing.

3854. Where can the overalls be kept from day to day when working continuously on one job?—They are usually hung up wherever they hang up their clothes, in the room they use as a mess room.

3855. Can you always provide a place for the painter to hang up his coat where there will be no risk of dust falling upon it?—They make a place for themselves generally. They usually drive a nail into the wall or something.

3856. Where do the men generally have their meals?—As a rule in the kitchen or basement.

3857. But do they not frequently have them in the room in which they are working?—Not very often.

3858. Do they sometimes?—They do sometimes, when they are only doing one room.

3859. But in the case where they are only doing one room, they would have to have them in the room they

are working in, would they not?—Yes, if they are not working near enough home for them to go home to their meals.

3860. Then you cannot always provide a place quite free from the risk of contamination where the painter may leave his food during his working hours?—He always carries a bag for his food, but you could not guarantee that you could find a separate room.

3861. All these precautions which I have cited, and others as well, are insisted on for the mitigation of lead poisoning risks in potteries?—Yes.

3862. Would it not be exceedingly difficult to carry them out faithfully in connection with house-painting operations?—It would, except where the painting is done in workshops.

3863. Then at the best, such precautions would not deal with the most important risk, namely, the risk arising from dust and spray which the workman can inhale during the whole of his working hours?—No.

3864. First, as regards the dry rubbing down with sandpaper. I understand this process is indispensable?—Yes.

3865. Is the dry method not applied invariably to newly painted surfaces on which the paint is already dry?—Always between coats, yes.

3866. I understand that the wet process cannot be substituted for dry rubbing between the first and second coats, when ordinary paint has been used?—No, the wet rubbing would cause it to cord up, to rub up into little lumps. It is not practicable.

3867. Is it only on high class work which is to be enamelled or varnished that the dry process of rubbing down can be dispensed with?—It is done in all processes to a slight extent.

3868. But my point is this: is it only on high-class work which is to be enamelled or varnished that the dry process can be absolutely done away with?—Do I gather that it is in rubbing down varnish or rubbing down enamel which has been done already for a next coat, then the work is done in water, but otherwise it is done dry? Is that what you are referring to?

3869. Yes?—That is so.

3870. The filling material dries very hard, and, therefore, can be rubbed down with pumice stone and water, can it not?—Yes.

3871. But a fresh coat of paint which has dried, say, in 24 hours, but not yet thoroughly hardened, would be spoilt by wet pumice stone?—Yes, it would be.

3872. And it would also clog up the pumice, I suppose?—Yes.

3873. Where dry rubbing down with sandpaper is indispensable, how can you prevent the worker from breathing the lead dust?—There is practically no dust from it in rubbing down oil paint, but if they were rubbing down the filling which is made from white lead there would then be dust.

3874. We have had evidence to-day which shows that the dust arising from the sandpapering is very considerable. We have been told that it covers the man's clothes as well as the floors and surrounding objects. How is it possible to save the workman from the very serious danger involved in breathing this dust?—It would have to be a flattening paint, that is, paint which is made with turpentine alone. If it was paint with oil, that would be impossible.

3875. I am speaking of flattening paint?—If there was much glasspapering done on flattening you would get a dust.

3876. Could you use an exhaust draught to remove this lead dust?—It would have to be part and parcel of your rubbing down with glasspaper.

3877. It would not be practicable?—No, it would not be practicable.

3878. The next question I want to ask you is about the painting of ceilings having moulded or relief designs. In doing this work we are told that the brush has to be pushed into the background of the ornamental work; is that true?—Yes.

3879. This gives rise to splashes which must frequently fall even on the face of the worker?—Yes, it does.

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[Continued.]

3880. How can you deal with the spray which arises in this operation?—It is a thing which is bound to occur. It could not be obviated.

3881. You cannot use an exhaust draught to catch the spray?—I think not.

3882. Then, again, we are confronted with the problem of how to save the worker from the grave danger involved in breathing this spray?—Of course, if he kept his mouth open he would be just as likely to take it in as not.

3883. He could not keep from it very well?—Not if there was much, but the amount of spray is very small.

3884. You admit that there is a certain amount of it?—Yes, there is a certain amount, because after you have been doing it you require to wash your face. It is all over little specks.

3885. Precisely the same considerations apply to the process of stippling, do they not?—No; there would be no splashing from stippling.

3886. Would you agree with this, that fine particles come from it?—No, I do not agree that anything comes from it. It attaches to the brush itself. As soon as the brush begins to get clogged you have to discard that brush and get a fresh one, if you are going to make a decent surface of it.

3887. Do you have old paint burnt off with a spirit or charcoal burner?—With spirit burners.

3888. How can you prevent the worker inhaling the fumes which arise from this process?—If he is working in a room, of course, he might get the fumes, but outside he would not be likely to get any fumes. If he uses a lamp inside he would get the fumes, but it is very unusual to use lamps inside, because of the unpleasant smell it makes about the building.

3889. We have been told by one witness, that the burning off outside has sometimes occasioned poisoning. Are you surprised to hear that?—Yes, I am surprised.

3890-1. It would depend which way the wind was blowing. It might blow right in a man's face?—Or he might be working in an alcove where the fumes were, so to speak, pocketed.

3892. Do you agree that there is danger outside?—It is very small.

3893. Where and how do your men mix their colours?—On the job always.

3894. Do you adopt any precautions to deal with the danger that arises when colours are handled dry?—We have no lead dry colours.

3895. But in mixing the turpentine and oil with the lead there are a certain amount of fumes which arise, are there not?—If it is demonstrated that the fumes from lead at an ordinary temperature are dangerous, then there would be some danger.

3896. It appears from your evidence, then, that there are certain indispensable processes in carrying out which the painter must necessarily inhale some dust, some spray or some fumes containing lead. How are those dangers to be met?—By dispensing with lead.

3897. Is it possible to remove the danger entirely in any other way than by using a substitute for lead?—I do not think so.

3898. Various witnesses have told us about non-poisonous substitutes for lead as a white base. Have you any personal experience with such substitutes?—We have used three or four manufactured articles which are all of a similar nature on analysis—whites.

3899. Have you used leadless white paint for exterior and interior work?—Both.

3900. Have the workmen applying these non-poisonous paints known what they were using?—No, they have not.

3901. Did they use them satisfactorily?—Quite.

3902. Have you had any complaints as to difficulties in working with the leadless paints?—Not with those that they have known nothing about.

3903. I think you have something to tell us about the painting classes at the Manchester Municipal School of Technology?—Yes.

3904. Have you used white lead there?—Not this year at all.

3905. Have the students found any difficulty in using the substitutes?—None whatever. There have been just the same difficulties that we have with white lead there, and that is the first difficulty that we have to get over with new painters, they will make the stuff too thin.

3906. Is the work as good as when white lead was used?—Better.

3907. Corroborating what you have told us, the Office of Works and several other people have succeeded in obtaining and using non-lead paints. I understand you agree that that is quite possible?—I think it is so, yes.

3908. Then you realise this, that if the free use of lead is allowed to continue, the Home Office will have to insist on the rigid observance of all precautionary measures in the same way as in other industries where the workers handle lead?—We shall find difficulties in framing them.

3909. But if lead is used?—There should be some restriction I think.

3910. Do you realise also that the hours of labour would probably have to be reduced, as has been done in other dangerous trades?—The hours are not excessively long already, I think.

3911. Do you think also that this would involve an extremely complicated and elaborate code of regulations?—I am sure it would.

3912. Would you be fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess-rooms, washing accommodation, avoidance of dust, limitation of hours and all other such matters?—It would be almost impossible to observe anything on that.

3913. (Mr. Sutherland.) Would you qualify that?—Yes. I think it would be absolutely impossible.

3914. (Chairman.) You would prefer as an alternative to that, the abolition of lead?—Yes, I would, absolutely.

3915. (Mr. Sutherland.) Does the term zinc oxide indicate a particular paint, or does it indicate simply a white paint in which zinc in indeterminate proportions is used?—I should say you would insist on the zinc oxide without any admixture.

3916. Would pure zinc oxide give you a permanent paint?—I think not.

3917. Then you would have to mix it with some other material to give it the permanency and to give it opacity?—The zinc would be too transparent, altogether.

3918. Then practically what the chairman calls non-lead paint represents any amount of different formulas, does it not?—Yes, either china-clays or something of that sort.

3919. And to establish a standard of leadless paint would mean co-operation between public bodies to get something that would be accepted?—Yes.

3920. For instance, if the Government prohibited white lead it would simply leave the profession, the builders, and the public, confronted with any kind of paint that was put on the market as leadless paint. An architect drafting a specification in the interests of his clients naturally wishes to get the best. How should we get it?—I think you want an inquiry to find which is the best and make it the standard.

3921. There is the Government's interest and the architects' interest representing their clients and the public interest representing permanency?—Yes.

3922. Have you had much experience of zinc paints for outside work?—Not a great deal.

3923. Have you had sufficient to really establish data upon it?—I think not.

3924. Do you think it would be an easy thing to establish a formula for leadless paints?—In a given period of about five years.

3925. I was going to ask you what term you think it would be necessary to give the public in order to transfer them from the use of lead paints to the use of leadless paints. You say you think five years?—Yes, I should think so. I think it would force the hands of the paint manufacturers or chemists and make them bring something forward.

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MR. WILLIAM HENRY CANTRILL.

[Continued.]

3926-7. Do you think it is desirable for this Committee or any other body, or this Committee, in conjunction with any representative body, to establish, on an adequate scale, something like tests of the physical properties of these leadless paints?—I think myself that a Committee should be formed to go into this matter.

3928. Do you know that the Dutch Government have just completed an inquiry which covered something like five or six years?—Yes.

3929. And that they took zinc paints and lead paints, and they seem to have tested them on all kinds of surfaces and position. Do you think that such a step is desirable for this Committee, or any other committee, before committing ourselves to a definite pledge or recommendation?—I should say it is necessary that you should have a committee about it, and not bar the use of lead immediately.

3930. You do not think there would be any objection on the part of the painting trade, given a satisfactory substitute for white lead?—I think not.

3931. Then a question was put to you about the fumes from the lamp. Do you think a worker works directly over the fumes of the lamp while burning off?—Not too unpleasantly near.

3932. Nor so near as to be dangerous?—No, he holds it at arm's length, except just in corners where he cannot.

3933. You think the objectionableness of the fumes would not be sufficient to endanger the health of the operative?—No.

3934. The interior work is not done with a lamp but done with solvents?—Yes.

3935. Do you give your men accommodation for hot water? You are bound to for meals, are you not?—Yes.

3936. But is there a difficulty in getting them hot water for washing their hands?—No, I do not think so. We find, as a rule, the customers themselves are only too pleased to find it.

3937. Do you think there is any danger in rubbing down?—No.

3938. Do you think the rubbing down is done to such an extent, and cuts off so much dust containing lead, that it becomes a danger to the health of the operative?—In our experience there is very little glass-papery done.

3939. And it would always be done, not so much to remove the surface of the paint, as to remove the little knits or rubs?—Yes.

3940. You do not think that the danger from the spray or dust, coming from stippling, is insignificant. It comes from the application of the paint?—Yes, it comes from the application of the paint. The man who is stippling always comes off worse than the man who is laying on the paint, because he stands a short way from the ends of the brush and he receives splashes from the brush, whereas the man who is putting it on gets none. It is not from the stippler, but from the man who is applying it, that he gets his splashes.

3941. The addition of lead poisoning to the Workmen's Compensation Act has added substantially to the rate of insurance, has it not?—Yes, undoubtedly.

3942. It rose, I think, from something like 25s. to 30s. per cent. last year?—Yes.

3943. (Chairman.) Why do you consider five years necessary as an experiment?—In Manchester the life of an average outside is five years.

3944. But you think the Home Office would allow that period in view of the evidence that they have got from the Board of Works who have been trying it for the last five years?—If they have given it the five years test I should think that is quite sufficient.

3945. (Mr. Sutherland.) I should like to ask you whether you do not think that climatic conditions are not an important factor in the question of the use of zinc-white for outside?—Yes.

3946. In a climate like France it is very different to a variable climate like we have here, where there is so much damp?—Yes. Even 10 or 12 miles out of Manchester you would find it lasted very much better than in Manchester itself.

3947. (Mr. Parsonage.) You have paid compensation for lead poisoning cases, have you not?—Yes, three cases.

3948. One has been on for a considerable time, has it not?—Yes.

3949. Four years, I think?—Yes, three or four years.

3950. Was that the case of Winterbottam?—That is the name.

3951. I think he is still drawing compensation, and he has been receiving it since 1907?—No, it has been settled recently, and he is back at work again, not with us, but, I believe, with his brother-in-law—but he is at the trade.

3952. (Mr. Gardner.) You said you had been 23 years in the trade and 18 years of those as an employer?—Yes.

3953. Then you said that you had been apprenticed as a student?—I was with my father.

3954. But you went out to work, did you not?—Yes, I went out to work and studied in the evening at the Art School, and took the winter terms at the Art School instead of working at the trade.

3955. Then we may take it that you are a practical painter having worked at the trade?—Yes.

3956. In speaking about the provision of hot water, of course, you are speaking of your Manchester experience, and not outside the Manchester area?—Yes; it is within the rules of the Union that it must be provided, and a place to get their food in.

3957. If dust and fumes are not the cause of lead poisoning what would you say was the cause of lead poisoning?—It is only my theory, but I think they can take it through the pores through dirty hands, and leaving it on during the night, through not properly washing themselves, just the same as they can by eating it.

3958. (Mr. Parsonage.) It is the fact that the doctors do not accept that, is it not?—The doctors do not accept that, but it is my opinion that you can get infection through the skin. In working with dirty handles of brushes I think it is just as dangerous as eating it.

3959. (Mr. Gardner.) I suppose unless he was a very careless workman who was working on that wall, say, he would not make those spots on the floor with the stippling?—No.

3960. How would you account for it if there were those spots when it was stippled?—It would make a great many small splashes from the edge of the brush.

3961. From the stippler?—No, not from the stippler. In laying it on it flicks from those small outside strands.

3962. How would you account for the man working with the stippler having the back of his hand covered with small spots if it was not coming from the stippler?—I do not know; I have not noticed it.

3963. Have you yourself stippled much?—Yes.

3964. And have you never noticed it?—No.

3965. (Mr. Parsonage.) That is an illustration of a stippler? (Sketch handed to the witness.)—We do not use that class of stippler, but I can quite understand him getting it, because he would be receiving it from the man who was brushing and not from his own brush.

The witness withdraw.

## FIFTH DAY.

Thursday, 27th April 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Mr. E. L. COLLIS, M.B.

Mr. F. G. RICE.

Mr. W. G. SUTHERLAND.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

E. A. R. WEBBER

R. U. SHAXBY

} (*Acting Secretaries*).

Mr. J. PARSONAGE (a member of the Committee) recalled and further examined.

3966. (*Chairman*.) You are Secretary of the National Amalgamated Society of Operative House and Ship Painters and Decorators. I understand that you have handed to Dr. Collis various records in your possession showing particulars of the deaths which have occurred for a number of years among the members of your society?—Yes; in all I have handed to Dr. Collis records of 935 deaths which have occurred during the six years from 1905 to 1910, inclusive, among the members of my society.

3967. What is your average membership?—About 16,000, taken over the last six years.

3968. The title of your society includes both house and ship painters. How many members of your society do ship painting exclusively?—I could not say

definitely the number who do ship painting exclusively. I should think it is very small; I should not say more than 100. I could get the records from our branches in the shipbuilding districts.

3969. Perhaps you will do that?—Yes.

3970. Were the records compiled specially for the purpose of this inquiry? No; they were compiled without any reference to their being used for a purpose such as that of the present inquiry.

3971. How have they been collected during the years in question? Quarterly, for the purpose of insertion in our quarterly reports.

3972. May we rely upon their being absolutely trustworthy as far as your society is concerned?—Yes.

Mr. ARCHIBALD GARDNER (a member of the Committee) examined.

3973. (*Chairman*.) You are the Secretary of the Scottish Society of Operative House and Ship Painters. I understand that you have handed to Dr. Collis the various records in your possession showing particulars of the deaths which have occurred for a number of years among the members of your society?—Yes; I have handed to Dr. Collis records of 305 deaths which occurred during the 10 years 1901 to 1910, inclusive, among the members of the society.

3974. The title of your society includes both house and ship painters. How many members of your society do ship painting exclusively?—I have no accurate information as to how many men never work outside of a shipyard, but I should say from 50 to 75. I can get the accurate information as to that point, but I would not put it above 75 who never leave the shipyard.

3975. What is the average membership of your society?—Our average membership is a little over 3,000, say 3,240.

3976. Were the records compiled for the purpose of this inquiry?—No. They were compiled without any reference to that. They were compiled for the information of our members.

3977. How have they been collected during the years in question?—Quarterly from the branches. We get them in quarterly.

3978. May we rely upon their being absolutely trustworthy as far as your society is concerned?—Yes.

3979. (*Dr. Collis*.) Is there any difference between the way in which house painting is carried on in Scotland and in England which might make the Scottish workman more liable to accident?—No. There are differences in scaffolding outside work in some towns. We do not use the travelling cradle. It is all ladder work, with the exception that we use what is called a hanging scaffold, which is a much more dangerous form of scaffolding than the travelling cradle.

3980. Would they be more liable to falls with the hanging scaffold that you speak of?—Yes. There is no protection for the men.

3981. (*Mr. Sutherland*.) There is not a back board?—No; there is only a belly rope.

3982. What are these deaths? Do they include accidents?—Every case of death, no matter what the cause, including accident, has been sent on to Dr. Collis. They have all been copied from the certificates which we have in the office. We file all the Registrar General's certificates.

Mr. E. L. COLLIS, M.B. (a member of the Committee), examined.

3983. (*Chairman*.) You are a Medical Inspector of Factories at the Home Office, and a member of the present Committee?—Yes.

3984. You have received certain details from Mr. Parsonage and Mr. Gardner, members of the Committee, relating to deaths among house painters?—I have.

3985. Do the figures supplied by Mr. Parsonage relate to deaths among members of the National Amalgamated Society of Operative House and Ship Painters and Decorators during the years 1905 to 1910?—I understand that that is so.

3986. And those supplied by Mr. Gardner relate to deaths of members of the Scottish Society of Operative House and Ship Painters in the years 1901-1910?—Yes.

3987. These figures, as we have heard from Mr. Parsonage and Mr. Gardner, include a small proportion of ship-painters. Would this affect your deductions at all?—I think not.

3988. What are the respective numbers of deaths which have occurred in the two societies?—There have been 935 deaths during six years in the National Amalgamated Society of House and Ship Painters and Decorators among an average membership of 16,571; and 305 deaths in 10 years in the Scottish Society of House and Ship Painters among an average membership of 3,239.

3989. Then in all you have examined records of 1,240 deaths among the members of those two societies?—I have.

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MR. E. L. COLLIS, M.B.

[Continued.]

3990. The Registrar General at Somerset House in classifying the mortality figures according to occupations, deals with a class defined as "plumbers, painters, and glaziers." Do you consider that this class accurately represents house-painters taken by themselves?—No, but since house-painters form a large proportion of this class, the figures stated give some indication of the causes of death among house-painters.

3991. Have you studied the Supplement to the Registrar General's Report from this point of view?—I have.

3992. What are the main points of interest to this Inquiry which are brought out in the Supplement?—It is there stated\* that "in the main working time of life the comparative mortality is 1,114, or 11 per cent. above the standard. This excess is most marked under the headings 'Plumbism' and 'Bright's Disease.' But there is also a substantial excess in the mortality from phthisis and diseases of the nervous system . . . . It is noteworthy that the high fatality from plumbism and Bright's disease which occurred ten years ago has been maintained since that date, the mortality from plumbism being 22 in both periods, and that from Bright's disease being 72 in the first and 69 in the second of these periods respectively . . . . It is significant that the mortality from lead poisoning has remained practically constant ever since 1880-82."

3993. When you say 69, is that 69 deaths out of 1,000?—That is the comparative mortality figure.

3994. (Mr. Sutherland.) Does it mean 69 per 1,000?—No, not quite. You have the mortality from Bright's disease of all males taken as a certain number in every 1,000 deaths, and then you have the comparative mortality figure among painters, plumbers and glaziers in proportion to the 1,114 of that class. Comparative mortality figures always take the whole of the deaths in the general population as 1,000. The comparative mortality figure for Bright's disease for all occupied males is 32 as compared with 69 and 72 for the class we are dealing with.

3995. What is the 1,114?—All males being 1,000 it is 1,114 for the class he is dealing with, namely, plumbers, painters and glaziers. If you had a given general population, which would be somewhere about 60,000 to 70,000 of ordinary people, 1,000 would die; but if you took 60,000 to 70,000 plumbers, painters, and glaziers in the same period 1,114 would die.

3996. Why do you fix on 60,000 to 70,000?—It roughly gives you the number among whom 1,000 do die of the ordinary population.

3997. (Mr. Rice.) Suppose we said 11 per cent. more die?—That is his statement.

(Mr. Gardner.) The mortality is 11 per cent. higher amongst plumbers, painters and glaziers than it is amongst ordinary people.

3998. (Chairman.) Have you, in the course of your investigation of the figures supplied to you by the societies' representatives, given attention to the diseases mentioned in the Registrar General's Supplement as specially liable to affect lead-workers?—Yes, particularly from plumbism, Bright's disease and phthisis, but I have not attempted to deal with "nervous diseases" in this investigation, because I felt some uncertainty as to which diseases the Registrar General had included under that heading.

3999. Have you arranged the information in the form of statistical tables?—Yes, on the lines adopted by the Registrar General. I put in a table showing the details for the two societies taken together.

4000. What deductions can be drawn from these figures?—I have drawn up a second table to show the deductions which may fairly be drawn, namely, that in every 100 deaths which have occurred among the members of these societies, between 13 and 14 occur from causes attributable to lead.

4001. Does this mean that of every 100 painters who died, only between 86 and 87 would have died if

they had not come into contact with lead?—The study of the ages at death leads me to think that this is so, because if these three causes of death be removed from the total other causes, the age at death from these remaining causes then closely approximates the age at death of all males.

4002. Does the age at death of the members of these societies differ at all from that of the general population?—Yes. I have arranged additional columns on Table II. to show this point. In these columns the median age at death (which Bowley in his book "Elements of Statistics" regards as the most useful form of average) is shown to be eight years lower for house painters than for all males.

4003. Will you give us details of those figures, please?—For all ages the median age at death due to all causes is 56 to 57, to plumbism 48, to Bright's disease between 57 and 58, and to phthisis 39 to 40. In the class given by the Registrar General, plumbers, painters and glaziers, the median age at death due to all causes is 48 to 49, to plumbism 44, to Bright's disease between 50 and 51, phthisis 38 to 39. As calculated from the table made from the statistics of the two societies, the median age at death from all causes is 48 to 49, to plumbism between 45 and 46, to Bright's disease 49, and to phthisis between 38 and 39.

4004. The most important conclusion is that, from all causes, the median age at death is 48 to 49 amongst painters, as compared with 56 to 57 among the general population?—That is so, with regard to the male population.

4005. How do you explain this great lowering of the age at death among house painters?—By the fact that plumbism and phthisis, which the earlier columns of the table show to be more prevalent among house painters, cause a lower median age at death than that caused by all other diseases.

4006. Do you consider that the increased prevalence of these diseases is sufficient to account for such a great difference in the median age at death?—Yes, I do.

4007. Have you noted any marked difference between the causes of death occurring in the National Amalgamated Society of Operative House and Ship Painters and Decorators and those occurring in the Scottish Society?—Yes. In the Scottish Society the incidence of plumbism is decidedly lower, that of Bright's disease somewhat lower, but that of phthisis decidedly higher. The figures are very close to those given by the Registrar General for plumbers, painters and glaziers.

4008. Have you noted any other difference?—Yes. The mortality from accident, particularly from fracture of the skull, is higher among the Scottish Society.

4009. (Mr. Sutherland.) Is the mortality from general accident higher in Scotland?—The mortality from accident is higher, which is accounted for particularly by fractures of the skull. If the fracture of the skull were taken out you would have about the same.

4010. (Chairman.) Now you have summarised for us the results of your investigation into the mortality among house painters. Is there any other way of ascertaining the amount of ill-health caused by employment?—Yes, from statistics of invalidity, by which I mean sickness occurring during life, when such statistics are available.

4011. Do you consider this question of invalidity important as a test of the danger of an industry?—Yes, it probably gives even more accurate information than the mortality figures.

4012. Why do you think so?—Because this point has been established in two separate reports, from which, if you will allow me, I will quote extracts. The careful investigation made, for actuarial purposes, by the Manchester Unity of Oddfellows, states: "On a broad view of the facts, therefore, it appears that as between the elements of geographical situation and occupation the former should be chiefly considered

\* Supplement to the Sixty-fifth Annual Report of the Registrar General of Births, Deaths, and Marriages in England and Wales. Wyman and Sons, 1908 [Ct. 2619]. Price 1s. 10d. p. lxxix-x.

† See Appendix XI., Table A. ‡ See Appendix XI., Table B.

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Mr. E. L. COLLIS, M.P.

[Continued.]

"in the formation of monetary tables depending on 'mortality.' When referring to invalidity this Report says: \* 'It will be seen . . . that the proportion of members sick during any year varies with the occupation, and that the differences in the 'risk of 'incapacity,' as it may be termed, in the several occupation groups, are remarkably regular at nearly 'all periods of life.' The Second Report is one issued in 1854 by the Registrar of Friendly Societies. It is there pointed out that 'it was established that 'locality had not very much to do with the average amount of demand which was likely to be made on 'the funds of a friendly society. The only real practical difference in the distribution of sickness that could be discovered was seen to turn on the amount of physical force called out by the occupation of the contributors.' These two Reports, issued with 50 years interval between them, bringing out independently exactly the same points, are, I think, somewhat remarkable.

4013. Are you aware of any general statistics of invalidity among painters?—Yes. The report already quoted of the Registrar General of Friendly Societies states:† "There were four highly exceptional cases which were susceptible of classification with any other calling . . . These cases consist of the mariners, the miners and colliers, the painters, and the railway servants." And he gives figures to support the statement.

4014. What do these figures show?—The tables given have been reproduced in curves by Mr. Shaxby and show that, although painters are not liable to accident-sickness to the same extent as the other three classes specified, yet the contribution required from the painters stands second, and is only exceeded by that required from miners and colliers.

4015. Do you think that these figures in any way represent the present condition of the health of painters?—Probably, because, although this inquiry has not been repeated, excessive invalidity among painters has been brought to light in recent years by the premiums required to insure employers against sickness among their workpeople.

4016. Against what risks do employers now have to insure their workpeople?—The Workmen's Compensation Act of 1897 made employers liable for sickness due to accident. The later Act of 1906 added sickness due to certain diseases caused by occupation, of which lead poisoning is one, and since this Act became operative insurance rates for painters have increased, presumably to cover risks due to lead poisoning while they have somewhat decreased during the same period for most other occupations.

4017. Upon what figures do you base this conclusion?—The investigation published in the United States, in their "Bulletin of Labour" of 1910, which was issued from Washington, in which figures are given showing, for all the principal civilised countries, the insurance rates charged in the various occupations.

4018. How do the rates for painters in this country compare with those of other countries?—The report shows that the increase of rates for painters which has taken place since 1907, has not occurred in countries where lead poisoning is not the subject of compensation.

4019. Next to coal-mining, in which the death-rate, owing to accidents, is very excessive, you consider that the house-painter's occupation is one of the most dangerous occupations in the country?—As far as information from the invalidity tables can help us, this point of view seems to be established.

4020. (Mr. Sutherland.) Does the United States report cover every European country?—It deals with general insurance in the respective countries—Austria, Belgium, Denmark, Finland, France, Germany, Great

Britain, Italy, The Netherlands, Norway, Sweden, Switzerland, Canada, New York, and other States of the Union

4021. Do not you think that a good percentage of the invalidity in the painting trade is due to the seasonal nature of the occupation, and the consequent insufficiency of food when the men are out of work? Do not you think that that would have a very important effect? A number of painters lose a great deal of time in England, as Mr. Parsonage knows?—Do you mean total invalidity or invalidity due to the special question of plumbism?

4022. I mean total invalidity. You said that invalidity was a test of the danger of an industry?—Yes.

4023. But you did not merely confine yourself to plumbism?—No.

4024. You were speaking of general invalidity?—The insurance point can only affect plumbism.

4025. A painter when he is at work diets himself very well, but when he is out of work he must very often go short?—I see your point. I am trying to work it out in my mind. Your suggestion is that when the painter comes back to work after an interval he is semi-starved, and during the first two or three weeks, until he has received his wages and begun to feed himself, he is more liable to illness. Is that it?

4026. No. I am speaking of the general lowering of the man's system which will take place when he is not well fed in the slack season?—A person who is not well fed is certainly more liable to illness.

4027. I do not say that they starve, but they cannot live as well in the quiet season as they do when they are at work?—I follow.

4028. (Chairman.) Would not that apply to several other industries?—Yes.

4029. (Mr. Sutherland.) Painting is specifically a seasonal occupation?—Might I try to put my point more clearly? Apparently I have not made it clear. It is this: The old statistics, which are the only ones we have to go upon which accurately represent the amount of invalidity suffered by painters as compared with other classes, show that the figure for the painter is high. When we seek for a reason for this increased invalidity we have to take into consideration the point that since lead poisoning was made a subject of compensation apparently lead is causing invalidity, because the premiums to cover the risk have risen. Our information as regards other forms of illness in the trade is nil. Your point may or may not be correct, but I have no figures at all to substantiate anything but the fact that lead sickness occurs in the trade.

4030. Has lead sickness any bearing on the statement that you made, that the invalidity was important as a test of the danger of an industry? Was that a quotation?—Yes.

4031. In that report was lead taken into consideration?—The value of that report is that it does not consider particular illnesses, but illness as a whole, and I give it a local and particular application. It was not prepared for this special point.

4032. You said that locality has nothing to do with the demands on the funds, as I understood you, of the associations or of the friendly societies, but that the demands were due to the amount of physical force called out by the occupations?—Yes. The words "physical force" are there used by the Registrar of Friendly Societies. He would have brought out his point equally if he had said "the form of the occupation." He must himself have introduced the question of physical force, because he does not take out any statistics of the physical force, but he probably had in his mind a man employed before a furnace. A puddler has to exercise an amount of physical force which produces occupational illness.

4033. There is no comparison between the force which a puddler or a man in some of the other occupations has to put out and that demanded of a painter. His is rather skill than heavy labour?—Perfectly, but it is occupation, and it is what happens in the occupation, that produces the invalidity.

4034. The term "the amount of physical force called out" rather throws us off the line?—I was bound

\* Sickness and mortality experience of the I.O.O.F., Manchester Unity, during the five years 1893-97. A. W. Watson, 1903, p. 49.

† Return of Friendly Societies. Sickness and Mortality. Mr. A. G. Finlaison's Report, Second Part, 1854, p. 2. Out of print.

‡ Ibid.



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[Continued.]

to quote the absolute words. He is speaking of the trade as a whole. Had he been speaking of a particular one, he might have modified his adjective.

4035. (*Chairman.*) If Mr. Sutherland's conjecture is a right one, that this invalidity is caused to a great extent by the fact of the man having seasonal work, and thereby not being properly fed in the interval, that would be a very good reason why the danger of lead should be withdrawn from the men?—Yes. A badly fed person is always more liable to take lead poisoning than a person in good health.

4036. (*Mr. Rice.*) I am not quite clear whether your evidence agrees with the evidence of Dr. Legge. Dr. Legge in his evidence mentioned 387 fatal cases in ten years, or on the average 38 per year, connected with lead poisoning. That would be coach-painters and house-painters?—No; it is house-painters and plumbers only.

4037. I would like, if I could, to get your estimate as to the number of deaths. You have prepared some information, and I daresay you could give us the number of deaths per year?—From lead?

4038. Yes; with regard to house painters?—It is something between six and seven per year in the members of the two societies with regard to which I have had figures given to me.

4039. Between six and seven a year directly due to lead poisoning?—Yes.

4040. In 10 years there would only be two deaths directly due to lead poisoning, as I understand the report from Scotland? There is one point I did not quite understand. You say 32 ordinary people die of Bright's disease, and 69 and 72 plumbers, painters and glaziers?—Yes.

4041. Thirty-two ordinary person per 1,000?—Yes, 32 deaths from Bright's disease out of 1,000 deaths.

4042. Against 69?—Yes.

4043. That is rather more than double?—Yes.

4044. Yet, on the other hand, 1,114 plumbers, painters, and glaziers die from Bright's disease?—No; from all causes.

4045. That is 11 per cent. more than the others?—Yes, it is all causes; the Bright's disease is lost in that.

4046. Insurance premiums must of necessity be increased where the liability is greater?—Yes.

(*Mr. Rice.*) It is not absolutely reliable.

Mr. JOHN BANCROFT (18, Petley Road, Hammersmith) examined.

4051. (*Chairman.*) What practical experience have you had in the house-painting trade?—My experience has extended over a period of 27 years.

4052. What branch of the National Society of Operative House and Ship Painters are you connected with?—I am connected with the Hammersmith Branch, and I am also the London organiser. My duties are to look after the accident cases and lead poisoning cases, and also any difficulty that may arise between workman and employer.

4053. Have you had any experience of lead poisoning among the members of your branch?—My experience has been in connection with the whole of London, and during the last 12 years I have been in close touch with most of the cases that have come forward, and the different lead poisoning cases during the last five years in which action has been taken.

4054. If any specific cases of lead poisoning have come before your notice I should like the figures given in evidence?—There are at the present time a matter of seven that are actually being dealt with by myself and looked after at the present time. May I state the number that we actually dealt with during 1910?

4055. What is the membership of the branch?—The numbers in London are roughly about 3,000.

4056. How many cases of lead poisoning have you had amongst those 3,000 workpeople?—We have only tabulated them, since the Act came into force.

4057. Since 1906, how many cases have you had?—We have had 20 cases in London since July 1906.

(*Dr. Collis.*) The Act came into force in July 1907.

4047. (*Mr. Sutherland.*) The liability reflects the danger?—Yes, the liability reflects the danger.

4048. And the experience?—Yes, and the insurance companies had to discover that the plumber and painter were liable to lead poisoning. The law did not tell them so.

4048A. (*Mr. Sutherland.*) The insurance rates have jumped from 20s. to 30s. after three years' experience of the 1907 Act?—None of the Companies had data to go upon, and they fixed three years, and then put the rates up from 20s. to 30s.

(*Mr. Parsonage.*) Insurance companies to-day are insisting that a man who has received compensation for lead poisoning shall not be insured, and that means that the man is prevented from earning his living. I can absolutely prove that from many towns.

(*Mr. Rice.*) For general building they have a lower rate?

(*Mr. Sutherland.*) Yes, but not much lower.

4049. (*Mr. Parsonage.*) I believe that the Hearts of Oak are the largest friendly society working from one central office in England, and they refuse to admit painters into that society. How would that affect the returns made to the Registrar? If the man applying for admission to the Hearts of Oak put his occupation down as a painter he would not be admitted on account of the danger of the occupation, so that it must materially affect the returns made to the Registrar?—But the Registrar of Friendly Societies when he published his statistics in 1864, and that may have been the rule of the Hearts of Oak then, separates out the painters entirely, so that it would not make any difference what society they are in.

4050. But this society would not admit painters?—Then all we can say is that the society cannot give us any figures. I do not think we can get any further than that.

(*Mr. Parsonage.*) With reference to the point that a painter does not get sufficient food, which, unfortunately, we know perfectly well, I have just got out my returns for the quarter from January to March 1911. Trade has been considerably better, and we have paid out about 5,000l. less in unemployed benefit than in the corresponding quarter of 1910, and I find that the sick and funeral benefit shows an increase over last year. That proves that when trade is good there is more sickness, because there are more men employed. That rather contradicts Mr. Sutherland's point.

4058. (*Chairman.*) How many deaths have there been?—Four out of that number.

4059. Please verify from the recorded figures your statement of the number of cases of lead poisoning you have had, and the number of fatal cases each year from the time that the Act came into force?—Very well.

4060. Now I will ask you a few questions about the different processes. Does the making up or mixing of stoppings and paints give rise to dust?—No.

4061. Does the mixer inhale fumes during the mixing?—Yes, undoubtedly.

4062. Do fumes arise when he cleans out the vessels which have contained paints?—To a greater degree when the vessels are cleaned out by burning them out as we term it.

4063. Is it customary to sandpaper the work between successive coats of paint?—Yes.

4064. Does this cause much dust?—It does.

4065. Do you consider the breathing of that dust one of the principal sources of danger in your employment?—Undoubtedly.

4066. I suppose it is quite impossible to remove this dust by a local exhaust draught arrangement?—I am afraid that it is.

4067. Certain parts of the work are rubbed down with pumice stone and water, are they not?—Yes.

4068. Would it be practicable to prohibit dry rubbing down?—No. It would be possible to reduce it considerably.

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4069. It would be impracticable, would it not, to rub down mouldings or curves with pumice stone and water?—Yes.

4070. Or any new paint, between coats, which was dry but not fully hardened?—It would.

4071. How can we remove the danger from this dry sand-papery?—By the more practical appreciation of the treatment that is necessary. I mean to say this: The methods that are adopted to-day are only adopted for one purpose—convenience and cheapness. There is really no necessity for a great amount of glass-papery which is done to-day if the work was treated properly from the commencement. If the work is properly prepared in the first place and a competent workman puts on the coats, the necessity for removing the "nils," as we term them, is considerably reduced. Therefore the sand-papery is not necessary, to the extent that it otherwise would be.

4072. But is it possible to do away with this danger entirely?—No.

4073. Except, I suppose, by prohibiting or restricting the use of lead?—That certainly would be one direction in which to obtain the desired result.

4074. Are you acquainted with the operation known as stippling?—Yes.

4075. Will you tell us what you understand by stippling?—In stippling a wall the object first of all is to get as much colour on as possible, and at the same time to spread it out as uniformly as possible so that every part of the surface shall be equally treated. By so doing you serve two purposes: you prevent what we call a shady result. The work would look cloudy if not so treated. Then, again, you practically get a generally good effect by treating all the work alike, which could not otherwise be done than by what we term the flatting. With regard to putting flatting on with a brush, it would be absolutely impossible to distribute it effectively without the use of the stippler, because the nature of the paint used does not allow you to get over the surface quickly enough, and the brush, therefore, has not time to distribute it sufficiently without the use of the stippler.

4076. In such work and in all painting where the brush has to be pushed into crevices and corners, is there not a considerable splashing, or at least a spray or vapour formed of small drops of the paint?—Yes. The face of the man after working for an hour or two would be almost covered in some cases, where the work was rather intricate, and where the enrichments were many, and the character of the work required a certain amount of pushing into the crevices, &c.

4077. How can the worker be safeguarded against breathing such spray or vapour?—Ventilation would be the first safeguard, and even in that case, in the case of flatting walls, the average painter is not inclined to have too much draught coming in. He considers that it interferes with the possible result. Ventilation is undoubtedly one of the first things.

4078. Would ventilation remove the danger?—Ventilation would reduce it. It would not remove it.

4079. Have you had any experience of the aerograph or spraying machines?—I have not. I have had several complaints that this is very injurious to the workmen. At a large hotel about three months ago a sprayer was used, and the complaint was that two men within a few hours were compelled to leave off. One went home and was away for a few days.

4080. With regard to old paint-work. There are three methods in use for removing old paint, are there not?—Yes.

4081. Burning off, scraping off, and solutioning?—Yes.

4082. Which of these methods is most used?—The burning off.

4083. Can a painter avoid breathing fumes in the burning off process?—He cannot avoid inhaling the fumes, but that, again, could be reduced by a reasonable amount of ventilation.

4084. Is burning off generally followed by sand-papery?—Yes, or pumice stone and water, as the choice may be. It is more often sand-papery.

4085. This, then, introduces a further risk of breathing dust?—Yes; but the dead paint in that case,

in my opinion, would not be quite so injurious as the newer paint, which is more alive.

4086. Where scraping is done there are, I suppose, small particles which give rise to dust also, and this is breathed?—Yes.

4087. Is solutioning or pickling less dangerous than either burning off or scraping?—Undoubtedly. The only danger in that would be by contact—allowing the hands to get dirty, and so on.

4088. Is solutioning comparatively little used?—Yes, it is not used very much at the present day.

4089. Can you suggest any way in which the dangers may be entirely removed from the burning off and scraping processes?—I am afraid I cannot, only with a reasonable amount of ventilation you prevent the accumulation of the fumes in any room where the burning off is taking place.

4090. But, would a system of ventilation be practicable?—A system of ventilation would be practicable in burning off.

4091. Can you suggest in what way?—I would say open the windows at the top. Fumes naturally rise, and providing that a current of air could be got through it would certainly reduce the accumulation of the fumes.

4092. But when the wind was blowing in the direction of the window, would it not make it worse?—The average believer in ventilation does not worry himself about the direction of the wind. The average painter on going into a room which smells foul immediately opens the window.

4093. You seem to have a vague idea of ventilation, but no practical suggestion to make?—The ventilation would be limited by the amount that it was possible to obtain, for instance.

4094. Do you mean by ventilation the removal, by some air current, of the dangerous or noxious fumes and dust?—The accumulation of vapours would be mixed with the purer air, which must materially reduce the evil effects of the vapour.

4095. Can you name any other processes in which there is a grave risk of the painter inhaling dust, or fumes, or spray?—In the preparation of work originally, if pumice stone and water was more generally used, it would reduce the necessity in many cases not only for burning off but also for scraping and sand-papery—more particularly the latter.

4096. Are there any other processes in which there is grave risk of the painter inhaling dust, or fumes, or spray?—I think there are not.

4097. I suppose there are many processes in which the painter cannot avoid getting his hands soiled with paint or stopping material?—Yes.

4098. Do you think that the provision of washing conveniences and the regular cleansing of the hands is important?—Yes, and the mouth.

4099. Should hot water always be available?—Hot water should be used if possible.

4100. Is it generally practicable to get it?—No.

4101. Is food often kept in the pocket of the working coat, and eaten in the place where paint is being used?—Very often.

4102. Is it frequently impracticable to have the use of a separate place as a meal-room?—Not frequently. The greater possibility is that it is practicable for the men to move into a room where paint is not being used.

4103. Do painters usually wear overalls while at work?—In many cases.

4104. How are they kept clean?—By washing. The average man washes them once a week, or gets them washed.

4105. Do the men have to carry the overalls in their tool bags?—Yes.

4106. I suppose that the overalls would be rather dirty towards the end of the week?—Yes, they would.

4107. In other industries where lead compounds are used the Home Office have prescribed a medical examination at monthly, or even weekly intervals; and the examining surgeon has power to suspend men who show early symptoms of lead poisoning. Would you like to see this introduced for house painters?—It would be practicable, because the casual nature of

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their employment would lend itself somewhat to that examination.

4108. Are the men that you are connected with generally desirous that lead should be prohibited?—No, there is not that desire, particularly in London.

4109. Have you had any experience in the use of non-poisonous substitutes for white lead?—My experience has been mostly on Government work.

4110. Do your men complain of the evil effects of coming into contact with lead?—I have a case at the present time in which a man who has not been working with lead is poisoned.

4111. But listen to my question. Do your men generally complain to you of the evil effects of having to work in contact with lead?—Yes, they do complain. They do not complain so much as they do of the lead substitutes.

4112. (*Mr. Parsonage.*) You are referring to the working of the material?—Yes.

4113. That is a different matter altogether?—The men often complain of the effects of lead.

4114. (*Chairman.*) But I want to know whether your men are very much in earnest with regard to the deliberations of this Committee, or do they want to be left in their present position?—I am afraid that they do not generally appreciate the usefulness of the investigations that are being made, but I believe that they have certain desires in the matter.

4115. What are those desires?—That they should be given a reasonable opportunity to carry out their work without too many of the present day methods, which they complain are more injurious and bring about a greater amount of lead poisoning than the methods of old.

4116. Have your men ever put forward any practical suggestions for relieving them of dangers which they undergo in their present work?—Only that the work should be done in the proper way; that is the only contention that they hold.

4117. What do you mean by the "proper way"?—They complain that the present day method of carrying on painting is injurious and brings about more lead poisoning than is actually necessary. That is their contention.

4118. Have they made any suggestions to relieve themselves of the danger that you speak of?—I cannot say that they have, only in individual cases.

4119. Do I understand that the men admit to themselves that there is an evil, but they have no practical suggestion for remedying that evil?—There is no collective suggestion in that direction, I think.

4120. Do you yourself think it is possible to make any recommendation to this Committee with a view of mitigating the evil which the men suffer from to-day?—Yes.

4121. What are your suggestions?—I suggest that lead is used to-day in a reckless way, that painting is done in a reckless way, and that the evils of lead poisoning are accelerated by the present-day process.

4122. What suggestions have you to put before us to alleviate the evil or to change the conditions in which the men have to work?—One of my suggestions would be that practical men should be first of all put in charge of painters, which is not the case to-day.

4123. Have you any practical suggestions to make with regard to the different processes in which the men are engaged?—With reference to the preparation, I would say that the use of glass-paper should be considerably reduced. It should be reduced as much as possible. It is undoubtedly one of the greatest evils.

4124. (*Mr. Sutherland.*) You say that the men are not desirous of having white lead prohibited?—Yes.

4125. They have not expressed any opinion one way or the other?—There has been no collective expression of opinion from our members in that direction.

4126. Has it been discussed as a problem at all?—It has only been discussed incidentally, not generally.

4127. What do you mean when you say that the present-day methods are reckless?—Because unpractical men are put in charge of workmen—men who are not able to direct the work and to safeguard the men to the best advantage.

4128. In what way?—Supposing that you put a man to work who does not appreciate the whole of the danger of the materials that he is using, he will supply the men with dirty brushes and dirty kettles, and he will give them no time in which to cleanse themselves, and so on.

4129. A sensible foreman does not do that?—But they are not all sensible.

4130. The bulk of the men are sensible when they are put in the position of foreman. How would you suggest the reduction of the use of glass-paper?—By employing a competent man who can spread the paint without leaving too many ridges.

4131. You think that good painters would do their work so that it would not need so much sand-papering?—Undoubtedly.

4132. Sand-papering is not really intended to cut down work to a surface like that (*indicating a painted door in the room*), is it?—No.

4133. If you were rubbing down a door, you would not get covered with dust?—If you rubbed a door down to make a good job of it, and the work underneath was bad, you would be covered with dust when you had finished.

4134. From white lead paint?—Yes, from paint.

4135. Would it not cut all the paint off to produce a dust like that?—It would cut some of it off.

4136. Does not the sand-paper get useless by the filling up of the surface of the sand-paper with the paint?—Yes.

4137. How can dust get on the floor and on the workman, then?—Some of it goes on the workman. It does not all go on the floor.

4138. But a great deal of it does?—It is necessary for the workman to shut his mouth just as much as it is for him to wash his hands before eating food.

4139. Speaking from a large experience, I have never seen work cut down to such an extent with sand-paper as to produce a sufficient amount of dust to cover the workman. The old distemper did because it was light. What is your experience?—I have heard a foreman say, "You will find the sand-paper inside the "paint kettle." It depends upon how you use the sand-paper.

4140. That sand-paper would not cut down?—No. You know what that means.

4141. Exactly. That dispenses with the danger that we have been referring to?—Quite so. If the customer is satisfied, the employer will be.

4142. With regard to ventilation and opening the window, you mean that the circulation of the air mitigates the effect of the fumes?—Yes.

4143. Do you think there is any danger arising from outside burning off?—Not to the extent that there would be inside, because the fumes are immediately, or almost immediately dispersed.

4144. (*Mr. Rice.*) With regard to rubbing down with glass-paper, what proportion of paint-work is rubbed down with glass-paper?—It is rubbed down to give the effect the employer wishes to produce at the finish.

4145. But what is the proportion of the work that is rubbed down with glass-paper?—To produce a good result, even if the brush work was good, it would be necessary to pass a little paper over each coat.

4146. But can you tell me the percentage? Is it 50 per cent, or 100 per cent.?—It depends considerably on the workmanship. If a man spreads paint on with an unbiassed mind and puts it all over the place, I think you will agree with me that a lot of it has to come off, especially if you want to produce a good result.

4147. I quite understand that, but I want to know your estimate of the proportion of painted work that is rubbed down with glass-paper. What would be the proportion of the work on which glass-paper is used to the work on which pumice stone and water is used, or on which there is a total absence of rubbing down?—Certainly, more than three-fourths would be glass-papered.

4148. Three-fourths of the painting work done in London is rubbed down with glass-paper—is that your answer?—Yes.

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4149. Have you had much experience of the cheap form of painting in speculative building?—The experience that I have had has been with men who do not confess themselves to be speculative builders, but who actually are in the habit of adopting similar methods.

4150. Do you ever find glass-paper used on their work?—Yes, to a large extent.

4151. Even the speculative builder, the small property builder, uses glass-paper?—No, he makes no bones about it. He does not use it.

4152. You said that he did. Then your estimate does not include the speculative or small property builder?—No.

4153. Do you mean that three-fourths of the best work is rubbed down?—Yes.

4154. What are the proportions in London of good work and common work?—At present you may say that out of the whole work done, possibly three-fourths of it is done very badly indeed.

4155. That means to say that we have reduced the good work to a third, and that of that three-fourths is subjected to rubbing down with glass-paper?—I mean to say this, that the whole thing has practically had a bad slip as far as the workmen are concerned.

4156. Would you keep to the point. You have just said that you think that two-thirds of the work in London is common work, and that a third is good work. You say that three-fourths of the good work is rubbed down with glass-paper?—Yes.

4157. You mean to say that two-thirds of the work does not have any glass-papering at all, or 66 per cent. of the work in London has no glass-paper?—That does not follow at all.

4158. That is the conclusion from your answers to my questions?—It does not follow. I have seen work in which a good result was deemed necessary for a finish, and they have commenced very badly indeed and used a tremendous amount of glass-paper to remove the first evil.

4159. You have admitted that the cheap work, the small house property, does not receive any glass-papering?—No, they cannot afford it as a rule.

4160. And the outside work does not receive any glass-papering?—Except the front door.

4161. I want an estimate of the amount of painting done in which glass-paper is used. I understand you

to say that for three-fourths of the best internal work glass-paper is used?—Yes.

4162. In the other case glass-paper is neither required nor used, nor can be afforded?—The speculative builder, as a rule, has not time for it.

4163. (Mr. Parsonage.) You spoke of ventilation. When work is being painted in London, the first thing that is done when men are putting on the paint is the closing of the windows?—Yes.

4164. They must be closed. They cannot have draught when they are painting?—No.

4165. I do not want to go into speculative builders' work; but with regard to rubbing down, as to the proportion of sand-paper to pumice-stone and water, you would say that three-fourths of the work was sand-papered?—Yes.

4166. (Mr. Gardner.) You agree that it is necessary in order that a man shall keep clean; that he should have hot water for washing his hands and so forth?—Yes.

4167. Is it customary in London at the present time to provide material for getting hot water?—No, it is not customary to provide any water. Men can possibly get it in their own time. In builders' shops, especially, they will not very often allow the men time to wash their hands. The whole system is bad.

4168. You are quite certain that you know of no shop—I am not speaking of builders merely, but I am taking the ordinary house decorators—where it is customary to supply hot water and soap for the washing of a man's hands before taking a meal?—I know of none.

4169. You say that a good deal of lead poisoning might be obviated by the alteration of the method. Do you mean by that that if there was more oil colour used and less sharp colour in the bringing up of the work, that would obviate a good deal of the evil?—To a considerable degree.

4170. (Mr. Parsonage.) Did you ever hear of moistening glass-paper with turpentine?—No.

4171. In the whole of your experience in London, have you come across that?—No.

4172. The statement has been made by an employer in London that generally his men moisten the glass-paper with turpentine when they are using it?—That is almost equal to putting it in the paint, of course.

The witness withdrew.

Mr. GEORGE WEBB (14, Gore Street, Newport, Monmouthshire) examined.

4173. (Chairman.) What practical experience have you had in the house-painting trade?—I have had about 31 or 32 years.

4174. Have you been builder's foreman and foreman decorator during that time?—For over 20 years I have been builder's foreman and foreman decorator. I was 17 years foreman to one firm, and I was for three years foreman in Bristol.

4175. Are you a member of a trade society?—I was for nearly 20 years.

4176. Have you any personal knowledge of lead poisoning?—I have had two attacks and I am suffering now, as you see. (The witness pulled down his lower lip.)

(Chairman.) Dr. Collis will look at you. (Dr. Collis examined the witness.)

(Dr. Collis.) I should not like to say for certain that he had been exposed to lead.

4177. (Chairman.) (To the witness.) You were saying that you were just recovering from a second attack of lead poisoning?—Yes. It is about three months since I commenced again. I had nearly five months under the doctor.

4178. Were you examined by a medical man?—Yes.

4179. Did he say that your case was one of lead poisoning?—I was examined by Dr. Lane, a medical doctor in Newport.

4180. Did he give you a certificate to say that you were suffering from lead poisoning?—Lead neuritis.

4181. Have you always been very cleanly in your habits?—Yes. I have been an athlete, and I have

always been used to washing, and I have always insisted on trying to keep myself as clean as possible.

4182. I mean in your work?—Yes. I never have had any food of any kind whatever without thoroughly washing myself.

4183. Have you been able to obtain nail-brushes and soap?—No, never.

4184. Have you had to provide them yourself?—I have had to provide them myself when I have wanted them.

4185. Have you always provided them?—I always kept a brush and soap in my bag when I was working as a journeyman. I use them at home now.

4186. Have you known cases of lead poisoning amongst other painters with whom you have worked?—Yes, I have known several cases of it, unfortunately.

4187. How many cases have you known?—I have known a good many of them. Sometimes the doctor's certificate does not say that it is lead poisoning, and you cannot say anything; but I have known men die from lead poisoning, and I know men in Newport to-day in whose veins you can practically see it.

4188. Does the making up or mixing of stoppings and paints give rise to dust?—It does. In mixing dry white lead for hard stopping the dust of the white lead flies about.

4189. Does the mixer inhale fumes during the mixing?—He does in making up paints.

4190. Do fumes arise when he cleans out the vessels which have contained paints?—Yes; that is the worst part of it. If you have zinc kettles you can possibly

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clean them out without any fumes arising, but in the provinces they go in for cheapness and they get tin kettles, and you burn them out every time, and when you burn them out you have the smell of the burning around you all the time that you are cleaning them out.

4191. Is it usual to sand-paper the work between successive coats of paint?—It should be done at every coat, but sometimes it is not with cheap work.

4192. Does this cause much dust?—Yes, it causes a dust undoubtedly, especially if the mixing of the paint is not satisfactory. There may be adulterated stuff there. Some paints you can bind harder than others.

4193. What proportion of the work that the painter does is sand-papered in this way?—On what we call middle-class work there is an ordinary amount, but they do not spend much time on cottages.

4194. What proportion of the time that is occupied by a painter is devoted to sand-papering?—I should say from actual working that it would take about one hour per room. I should say in regard to painting that it would be about one hour in six or seven.

4195. Do you consider that the breathing of this dust is one of the principal sources of danger in your employment?—I do not consider it as one of the principal. I consider that the making of the paint in itself is about one of the most dangerous things.

4196. (Mr. Parsonage.) By the man on the bench?—Yes.

4197. (Chairman.) Do you consider the breathing of dust caused by sand-paper to be a source of danger?—Yes, I do; because you get it in the lungs, and you have to throw it out from your chest afterwards. It gets in the nostrils and so on.

4198. Is it quite impossible to remove this dust by local exhaust draft apparatus?—I do not think it could possibly be done. The dust would be created all the time they were rubbing down. The way in which I think it could be done away with is by rubbing down with pumice stone and water. That would remove a lot of it.

4199. Is pumice stone and water used a good deal now?—No; they do not devote the time to it that they used to.

4200. Would it be practicable to prohibit dry rubbing down?—Well, you would have to get a man to watch them.

4201. And if you got a man to watch them?—If it was prohibited, if this Committee put their foot down and said, "It shall not be done," it could be done without.

4202. Are you referring to sand-papering?—Yes.

4203. In every case, would it be possible?—In the majority of cases, it may not be possible in small mouldings or quirks, but it would remove 80 per cent. of it.

4204. In respect of new paint, which was dry but not fully hardened, what would you do then?—It would be better to rub it down with pumice stone and water. Otherwise, if you rubbed it down when it was dry, you would cut it all up and make it rougher, unless it was thoroughly hard.

4205. Then, in your opinion, sand-papering could be dispensed with?—It could not be absolutely dispensed with.

4206. But 80 per cent. of it could be?—It could be, if time was taken to rub it down in the old-fashioned way with pumice stone and water.

4207. Does the application of pumice stone and water take longer than sand-papering?—It would take a little longer, but it would result in a better class of work, because, in a sense, even if the paint was a little fresh, the water would harden it, and it would be a better job.

4208. Are you acquainted with the operation known as stippling?—Yes; I have done an enormous amount of that.

4209. Will you tell us what you understand by stippling?—I have stippled in water colour and I have stippled in paint in flattening. I have done an enormous amount of it in regard to indoor work. I have stippled all classes of work.

4210. Is there a considerable amount of splashing when the brush is pushed into the crevices and corners?—If it was done carefully, there would not be a great amount of splashing—if it was not allowed to flow on too freely.

4211. Some witnesses have told us that a good deal of the paint falls on their faces. Is that your experience?—It would if they were doing ceilings, but it ought not to if they were doing walls. They should be above their work and work downwards.

4212. How can the worker be safeguarded against breathing such spray or vapour when stippling ceilings?—I have not seen any invention or any appliance for preventing it. I have always had to take it as it came.

4213. Do you think that it is possible to safeguard the workman under such circumstances?—I should think that it could be done.

4214. How?—Well, if there was some kind of pad or small face-covering.

4215. Do you mean if the workman wore a sort of mask?—Something after that style possibly might stop a lot of it.

4216. Do you think that the men would wear a mask?—If it was any advantage to them they would, I think. They ought to wear it, if it will protect them. I should have no objection to wearing one if I thought that I would be better for it, if it was a practicable one.

4217. Now with regard to old paint work. There are three methods in use for removing old paint, are there not—burning off, scraping off, and solutioning?—Yes.

4218. Which of these methods is most used?—Burning off is the quickest.

4219. Can a painter avoid breathing the fumes in the burning off process?—I do not think so. I never could. You have to keep close to your work, and you have the smell coming all the time when the lamp is going. I do not think that it was so bad when the charcoal burners were about.

4220. Is burning-off generally followed by sand-papering?—It ought to be.

4221. Must it be?—It must be sand-papered, or pumice stoned with water.

4222. If it is sand-papered, does that introduce a further risk of breathing dust?—You get more dust then than you do anywhere, because the burning off makes it crisp.

4223. Where scraping is done there are, I suppose, small particles which give rise to dust also, and this is breathed by the men?—Yes, you are bound to get small particles in scraping off, and the dust is bound to be breathed.

4224. Is there any remedy that you can suggest for that evil?—If they could get a solution that could be used without its getting round the hands and so on, they might possibly be able to wash it down; but I think that one is practically as bad as the other. With regard to dry scraping, if they give you time I do not think it would so injurious as the burning off.

4225. Is solutioning less dangerous than either burning off or scraping?—It possibly would be if they used their brushes and so on in washing it off a lot. The reason why they do not do much of it is, I believe, because of the mess that it makes about the place. They get their hands covered with it.

4226. Can you suggest any way in which the dangers may be entirely removed from the burning off and scraping processes?—I cannot suggest any way at present; but I do not believe that there was so much danger when the charcoal burning off took place as there is with the lamps, because the charcoal burner, the old style of burner, threw a dead heat on to the work and you could get it off better than you can with the dry heat of the lamp; and the fumes of the charcoal seem to clear it away a lot.

4227. Do you think that there is always danger in wet lead paint itself from the smell of the fumes?—Yes, I believe there is always danger in it.

4228. I understand that you wish to name a danger in connection with turpentine substitutes used in paints?—Well, I do not know what you gentlemen think of it, but I think it is a danger, and a serious

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danger. I have found out that if you put pure turpentine in with the oil the paint work stands and it hardens, and you get a good surface on it; but if you put imitations in, in less than three months you see it a dry powder practically, so that you can wipe it off. You pay to-day about 6s. 9d. or 6s. 10d. a gallon for turpentine. You can get petrol at about 1s. 5d. a gallon; you can get paraffin at about 8d. a gallon; and benzoline at about 2d. a pint, and an enormous amount of that is used. If it is not dangerous to have petrol mixed with paint, what is? Suppose it is used in a house where there is a family living, and by any means it explodes or a fire comes to it? The coroner's jury may bring it in that it is accidental death, but I reckon that it is murder.

4229. I suppose that there are many processes in which the painter cannot avoid getting his hands soiled with the paint or stopping material?—He cannot avoid it when stopping, because he is bound to get it on his hands. I generally use myself a small board; but where one uses a board, a dozen put it in their hands after they have mixed it up. With regard to putty and linseed oil, I do not think there is much injurious effect, but when it comes to white lead stopping and red lead stopping, I think there is a serious danger.

4230. Do you think that the provision of washing conveniences and the regular cleansing of the hands is important?—Yes, I think it is very important.

4231. Should hot water always be available?—Yes. You might not believe it, but I have never seen it in the provinces yet, and I have been working in my trade all this time. I have never seen the inspector put his foot down and say that it should be available. That is honest. I would like to see it. I would go and have a look at it.

4232. In your experience, is it impossible to get hot water?—It would not be impossible if they were compelled to do it. They would have to do it.

4233. But has it been impossible hitherto?—Yes; it has been impossible to me. It has been impossible to get cold water until I got home.

4234. Is food often kept in the pocket of the working coat, and eaten in a place where paints are being used?—I have seen them hundreds of times taking it out of their pockets and sitting down and eating it where the paint was made and where it was being used, without any provision at all for washing or anything else. I am not alluding to big firms—some are better than others; but taking the general run, right away outside of London, you have to contend with what I have described. If you were seen washing your hands in the employer's time you would get about two hours' wages stopped.

4235. Do painters usually wear overalls while at work?—They do in some towns, and in some they do not.

4236. Are the overalls washed pretty frequently?—Those who take a pride in themselves come on Monday morning with clean overalls. Sometimes men do not.

4237. For how long do those who do not take a pride in themselves wear unclean overalls?—Some of them get what sailors call dungaree blue overalls. You can put them on and they stop there until they fall to pieces, practically.

4238. Do you say that they are never washed at all?—Some are not. In large shops where men take a pride in themselves, they have a white jacket and overalls, and they bring them to work on Monday morning nice and clean.

4239. Do not the foremen insist on overalls being clean every week?—In some towns the foreman would not get many hands if he insisted on it.

4240. Do I understand that in your opinion the washing of overalls is very badly done?—It is in some cases. Some are done very nicely, but where men are slovenly they throw them about anywhere.

4241. Would you say that a large percentage or a small percentage of the men were cleanly in this respect?—A good percentage is cleanly. It is more the casual type of man who is the trouble—men who are here to-day and gone in a week's time.

4242. Is that a large or a small percentage of the men?—In towns the work comes in a rush, you want men, and you have to put on anyone. You keep a casual man on possibly for three or four weeks, and then he may be tramping somewhere else. It is the casual class of man who suffers most, I believe.

4243. When you are working with lead paint do you feel any ill effects yourself?—Yes, I do. I have had headache very often, and when I have got home I have scarcely been able to rise after I have sat down after using a lot of it, especially if I have been making up a large amount of paint for others to keep on going.

4244. Have you felt the same ill effects when you have been working with zinc paints?—I have not felt them so much with the zinc paints, but if I have been working with lead paints for a long time and then have used zinc paints I have felt an effect in the stomach for a bit—more of a gripping nature for the time being. That is due to just the change from one to the other—having the effects of one on you all the time.

4245. (Dr. Collis.) Have you used non-lead paints much?—I have used them, not as regards what you call paint, but in water colours.

4246. Not in oil paints?—Not in oil paints.

4247. In distempers?—Washable distempers and that sort of thing—but it has been always lead with me.

4248. You have always worked with lead paints?—And zinc.

4249. Zinc is a non-lead paint?—I have used zinc occasionally when we have wanted it for a bit, but it has been mostly lead.

4250. Have you used zinc to any extent—for a whole day or two days at a time?—I have used it when I wanted to do some classes of work, but of course in the buildings it has been all lead that I have been using. I have not used an enormous amount of zinc, only occasionally.

4251. Perhaps half an hour during a day's work. Is that what you mean?—Sometimes I may not have used zinc for a week.

4252. Have you ever used it for as long as a week?—I have used it for three or four days straight off sometimes.

4253. Do you think you could in any way tell whether you were using zinc or lead paints, if you had not been informed that it was a zinc or a lead paint that you were using?—I always feel heavier in using lead than with zinc. I always feel of a heavier nature and more tired, a lot.

4254. Do you notice any difference, for instance, in the smell that the two forms of paint give off?—There is a different smell noticeable, but nothing exceptional.

4255. Do you think it is sufficiently noticeable that if you were given two lots of paint you could say, with some amount of accuracy, which was the lead and which was the zinc?—Yes, I could possibly say that very clearly. I could tell the difference in the smell.

4256. (Mr. Gardner.) In your district do all the painters serve an apprenticeship to the trade?—They did years ago, but they do not now. It is cheapness now.

4257. You say you have suffered from lead poisoning. Do you chew tobacco?—No, I have never chewed any in my life.

4258. Do you smoke?—Yes, I smoke.

4259. I suppose there is no question of getting paint in your mouth through smoking a pipe?—No. In most of the shops and buildings they do not allow you to smoke in working hours.

4260. You have already told us that you could not get hot water on the buildings and that there are no appliances for cleanliness?—Yes.

4261. You are of opinion that the wet process between coats could be used, are you not?—If time was allowed.

4262. We will take the work as it is done. If you go in and coat a room down one day, you could not use pumice stone and water the next day on that work, to begin on the second coating?—You could not use it satisfactorily. If it were allowed to stand a little

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longer you would have a chance of it, but it is too much rushing work for that.

4263. But I am referring to the work as it is done. You could not use pumice stone and water under a week's time, could you?—Yes, you could in under a week's time, but you could not give it a coat to-day and another to-morrow.

4264. In ordinary oil colours you would not. When you are stippling, do you think the method of stippling, even stippling a wall, throws off spots?—It throws off spots.

4265. Do you think so?—I think so.

4266. We have heard here that when you are stippling a wall there are no spots?—I think he must have been dreaming; he has not done much stippling at any rate, whoever said that.

4267. Do you think that the men could wear a mask for doing work over their head. I suppose you have no experience of what a mask would be like in work?—I have never used one. I would not mind using it to try it, but some of the masters would not allow you time to put it on.

4268. You are also of opinion that the use of a substitute for turpentine causes white lead to chalk and flake much quicker than ordinary pure turpentine and oil?—Yes, in my opinion it takes the entire nature of the paint away.

4269. Would that not be a danger, even to public health, in an ordinary living room, if paint was flaking and chalking to such an extent?—There is a danger, I take it.

4270. Is it not quite customary in your district to take your food in a room which is being painted?—They have to do it when they are away from home. When they have only half an hour or an hour for their meal, they have to do it. In some places, where there is a large building, like when I was at Aston Gate with Messrs. Cowling & Son, they had mess-rooms put up, but that was a job worth a quarter of a million. In an ordinary building you have to take it where you can get it.

4271. That is to say, in the ordinary building you have always to take your meals in the room you are painting?—You have not always to take it there, because sometimes you happen to be close at hand, and you can go home, but usually you have to take your breakfast, if not your dinner.

4272. (Mr. Rice.) I am rather interested in this question of a substitute for turpentine. Do you say now that petrol is used as a substitute for turpentine as a thinner?—It is used, and a lot of other things are used in it. You have to compete with a lot of men that are practically unprincipled. They will use anything, and they do use it.

The witness withdrew.

Mr. FREDERICK BONNER examined.

4286. (Chairman.) Are you a working master house decorator?—Yes.

4287. Where is your business?—At 20, Park Street West, Luton.

4288. How long have you been in the painting trade?—Ever since I was 11 years of age; I am 40 now.

4289. How long have you yourself been an employer?—Nine years.

4290. What is the average yearly number of painters you employ?—On an average about 7.

4291. Are you a member of any trade organisation?—No, we have not any in the town. It has been tried, but it seems to fall through. There is too much jealousy.

4292. What sort of paints do you apply; do they all contain lead compounds?—They all contain lead compounds, but one that I have been using this last five years contains a very small proportion of lead; the bulk is zinc oxide.

4293. What proportion of lead do you use in this one particular paint?—I could not tell you the exact

4273. Are you a working painter or a foreman painter?—I am carrying on business on my own account now. During this last two years or so I have been working up a business of my own, but I have been a foreman painter for over 20 years.

4274. When you were a foreman painter, did you give facilities to the men working under you for washing their hands? I have always tried to keep a bucket of water there. I have gone to try and get it for them myself, if I could, but I have got in innumerable rows for getting it and wasting time. If they can get it in their own time they can do it.

4275. But you have got this water for washing?—I have got it for myself also, so that we could all have it.

4276. There has been no question about the men being willing to wash in their own time, has there?—If the man would not wash in his own time, he has had to go dirty, and he has often suffered for it.

4277. The masters never objected to the men washing, but they may have objected to their washing in their time. Is that so?—They could not possibly object to a man washing in his own time, but they would object to his washing in their time, and they would make no provision for the men to do it. I have never seen it.

4278. Now with regard to the question of glass-papery, I understand you to say that, in a room which took six or seven hours to paint, one hour would be occupied by rubbing down with glass-paper?—Yes, one hour would be occupied at least in rubbing it down, if he has done his work as he ought to do it.

4279. Is every room that is painted rubbed down with glass-paper between the coats, or is it only the best work?—Only the better class work. They will not allow you time to do it in the cheaper class work.

4280. In the cheaper class work there is no glass-papery?—It may be that there is a bit now and again on a door.

4281. But, as a rule, is that so?—There is some used, but a very small bit.

4282. Are you used to doing good class work or common work?—I have done all kinds of work. I have done the King's Head Hotel in Newport right away through with lin crusta and anaglypta and all kinds of decorations. I have done the better class work.

4283. And you have done common work, I suppose?—Yes, cottage work, to an enormous extent.

4284. (Mr. Parsonage.) You have done anything that pays?—Anything that you can get hold of now, you have to do.

4285. It is only on the best class work that the glass-papery is used? I will not say that. It is used occasionally on common work, but very little. They will not give you the time which ought to be used on the job. Of course they have to use glass-paper in buildings, and so on.

proportion, because it is sent ready made, but when I make it up myself I use zinc white as it is sent in the case, and a very small proportion of white lead to give it body.

4294. What proportion of white lead do you use?—About a quarter.

4295. That is to say, about 25 per cent.?—Yes.

4296. Have you known any cases of lead poisoning?—I have known of two personally. One was at the very first job I was on for myself. We had a conservatory to do, and the pantry opened from the conservatory, and some food got left in the pantry, and all that partook of the food in the house (some of them did not) were very bad. The food was left there all night, and, of course, the pantry ventilator was open all the time.

4297. Have you had to pay any compensation for lead poisoning since the Act came into force in 1907?—No.

4298. Does the making up or mixing of stoppings and paints give rise to dust?—No, there would be no

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dust arising from the mixing of them. White lead is ground in oil, and of course it is a paste.

4299. But what about the stopping?—That is made from the white lead and putty mixed.

4300. Do you not use dry white lead for that?—No, I have not known it in the painting trade to be used in that way. If we want hard stopping, we make it of white lead and putty, half and half.

4301. Then, the mixer does not inhale dust during the mixing?—No, there is no dust.

4302. Is there any danger when he cleans out the vessels which have contained paints?—Only in getting it on the hands. That would be the only thing.

4303. Do you ever burn out vessels which contain paints?—No, I always have them scraped, and that is, of course, only like paint skins.

4304. Is there any dust arising from that?—No.

4305. Is it done wet?—The paint skins are like thin leather when they are scraped out of the cans. The old-fashioned way was to burn them out, and then you would get dust.

4306. And you would get fumes, I suppose?—Yes.

4307. You would get fumes and dust?—Yes, it was abominable—a dirty method. It used to have to be done out of doors, because the smoke was as black as ink. It came up in clouds when they burnt the kettles out.

4308. Is it usual to sand-paper between the coats of paint?—Yes, and that is where you get the dust. A far better way would be if everyone insisted on all the work being rubbed down wet with pumice stone—far better than the dry rubbing with sand-paper.

4309. Would it be practicable to insist in every case on rubbing down with pumice stone and water?—I should think in 9 cases out of 10 it would be—quite.

4310. What would you do in the tenth case?—It would be fancy moulding where you could not get the pumice stone in. All flat surfaces could be always rubbed down damp. Another thing is, you can rub them down better with pumice stone when they are wet than you can rub them down dry.

4311. All flat surfaces could be rubbed down wet?—Yes.

4312. But it is only mouldings and curves that have to be done with sand-paper?—That is all, where you could not get pieces of pumice stone in.

4313. With regard to new paint which was dry but not fully hardened, how would you treat that between coats?—There is a way of rubbing it down, but you are sure to get a little dust then. You cannot help getting a little dust; if you rub too hard, of course, you fetch the lot of it up.

4314. In your opinion is it impossible to do away with this danger entirely?—I do not see how you can do away with it entirely. There is sure to be a dust.

4315. Are you acquainted with the operation known as stippling?—Yes.

4316. What is stippling?—It is simply that when the paint is put on the wall, another man stands beyond with a large square brush about 8 inches by 6, and simply puts the work to take all brush marks out. That is all it is used for.

4317. In such work, and in all painting where the brush has to be pushed into crevices and corners, is there not a good deal of splashing?—There should not be, at all.

4318. Is there any spray or vapour formed of small drops of the paint?—There should not be at all. I have never seen any.

4319. Not from stippling?—Not in stippling. It is a very sharp colour used for stippling. It is more turps than anything in stippling.

4320. Then, in your opinion, is there no danger in stippling?—No, not at all.

4321. Does not the paint get over the men?—No, I have never seen any, and I have worked from one end of the country to the other.

4322. For instance, in stippling ceilings, with his face turned towards the ceiling, would the painter not get any splashes on his face?—No, he would not get any in that way at all. The man would not be underneath; his hand would be extended. He would be away from it; he would be further back; he would

not work over his head, because it would make his neck ache too much. You cannot get the men to do it. They will reach forward rather than work over the head. Direct overhead work makes the arm ache too much.

4323. As regards old paint-work, there are three methods in use for removing old paint, I believe: burning off, scraping off, and solutioning. Which of those methods is most used?—Burning off is used almost as much as anything.

4324. Can a painter avoid breathing fumes in the burning-off process?—He cannot help it, and when you are burning off in some classes of work dust arises very badly. It all depends on the age of the work that is being burned off. Some of it that has got much varnish is sticky when you burn it off, and there is no dust from that, you can scrape it off; but if you burn off woodwork where there has been no varnish, you find at the bottom of the door almost a shovel-full of dust.

4325. Is burning off generally followed by sand-papering?—Yes, and you get dust in that way again. You get a good quantity of dust in that way.

4326. Is that process inevitable?—A good many use the pickling now. I think there are three or four paint removers on the market, known as solvents.

4327. Do you say this sand-papering introduces the further risk of breathing dust?—You cannot help it; there is no way out of it unless you have respirators for workmen burning off or sand-papering. Both those processes cause a lot of dust.

4328. Where scraping is done there are, I suppose, small particles which give rise to dust also?—Just the same.

4329. Is solutioning less dangerous than either burning off or scraping?—Considerably. There is a considerable difference between the two. The solution makes it damp and stops it from rising.

4330. But I understand it is comparatively little used?—They do not like to go to the trouble of it. They will not go to the trouble of it. It is a little more expensive than burning off.

4331. Can you suggest any way in which the dangers may be entirely removed from the burning off and scraping processes?—Only by wearing very fine respirators, the same as they do in asbestos works. I think they are bringing that into force in Belgium now—wearing respirators.

4332. Are there any other processes in which there are grave risks of the painters inhaling dust or fumes or spray?—There is in paper-hanging. You get a lot of it there, but of course that has nothing to do with paint. You get a lot of dust in that way. With those rough wall papers, the in-grains, when you paper a room you find all along the floor of the room all round nothing but dust, unless it is sanitary paper, and you get no dust then.

4333. Do the painters remove the old papers on the walls sometimes?—I wish that was generally done. They do not.

4334. What is the custom in the trade?—The painter does it sometimes, but it is not usually done at all, I am sorry to say.

4335. Is it generally the painter who removes the old paper, when it is done?—Yes; the painter does that work—when it is done.

4336. But very often they paper over the old one, do they?—Yes, they paper over the old one. A month ago I was doing a sitting-room that had not been done for 20 years. There were six papers on the wall, and the last time the room was done was 20 years ago.

4337. I suppose there are some processes in which the painter cannot avoid getting his hands soiled with the paint or stopping material?—Yes, there are plenty of them.

4338. Do you think that the provision of washing conveniences and the regular cleansing of the hands is of importance?—I think so.

4339. Should hot water always be available?—It would be difficult on new buildings. That is where the great danger comes in with dirty workmen; there is no provision for their cleaning.



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4340. But do you think it is very important that hot water should be available?—I do think so.
4341. But you do not think it is practicable?—You get a long way from home, and there is, perhaps, only a cold-water service laid on for the use of the bricklayers and plasterers. You can get no hot water, or anything, or any towels or soap provided for the workmen. Cleanliness, I think, goes a long way.
4342. You mean to say you cannot expect the men to preserve cleanliness if they cannot get the materials to use for that purpose?—That is so.
4343. Is food often kept in the pocket of a working coat?—That is often the case, I think.
4344. And eaten in a place where there is painting going on?—Yes.
4345. Frequently?—Yes, all over the country. I have worked in the south of England and in the north of England, and I have worked a good many years in Luton, and that is done everywhere.
4346. Is it, generally, impracticable to have a separate room for meals?—It is a difficult matter to provide a separate room for them.
4347. Do painters usually wear overalls while at work?—Yes.
4348. How are they kept clean?—For myself and my workmen, we have them clean every week, but that is not the case in all places.
4349. There is no regular system about it?—There is no regular system at all.
4350. For how long may they go without being washed sometimes?—A month or two, perhaps; I should not be surprised at that at all. From the state that I have seen some of them in, they could not get like it in a week.
4351. Do the workmen take their overalls home every day?—They generally leave them on the work, unless they are notified on the job that they will perhaps be taken to another job the next day.
4352. How do they carry them home, then?—Perhaps in a bag or a basket.
4353. Or in a tool bag, perhaps?—Yes.
4354. I suppose a dirty overall would involve a certain amount of danger, would it not?—It is sure to. I do not see how it can be avoided, because some men keep a piece of rag in their pocket, and as soon as they have done a piece of work their hands will go down to it and they will rub them. Of course, there is a great difference between them in that way; some are very clean and some are very dirty.
4355. In some industries where lead compounds are used, the Home Office have prescribed a medical examination at monthly or even weekly intervals, and the examining surgeon has power to suspend men who show early symptoms of lead poisoning. Would you like to see this introduced for house painters?—I should think it would be a good thing.
4356. Do you think it would be practicable to insist on medical examination?—Our trade is a rather peculiar trade. For instance, sometimes men will only be on for the season. It would come rather hard in some cases, no doubt. In the rush perhaps one man will be employing 20 men, and perhaps in two months, when things have slackened down, he will only have half that number, and some of the men will have gone back to a different trade for the time being.
4357. Would it be difficult for the examining surgeon to see the men?—No, it should not be at all.
4358. In your own case, for instance, how could the medical examining surgeon see them?—He could see them in the evening when they have done work.
4359. At his own surgery?—Yes.
4360. That would mean that the men would have to call there?—Yes, that would not be difficult at all.
4361. But who would pay the cost of their going for examination?—That is rather a delicate question. I do not know whether the master would want to pay for it or would care to pay for it.
4362. (Mr. Parsonage.) Would you?—Personally I should not.
4363. (Chairman.) In your opinion, would precautions such as the use of lavatories, overalls, separate rooms to have meals in, and medical examination, save the painter from the risk of dust or spray of fumes arising in the course of his work?—They would do so.
4364. To a certain extent?—To a certain extent.
4365. But not wholly?—Not wholly.
4366. The danger, for instance, of burning off and scraping would still remain?—That would still remain; that could not be avoided.
4367. Can you suggest any practical means of preventing the formation of such dust and fumes, or of removing them by fans or such like apparatus?—I think that would be rather difficult.
4368. Do you think it would be impossible to stamp out the evil of lead poisoning without replacing the lead by some non-poisonous substitutes?—I think that is the greatest solution of the difficulty. I have been using a substitute for five years, and I seldom use white lead now unless it is specified. If I get a specification which specifies that white lead is to be used I keep to the specification, but otherwise I do not use white lead at all—not wholly as a white pigment.
4369. But you have told us earlier in your evidence that you use about a quarter white lead?—I use a quarter.
4370. Do you ever use less than that?—I never use less than a quarter, because you would not get the body to the paint. I do not think you can get a substitute entirely free from white lead to have the body. Zinc white has not got the body. It is a splendid thing otherwise.
4371. Suppose the Home Office were to prohibit the use of white lead altogether, how would that affect your business?—I think they have done it in France. I believe so.
4372. Would you have any great objection yourself?—I should have no objection whatever.
4373. If it were made universal?—If it were abolished altogether, I think ways and means could be found of getting a good white pigment without the use of white lead.
4374. We have heard some suggestions of reluctance on the part of some painters to adapt their methods of working to the peculiar requirements of zinc and other leadless paints. Do you find any difficulty in using such paints?—No. It has wanted a little skill, because it rubs out so thin, but the only thing is to mix it a little thicker to start with.
4375. (Dr. Collis.) You mentioned, as one of the possible precautions which might be adopted, the use of respirators, did you not?—Respirators, in burning off, to save the dust, and in rubbing down.
4376. That is to save the dust?—To save the dust entering the mouth.
4377. You said you had seen respirators used in asbestos works?—Yes.
4378. Which asbestos works have you seen them in?—The United Asbestos Works.
4379. Is that at Luton?—No. I think they have amalgamated with Bell's Asbestos Works.
4380. In Luton?—No, in London.
4381. Have they always used respirators there?—They have, always, in the 18 years I have known it, in the carding rooms, because it is very bad there.
4382. I have been over some asbestos factories, and I have no recollection of seeing respirators worn to any extent at all, and I asked the question because of the great difficulty we have always found in getting any workpeople to wear respirators, even when they are required to for their own protection. I want to know whether your experience is contrary to that?—It is the same. They do not like wearing them.
4383. So you think that, although they might be ordered, there would be great difficulty in getting them worn?—Yes, that is it.
4384. Do you think it would be practicable to get them to wear them when they are employed, perhaps, on a piece of work which is 20 miles from the centre, in painting a house?—I think they ought to be insisted on.
4385. How do you think they could be insisted on?—I do not know, unless any provisions were made in an Act of Parliament to compel them to use them.
4386. But an Act of Parliament is no good, unless it is enforced. How could we enforce it?—I do not

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see the way, unless there were inspectors going round all the time, and that, of course, means something in the country.

4387. And then an inspector has to enter a man's own private dwelling, does he not?—It is rather a peculiar question, I can see, but it would be a valuable thing if they did wear respirators.

4388. I am prepared to allow that to keep away the dust, a respirator for protection would be useful, but I want to know whether you have considered how this, if it were made a legal requirement, could be enforced?—Perhaps the local sanitary inspectors could be given power to do that.

4389. To enter each man's own private dwelling when he is doing his spring cleaning or having his drawing room painted?—It would be rather a delicate thing.

4390. (Mr. Rice.) How does this zinc oxide paint, that you have been using for five years, wear?—That is Vitulite, made by Carson and Sons, of Battersen. I have been using that for five years, and I find it stands better than white lead.

4391. You say you make it yourself, and when you make it you put the proportion of 25 per cent. of white lead?—Yes, when I make it, but I do not make a lot of it. I buy it from the firm ready mixed. Sometimes, if I run out, I make it myself.

4392. In rubbing down between coats with this particular paint, is there any dust from it?—Not much. It sets very hard. It is a slower drier: that is the one fault, I think. So much zinc in it makes it slower in drying. Zinc of itself is not such a good drier as lead, but it sets much harder, and my men do not like it because it sticks on the kettles so tight.

4393. In rubbing down with the glass-paper between the two coats, the dust is less with this particular paint that you use?—Yes, there is less dust with that.

4394. Have you used it for outside work?—I have used it for outside work ever since I started in business.

4395. And are you quite satisfied with the result?—I am more than satisfied, and my customers are too. It keeps a better colour: the atmosphere does not act on it and discolour it. I have got some fronts done five years ago which are better than white lead fronts done two years ago in the same street.

4396. I understood you to say that the cleanliness of the overalls worn by the painters depends on the men themselves and their own personal cleanliness?—Yes.

4397. With regard to the food that is carried in the pockets of the workmen, is there any other means of carrying it?—Very few of them ever trouble to carry a basket. They take a basket with their tools on the job when they go, and they leave the basket there till they have finished on that particular job, and then as they go backwards and forwards they wrap their food in paper perhaps—the bulk of them—and put it in their pockets.

4398. And they take off their coat, I suppose?—Yes, and hang it up anywhere. There is no particular place to hang it; it is hung anywhere.

4399. In a place of safety, I presume?—Yes.

4400. (Mr. Gardner.) In your district do all the men serve an apprenticeship to the trade?—I think apprenticeship is dying out all over the country.

4401. But in your district, instead of serving an apprenticeship, do they just go to it and pick up the trade casually?—That is just one of the great evils of the trade.

4402. I take it, as you are using so much zinc white, that all your work is brought up by that. Is that the custom in your district. Apart from your own shop, is the work brought up by oil colour or sharp colour?—That is left to the individual master.

4403. But what is the sort of custom in the district?—I should think about half, one man would use one and one another.

4404. That is to say, there is no general custom?—There is no general custom.

4405. You told us that you could use the wet method of polishing down between coats instead of sand-papering. If your colour takes so long to dry and harden, how long would it need to stand before

you could pumice-stone it with water between each coat?—You would not want to pumice-stone it down after you had put one coat on.

4406. (Mr. Parsonage.) You mean not between coats?—Not between coats, only before you put your first one on again.

4407. (Mr. Gardner.) I think, in your answer, you led us to infer that the wet method could be substituted between coats, and that is why I raised that point?—If I gave you that impression, that is wrong. It would be before the first coat was put on again.

4408. In the preparation of the work?—Yes, what they call preparation, in the specification of the architects, is really taking little nibs and little lumps and things off and making it smooth before you put your first coat on, if they specify two coats. I have never heard a specification worded in that way. I have simply heard: "wash down or rub down before the two coats." They would never specify it in between the two coats, unless you were going to do any enamelling, and then you would have to do a bit of rubbing down, but the colour then would be sharp, or what they call flatted.

4409. I can produce you specifications saying: "All work to be sand-papered between each coat"?—Yes, I have seen some very curious specifications. I had one a little time back: "four coats of oil, grain and twice varnish as existing woodwork," and the woodwork was new woodwork, simply stained and varnished. The man could have been putting coats of oil and graining from now to the end of the century, but he would never match the existing woodwork, because it was simply stained woodwork.

4410. In painting a wall such as the wall of this room, the man would not make many spots in putting the paint on it, would he?—There would be a few.

4411. But nothing much?—No.

4412. Then, again, suppose he stippled the wall with the flattening, where would the multitude of small spots come from on the moulding and skirting and all round the floor if the stippler does not produce a great amount of small spots?—The man would put the paint on in front of the man who was stippling, and as a rule it is very thin, and that splashes a little bit, but it is very, very fine stuff, and it generally falls straight to the ground, because as the brush is worked longways it would fly out, away from the man, whichever way he held the brush. They do not paint up and down; the stippler simply takes out the brush marks. There is no splashing with him at all, because the paint is already on the wall.

4413. Now with regard to the zinc paint on outside work, how does it stand on ironwork? Have you brought up ironwork from the beginning with zinc?—I have not brought it up with all zinc, but with a small proportion of white lead in it.

4414. How does it stand?—It stands on ironwork very well indeed.

4415. So that you think that zinc paint with 25 per cent. of white lead in it is a very good preservative for outside work?—I think you could go to even a smaller proportion of white lead than that.

4416. In mixing your zinc paint, what oil do you use?—Linseed oil.

4417. Is it raw oil or boiled oil?—I find raw oil stands better than boiled oil.

4418. Do you find any difficulty in it drying, except that it is a little slower?—It is a little bit slower, but that is no detriment to the paint, because paint dries too quickly sometimes.

4419. (Chairman.) We have been told by the representative of the Office of Works that the addition of 5 per cent. of lead to the non-poisonous paint would be just as efficacious as the normal lead paint used to-day?—I think it would. It only wants a small proportion of white lead to make the body.

4420. (Mr. Gardner.) Of course, with that they use refined boiled oil, not raw oil?—There is only the price of 2d. per gallon in that.

4421. (Mr. Parsonage.) With regard to stippling work, if you were going to flat and stipple an anaglypta ceiling, you would cover the floor with cloths, would you not, to protect it?—Yes.

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4422. Then there must be splashes, or you would not do that?—There are sure to be splashes, as I say, from the end of the brush.

4423. If you are using a stippling like that (*producing an illustration*) the painter who is using the stippler will get the splashes all over the back of his hands from the stippler, will he not?—No, he could not, because you have got a brush 8 inches by 6 inches inside. I do not know whether it is the general practice in the stippler that you are showing me there, but in the generality of the stipplers the handle comes outwards and not on the back.

4424. I do not mean on the back; I mean the handle comes out at the end?—Yes, it comes out straight, something after the style of a hand broom.

4425. Now, with regard to rubbing-down work between coats, after the work is prepared for painting, we will say, that is rubbed down with pumice-stone and water?—Yes.

4426. You always use glass-paper or sand-paper, as you term it, afterwards?—Yes.

4427. You would not profess to rub down newly painted work with pumice stone and water, would you?—And not touch it with anything else afterwards? You must use something.

4428. But you would use sand-paper?—Yes.

4429. And, in a country town like Luton, you would use more colour than you would use, say, in London?—Yes.

4430. And there would be far more dust from sharp colour?—Yes, you would get far more dust from sharp colour.

4431. So there would be more dust from rubbing-down and glass-papering work in London than there would in a country place?—Yes, there would.

4432. And consequently far more danger?—Yes, there would be.

The witness withdraw.

## SIXTH DAY.

Friday, 28th April 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. A. L. C. FELL.  
Mr. C. L. MASON.

Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WEBNER } (*Acting*  
R. U. SHAXBY } *Secretaries*).

Mr. C. KINGGATE (a member of the Committee) examined.

4433. (*Chairman*.) You represent the United Kingdom Society of Coachmakers, and you are a member of the present Home Office committee?—Yes.

4434. What practical experience have you had in the coach-painting trade?—I am a practical workman of 35 years' experience as workman, piecemaster, and foreman.

4435. Have you worked at railway coach and tramcar painting, or only at carriages and motor cars?—Only at carriages and motor cars.

4436. Have you known many cases of lead poisoning among coach painters?—Yes, I have known a great number. I contend that the evil effects of the use of lead are much greater than shown by the returns made to the Home Office, and that a great number of cases are never reported.

4437. What are the grounds for your statement that a great number of cases of lead poisoning are not reported to the Home Office?—Men have refrained from attributing their illness to lead, when it is well known that it is the cause, for fear of being discharged from their employment, and men have had to leave their occupation owing to the effect the use of lead has had upon them; and many of the cases involve absence for only a few days, and so are not generally reported.

4438. Do you wish us to understand that you find this lead poisoning evil very extensive and very serious in your trade?—Yes. I may say that many men have to continually dose themselves with purgatives to keep at work, which must have a very injurious effect upon their system and lower their vitality, rendering them more susceptible to other ailments. I know many cases of men away for a few days very frequently. They know that the illness comes from lead—gout for instance. No report is made.

4439. Have you known men affected with other diseases which are intensified by their having lead in their systems?—Yes.

4440. Can you give us the number of members in your society, and particulars of the lead poisoning cases which have come to your knowledge in connection with those members?—The average number of members in round numbers is 8,000. I have furnished Dr. Collis with detailed information as to deaths of members of my society during the last six years, and he has agreed to classify and arrange the material in the form of a table which he will put before the Committee. I might say here, that I have gone through the number of our members, and that the number of painters out of the 8,000, is 2,700. The number of body and carriage makers that are brought into contact with lead, is 3,100.

4441. So that, out of your membership, 5,800 are brought into actual contact with lead?—Yes.

4442. Were the records of deaths compiled specially for the purpose of this inquiry?—No; they were compiled without any reference to their being used for a purpose such as that of the present inquiry. They are taken from our reports, issued quarterly.

4443. How have they been collected?—Every certificate is sent to the head office, and the member's name and cause of death is published in our quarterly report. These are taken out of our quarterly report, and sent to Dr. Collis.

4444. Then we may rely upon their being absolutely trustworthy as far as your society is concerned?—Absolutely.

4445. Now, I should like you to deal with each of the processes which involve risk of lead poisoning in the coachbuilding trade. First, as regards the body makers; are they exposed to any risk?—Yes, to great risk.

4446. For what purpose do they handle lead material?—All woodwork is put together with lead. The joints are well leaded, and all ironwork is also fixed with lead. For instance, in putting in the panels

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of a carriage, the grooves are filled with lead, and the forcing together of the woodwork with the panels, causes the lead to spurt out. This is wiped off with a piece of canvas. The men's hands are, generally, while putting work together, covered with lead.

4447. Why is lead used in jointing?—It is used to give a further fixing so that joints shall not show, and also to prevent water having any effect.

4448. In what way is the jointing done when metal fittings are being attached to the woodwork?—The jointing is done in the ordinary way when metal fittings are fixed. The metal is generally bolted on in the case of body making. In the ordinary carriage the inside has what is known as an edge plate, which goes the whole length of the body. This is fixed on with bolts and is always well bedded with white lead. The jointing of the woodwork is made in the ordinary way.

4449. Why is white lead used for that specific purpose?—Only because it is useful for helping to fix the joint, and to prevent its moving, and to prevent any action that water may have upon it.

4450. Has any other material been tried?—I have not any personal knowledge of other material, but I have inquired from those who use it, and find that there is a very effective other material, non-poisonous, which could be used in the place of lead for this purpose.

4451. Does the vehicle in course of construction next pass into the hands of a carriage maker?—Yes.

4452. Please tell us exactly what his work consists of?—The body as it comes from the body maker is just an outline of the body, and he has to attach everything to it. He has to make the under-carriage and also give details for springs and axles, and fix them, and generally make patterns, and supervise the work of the smiths.

4453. Does the carriage maker come into contact with lead?—Yes, more than in any other branch. He constantly uses white lead. All work is fixed with white lead. The carriage is composed of wood and iron—wood heavily plated on account of its lightness—and this is always well bedded with white lead. Every bolt has to be white-leaded before it is put in, and generally, where fixing with clips, a small piece of Morocco or thin leather is placed between two pieces of iron. That has to be well covered with lead before it is put in.

4454. What does he use the white lead for?—That is supposed to give, I take it, extra fixing, so that there shall be no movement between the wood and the iron, and also to prevent the iron from rusting. Most of the old firms, especially, were exceedingly strict with regard to the use of lead.

4455. Is it generally considered necessary to use white lead for this purpose?—Employers have always considered it so, and they are very strict on this matter. I have known men to be discharged for simply putting in a bolt without white-leading under the head. Consequently in using so much lead his hands are continually covered with lead.

4456. When the carriage maker has completed the work of fitting up, is the vehicle ready to pass into the painter's hands?—Yes.

4457. The first coats of paint applied are termed priming coats, are they not?—Yes, generally there should be three coats of priming. The first one is frequently done at the body-makers' bench, but generally whilst the coach maker is working at it.

4458. Does the priming contain lead?—It is all lead practically.

4459. Is sandpapering done between the successive priming coats?—Yes. In all work, generally, sandpapering between different priming coats is done.

4460. In what shop is this generally done?—It is generally done in the shop where the carriage is being hung, as we term it—where the carriage maker is working. Afterwards it is generally taken into the paint loft.

4461. So that the body makers and carriage makers are frequently exposed to dust made by the painters?—Yes.

4462. Do you regard the breathing of this dust as one of the most serious dangers of the industry?—Absolutely the most dangerous.

4463. Can it be replaced by a wet rubbing process?—No.

4464. Why not?—Because it would raise the grain of the wood. The first coats of priming enter into the grain of the wood. If that was rubbed down with water it would have the effect of raising the grain, so it has to be sandpapered.

4465. Is it generally possible to use any form of local exhaust apparatus to remove the dust?—No, I do not think it would be easy in most cases, as far as my knowledge goes.

4466. How is this danger to be overcome?—The only way that I can suggest is by the total prohibition of the use of lead.

4467. Now, the next process is what is generally known as filling?—Yes; a body receives generally six coats of filling.

4468. Can you tell us what is meant by filling?—Filling is material made up of ground slate, I believe. It is called patent filling. In many cases lead is mixed with it, but in the patent filling itself there is no lead.

4469. What is the object of the filling process?—It is to thoroughly fill up the grain, so that nothing shall show. These coats are put on one after the other.

4470. Does the filling material generally contain lead?—In many cases lead is used. It makes it firmer and it faces down harder, and gives it a better surface. It is possible to use it without lead.

4471. There is, I believe, no rubbing down between the successive coats of filling?—No.

4472. Is stopping generally done after the last coat of filling has been applied?—Generally.

4473. Will you describe this stopping process?—The stopping that is known as hard stopping is made from dry white lead and gold size to fill up the pin-holes and various little places that are not made up level with the filling.

4474. By whom is the stopping material mixed?—By the man who uses it. He takes the dry white lead himself and mixes it with the gold size.

4475. Do you consider that the mixing of white lead and gold size is attended with danger?—Yes, undoubtedly. There must be a certain amount of dust arising from the handling of dry white lead powder.

4476. Is a staining coat applied after the last coat of filling, and on top of the stopping?—Yes, after the last coat of filling and the stopping, a coat of stain is put on the filling.

4477. Of what does this consist?—It simply consists of vegetable black and turps and driers.

4478. For what purpose is this staining coat applied?—There is rather a rough surface after the six coats, one on top of the other, have been put on. The man that rubs that down can see exactly whether he has got the whole of the staining out, and consequently got a good surface upon his work.

4479. But there is no danger in this process of staining?—No.

4480. How is the rubbing down done after the application of the filling coats and the staining coat?—It is always done, in my experience, with pumice stone and water.

4481. Is it ever done dry, for example, with sandpaper?—Not on a body, to my knowledge.

4482. What is the extent of the danger in the rubbing down after the application of filling and stopping?—It varies very greatly. If the filling is free from lead and there has been little stopping, the danger should be very slight. In any case, as the rubbing down is done wholly by a wet method, the danger is small in comparison with that of sand-paper processes.

4483. Does that answer apply to bodies only?—Yes, to bodies only.

4484. Are the wheels and the carriage under-work treated differently?—Yes. The carriage under-work and the wheels especially are always sand-papered, and a great deal of dust is caused in this operation.

4485. Is this dust of a poisonous nature?—Yes, practically all lead. And further, a large amount of hard stopping is used, on wheels especially and on the

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woodwork of a carriage, which is sand-papered down, and which is again all lead.

4486. This, then, is also an extremely dangerous process?—Yes; it is probably the worst process in the whole coach-building industry.

4487. Is it impossible to use wet methods of rubbing down in this work?—Yes, especially owing to the prevalence of curved surfaces; also it would raise the grain of the wood.

4488. Is it practicable to apply local exhaust ventilation generally?—I think it would be very difficult and expensive. I have never seen any such apparatus in use myself, so I cannot speak as to that.

4489. After the rubbing down of the filling has been completed, what is the next operation?—The application to the body of two coats of lead colour, both faced with pumice stone and water as a rule.

4490. Is the work then ready to be painted in the desired finishing colour?—Yes; it then receives a coat of ground colour—generally two coats of colour.

4491. Is the carriage then ready for varnishing?—Sometimes. I might mention here that assuming a body is to be painted blue, it would be painted a coat of prussian blue in the first instance and then a coat of ultramarine and then a coat of varnish colour, which means half colour and half varnish. That is generally called a coat of glaze.

4492. (*Lord Henry Bentinck*.) That is over all, is it not? Yes.

4493. (*Chairman*.) I will ask you a few questions on flattening. In the process of applying ground colour, finishing coats, glaze, and varnish, is there no rubbing down between successive coats?—There is no rubbing down, but the work is flatted with cloth and pumice powder.

4494. For what purpose is this done?—To make the surface dead, so that the next coat will adhere. It also takes out every mark or scratch that may be left on the panel.

4495. Is there any danger in this process?—No, none whatever I think.

4496. To what extent do your answers apply to the manufacture of motor-car bodies?—All that I have said about painting applies equally to motor-car bodies when made of wood. Lead is not used, however, in attaching the metal underwork to the body, as is customary in the carriage building.

4497. Have you anything special to say in regard to tramcar and railway work?—I have not myself worked upon tramcars or railway work, but I know that a very great amount of lead is used, especially on the roofs of tramcars, in fixing the canvas; and also generally, in making bodies, a large amount of lead is used.

4498. You have not yourself worked in railway or tramcar works, and would therefore rather not speak in detail of such work, I suppose?—No, not further than my knowledge by coming in contact with men who have done the work.

4499. Are you going to bring witnesses who have come in contact with tramcar work?—I could do so. You will have one this morning who will be able to speak about that.

4500. You have now told us all the operations in which there is a serious risk of lead poisoning in coach-building work. Is it, in your opinion, impossible to remove these dangers, except by prohibiting or closely restricting the use of lead?—That is my absolute conviction.

4501. There are, no doubt, many processes in which the workman cannot avoid getting his hands soiled with the material he is using?—Yes; it is impossible in the cases which I have stated.

4502. Is adequate washing accommodation provided by most of the employers?—No; very rarely in coach-making shops. I am speaking of private coach-makers. The big railway companies, and so on, generally provide adequate accommodation for washing, but the majority of the private coach-makers provide no accommodation whatever.

4503. Are nail brushes and hot water available as a rule?—No.

4504. Is time allowed to the men for washing before leaving off work for meals?—No.

4505. Are facilities for cleaning the teeth ever provided?—No.

4506. Is food often kept and eaten in the work-rooms where lead paint is being used?—Yes; in many cases that is done.

4507. Are meal-rooms provided, equipped with suitable seats and tables, and properly warmed in winter?—Very rarely indeed.

4508. Do the men have the use of a cloak-room?—No.

4509. Do coach painters wear overalls while at work?—No, they do not. I think that the employers should be compelled to provide overalls for them, if it is possible, if lead is to continue to be used.

4510. Can you tell us what are the usual hours of work for coach painters?—The ordinary hours generally worked are from 50 to 55 per week. But many hours are being worked at the present time beyond the ordinary hours. There is a very large amount of overtime being worked at the present time.

4511. What are the hours when they are working overtime?—At the present time they are working a very large amount of overtime. Men are working all hours nearly, very late at night and all day on Sunday. At the — motor-car works they have been working on Sunday for a very long time.

4512. Does that particularly apply to motor-car works?—It applies particularly to motor-car works.

4513. To any other branch of industry?—There is hardly any other industry except with regard to railway coaches and cars. The private coach maker is in the same position as the motor-car company. There is very little call for horse drawn vehicles.

4514. Have you noticed any alterations in the hours of employment as the result of the development of the motor-car industry?—Yes; that is the point I wish to mention—the increased number of hours that are worked by the men, especially in the painting.

4515. Have you any idea how many hours overtime they work?—I should think in many cases they make two weeks in one.

4516. (*Lord Henry Bentinck*.) With the same staff?—Yes, with the same staff.

4517. Is that legal?—Yes.

4518. (*Mr. Fell*.) That is not calculated on the actual hours but on the overtime basis?—It is not calculated on the actual hours. They would be working perhaps till 10 o'clock at night and Saturday afternoon and all day Sunday.

4519. (*Chairman*.) Would it be desirable to have a periodical medical examination by a surgeon with powers to suspend from employment in lead processes?—No, I should think not under present conditions.

4520. But you understand that if lead is allowed to be used in the future in this industry, the Home Office will insist on that?—I am only thinking that there would be a strong objection from the workman's standpoint to this, because it might be the cause of his being discharged on account of being subject to lead-poisoning. I think that was brought out when Mr. Steinitz was here. He admitted that they would not employ a man if they knew he suffered from lead-poisoning.

4521. Supposing this Committee are able to recommend the adoption of stringent regulations in regard to lavatory, meal-room and cloak-room accommodation, wearing of overalls, and medical examination, together with exhaust ventilation, wherever it can be applied, and that these regulations are fully observed, do you still consider that the dangers of the industry would only be reduced and not removed?—I do. I consider that it is impossible to remove the dangers entirely in any other way except by prohibiting the use of lead.

4522. Have you had any experience in the use of coach-painting materials which are entirely free from lead?—No, not personally.

4523. Do you think it would be possible to abandon the use of lead paints generally in the coach-building industry?—Yes. I consider that efficient substitutes

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of a non-poisonous character are available, from all the information I can obtain from those that use them.

4524. Do you think, taking the motor-car industry, for example, that if lead was prohibited in this country, it would interfere with the industry in regard to foreign competition?—No, not at all.

4525. (*Lord Henry Bentinck*.) You are not acquainted, I suppose, with the possible substitutes for lead for jointing purposes?—Not personally, but I have information from those that use the substances, and they assure me that they are quite equal for the purpose to lead.

4526. They are using them?—Yes. The largest coach-making shop in Manchester uses them. I tried to get the foreman to give evidence, but he says he cannot spare the time. He assures me after many years' experience that it is quite equal to lead. He is a practical man, and a teacher in the Manchester Technical School, and he assures me it is quite equal to lead for the purpose of jointing.

4527. There is an increase of lead-poisoning since these long hours have been the order of the day?—I have no statistics upon that.

4528. But it is your experience, is it not?—Yes.

4529. The health of the men is deteriorating?—Yes; I know many cases of men who are frequently ill.

4530. How many hours a day do they work on the average?—The normal hours are 50 to 55, but there is a very large amount of overtime being worked, especially in the large motor firms, including the principal firms in Coventry.

4531. Have you any idea what that works out at?—About four hours each day for six days—24 hours—and the Sunday—perhaps 20 to 30 extra a week.

4532. Do the same staff work all through Sunday?—Yes. It naturally must exhaust them physically.

4533. Do you think that is common to the motor-car trade, generally speaking?—Yes, when there is a boom. There is this to be said: it has been practically impossible to get men during the boom lately.

4534. What kind of men?—Body-makers, at the present time. I could find places for a great number of body-makers to-day, but I cannot get them.

4535. How long has that been the case in the motor-car industry?—Only lately, the last six months.

4536. There is always a good demand for body-makers?—Yes. A little while ago there was a very heavy slump. The worst of this kind of thing is that a very large number are discharged generally when the slump comes. There is not that stability of employment that there was under the old coach-making firms.

4537. When was the slump?—About two years ago. We paid 1,000*l.* per month unemployed benefit, taking the average. We paid 13,000*l.* in the year.

4538. (*Dr. Collins*.) I understand that you consider that stopping and filling can be done entirely without the use of lead?—Yes.

4539. And that, in the painting of coaches in general, a considerable amount of varnishing is done before the work is finally completed?—Yes.

4540. More varnish is applied than in the case of house painting?—Yes. There should be three coats of varnish on the body of a motor-car or carriage.

4541. Is it a fact that almost any pigment will stand well under three coats of varnish; it does not much matter what it is?—As far as my knowledge goes, that is so.

4542. Even the cheapest of pigments would wear pretty well with three coats of varnish?—Yes.

4543. So that, for that reason, it should be easier to replace lead in this industry than in the house painting, from the point of view of the work?—Yes, undoubtedly.

4544. (*Mr. Fell*.) On the question of pigments under three coats of varnish, if you get any chipping or cracking, then the nature of this substitute comes in?—Many materials crack under the surface if they are badly mixed or, as we say, put on "hot," that is quick drying colour to get work out quickly.

4545. Unless you keep on varnishing to keep the pigment covered, if the pigment powders, or anything of the sort, you feel the effect at once?—Yes.

4546. Whereas with lead you might not?—There would always be sufficient cover over any lead that was used in painting to prevent any action of the atmosphere.

4547. You think it would never get down to the pigment?—Not with proper work. I cannot answer as to cheap work, but I am speaking of high-class work, which I have been used to.

4548. Take tram-cars, where you cannot have cars going in to be varnished every day? Suppose there is an accident?—You would put sufficient on them to keep it for the time being.

4549. Could you give the Committee the number of men working in paint shops and the number in body shops?—Only on the lines of the different branches. 2,700 are painters and 3,100 are body-makers.

4550. Are there any figures available to show, of those numbers, how many have been affected with lead-poisoning?—No. That could be obtained as far as the deaths are concerned, but not as far as the ordinary cases are concerned. Hundreds of cases are never reported at all.

4551. It would be interesting to try to differentiate between the two classes of men?—My experience has been, in the positions I have held for 30 years in London, that the man most liable to lead poisoning is the carriage-maker. I have known in my time three deaths of carriage-makers, but they are a very small number comparatively.

4552. That is apart from the painter?—Yes, apart from the painter altogether—a separate branch.

4553. That is the man simply working in woodwork, putting the wood and iron together?—Yes. Generally speaking, the body is painted with priming coats, and there is filling up in the place where he is working at the same time. He has the sandpapering and the priming coats to contend against, and the constant using of lead himself.

4554. With regard to substitutes, you have to have a substitute which will give the same adhesion as lead?—Yes.

4555. The chief trouble, I understand, at the present time with patent stoppings is that they powder, and that bolts bedded in a substitute for lead shake loose?—In jointing paste?

4556. In jointing paste?—I believe that in some kinds of pastes that are used with an iron base that is the case, but in other cases it is not so.

4557. Does that apply to woodwork and iron?—It applies to woodwork and iron.

4558. Is it not a fact that in motor-car works where substitutes are used, particularly on French motor-cars, you get much more cracking where you have panel work?—I have not any knowledge as to that.

4559. I believe that is so. With metal panel work you get a good deal more working between the parts?—There should not be the slightest working.

4560. I am speaking of steel panel work where you have bending?—I do not understand you.

4561. Take doors of motor-cars.—The majority are made of wood at the present time, and some of aluminium.

4562. Aluminium or steel.—The wood framing is the same. There must not be any movement whatever, or the joints would show.

4563. Suppose there was a jar?—Then the joint might show.

4564. Would it be so with lead as much as with a substitute?—I am not speaking from personal experience. Those who use it say that it is quite equal to lead for the purpose. The class of work that the Manchester firm I spoke of are turning out is the highest class that there is in the country; and that substitute has been used for years.

4565. Is that all motor-car work?—Yes, and carriages.

4566. Do not you find that where the springs are painted with the substitute you get more cracking?—I do not know. I am speaking now of jointing paste

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4567. On wheels and under-frames and things like that?—I do not think so. There will be other witnesses who will speak upon that, practical painters, and they will be able to answer that question better than I can.

4568. One of the principal reasons why the carriage-builders suffer more from white-lead poisoning is that they have, up to now, not been treated under the ordinary Act applying to white lead?—Practically. Very few in either of the branches have been treated that way.

4569. They have not been provided with any washing arrangements?—No. It has been quite a usual thing for the painter to wash his hands in the pail he has been rubbing down with.

4570. Do you know if, in the trade, it is common to have the one break system like they have at Loughborough?—No. A firm in Manchester work for 50 hours instead of 53 with one break. I believe it was introduced at the Motherwell car works, but they reverted to the old hours. At Preston car works they work 50 hours with one break.

4571. Do you suppose that the men bring their food into the shop?—They have breakfast before they start.

4572. Do they bring lunch?—Mr. Steinitz said that owing to the men having such a long shift they found it necessary to have some food. That has been very usual even when they have had breakfast in the shop. In many cases they have had lunch. In the old firms in London it was always recognised. They have breakfast at half-past eight and lunch at eleven o'clock.

4573. You spoke just now of the varying number of men employed, a large number being taken on, and then a large number standing off. Is not that due a great deal to the fact that it is a trade where you want all motor-cars out in the summer, for instance, and therefore painting has to be done early in the spring?—No, that is not so. The reason mainly why there has been the number of discharges has been the possibility of a change in the shape or design of the motor-car, and the manufacturers would not make a stock. In the old time coach-makers in London generally know what would be wanted during the next season. In the winter time they would make a number of broughams or victorias or landaus, and there was practically a permanency for wood-workers and smiths. There was generally a fluctuation with painters and trimmers. Now that motor-cars are getting somewhat more standardised there is not the same liability, I think, to that large number of discharges as there has been. They feared that there would be a change in the form or the design of the car, and that, therefore, they would practically have to scrap the work they made for stock.

4574. Coach-painters' work is not so irregular as house-painters' work. It is more continuous all the year round?—Yes. There is, as you say, at this time of the year perhaps a larger number employed. That would be mainly repairs. The older vehicles, as the summer is coming, would have to be touched up and varnished, and so on. There is generally a larger number of painters unemployed than men of any other branch at certain periods.

4575. Your men would not have the same possibility of being run down through long spells of work?—No. They do not have long spells. Some would always be on, and some would be off for a few weeks.

4576. (Mr. Mason.) Is not washing accommodation compulsory under the Factory Act?—That is quite true, but unfortunately the Factory Inspector does not visit the places very frequently. It is practically impossible for him to do so. Very few coach-making shops in London, when I was working in London seven or eight years ago, had any washing accommodation at all.

(Chairman.) Coach builders will probably be very much startled, if lead is allowed to be used in the future, at the restrictions that will have to be observed. They will have to level up with all the other lead industries, if the use of lead is allowed to continue.

4577. (Mr. Mason.) You mentioned just now the use of men washing in pails and buckets?—Yes.

4578. Is there any objection to their doing so?—When they have been rubbing down, especially where lead is used in the filling, there is a quantity of lead in the water.

4579. You are speaking of using the water which they have been using for rubbing down?—Yes. If a labourer was rubbing down a body, and the dinner time came, he would wash his hands in the pail that he had been working with.

4580. Is there any objection to his washing in the pail, provided he uses clean water?—No.

4581. In your opinion, a pail is equally as good as a basin?—Yes. It would be preferable to have hot water, where he could get it.

(Chairman.) Dirty water would not be allowed in labour industries. A man must have clean water to wash in. If one man has washed in a pail of water, there is no objection, if the pail is emptied, to another using it, if he has fresh water. It is absolutely essential to get his hands thoroughly clean, and he cannot do that if he washes in a muddy pail.

4582. (Mr. Mason.) There is no difficulty, in the ordinary course of things, in a man getting clean water in his own bucket?—No.

4583. In your opinion, it is not necessary to lay down a regulation enforcing basins for men who already have a pail?—He should have a basin, if possible. A proper washing place is far preferable, undoubtedly.

4584. Why?—Because of the greater possibility of cleanliness. The clean pail might have to be fetched from a distance, and that would not be done, and, consequently, a large number would wash in the same pail. Water would not be very convenient, perhaps.

4585. Has not every man a bucket himself?—No.

4586. Not in the coach-building trade?—No.

4587. In the railway carriage trade, every man has a bucket?—He might not need a bucket. He might be working for many days, and not require any water at all. Water is only used for flattening and rubbing. Generally, the rubbing is done by a labourer, and only the flattening is done by the man himself. With 20 men there would not be half a dozen buckets among the lot.

4588. Do you say that in the railway carriage trade each man is not provided with a bucket?—I am not speaking of the railway carriage trade, but of the private coach trade.

4589. You cannot speak to the efficacy, or otherwise, of buckets for washing?—No.

4590. Can you tell me what the membership fee in your society is, as compared with the boilermakers or some such society as that?—Our entrance fee is simply half-a-crown. The boilermaker pays the same, but if a man comes out and rejoins it goes up to a large amount, up to 2l. Many societies vary in that direction.

4591. Is your society more costly to join than an average society?—Less costly to join.

4592. To be a member of?—I should say that there are some societies with considerably less contributions. Our nominal contributions are a shilling per week, and then there are levies.

4593. Can you tell me how your sick pay compares with that of any other society?—Our sick benefit is on rather peculiar lines. The amount of benefit expended one quarter is paid for the next by levy. It is a very small amount.

4594. (Dr. Collins.) Is the levy or the sick pay, a very small amount?—Both.

4595. (Mr. Mason.) Is it not rather curious that, in a society composed principally of men exposed to lead, the sick pay should be so small?—No, because a great number are off for a few days who never think of going upon the sick fund.

4596. What is the average time men are off sick who declare upon the funds?—I could not tell you that. I have no statistics.

4597. (Mr. Robins.) With regard to washing accommodation, do you not think that for men to wash in a bucket would be a dangerous process, from the simple fact that the bucket is never clean?—Yes.

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4598. It corrodes, and dirt catches round the sides of the buckets. It takes a great effort to clean a bucket after a man has been rubbing down for two or three days?—I quite agree that there is considerable danger in washing in the bucket for that reason.

4599. Do you think that the process of facing lead colour after it has been rubbed down (it is usually given two coats of facing matter) is a very dangerous operation, seeing that the water to a large extent is filled with lead, which is likely to enter into the pores of the skin?—No, I do not. It is not generally understood that it can enter through the pores of the skin.

(Chairman.) It cannot. That has been established beyond question.

(Witness.) No, I do not think there is that danger in the operation at all.

4600. (Mr. Robins.) With regard to the cracking of paint, is it not a fact that the cracking of the paint is more general where work has been done in a quick

slip-shod manner?—Yes, that is generally the case. The cause of cracking is that it is done with a quick-drying colour.

4601. Not with oil?—Not with oil.

4602. You mentioned, with regard to cracking of joints, motor-cars particularly. Do you not think that the reason why it cracks at the joint is that, generally speaking, two metals meet together. Whereas in the old coach trade metal and wood met together, in the new motor industry metal and metal meet together, and there is likely to be a slipping apart and consequently a great tendency to crack from that fact?—Yes, that would be so if you are speaking of metal mouldings.

4603. I am?—Yes, there would be that tendency.

4604. (Lord Henry Bentinck.) White lead is used between metal mouldings to prevent possible rattling?—No; it is generally more that water should not get between. It is generally fixed sufficiently well to prevent rattling.

Mr. DAVID WILLIX (59, Hatfield Street, Belfast) examined.

4605. (Chairman.) What is your occupation?—I am a coach-painter.

4606. What practical experience have you had in the coach-painting trade?—My practical experience ranges over a term of 16 years in all classes of coach-painting—that is, ordinary private vehicles, motors, and railway and tramcar work.

4607. What branch of the United Kingdom Society of Coach-Makers are you connected with?—The Belfast branch.

4608. Are you prepared to answer questions regarding the various processes in detail?—Yes.

4609. I should like you to deal with each of the processes which involve risk of lead poisoning in the coach-building trade. First, as regards the body-makers; are they exposed to any risk?—They are exposed to great risk in the use of lead.

4610. For what purpose do they handle lead material?—For the jointing of wood and iron.

4611. Why is lead used in jointing?—Principally to keep out wet and to stop rust, if possible.

4612. Will you tell us exactly in what work jointing is done?—In the jointing of the frame and the putting together of the panels by mortice and tenon.

4613. In what way is the jointing done when metal fittings are being attached to the woodwork?—In the jointing of the iron to the wood it is bolted and sometimes screwed, and the white lead is placed between the wood and the iron. I might emphasize that that is where the great danger comes in. The body-maker, holding the iron in his fingers, is likely to come in contact with the lead. I might say that that is the real danger with body-makers and carriage-makers. We emphasize the difference in the branches.

4614. Does the vehicle, in course of construction, pass from the body-maker into the hands of a carriage-maker?—It does, from the body-maker. The body-maker makes the body, and the carriage-maker has to do with the under-carriage. The body-maker has nothing to do with that.

4615. Please tell us exactly what the carriage-maker's work consists of?—The carriage-maker makes all the under-carriage proper—that is what we speak of in regard to private vehicles—and does the putting together, and the hanging of the carriage, and so on.

4616. He fixes springs and axles?—Yes, and brake handles.

4617. Does the carriage-maker come into contact with lead?—Equally with the body-maker.

4618. What does he use the white lead for?—For the jointing of the iron and wood of the carriage.

4619. Is it generally considered necessary to use white lead for this purpose?—It is, unfortunately.

4620. Do you know of any substitutes that have been tried in place of lead?—Yes, there is a substitute for lead called jointing paste, which is practically non-poisonous, and is said from experience to be equal to that made with white lead for durability.

4621. By whom has it been said that it is equal?—The men who have wrought with it.

4622. Have you ever heard any manufacturer say that it is equal to lead?—No.

4623. When the carriage-maker has completed the work of fitting up, is the vehicle ready to pass into the painter's hands?—Yes.

4624. The first coats of paint applied are termed priming coats, are they not?—Yes, they are.

4625. Does the priming contain lead?—All lead with the exception of a little black.

4626. Is sand-papering done between the successive priming coats?—It is.

4627. In what shop is this generally done?—In all the shops.

4628. So that the body-makers and carriage-makers are frequently exposed to dust made by the painter?—Yes, when working in the paint-shop.

4629. Do you regard the breathing of this dust as one of the most serious dangers of the industry?—I do.

4630. Can it be replaced by a wet rubbing process?—No, it cannot.

4631. Why not?—Because you would be liable to raise the hair of the wood, as it is commonly called, and the owners of the vehicle, whatever it may be, would certainly object to water going on to it so early.

4632. Would it be possible to use any form of local exhaust apparatus to remove the dust?—No, not that I know of.

4633. Then how is this danger to be overcome?—By the abolition of lead.

4634. Is there any danger in filling?—There is to the rubber, that is the pumice, as we call him.

4635. Does the filling material contain lead?—It does—two-thirds.

4636. Then in regard to stopping, is stopping generally done after the last coat of filling has been applied?—It is, in body work. I should say after the priming it is stopped. The nail holes are filled up, as we call it, with sand and grit.

4637. What is the stopping material made of?—Dry white lead, gold size and turpentine.

4638. By whom is the stopping material mixed?—The painter.

4639. Do you consider that the mixing of white lead and gold size is attended by danger?—It is.

4640. Does any dust arise from the operation?—No dust arises from the making of it, but a man cannot keep his hands free from it.

4641. There is no danger in staining, is there?—No.

4642. Then in regard to rubbing down, how is rubbing down done after the application of the filling coats and the staining coat?—With pumicestone and water.



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4643. Is it ever done dry; for example, with sand-paper?—No, that is never done to body work. It is used for carriage work.

4644. What is the extent of the danger in rubbing down after the application of filling and stopping?—In the rubbing off of the filling, the pumicer cannot keep himself free; his hands and arms are covered with the dirt, and necessarily he must get a certain amount of white lead.

4645. Does he get it on his hands and arms and on his clothes?—Yes. Very often from the neck down he is covered with dirt.

4646. Do these answers apply to bodies only?—Yes.

4647. Are the wheels and the carriage underwork treated differently?—Yes, they are treated with dry sandpaper.

4648. Is this a dusty process?—It is very dusty and very dangerous. I might say it is the most dangerous part of it.

4649. Is it impossible to use wet methods of rubbing down in this work?—Yes, it is impossible.

4650. Why?—You could not possibly get pumicestone in between the spokes of a wheel, for instance.

4651. Is it practicable to apply local exhaust ventilation to this process to get rid of the dust?—No, you could not apply it.

4652. After the rubbing-down of the filling has been completed, what is the next operation?—Priming again, with two coats.

4653. With finishing coats?—Yes, two priming coats of lead colour.

4654. Is the work then ready to be painted in the desired finishing colour?—Yes.

4655. Is the carriage then ready for varnishing?—It is ready for whatever colour may be put on it.

4656. There is no danger in flattening, is there?—No.

4657. To what extent do your answers apply to the manufacture of motor-car bodies?—Just in the same degree as to ordinary work. There is the same danger attached to it.

4658. Have you anything special to say in regard to tramway and railway work?—The danger is even greater, because there is a larger bulk of work. In the case of railway and tramway work a man cannot possibly free himself, because he has to look up to it, as it were, when he is sandpapering, for instance. It is above him all the time. He cannot get above it, and he gets the dust on himself.

4659. You have now told us all the operations in which there is serious risk of lead poisoning in coach-building work. Is it in your opinion impossible to remove these dangers except by prohibiting or closely restricting the use of lead?—It is.

4660. You have told us also that there are many processes in which the workman cannot avoid getting his hands soiled with the material that he is using?—Yes.

4661. Is adequate washing accommodation provided by most of the employers?—No, unfortunately not.

4662. Are nail brushes and hot water available, as a rule?—I never saw a nailbrush in my life in any works that I was in. I might say, that I only saw hot water in one works that I was in.

4663. How many works have you been in?—Many. Between England and Ireland, I have been in a good few.

4664. Is time allowed to the men for washing, before leaving off work for meals?—Not in general. In one shop that I was at work in, and only one, it was allowed.

4665. Are facilities for cleaning the teeth ever provided?—No. That applies all round, to painters in general, and body-makers.

4666. Is food often kept and eaten in the work-room, where lead paint is being used?—Yes, often. I might say always, or with very, very rare exceptions.

4667. That is breaking the law, as it exists to-day?—There is only one shop that I know in Belfast where you are compelled to leave the paint shop when you take food, and that has only been in existence for a short time—twelve months.

4668. Then, I suppose that meal rooms are not provided?—No.

4669. Do you think that meal-rooms should be provided, equipped with suitable seats and tables, and properly warmed in winter?—Yes.

4670. Do the men have the use of a cloak-room?—No.

4671. Where do they put their clothes when they are at work?—Just by their work.

4672. So that they collect as much dust as possible on their clothes?—Quite so.

4673. Do coach-painters wear overalls while at work?—No; very rarely. I wear overalls myself. There are only about six of us in Belfast who wear overalls. Coach-painters think that they are above the average painter, and a black apron is more in their line. They look upon overalls as something which they should not use. I wish that they would use them a great deal more.

4674. What are the usual hours of labour for coach-painters?—Fifty-four per week.

4675. Do they work much overtime?—Not generally.

4676. Not in Belfast?—In Belfast there is not much overtime worked.

4677. Do they work any overtime?—Yes, they do. I have worked overtime since Christmas myself.

4678. What would be the average hours of work that these men would do, including the overtime?—I have never thought about averaging it up. The overtime is so very small that I could hardly just name it to you.

4679. Have you noticed any alterations in the hours of employment as the result of the development of the motor-car industry?—No.

4680. Do you think that a restriction of hours of work in the lead processes would be a salutary measure to adopt in the interests of health?—I think it would.

4681. Would it be desirable to have a periodical medical examination by a surgeon, with powers to suspend from employment in lead processes?—Yes, I would say so. It is quite necessary. It is done in a good many other industries, and I have wondered why it has not been done in our own for the benefit of the men themselves.

4682. Supposing that this Committee are able to recommend the adoption of stringent regulations in regard to lavatory, mess-room and cloak-room accommodation, the wearing of overalls, and medical examination, together with exhaust ventilation wherever it can be applied, and that these regulations are fully observed, do you still consider that the dangers of the industry would only be reduced and not removed?—Only reduced—that is all.

4683. Have you had any experience in the use of coach painting materials which are entirely free from lead?—All the colours that we use are free from lead.

4684. But with regard to ordinary paint?—No, certainly not—primings and such like.

4685. You have not?—No. Do you wish me to speak of substances that we have used occasionally?

4686. Have you ever come across any substitutes for lead paint?—Yes.

4687. Have you heard them spoken well of?—I can recommend them. One I have found to be the most serviceable of all, and I can recommend it.

4688. Have you given it a fair test?—We have given it every test it is possible to give it.

4689. For how many years have you tried it?—Not years—I have not known it for years.

4690. Only just a few months?—Yes. We came across it in October last.

4691. You could not say that it would be possible to abandon the use of lead paint generally in the coach building industry, from your own experience?—It would be possible to abandon the use of lead paint if you had a proper substitute.

4692. But you do not know of a proper substitute?—Yes; one.

4693. What is it called?—Fordite.

4694. (Dr. Collis) Your work is chiefly the building of motor carriages, is it not?—Yes; and coach-building

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in general, and railway and tramway work. That is what our men are all employed at.

4695. Do you know anything at all of the amount of the payments made for sickness to members of your society?—I could not answer that. I did not think of looking it up, but the secretary can look it up.

4696. You do pay for sickness?—Yes.

4697. For sickness due to disease as well as for sickness due to accident?—Yes.

4698. Would it be possible for you, at some later time, to let us have figures showing the amount that you have paid for sickness due to illness and sickness due to accident?—Yes, I dare say that it would be. The secretary could look up the books.

4699. Will you let our secretary have that information?—Yes.

4700. (*Mr. Kinggate.*) That must come through me. Dr. Collis is speaking of the whole society, and not only the Belfast branch?—Yes, that must come through Mr. Kinggate.

4701. (*Mr. Fell.*) You said that on tramway and railway work, the process was much more dangerous for the man because the work was above him?—Yes, and in greater bulk.

4702. Are you only speaking of where he does dry rubbing down?—He does dry rubbing down in other work as well. He does a good deal in the smaller work.

4703. I am speaking of tramcar work?—He has to sandpaper and dry rub down between coats.

4704. Is it not possible to do wet rubbing down in tramcar work?—It is after filling, but not before.

4705. Is it not possible, up to that point in the process, to omit lead and use some substitute?—Up to the completion of the lead colour?

4706. Yes?—Yes it is. I have some patterns in my pocket.

4707. There is no difficulty in that?—None whatever.

4708. Have you had actual experience yourself in tramcar work?—Yes.

4709. Do you think that, with a tramcar, you can go through the whole of the processes without dry rubbing down?—No, I do not.

4710. You say that there are certain processes in which you could omit lead?—Yes, and use a substitute.

4711. When you came to the final coats you could use lead paint, could you not? Would you have to rub down dry?—I do not quite follow. Our first two coats we call priming, and we fill up and give two coats again. It may be yellow or it may be red, blue or green. After you have the job filled you apply the colour. You have two coats of priming. If the colour is a yellow, or in that range, you have to dry rub until you get the varnish colour on. It is all wet rubbing from that to the finish.

4712. You mentioned the use of Fordite?—Yes.

4713. Does that spread in the same way as ordinary lead colour spreads?—I may say that it spreads easier.

4714. Do you get the same opaqueness?—You do.

4715. You do not know about the lasting properties of it?—As far as I have tested it, it has lasted very well.

4716. You do not know what the wearing properties would be as you have only tried it since October last?—I do not know what the wearing properties would be over a number of years.

4717. We have cars that have been running for 25 years. They have practically never been repainted. They have just been touched up and varnished?—I should say that they are badly cracked.

4718. No, they are not cracked?—I never yet saw a vehicle that had been out for that length of time that was not cracked, whether it was a railway carriage, a tramcar or a private coach.

4719. (*Mr. Mason.*) You were asked a question about the provision of tooth-brushes. Would you suppose that, if tooth-brushes were provided the men would use them?—I could not answer for the men in general; I would not even answer for myself in that respect. Unfortunately I have not many teeth.

4720. Would it be a wise plan to supply tooth-brushes?—I think that it would be a standing joke for a long time, but it would wear off.

4721. How much dry rubbing will a man do on a carriage?—Have you had any experience of railway carriage building?—Yes.

4722. Take a 50-ft. coach. How many hours of dry rubbing would a man do on that?—That is taking the whole coach through?

4723. Yes?—It would depend on the length of time that he has in which to paint the car.

4724. Yes, but taking the ordinary railway carriage practice, what should you say?—The answer that I gave you previously I might say applies to that, because if the man has plenty of time he will sandpaper his job well, and that causes him to get more dust. If he has not much time he gets over it more quickly and gives it less rubbing, and therefore he gets less dust.

4725. Can you give me any idea of the two extremes?—No, it is so broken up that I cannot possibly answer.

4726. Would it be as much as five hours?—Taking the coach all over, yes.

4727. Would it be more than five hours?—Yes, in many cases. If a man had plenty of time for his job he would probably take two hours in sandpapering one side only, and he would be worked pretty well if he sandpapered a 50-ft. coach properly on one side in two hours.

4728. Do you think he would take ten hours over it. I am not speaking of exhibition jobs, but of ordinary coach painting as carried on to-day?—No, he would not. Your question now applies to one coat. I take it.

4729. No, right through the entire job?—He would take certainly ten hours if he was doing it properly.

4730. Would you be surprised to know that about four hours is a very general practice?—Are you speaking of England or Ireland.

4731. England?—I know nothing of railway work in England. I could give an answer to that, but I would rather not.

4732. Have you had any experience of Fordite as used outside?—Do you mean on the outside of a building.

4733. No, I mean as opposed to the interior of a tram-car, for instance. Where Fordite is frequently used, do you know of Fordite being used with white uppers?—For outside work?

4734. Yes?—No, we have no white work in Ireland on railway carriages that I know of.

4735. Your experience of Fordite having been used has all been connected with inside work?—Yes.

4736. (*Lord Henry Bentinck.*) Have you ever used it on the panel of a carriage?—Only as an experiment for our own information.

4737. How many coats of varnish do you give Fordite? Do you give it more than you give to ordinary paint?—We have not tested it in that way. We gave it two coats, but we never went to the length of varnishing. We wanted to test the Fordite itself, so we did not varnish it.

4738. You put it to a more severe test than ordinary paint. You did not varnish it?—We did not. I have some samples.

4739. You have no experience of it with regard to the finished article?—No.

4740. (*Mr. Kinggate.*) Have you used Fordite at all as a priming coat on coaches?—Not outside—only for samples.

4741. For the inside of coaches?—Yes.

4742. It has not been used for priming purposes for outside work?—No. We cannot get it to use, unfortunately.

4743. Do you mean that they will not allow you to use it?—Yes; we are compelled to use lead.

4744. I understand that Mr. Gardner stated that it was preferable to and was equal to lead?—In our experience of it we have found that it is, but we cannot get the firm to use it. I daresay that they have their own reasons for that.

4745. Have you any knowledge of what Fordite is composed of?—No.

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4746. Do you know what the base of it is?—No.  
4747. Have you any knowledge of the cost of it in comparison with lead?—It is dearer than lead.

4748. Would it work out considerably dearer than lead?—No, I do not think it would work out dearer than lead, in the end I think it would be cheaper.

4749. On account of its covering properties?—On account of its covering properties. It is so elastic that you can cover a greater space with a certain amount of Fordite than you can with a certain amount of lead.

4750. Is it quite as opaque?—Quite. We have found it so.

4751. (Mr. Robins.) You were speaking just now of the use of Fordite in the inside of a coach. Is it a different class of paint for the inside?—Not as far as lead is concerned.

4752. Is there an inside painter and an outside painter?—There is in some works. In others the man who does the outside does the inside.

(The witness withdrew.)

Mr. BERNARD DALY (7, Herbert Street, Everton, Liverpool) examined.

4757. (Chairman.) What is your occupation?—I am a coach-painter's brush-hand. If you can get a job as a painter you get a higher rate.

4758. Are you a member of any trade union?—No.  
4759. Do brush-hands usually belong to a trade union?—No.

4760. Why is that?—It is rather a conservative method of the union. They try to exclude brush-hands. They think they would be dangerous to the painters proper—that they would do away with the painter proper. They would be interlopers, as it were, they think.

4761. Then the workmen employed in coach-painting, and subject to the dangers which have occasioned this inquiry, are divided into different classes?—Yes.

4762. What practical experience have you had in the coach-painting trade?—I have been working at the trade since I was 14 years of age—all my life.

4763. Have you worked at railway-coach and tram-car painting or only at carriages and motor-cars?—I have worked at railway-coach and tram-car painting, and coach and motor painting—all branches.

4764. Have you known any cases of lead poisoning in this time?—Yes.

4765. How many fatal cases have come to your knowledge?—Three.

4766. Covering what period?—The whole period, but there have been several cases where men have left the trade and died off. They have really died from lead poisoning in my opinion, but the doctor has given it as phthisis. The lead has induced consumption and other diseases, but the lead has really killed them.

4767. Do labourers suffer to the same extent as regular coach-painters?—Well, so I believe.

4768. How do you explain that?—Because they do the priming work mostly, that is, they get the body in the bare wood. They have the priming coats to put on, which are composed almost entirely of white lead and thinners—turpentine and gold size. The lead is used to fill up the grain. It is a preparation for the final coat afterwards, and the danger is in the priming.

4769. Do I understand that you find this lead poisoning evil very extensive in your branch of the trade?—Yes.

4770. Are you prepared to answer questions regarding the various processes in detail?—Yes, as far as I know, I am.

4771. First, as regards the body-makers, are they exposed to any risk?—Yes.

4772. For what purpose do they handle lead material?—They impose it on the plates and in mortices and joints to make them adhere together, to prevent vibration and to prevent water going in and swelling the wood. It makes a close joint so that nothing can penetrate between the plates and the wood.

4753. How long is it since they started using Fordite?—About October last.

4754. Have you seen any perceptible difference in regard to the health of the men and their vitality at the end of a day's work since they ceased to use white lead? I have heard them say they were very pleased to use it, as they did not feel so depressed, as it were at the end of the day.

4755. (Mr. Mason.) Would it alter your opinion as to the cheapness of Fordite as compared with lead, if you were told that the London and North Western Railway Company used tons of Fordite for quite a long time, but had to give it up because it was found to be so much more expensive than lead?—No, having regard to my experience, it would not.

4756. I gather that your experience is not very large?—It extends over the time that I have stated.

4773. Why is lead used in jointing?—Because it is impenetrable. It prevents the water getting between the plate and the wood which is not painted. The only chance that it has of getting any paint is when it is put together. If it were put together without the white lead between, the water would penetrate.

4774. Does the vehicle in course of construction next pass into the hands of a carriage maker or body-fitter?—Yes.

4775. Please tell us exactly what his work consists of?—He makes the under works and hangs the body, balances it, screws it up, fits the brakes, and sees that the whole thing swings correctly.

4776. Does the fitter come into contact with lead?—Yes.

4777. What does he use the lead for?—He fits the plates on to the wood bed, and the bolts and the springs. The spring is composed of several plates, and there is lead put between each plate.

4778. Is this a very dangerous process?—Yes, it is dangerous, but of course there are more dangerous processes.

4779. When the carriage-maker or fitter has completed the work of fitting up, is the vehicle ready to pass into the painter's hands?—Yes.

4780. The first coats of paint applied are termed priming coats, are they not?—Yes.

4781. Does the priming contain lead?—Yes; it must do to be effective—to be any use.

4782. Is sand-papery done between the successive priming coats?—Yes.

4783. In what shop is this generally done?—In most shops they sand-paper between the priming coats just to smooth it a bit.

4784. But in which shop?—Usually in the coach-makers' part of the shop or the carriage-makers' shop.

4785. So that the body-makers and the carriage-makers are frequently exposed to dust made by the painters?—Yes.

4786. Do you regard the breathing of this dust as one of the most serious dangers of the industry?—It is the most serious danger of the industry.

4787. Can sand-papery of priming coats be replaced by a wet rubbing process?—It would raise the grain. You see you are too near the wood and you would raise the grain. There is no filling on.

4788. Is it possible to use any form of local exhaust apparatus to remove the dust?—I have never had experience of anything of the kind, and as far as I know it would be very cumbersome and very expensive and difficult to use.

4789. How can this danger be reduced?—There is no way of reducing it unless you do away with sand-papery altogether between the primary coats.

4790. Is the next process what is generally known as filling?—Yes.

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4791. Does the filling material contain lead?—Yes, always in my experience. You cannot have filling without lead.

4792. Is there much danger in this process? I think so. I think there is considerable danger to-day in the smell, and in the handling of the brush. You have to put it on in such great quantities. The more you put on the better you fill. You use heavy brushes, pound brushes they call them. It runs down your hand if you are doing overhead work. There is great danger of it getting on your hands, and a bad smell arises from filling.

4793. There is, I believe, no rubbing down between the successive coats of filling?—No.

4794. Is stopping generally done after the last coat of filling has been applied?—It is generally done, not always. The most effective way is to do a little bit of stopping between each coat of filling.

4795. What is the stopping material made of?—White lead, with just sufficient thinning to make it into a paste. The less thinning you put in the better is the stopping for hardness and durability.

4796. By whom is the stopping material mixed?—Usually by the painter or the brush-hand who is using it. Sometimes an apprentice is told off to make sufficient for half a dozen men.

4797. Do you consider the mixing of stopping material dangerous?—Very.

4798. Why?—Because the white lead is in a dry powder. Dry white lead is used for making stopping. As you mix it and gradually blend it with a knife—you have a knife in your left hand and a mallet in the other—the dust rises and you inhale it. You have to beat it to get it into a paste of the right consistency.

4799. How is the rubbing down done after the application of the filling coats? With pumice stone and water.

4800. What is the extent of the danger in the rubbing down after the application of filling and stopping?—When you start to rub the filling you remove a certain portion of it, about a third, before you produce your level surface. That goes into the bucket of water you are using, and unless you change it every 10 minutes, the lead cleaned off by the stone comes off the sponge into the water, and you are always handling a white lead mixture in a liquid state. You have to change it to see what you are doing. I believe that it is absorbed into the pores of the skin. If not, it will dry on you in the form of dust and be brushed off.

4801. You cannot absorb it through the pores of the skin. That has been proved beyond question. The latter part of your explanation is material. Are the wheels and the carriage underwork treated differently from the body?—Yes.

4802. Is a good deal of dust caused in the operations of painting the wheels and carriage underwork?—Yes, in the sand-papery.

4803. Is this dust of a poisonous nature?—Very poisonous.

4804. Is it impossible to use wet methods of rubbing down in this work?—It is impossible. The underwork of carriages and chassis get less priming. They get two coats of priming on the wood or iron and then sand-papery and stopping. They do not reckon to get as good a surface, but they want a fine surface. There are so many crevices and corners and bends and places to turn round that it could not be done in the time with pumice stone and water.

4805. Is it practicable to apply local exhaust ventilation generally in this process?—I have never seen it done. I do not know whether it is feasible. I think that it would be very costly and cumbersome.

4806. Is there any special danger in the finishing work?—There is a danger when there is a lot of wet work about, especially at any time during the evening, when most of the finishing work is done. In the majority of shops they use naked gas lights for illumination and to heat the atmosphere and make the varnish flow better. The wet varnish makes a smell in the room, and the naked lights consume the oxygen, and the two things together seem to make a very poisonous smell, which affects the throat and

makes you choke, and makes the eyes and nose of the men run, and affects the lungs. I believe that one of the causes of colic is varnishing. They do it in the evening time when the shop is quiet and there is no vibration, and I would advocate electric light and steam heating. Coke fires give off a dangerous smell, and they use those.

4807. Is there any danger in the process of flattening?—No, I do not think so.

4808. To what extent do your answers apply to the manufacture of motor car bodies?—It is practically the same as with regard to horse carriages, except that there is more sand-papery of the under works in one case than in the other. The horse carriages are smoothed up much better by coach-makers than chassis are by engineers. The woodwork and sides of a chassis are terribly rough compared with coach-makers' work. The gun-carriage wheels, as they are called, and the framework of the chassis are done by engineers, who do not understand the fine finish required in coach work. They do not seem to think it is necessary to get the work up so well, and it needs some sand-papery, and, therefore, more dust is created.

4809. Is there any other special danger in the motor-car trade?—There is the danger of piece-work being hurried. I am working on piece-work myself. I cannot help it, because the exigencies of the trade demand it. The men are rushed and working at a given price, and have to do so much before they earn a week's wages; they have not time to be as cleanly in their methods.

4810. Have you anything special to say with regard to tram-car and railway work?—I believe there is more danger in tram-car work and railway work than there is in ordinary coach painting, because the insides of railway coaches are mostly got up in whites or creams or colours derived from lead, and tram-cars are got up in light colours which always have a strong foundation of lead. The canvas on the roof has a bucket of lead poured on it to keep the water out, and it is spread and allowed to dry.

4811. You have told us that there are many processes in which the workman cannot avoid getting his hands soiled with the material he is using?—Yes.

4812. Is adequate washing accommodation provided by most of the employers?—In some cases it is, but in others it is not. There is nominal washing accommodation, but not sufficient.

4813. What kind of washing accommodation is provided?—Supposing that there are 20 men, there is a little bowl about 2 feet in length; the bell rings for dinner and the 20 men rush to wash all at once.

4814. In the one bowl?—In the one bowl. They cannot all do it, it takes several minutes, and they get impatient and they go to the white lead bucket to take the rough off. If they waited their turns, a quarter of an hour of their meal time would be gone. They will not stand it.

4815. Are hot water and nail brushes available as a rule?—In some case, but not in all. They are supposed to be, but they are not. I have known cases where a clean towel was hung up over the bowl, which must not be used. It has been there as a make-believe, and has always remained clean.

4816. Where you have found washing accommodation, how many towels would be provided for the 20 men which you have spoken of?—If there were four towels, say, for the 20 men, they would have to last for a couple of days, and they would be used two or three times a day.

4817. Do the towels get very dirty by the end of the two days?—Yes, they get very dirty.

4818. You say that nail brushes and hot water are not generally provided?—No, they are not.

4819. Is time allowed to the men for washing before leaving off work for meals?—In some cases, but in other cases no time is allowed.

4820. How much time is allowed in the cases where time is allowed?—Five minutes at the most.

4821. Is that taken out of the employers' time?—Yes, but the time is never stated. They look askant at you if they see you washing your hands, but they

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do not like checking you, and they do not check you. Some firms will not allow you to wash your hands in their time.

4822. Is food often kept and eaten in the work-rooms where lead is being used? Yes, nearly always. The men hang their coats up in the room where they work, and they sit and eat their meals there.

4823. No meal-rooms are provided? Only in one case—in Liverpool. There was another case where a room was provided, but they have abolished the use of it as a meal-room and made it into an office. They must have thought better of it.

4824. In your opinion should meal-rooms be provided, equipped with suitable seats and tables, and properly warmed in winter? Yes.

4825. Do the men have the use of a cloak-room?—No.

4826. What do they do with their coats when they are at work?—They knock a nail in the wall of the room where their job is, and hang them up.

4827. I suppose that their coats get saturated with dust?—Yes.

4828. They are bound to be?—Yes.

4829. Do coach painters wear overalls while at work?—Very rarely. I have known cases. I have worn them myself, but they get so thick with paint in a day or two that they are offensive to you.

4830. Can you tell us what are the usual hours of work for coach painters?—The nominal hours of work are about 9½ a day; but latterly they have worked all hours. They work from six o'clock in the morning to ten o'clock at night, and on occasions work all night. They work late on Saturday and on Sunday. I have worked Sunday after Sunday myself. I remember a statement by one of the leading coach makers in the country with regard to getting work out. He said, "There are seven days in the week, and 24 hours in the day, and it has to be out at a certain time."

4831. That is in the very busy season? Yes, that is in the summer time.

4832. In the winter do they have a slack time?—Yes; there is very little chance of getting a job in winter if one happens to be out of work at that time of the year.

4833. So that you take advantage of the overtime in the summer to make up an average wage?—That is the way in which it works out generally. It would be better if it were more equally distributed.

4834. Do you think that a restriction of the hours of work in lead processes would be a salutary measure to adopt in the interests of health?—I do. There is an agitation in the Coachmakers' Union in the North for the reduction of the hours from 53 to 50 a week. That would be very good if it were adopted; I would suggest only one break in the day, starting at 8 o'clock and working till half-past 12, then taking the dinner hour, and working on from half-past 1 to 6. That would be 9 hours a day. That, with from 8 to 1 on Saturday, would be 50 hours a week. That would reduce the danger of unclean hands at meal times by half. At present they start at 6 with an empty stomach and work until 8 o'clock. They wash their hands, if they have a chance, and eat their meal, and then have the dinner hour. In that way there are two chances of their eating meals with dirty hands.

4835. Do you consider it dangerous for men to work before they have had a meal in the morning?—Very dangerous. I know from my own feeling and from what other men have told me, that if you have a meal before you start you are fortified against the danger of colic and that sort of thing.

4836. Would it be desirable, in your opinion, to have a periodical medical examination by a surgeon with power to suspend from employment in lead processes?—It would be desirable, in my opinion.

4837. (Mr. Fell.) What technical work are you working on?—I am working on the priming and getting up of bodies of coaches.

4838. In large works?—Yes, in a large firm.

4839. Do your remarks with regard to the conditions as to washing, and so on, apply to fairly large works, or only to small works?—To large works also. With regard to the firm that I am working with now, the

conditions are very fair, but I have found large works just as bad as any very small and poor works where the employer was a struggling man and could not afford better conditions. Some years ago I wrote to the local factory inspector and complained of some tramway works. The conditions were terrible. There were men going off with lead colic day after day. They were boiling dinner cans, and the lead was actually dropping into the cans. I have seen it and others have seen it. There was no chance of cooking except at this place, which was an old engineers' shop that had been turned into a tramway works. It was not fit for coach building or coach painting at all. When the factory inspector went there he insisted on very great improvements, I believe, and it cost them hundreds of pounds to put things right. The result was that I was dismissed, because they knew that I had been complaining.

4840. Does your criticism apply to all paint shops in Liverpool, do you think?—No, not to all, but generally, what I have said about represents the average conditions.

4841. What particular class of work do the brush-hands work on?—A brush-hand is supposed to be a handy-man, he is what is known in the trade as a "broken painter," if you understand. He is very often a better man than the so-called proper painter, and more skilled. Many painters do not know how to make filling, or how to handle it, because they have never been on that work.

4842. Are you speaking of a man who has served his time?—Yes, and who has not been very successful at the lining work as a pencil-hand, and has become a brush-hand.

4843. Does the brush-hand ever become a painter?—Yes, I could become a painter, but the society is so very conservative in its rules.

4844. (Lord Henry Bentinck.) It would improve your position if you became a painter?—Yes, I should have higher wages, easier conditions and less danger. The coach painter proper has not nearly the danger that the brush-hand has.

4845. Why can you not become a painter?—You should ask Mr. Kinggate.

4846. (Mr. Fell.) Have you been actually engaged on the painting of tramcars?—Yes.

4847. Have you used substitutes for white lead?—Yes, I have used what is known as Purex. It is supposed to be genuine white lead, but innocuous. In my opinion it is not absolutely innocuous.

4848. Have you known any case of lead poisoning due to Purex?—No, I have not.

4849. Is Purex as easy to apply as ordinary white lead?—Yes, it is as easy to apply as ordinary white lead, but not nearly as serviceable. It has not the body, it has not the solidity of white lead. It would take about three coats of Purex to equal one coat of genuine English white lead.

4850. Does it last as long?—Well, I dare say that it does. I have never heard any complaint about the durability of it.

4851. You were saying just now that you recommended the one break system for men in the shop. Would not it mean that the men would want something to eat between 8 o'clock in the morning and half-past 12?—They work now from 9 till 1—four hours. I was advocating a stretch of four hours and a half, so that it is only half an hour longer.

4852. Would not there be a tendency for the men to bring food into the shop, or to want to bring food into the shop?—I do not think so. Some men would be eating all the time, some also are very dirty and uncleanly with regard to where they eat.

4853. Is the average brush-hand more dirty in his habits than the trained painter?—I believe so.

4854. That is probably the reason why brush-hands suffer more from lead poisoning?—The work is dirtier. The brush-hand uses much more paint. The coach painter is putting spirit colours on with fine soft brushes, and it is gentle work, but the brush-hand has to splash the paint about. It does not matter how it flows, because it will all be levelled with the stone; but the coach painter has fine colours already ground

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with turps at the mills, and mixed with gold size or varnish according to what they want.

4855. (*Mr. Kinggate.*) You made the statement\* that the carriage-maker puts lead between the plates of the springs. It is somewhat new to me to hear that any lead is ever put between spring plates?—Lead colour.

4856. No, there is no lead colour?—I cannot agree on this point. My observations since I was in London and my whole experience emphasise the fact that there is lead colour between the spring plates, and when the plates are tightened up the lead squeezes out and gets on to the hands of the man handling them.

4857. With regard to old springs, when you take them off and reclean them, a labourer will put a little lead colour in when he cleans them. The carriage maker has nothing whatever to do with putting springs together?—The coach-maker handles them when they are freshly coated with lead. The carriage-maker puts lead under his clips, does he not?

4858. I am a coach-maker myself. Now do you think the men would be favourable to medical examination?—I think so. I think that intelligent men would be favourable if they grasped the situation.

4859. Have you any knowledge of men being victimised on account of the fact that they are suffering from lead; that is to say, that the employer, knowing they were suffering from lead, will not employ them?—Yes.

4860. That is an objection to medical examination that would weigh with many, is it not?—I have in mind a foreman, a very clever man, a painter in a big firm in Liverpool, who was taken ill and who gave up because he was suffering from lead poisoning. When the employer went to enquire how he was going on, he gave out to his employer that he was suffering from some other disease altogether, for fear that he would be discharged.

4861. What is your reason for thinking that varnishing is one of the most deadly things in connection with finishing?—There have been four finishers in the firm that I am working for now who have all died as young men.

4862. Has that been traced to lead?—Yes. A doctor came in to see his carriage and he said that the atmosphere was deadly, and he did not know how the men lived in it. These four men have all died young from working in this close room. As I said, the gas consumes the oxygen of the pure air, and when there are two or three wet bodies there is a large area giving off a strong smell of japan or varnish. Some makes of varnish are worse than others.

4863. You generally have a special room for finishing, on account of dust?—Yes.

4864. That is kept up to a certain temperature so that the varnish shall flow, but there is no lead there? No, but I believe that there is danger from the gas and the strong smell.

4865. But that cannot be attributed to lead, which is what we are dealing with in this Inquiry. You are aware that there is a firm in Liverpool who do not use white lead, but Purex?—Yes.

4866. They find it perfectly satisfactory for all purposes?—I am working there myself.

4867. A member of the firm told me himself that it was satisfactory?—It is said that you can spread it on your bread, but I would not like to try it. I was using Purex yesterday. The general opinion of workmen is that Purex is not absolutely innocuous, and that it is not nearly so good as white lead.

4868. Your objection to overalls was that they would become offensive very easily and very quickly? You know perfectly well that the clothes which are generally worn by a brush-hand or painter are covered with paint and other matter. Would not they be worse than an overall? Would it not be better to wear overalls than to get the paint on your own clothes?

—A woman cannot wash a painter's overalls any more than she can the black apron. She could not get the splashes off.

4869. You might not be able to get some of the marks off, but it would be quite possible to keep them clean. On the Continent there seems to be no difficulty?—There would be a little time taken in putting them on in the morning and taking them off at night, which, perhaps, the man would jib at. If men were two or three minutes late, and the foreman saw that they had not their overalls on they would see that the men were late. Would the boss allow time for putting them on and taking them off, do you think? They are very keen nowadays.

4870. I know, but would it not be much better that a man should wear overalls which could be cleaned once a week?—Yes, it would be better, there is no doubt about that. Our wives always complain that, before we enter the house, they can smell the paint.

4871. Yes, before you get to the door?—Yes.

4872. (*Mr. Robins.*) For how long have you used Purex or a substitute for white lead?—About three or four years.

4873. Have you noticed at all that the men are more healthy and the vitality of the men is better after a day's work than it was when they used white lead?—You cannot very well tell, because all the time you are using Purex you have to use pure dry white lead stopping, so that it is neutralising the Purex all the time. You cannot use Purex for stopping.

4874. For how long have you been in the coach trade?—Since I was 14 years of age; and I shall be 37 on Monday.

4875. Do you think that the habits and conditions of the working painters are much more clean than they were when you first went into the trade?—I think so.

4876. You think that he is cleaner in his habits and takes more pride in himself than he did when you first went into the trade?—Yes.

4877. (*Lord Henry Bentinck.*) Have you had any experience of substitutes for white lead stopping? There are substitutes, are there not?—The only substitute that I know of is japan putty. That is made of japan and whiting. It is put on with a knife. There is no rubbing. You spread it as level as you can and leave it.

4878. Is it as effective as white lead?—It will fill up the holes, but you cannot get as good a finish. You can put white lead on and put it over the hole sticking up in a lump, and then get a piece of stone and wear it perfectly level. With the putty you press it in as well as you can and square it. It is very good, and with a bit of care I believe that putty is a good substitute on chassis and the underworks of carriages for stopping. One firm in Liverpool say that they would discharge any man that they saw using white lead sand-paper stopping on wheels. That is to their credit. If a man who has a good reputation as a coach-maker, and can produce splendid work, can take that stand, why cannot others? It costs a little more, not in the stuff, but because it takes a longer time to put it on. Sand-paper stopping you can slap on anyhow.

4879. (*Dr. Collis.*) Do you know any men, who have been employed with you, who have been using Purex only, apart from any other form of paint?—No, I do not. They have all been subjected to the dust of sand-paper stopping, even if they have not been using it.

4880. You know that Purex is lead?—Yes; it says on the label "Genuine English White Lead."

4881. As regards your own experience in working with it, do you feel any different after you have been working with it from what you would feel after you had been working with ordinary white lead paints?—Not a bit.

4882. Neither better nor worse?—You feel no different. I do not know whether the effect on the system is the same or not.

\* See answer to Q. 4777.

The witness withdrew.

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Mr. J. T. SWAIN.

[Continued

Mr. J. T. SWAIN (1, Bishop Gate Green, Coventry) examined.

4883. (*Chairman.*) What is your occupation?—Foreman painter.

4884. What practical experience have you had in the coach-painting trade?—Thirty years.

4885. What firm are you at present employed with?—The Daimler Company.

4886. Have you worked at railway carriage and tramway painting or only on carriages and motor-cars?—Only carriages and motor-cars.

4887. What branch of the United Kingdom Society of Coachmakers are you connected with?—The United.

4888. Are you prepared to answer questions regarding the various processes in detail?—Yes.

4889. What do you use for jointing?—We use the non-poisonous lead.

4890. Do you find that in every way efficacious? Yes.

4891. Have you had any complaints at all in connection with it?—None whatever.

4892. Not with regard to its durability?—No, none.

4893. Is that the only material used by body-makers in your firm?—Yes.

4894. Does the vehicle in course of construction next pass into the hands of a carriage-maker or body-fitter?—Yes; a body-fitter.

4895. Will you tell us exactly of what his work consists?—Fitting the body on to the chassis.

4896. Does the body-fitter come into contact with lead?—No.

4897. How is that?—He does not use it at all. It is not necessary in fitting a car body on to a chassis to use lead.

4898. Is it generally considered necessary to use white lead for this purpose?—No.

4899. When the carriage-maker or body-fitter has completed the work of fitting up, is the vehicle ready to pass into the painter's hands?—Yes.

4900. The first coats of paint applied are termed priming coats, are they not?—Yes, that is so.

4901. Does the priming contain lead?—No.

4902. Is that unusual in carriage-building?—Yes, I believe so. All the other firms that I am acquainted with use lead, but I do not. I have a particular process of my own.

4903. Is it a process that is patented?—No.

4904. Is it a process that you would divulge to your competitors?—Yes, with pleasure.

4905. Is sand-papery done between the successive priming coats?—No.

4906. What do you substitute for sand-papery?—It is not necessary to sand-paper at all.

4907. Can you explain to us why?—With regard to that which I speak of in the place of the lead, it is not necessary to sand-paper it. It is a smooth liquid substance, which it is unnecessary to sand-paper.

4908. It fits in completely, does it?—Yes.

4909. Is the next process what is known as filling?—Yes.

4910. Does the filling material contain lead?—Not to my knowledge.

4911. You are not quite sure about it?—You see I receive it from the manufacturers and apply it as received.

4912. Do you ask for non-poisonous filling?—Yes.

4913. You believe that it contains no lead?—That is so.

4914. There is, I believe, no rubbing down between the successive coats of filling?—None whatever.

4915. Is stopping generally done after the last coat of filling has been applied?—Prior to the last coat.

4916. What is the stopping material made of?—The stopping material used generally is made of lead, but the stopping that I use is not made of lead.

4917. And you find that in every sense as good as the lead stopping?—Yes.

4918. When did you first begin to discontinue the use of lead?—Two years ago.

4919. You have had no complaints at all from your customers?—No.

4920. Nor noticed any defects yourself?—None whatever. I may say that the work has been absolutely satisfactory.

4921. How is the rubbing down done after the stopping and filling?—With German brick and water.

4922. Is it ever done dry in your works?—No.

4923. Do you think it is necessary ever to do it dry?—No.

4924. Then is there any danger in the rubbing down after the application of the filling and the stopping?—None whatever.

4925. Does that answer apply to bodies only?—To chassis as well. You see using the non-poisonous stopping there is absolutely no danger whatever.

4926. Are the wheels of the carriages and the underwork treated differently from the body?—Differently from the body—yes.

4927. What do you use for the wheels and the underwork of the carriages?—The wheels, to commence with, of the Daimler cars are enamelled.

4928. Do you use no dangerous material at all on the wheels?—No; we do not touch the wheels, the wheels come to us all ready for use. They are made and enamelled away.

4929. Is there any lead used in the enamelling, to your knowledge?—No.

4930. You are sure there is not?—Yes, quite sure.

4931. After the rubbing down of the filling has been completed, what is the next operation?—The next operation would be to give a foundation for the colours that are to follow, and that foundation is composed in exactly the same way as that which is applied to the body when finished by the body-maker.

4932. Is the work then ready to be painted in the desired finishing colour?—Yes.

4933. And then the body is ready for varnishing?—When the colours are all applied.

4934. In the process of applying ground colour, finishing coats, glaze and varnishing, is there no rubbing down between successive coats?—None whatever.

4935. How do you fix the canvas on the roof of your vehicles?—With a composition of non-poisonous lead and varnish.

4936. Do you think it would be possible to abandon the use of lead paints generally in the coach-painting industry?—Yes.

4937. Do you know why other important firms have not taken the same steps as you have?—No, I cannot tell you why. My principle of painting is simply the same as the American.

4938. I was going to ask you whether from your knowledge there is any lead used in painting American motor-cars?—No, not by the American process, and mine is an adaptation of the same system.

4939. Is it more expensive than the ordinary lead?—No; from a commercial standpoint it is not.

4940. Is it cheaper?—Well, it might cost a little less for material but a little more for labour.

4941. Could you say from your knowledge whether it could be applied to tram-cars and to the railway carriages?—I do not see any reason why it should not be applied to all kinds of vehicular painting, taking into consideration the fact that the carriage and the motor-car are of the highest class. If it is put into those I do not see why it should not. In fact I should apply that system to almost any degree of quality of painting. I can use it for cheap work or I can use it for the highest class of work. The principle of it is simply in the foundation work, and my opinion is that it is in the foundation work where the great liability occurs in reference to lead poisoning.

4942. Did you introduce this system in view of your knowledge of the dangers of using lead?—Yes, I used it purely for the purpose, if possible, in my own way of getting rid of this evil of lead poisoning.

4943. (*Dr. Collis.*) I was not quite aware in what processes exactly you were using what you have termed non-poisonous lead. Would you mind recapitulating them?—First in the priming, and in the second place

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Mr. J. T. SWAIN.

[Continued.]

in the foundation of the colour that the car has to be painted.

4944. That is to say that this material is only used in two processes, and is never rubbed down, and is only used in the form of paint?—Yes.

4945. Do the same men carry on these two processes?—No.

4946. They are carried on by different men?—Yes.

4947. Who are also carrying on other processes as well?—No. There are different sections of men for different processes of the work.

4948. So that one man will be doing priming entirely with this material, and another man will be laying on the final colour on the car with this material?—Yes.

4949. This would be in the last three years?—Four years.

4950. Have you had any sickness at all among these two classes of operatives?—Not directly from my own establishment. The sicknesses that have arisen have been among men who have come from other works, and it has developed. For four years I have been without a case of lead poisoning.

4951. Then is it from the fact that, as you have stated, for four years you have been free from lead poisoning, or from other information, that you consider the material which you use to be non-poisonous lead?—From the fact that I have been free in my own process.

4952. But when you originally started it you could not have had that information. Did you look upon it as a non-poisonous form of lead when you originally started using it?—When first I commenced it was from commercial interests.

4953. As being cheaper?—Yes.

4954. And you found afterwards that there was less sickness?—Yes.

4955. There was no statement made that the material was non-poisonous?—No. When I first commenced this process, non-poisonous lead had not been brought to my notice. I used the ordinary lead, but I so reduced the quantity that was necessary to be used that it took away the greater part of the liability.

4956. So that you consider that your immunity from sickness in these two classes of people, one doing priming and the other laying on the final colour, is not to be attributed to the material they are using but to the way in which the material is used?—Yes.

4957. (Mr. Fell.) Do you receive the bodies complete before you start painting?—Yes.

4958. So that there is a certain amount of work done on them before they come to you?—They have the priming coat before they come to me, and I send the material down to the body department.

4959. That is non-poisonous?—Yes. I mix up off superintend the mixing up of all the material that is necessary for carrying on the painting.

4960. Do you know at all what the bodies are put together with?—Yes. They are jointed with a mixture of Japan and whiting.

4961. Does that stand?—Yes.

4962. Without any shaking?—Yes. You see the panels are steel, and, that being so, it takes much more to hold your frame than if they were wood, and I have mixed up this composition. We were troubled with panels wearing loose in the frame, and I mixed this up as a trial, and it proved very satisfactory, and we still continue to use it.

4963. Do you find that there is any crack in between the beading and the other part of the sides of, say, the doors, or anything of the sort?—Yes, there is that kind of thing taking place, because of the wear and tear.

4964. Do you find that that is the same whether you use lead or whether you do not use lead?—Yes, but not so much since we have used this particular composition that I speak of.

4965. I understood that you were prepared to give the Committee some description of what this composition was?—The priming?

4966. Yes, first of all the priming, and then the stopping too?—The priming is composed of what we should otherwise pass on one side practically as useless

or waste. It is the refuse japan and varnish mixed together with a little lamp black, or white, or green, or yellow, whichever is necessary to put into it, and then thinned down with turpentine.

4967. That is the priming?—Yes.

4968. What do you make your stopping of?—Whiting and japan.

4969. You were talking just now of rubbing down the chassis with German brick?—Yes.

4970. How do you manage to get round all the corners and everything with the German brick?—There is only the side of the frame really to be dealt with in the chassis. The springs and the crossbars are all polished before I receive them, and it is only the side of the frame that requires this particular attention from the painter.

4971. What do you call the American system of painting?—The American system of painting is exactly the same, only they have a preparation which they call wood filling. I have used it. I do not know exactly what it is composed of, but it occurred to me that I could use this japan and varnish mixed together, and that it would answer the same purpose. Its purpose is, of course, to fill up the grain and to form the foundation. By the old method of painting with lead the priming coat was applied to the woodwork, and when you came to look at it, it was only the liquid that the lead was mixed with that entered really into the grain of the wood. The lead remains on the top. That being so, the Americans produced this wood filling, which they stated would enter right into the pores of the grain, and completely close it up and so form a perfect foundation to work on. I used it some years ago, and very successful it turned out. When it was properly applied and a fair amount of work was applied to it, there was an excellent result. That is the American. Well, I thought "Why should not our varnish and japan do just as well? it is higher grade," and that being so, I applied it, and I claim that it does just equally as well. It is quite as good, and it does away with the necessity of using lead. It forms a suitable foundation for the work, and especially on motor-cars where there are steel panels. It will adhere more perfectly to the panel, and last longer, and there is less fear of chipping than there was when lead was applied.

4972. I understood you to say that for bedding your canvas you use a non-poisonous lead?—Yes.

4973. What do you call a non-poisonous lead?—That is paint supplied to us as non-poisonous.

4974. Can you tell me what it is?—No. You have to take it. It is up against the manufacturers if it is poisonous.

4975. (Mr. Mason.) I gather that the cheapness of your process depends on your being able to use such part of the varnish that you would in the ordinary course throw away?—No, I do not think so. Take it from the commercial standpoint. How much more do you think it would cost if you took the varnish and japan clear out of the bottle and mixed it up and used it? How much more would it cost than if you took the lead?

4976. Are you asking me a question?—You must excuse me but you were asking me a question. We considered the cost.

4977. I understand, then, from you that it is very much cheaper to use this waste from the varnish?—Yes; it is certainly cheaper.

4978. May I ask you what price do you pay for this varnish that you speak of?—Well, you see, I could not give you the price, not being in the buying department.

4979. In such a trade as railway carriage painting, that part of the varnish would be used on inferior work?—Yes.

4980. Therefore, would you get the same saying that you claim in what we may call the higher-grade work of the Daimler Company?—I can only speak for the class of work that I am connected with.

4981. You said just now that this could be equally well applied to railway carriage painting as to any other?—Yes, the system could be used exactly the same as far as the application goes.



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[Continued.]

4982. Would there be the same saving to a railway company?—That I could not say. Those who are in railway painting would be able to test it. Personally I do not think there is anything very serious about it.

4983. (*Mr. Kinggate.*) Would there be a considerable saving from the fact of there being no necessity for sand-papering?—Yes, there is a saving there certainly.

4984. Two coats of priming and two coats of sand-papering?—It is only necessary to put on one coat of what I spoke of instead of two coats of lead priming. You see it saves considerably in time. It is only necessary to put one coat of the mixture of that description on to a body. That is all that is necessary. But by the old process you put on two coats of priming at least—I did—or three coats.

4985. In some cases three?—Three coats was my standard of priming for a body. Now I only put on one by this particular method.

4986. (*Mr. Mason.*) And get the same result?—And get the same result.

4987. (*Mr. Kinggate.*) The object of putting on the priming is to stop the grain?—Yes.

4988. The method you think is effective for that purpose?—Yes. If you care to try it, just put a little of the lead colour on to your hands and put a little of this composition that I speak of, and see which takes the most to get off. You would have something to do.

4989. There would be less tendency for this to crack than there would with ordinary lead?—Yes.

4990. More elasticity?—Exactly. I am so taken up with it and so satisfied with the result of it that I say it is better all round, and after two years without a complaint I may very well take a little credit for it now. I have said nothing about it for two years. Had it not turned out successful, I should have dropped it, and shut the door, and said nothing about it. It was purely with the object of reducing the liability that caused me to use it in some parts of the work.

4991. The same thing occurs after the filling which is naturally porous. To stop the suction you put on two more coats of lead colour in the ordinary way. This has the same effect?—Just the same. In the American system they put this wood filling again on to their filled up rubbed down surface, the same as they put on to the wood in the first place.

4992. (*Mr. Mason.*) Are you using genuine turpentine with the filling, or a substitute?—Genuine. I am very particular about turpentine.

4993. There would be less suction with the genuine turpentine in the filling than there would with a turpentine substitute?—Exactly. I could not use a substitute, because of what would come on afterwards. Even if we got through successfully with the colour, we should have trouble with the varnish. It would begin to fall out then.

(*Mr. Mason.*) You are a lucky man if you can get turpentine.

4994. (*Mr. Robins.*) Have you seen any of the motor-cars after they have been out in use for two years?—Yes, plenty of them.

4995. What is their condition compared with cars painted with white lead, from a painter's standpoint, after wear and tear for two years?—It would be a very difficult matter when you came to view a car that had been out for two years to know exactly what it had been in contact with. A car under some people's care would look very satisfactory at the end of two years, while in other people's hands at the end of six months it would look a wreck. The only way

in which you could come to a conclusion as to the painting and the quality of the work would be to see whether that painting had cracked or peeled off or sealed. I have not found anything of that.

4996. You have found it far superior to painting with white lead? Yes. If any perishing has taken place it is in the finishing coat of varnish, which is a usual thing. The varnish is the first thing to give way, and it is very seldom that you find the paint destroyed down to the filling up.

4997. I take it then that, with regard to painting with your system, the perishing would be from the top?—Yes.

4998. And with white lead the perishing would come from the bottom?—Yes. You find that with the white lead ground or foundation your painting will have very large cracks, which take all the coats of paint and varnish and everything. They will go right through to the bare wood. That is with lead, but you will not find that with this principle of mine—or I have not found it yet.

4999. Do you find that since you have used non-poisonous paint for the painting of motor-cars the health and vitality of the men after a day's work has been better than when you used white lead?—Yes. The general health of the men is better altogether.

5000. Not that languid appearance?—Oh dear, no.

5001. (*Chairman.*) Does the Daimler Company belong to the Employers' Association?—Yes.

5002. Can the ingredients which you use in your non-poisonous paint be bought in England?—Yes, you can get them from varnish manufacturers.

5003. How many men do you employ?—I have 135 at the present time.

5004. I suppose, on the ground of saving of cost, that that saving would be enormously enhanced if you were exempt from such things as providing overalls, medical examination, exhaust draught, &c.?—Yes.

5005. If lead is permitted to be used in the future in the industry, the provision of overalls and other precautions would have to be enforced?—Yes, if the use of lead is prohibited in future, it will not affect us at all in any way.

5006. Then there is the other very important point, and that is, that you are also exempt from paying compensation?—Yes, it will make a considerable difference, no doubt.

5007. Would you send us a specimen of your non-poisonous lead, or perhaps you can tell us where you get it?—Yes; it comes from Docker's, of Birmingham.

5008. (*Mr. Kinggate.*) You have used non-poisonous lead exclusively for two years?—For two years previously to that I used the ordinary lead with the same system.

(*Dr. Collis.*) You cannot, then, put the difference down to the non-poisonous material, but rather to the way in which the material is used.

5009. (*Mr. Kinggate.*) What do you use the non-poisonous lead for?—The non-poisonous lead that we use now is used to bring up the light ground colours—white and cream.

5010. You do not use it all for priming purposes?—No.

5011. In painting colours that do not need any lead, you do not use lead in the ordinary way?—No.

5012. Only for special purposes?—Yes. It is used to bring up the ground colour for a white or a similar colour.

5013. For dark colours you do not use it at all?—Not at all. As the greater portion of the cars turned out are of a dark colour we use very little.

The witness withdrew.

Mr. HARRY ALLEN (106, Woodhall Road, Thornbury, Bradford) examined.

5014. (*Chairman.*) What is your occupation?—Coach-painter.

5015. What practical experience have you had in the coach-painting trade?—About 26 years.

5016. What class of work have you been employed in?—I have been employed on many classes of work. I have been employed the longest on tram-car work; I have also been on engine work and private work.

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[Continued.]

5017. What branch of the United Kingdom Society of Coachmakers are you connected with?—I belong to the Bradford branch.

5018. Are you prepared to answer questions with regard to the various processes in detail?—Yes, to the best of my ability.

5019. What do you use for jointing?—It is a mixture of Griffith's priming white and purple brown which contains ferric acid to a great extent, I suppose. That is my information from the manager. I only give it in that way.

5020. The body-makers in your works do not handle lead?—No.

5021. Does the vehicle in course of construction pass from the body-maker into the hands of the body-fitter?—We do not call him a body-fitter. He is the ordinary fitter—the mechanic. He mounts it on to the truck.

5022. Please tell us exactly of what his work consists?—His work consists of putting the body on to the truck and bolting it down, and generally coupling up.

5023. Does the fitter come into contact with lead? No, not at all.

5024. Is it generally considered necessary to use white lead now for fitters' work?—Not now, at any rate. We have done away with it altogether. It was thought at one time that it was necessary, but we do not use it now. For all I know, it is as satisfactory as it was before.

5025. When the fitter has completed his work, is the vehicle ready to pass into the painter's hands?—Yes.

5026. The first coats of paint applied are termed priming coats, are they not?—Yes.

5027. Does the priming contain lead?—No.

5028. Is sandpapering done between the successive priming coats?—Yes.

5029. In what shop is the priming done?—Very often in the body shop; sometimes in the paint shop, but more often in the body shop.

5030. Is the next process what is generally known as filling?—We have practically done away with filling at the firm that I work for. They do a little. The next process, as generally understood in the painting trade, is filling.

5031. Why have they done away with it in the place that you work at?—Because they think it is not necessary. They think that the cars do very well without it. They think that the durability of the cars is as good without as with it. They, of course, admit that the job has not the finished appearance. That is their contention.

5032. Is stopping generally done next?—Yes. We use stopping.

5033. What is the stopping material made of?—It is made of a non-poisonous substitute, the same as the paint. It is supplied in powder and mixed by ourselves. There is no lead.

5034. How is the rubbing down done after the stopping?—It is done by both processes; rubbing down by pumice-stone and sandpaper.

5035. Is there any danger in the rubbing down after the application of the filling and stopping?—Not at all, if it is non-poisonous.

5036. Are the wheels treated differently from the body?—We do not treat the wheels of the cars at all.

5037. You buy them already finished?—Yes. I do not know that they are treated in any shape at all. They are only rubbed over with oil. I believe they have some black kind of stuff, but we do not deal with them at all.

5038. Do you know whether any lead is used on the wheels?—Some of them when they come are painted, but they are never painted by our firm.

5039. After the rubbing down has been completed, what is the next operation?—The first coat of paint is then applied.

5040. Is the work then ready to be painted in the desired finishing colour?—There are other coats to follow before the finishing coat is applied. It is a repetition of what the first coat is.

5041. Is the body then ready for varnishing?—We enamel them. We use white enamel on our cars.

Sometimes we use what is known as varnish colour; that is a mixture of varnish and a substitute, but more often it is enamel.

5042. In the process of applying ground colour, finishing coats, glaze and varnishing, is there any rubbing down done between successive coats?—Yes; sandpapering.

5043. How do you fix the canvas on the roofs of your vehicles?—We use the same mixture as is used by the body-makers for joint making and bedding—that is a mixture of the Griffith's white priming substitute and purple brown.

5044. How long have you used, in coachmaking, materials which are entirely free from lead?—About two years in my present occupation, but I used a substitute many years ago.

5045. Have the results been satisfactory with these leadless materials?—Very satisfactory.

5046. Have the cars worn as well?—Yes; that is due, we think, to the protective coats of varnish that go on the top.

5047. Is it any more costly than the ordinary lead paint?—I understand that it is not. It has greater covering properties than lead. Weight for weight it goes much farther. It carries a great amount of oil and therefore it goes a long way.

5048. What is the composition of this substitute?—I can give you an analysis that was supplied to me by the firm who manufacture the substitute.

5049. Would you tell us what it is?—Zinc sulphate 13·3, barytes 31·2, zinc oxide 44·4, refined linseed oil 11·1. They gave me that as an approximate analysis when I wrote to them.

5050. (*Dr. Collis.*) Before you gave up the use of lead in your works, you were accustomed to work with lead?—Yes.

5051. Have you known of any illness occurring during that period?—Yes.

5052. What has been the state of health of the men since you have given up using lead?—Much better. I might say, in connection with that, that I was particularly reminded by one of my workmates to tell you that the general state of our health was better since we were using the substitute than it was before. He asked me particularly to mention it if I had an opportunity.

5053. (*Mr. Fell.*) Have you had any actual cases of men being knocked off their work since you started using this substitute?—No, I do not think we have had one.

5054. As to this bedding that you use for the canvas, do you find that it powders at all after it has been out in the weather?—I am told by the body-makers that it does.

5055. I suppose the erection of the body does not come under you. You do not have anything to do with that?—No.

5056. Do you know anything about the jointing?—I only know what has been told me by the body-makers. They say that the mixture we are using powders and they do not favour it, and they point out that the tendency is to loosen the joints. If it powders, it does not resist water in the same way as lead would. I can only say what our body-makers have told me.

5057. You say that this substitute goes farther. Is it as opaque?—Yes. Weight for weight the thing has a deal more covering power and will go a lot farther. You do not use the same amount at all, in weight, in painting a car as you would with lead.

5058. But to get the same effect of opaqueness, do you have to use more coats?—No; we just use the same number of coats.

5059. And you get the same effect?—We get the same result practically. We find that the first coat covers very poorly, but when it is applied on its own material the second coat surprises us. It covers very well. We also find that it is a better filler of the grain than lead. One of the reasons, perhaps, why we have knocked the filling off so much is because it fills the grain of the wood up better than lead.

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Mr. HARRY ALLEN.

[Continued.]

5060. Is it as easy to apply?—Yes. It needs a special education to apply it efficiently; it is as easy when you get used to it.

5061. Does it require special tools?—No, the same brushes and tools answer: you get an aptness when you get used to it. When you try to apply it in the same way as lead which you have been used to, it does not act as well.

5062. (Mr. Mason.) Judged by the experience of coachmakers, it would appear that this material depends entirely for its life upon the varnish?—They do not use varnish at all in what they use for jointing.

5063. It powders?—Yes, it powders.

5064. Judging from that it will only stand if it is protected by the varnish?—That is my impression. I have seen it tested by exposure to the weather for 12 months alongside a board that was done similarly with lead. It has been tested protected and unprotected, with the result that the unprotected coats have left the board in the case of the substitutes whereas the lead has stood. But when it comes to the coats protected with varnish, the substitute is equal to, if not better than, the lead; because it does not crack and it does not change colour. It does not go as black or as yellow.

5065. How long do you go between the painting of the cars?—That is rather a difficult question to answer, because so many mechanical damages occur to cars that some of them get painted two or three times. They get painted out of their turns.

5066. What do you aim at?—There is an attempt to get them through every two years.

5067. While they are standing at night, I take it, the cars are protected in sheds?—Yes.

5068. And are not exposed to the weather to the same extent as railway carriages?—No.

5069. Have you had cars which last considerably longer than two years?—We have been using the substitute about two years. The condition of some of them that have not had what I call mechanical damage is as good as the lead was. After being subjected to extra soap washing and the varnish gets away, they very soon begin to look shabby. We reckon that a car's life, as far as its appearance goes, is according to the mechanical damage that it receives. A car looks shabby when it gets scratched and kicked and knocked, even where the paint itself is fairly good when it has not been subjected to these mechanical damages, and it has to be repainted. The same mechanical damages will occur under lead as under a substitute, and therefore the life of a car with the substitute is just as long as with lead. It answers the purpose in the double sense that it is not poisonous and there is not the liability attached to it, and as painters we like it better now that we have got used to it.

5070. What system of washing do you use for your cars?—The car washers use a specially manufactured soap, but we have nothing to do with that in the painting department.

5071. Can you give me any idea how often they are washed?—No, I could not. Some cars get dirtier than others. Some roads are dirtier than others.

5072. (Chairman.) Are they washed every other day or every week?—They are supposed to be gone through in some form or another every night.

5073. (Mr. Mason.) I only wanted it approximately. With regard to the mechanical damage, I understand you use white enamel for the uppers?—Yes.

5074. Is that quite satisfactory?—Yes; we get very satisfactory results with enamel.

5075. How many coats of enamel?—Only one, occasionally two on new work.

5076. That would be applied in place of the varnish colour in an ordinary car at the same time?—Yes; we used to use the varnish colour. They like the cars very white, and by using white enamel we get them

whiter than we should with varnish colour. We did use Ripolin for a long while. We are using Noble and Hoare's enamel now.

5077. (Mr. Kinggate.) As you do not use any filling do you give a larger number of coats of paint?—No, we do not, but personally I think we ought to.

5078. Are the jobs really satisfactory from a painter's standpoint?—They are satisfactory for the amount of coats they get.

5079. That is a very qualified answer. Seeing that there is practically no lead left, it seems to me that there must be something more left with regard to this material, or else it would not hide the grain. The first priming coats are practically sandpapered off except the liquid that enters the grain. After the filling they are stoned down, and there is hardly any lead left in the filling. It has simply stopped the pores. There is really no lead left?—No. If you use lead in filling, you must leave the body on.

5080. But I mean in the filling is there as much sandpapering done and as much taken off?—There is middling sandpapering done and middling taken off.

5081. It seems to me from my practical knowledge that it is not possible to make a good job with this method that you adopt?—It is satisfactory for the number of coats it gets. It is not filled up, but it would not be filled up with lead. I say that as a practical painter. The life of a car is supposed to be so long, and it lasts that length of time.

5082. Taking ordinary coachmaking work as a whole, do you know that it is usual to have six coats of filling?—It was, under the old process. Things have been altered and revolutionised very much in the painting trade in my time. We used always to make our own filling at one time, and we thought you could not do a job at all without six coats. Now the manufacturers are supplying enamel filling, and three coats of that are equal to what six coats were. I have used a lot of Mander's enamel filling which I believe is non-poisonous, but I am not sure.

5083. (Mr. Robins.) You were speaking with regard to the covering capacity of zinc white and of white lead. You say that it does not cover quite so well on the first coat but that it covers wonderfully well with the second?—Yes.

5084. Supposing you are painting over an old surface, you, as a painter, will know that very often the underneath surface eats through the first coat if it is wet?—Yes.

5085. Do you find that it will eat through more with lead than with zinc white?—No.

5086. If it does not eat through your substitute, is not that the reason why the second coat covers better than you really think?—No, I do not think so. When I said what I did, I was alluding to new work. In the case of old work, I do not think that anything will strike through a job that has been well matured in the weather and rubbed down. Anything in the way of tar coming in contact with it would have to be killed or it would come through. Here nothing strikes through. I think that it is much more successful when it is applied on its own material. There is a certain amount of greasiness about lead which there is not about this substitute, and that is probably the reason why it does not cover as well. You may be using the substitute much thicker, much more round as we call it, than you would ordinary paint, and yet it will cover very poorly the first coat of new work. You may have sometimes to give it double the number of coats as with lead, but with the second it covers surprisingly well.

5087. What is your standard colour?—White.

5088. With regard to reds and so on, they would eat through white?—Yes.

5089. White would not eat through white?—They would do the same with lead, so there is no preference to be given to lead. If you were painting white with lead it would have the same effect.

The witness withdrew.

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[Continued.]

Mr. CHRISTOPHER JOHN SPENCER, A.M.I.E.E. examined.

5090. (*Chairman*) Are you the general manager of the Bradford Corporation Tramways?—I am.

5091. Have you held that position for some years?—I have.

5092. For how long have you held it?—Since 1898.

5093. What other experience have you had?—I have had 21 years' experience in the operation of electric tramways at Blackpool and South Staffordshire, and at Bradford at the present time. I am a past president of the Municipal Tramways Association of Great Britain and Ireland, which association I think comprises every municipal tramway undertaking in the United Kingdom, and I am an associate member of the Institute of Electrical Engineers.

5094. Can you give us an idea of the magnitude of your tramway undertaking? How many cars do you run, for example?—We have in stock 240 cars. We have about 55 miles of route. We serve a population of 337,000.

5095. Do you use any lead compounds in the painting of your tram-cars?—None whatever. Since the 4th January 1910, we have not used white lead of any description in my department either for the painting of cars or anything else where paint is used. At the present time 120 out of the 240 cars have been painted with the substitute.

5096. Before January 4th, 1910, did you exclusively use white lead for some cars?—We had been experimenting with substitutes for about three years, and we did not want to change until we were quite certain that the substitute was good enough or as good as what we proposed abandoning.

5097. Why did you abandon the use of white lead?—We had a rather serious case of lead poisoning some years ago in our paint shop. A workman somehow got lead into his system and died, and I turned my attention to substitutes to do away with the possibility. Our shop then was fairly well equipped with washing arrangements and so on, but it did not prevent this lamentable fatality. It is only fair to say that we have had some structural alterations since the death of this workman which have improved the washing facilities in the shop, but that is all. I then turned my attention to the use of substitutes in place of white lead. I heard that they were being used on some railways, and that some countries on the Continent were doing without lead in tram-car works, and we started experimenting with various substitutes which were then on the market.

5098. What experiments did you make?—First we experimented with a compound which I think is sold under the trade name of Purex, which seems to be a basic sulphate of lead. We used that instead of white lead, which is a carbonate plus a hydrate of lead. We experimented a great deal with Purex.

5099. Did you get satisfactory results with this material?—No, we did not get very satisfactory results. I hope shortly to be able to show you the result of our experiments with some boards that we have had weathering for some time.

5100. In what sense was it unsatisfactory?—We found that it did not seem to lay very well on the wood. Instead of getting a nice smooth coat, it crumbled and ruffled a little bit.

5101. What other substances did you experiment with?—We have experimented with a good many other substances. They seemed to be, in the main, mixtures of zinc sulphide, zinc oxide and barium sulphate. We have found some of these to be quite satisfactory—all of them more or less—some more than others—and we are informed that they are absolutely non-poisonous. That is on the analyst's reports which I will shortly put in.

5102. Could you give us the trade names of any of these various non-poisonous paints that you have used?—Yes; first Bayer Co.'s "Lithopone." Then we have had material from Docker Bros., known under the trade names of "Galvanised Iron Primer," "White Primer and Filler," and "Premier White Non-poisonous"; then material by Griffiths Bros., known as "White Priming," Noble and Hoare's "White-Filling,"

and "First Coating White," Wilkinson, Heywood & Co.'s "Vulcan White Paint" and "White Filler," and from various firms "Zinc White," which I suppose is just a zinc oxide.

5103. Which of these substitutes have you found to give satisfactory results?—One scarcely wants to advertise any particular ware.

5104. We would rather you did not give names, but would you tell us one or two of them?—One of the mixtures of zinc sulphide and barium sulphate is about the best; in fact it seems to be, if I can judge at all, the base of most of the others mixed up in different ways by the different sellers. As a matter of fact we have now decided almost entirely to use that which we consider best purely and simply.

5105. Do none of them contain any lead compounds at all?—I have here some reports from our city analyst, Mr. F. W. Richardson, and I will hand those in (*handing in the same to the Committee*). He says there that they are non-poisonous.

5106. How do the substitutes for lead paint compare as regards price?—The cost of painting cars with white lead or substitutes is approximately equal. The extra cost per hundredweight of substitute seems to be counterbalanced by its greater bulk for a given weight and consequently greater covering capacity. This statement is to some extent qualified by the fact that, when priming and painting new wood, three coats of substitute may have to be given where two coats of white lead would be sufficient, the substitute not having the same body or opacity. When, however already painted boards have to be dealt with, there is no necessity to use any more of the substitute than white lead.

5107. We have had evidence from a representative of H.M. Office of Works regarding house-painting. He told us that at first the zinc paints supplied require four coats in place of three lead coats, but more recently he has achieved the desired result from two coats of zinc paint in place of the usual three of lead. Would this information lead you to modify your view?—No. I think it is quite possible that with further experiments it may be possible to get the substitute to be as efficient in that direction as white lead, but up to the present, in my experience at any rate (and I can only speak from that) of priming new wood, you must have two coats of the substitute to one coat of lead for the first coat. After that it is the same.

5108. Do you find varnishing always necessary in order to protect your non-poisonous paint and keep it from falling to pieces when exposed?—I do not think that the substitute will stand the weather so well as white lead without a coat of varnish, but with a coat of varnish one is in our experience quite as good as the other.

5109. Generally speaking, you find that the non-poisonous substitute is as cheap as white lead?—Yes.

5110. Do you insist on any standards either of fineness of grinding for your paint pigments or of total weight of solid pigments, in a given quantity of mixed paint?—No. Up to the present we have not got down to specifications. We have simply been buying the materials makers have offered under certain guarantees.

5111. How do the substitutes compare with lead paints in the matter of permanence of colour?—I have some boards here, if you would let me show you them. I think they will show something about that (*producing some boards*). This board here was painted on the 21st December 1909, nearly 18 months ago. It is painted with ordinary white lead paint. There are the first, second, third, and fourth coats. These boards have been weathered. They have been exposed to the south-east and the heat of the sun, and they have been in a position where there is some smell of ammonia. In addition to that about each fortnight they have been washed with soap and water to approximate the conditions that you get on a tram-car. This is white lead. Here is a coat of varnish mixed with the paint. The cracking of the varnish is a fault of the varnish and nothing to do with the paint

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[Continued.]

underneath. *This* is the Purex paint. *This* was put on on the 11th February 1910. *This* is in better condition than the white-lead considerably, but if you look along *there* it does not seem to lie so well as the white lead. The varnished substitutes have stood equally as well. *This* is known as "Griffiths's." Speaking generally, they were put on in the early part of January last year. *This* is one of the absolutely non-poisonous paints. The first coat has perished as compared with *that*. *That* is not so good, and *that* is not so good. When you get the varnish on them they stand quite as well, if anything better, under the varnish, than the original white lead when you get to the top coats. *These* are pure zinc whites. *This* is lithopone, and it is the best that we have yet. It has been on for about 12 months, and it seems to stand quite as well as white lead. The colour is purely a question of the varnish. As I have said, I think that, without varnish, lead is perhaps better. Under a good coat of varnish one is as good as the other, in durability as well as other respects. After considerable experience I have no hesitation in saying that the substitute is equal to the white lead in durability when there is a sufficient protection from the weather by good varnish.

5112. To sum up your evidence it amounts to this: that you to-day use no lead paint whatever, and you have no cause to regret the change?—That is so. We have definitely decided to use nothing but substitutes in the future.

5113. Is there any reason that you know of why other makers of similar vehicles should not abandon the use of lead paints?—I am a tramways manager, and I would rather hesitate to say what may be right for other people. At the same time, for vehicles working under similar conditions to tram-cars, I do not see why they should not do the same.

5114. I ask you as a matter of public policy, taking into consideration the grave evils which ensue from using lead to-day?—There is no reason that I know of why people who are painting other vehicles operating under similar conditions to tram-cars should not do without white lead.

5115. (*Dr. Collis*.) You were working with white lead paints up to January 1910?—Yes.

5116. That is to say, that for 2½ years since lead poisoning was included in the Workmen's Compensation Act, under diseases for which the occupier had to pay, you were working with lead, and had to pay for any illness that occurred from lead?—Yes.

5117. Since January 1910, has there been any difference in the charges that insurance companies have made to you for your workpeople?—We have not insured against workmen's compensation risk. We have taken our own risk, but we have paid nothing in compensation to our workpeople for lead poisoning during that period.

5118. Could you tell us what you paid in compensation during the 2½ years previously?—No, I could not; I have not those figures.

5119. Could you ascertain the figures?—I can tell approximately correctly. The only claim that we have had since we had a paint shop was the death claim of the man who unfortunately died. That cost about 150l.

5120. You have not had any claims for sickness apart from death?—No.

5121. (*Mr. Fell*.) Are the conditions very special in your shop, that is to say the facilities?—The facilities are very good.

5122. The washing arrangements are good?—Yes, very good.

5123. Is all the painting work done in the paint shop, or is it partly done where you prepare your bodies?—All the painting that is done is done in the paint shop. The bodies are all painted there, and anything portable is painted there; but in the case of car trucks, and so on, they are painted in the painting shop or in the running shed sometimes, outside the paint shop. But they have the same washing facilities, it is only fair to say.

5124. Was that case of lead poisoning in your paint shop or body shop?—In our paint shop.

5125. Do you do rubbing down wet or dry?—It is done wet.

5126. In bedding down the canvas on your roofs, do you use this patent substitute?—Yes.

5127. Do you find that you get bad powdering after a short time?—No, I have not found that. Mr. Dawson, my assistant, tells me that we are using this with a mixture of ferric oxide for bedding on the canvas.

5128. To try to make it adhere?—Yes. I have a plate here which may be interesting. It is perhaps rather outside the scope of the inquiry. For stopping purposes we had some trouble with the non-poisonous stuff. It cracked when we used it in stopping up damaged panels, but the makers of lithopone have supplied us with material which does not crack.

5129. Have they taken to mixing it with a different carrier?—I cannot tell you. I have no idea how they have done it, but it is still guaranteed as non-poisonous.

5130. (*Chairman*.) Is it analysed and found to be non-poisonous?—The analyst states, "This is a compound of zinc sulphide and chiefly barium sulphate. It is free from lead and contains nothing injurious to health in the using. It is evidently what it is given out to be by the company."

5131. (*Mr. Fell*.) Do you use this substitute for jointing in connection with bodies?—Yes, along with ferric-oxide.

5132. You find that there is no difficulty from powdering there?—No, I have had no complaints.

5133. Do you use much metal work on your trucks?—We use ferric-oxide paint only. It is a rough cheap paint with no lead at all.

5134. Do you find that, cost per cost, this is about the same?—Approximately the same.

5135. How often do you paint your cars?—About every two years.

5136. That is renovation? Yes, it is renovation when the varnish starts to perish.

5137. You do not really get down to the wood-work?—No.

5138. (*Mr. Mason*.) Can you tell us the cost of labour as compared with material in painting coaches?—My assistant tells me that the cost of labour is about double the cost of the material.

5139. So that with material costing the same, if one had to put on more coats it would increase the cost considerably?—I pointed out that it is only in the case of new wood where it is necessary to use more coats with this than it is with white lead. When we do not do very much new wood painting and our work is almost entirely repainting, we are scarcely affected. Obviously, if we were painting on new vehicles and had to get down to the bottom, a double coat would be more expensive than a single one.

5140. If you had known that the paint used by H.M. Office of Works was composed very largely of varnish mixed with the pigment, that would tend to confirm your opinion that this substitute depends very considerably on the varnish for its life?—Yes, I think it would.

5141. What do you use for cleaning your cars?—Neutral soap.

5142. Plain soap?—Plain neutral soap.

5143. Do you use no acid or alkali cleaners whatever?—No.

5144. You have no experience of that with this form of material?—No. Some years ago we experimented with some of the paint-stuff that is sold by car washers, which seemed to be largely alkali. I abandoned it very quickly, because it was damaging the varnish. Before the substitute and after, we have used nothing else but plain neutral soap.

5145. A man in your position would have knowledge of other people's shops I take it?—Yes.

5146. Is it your experience that in the larger shops the washing accommodation is very poor?—My experience is confined to other tramway shops in the main, and the tramway shops that I have seen—the large tramway concerns that I have seen at any rate—are all under municipal management, and are pretty well equipped as a rule. Municipalities pay pretty good attention to the comfort of their workpeople.

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[Continued.]

5147. Do you find that workmen are apt to get into trouble if they wash their hands during working time or between leaving off one job and going to another?—No, we cannot get the men to wash as they should. That is the trouble. We give them five minutes at the end of each shift to wash their hands, but they take the five minutes and do not like to do the washing.

5148. You would be considerably surprised if you heard a witness say that his experience of large tramway companies was exactly the opposite?—I have no experience of companies. I am only speaking of municipalities.

5149. (*Mr. Kinggate.*) Do you use the usual vehicles and thinners that you do with white lead?—Yes—mostly raw linseed oil.

5150. The mixing is done the same?—Just the same.

5151. You have not experimented with different vehicles or different thinners?—We have experimented with petrol in place of turps, but it is a very small experiment. I would not like to put it forward seriously. (*The witness produced a board.*) There are turps down there and petrol here.

5152. The report of H.M. Office of Works pointed out that the way in which to get over the difficulty with regard to the durability of zinc oxide lay in the vehicle that was used. That report was made after the carrying out of experiments. I do not know whether possibly you might have experimented at all on the vehicle or thinner?—I have not.

5153. You do not know whether that would obviate the perishing which you have pointed out on the boards which have been exposed?—I was speaking to a representative of the Bayer Company some time ago, and I was complaining to him that some material that he had sent along was not quite so satisfactory as it might be, and he was curious to know whether we were using raw or boiled linseed oil for mixing. I told him that we were using raw linseed oil, and he said, "You are using the best. I should not advise any change there."

5154. Several witnesses have pointed out that much of it is with regard to the mixing, and if used as white lead is used it is a failure, but if used with other vehicles and thinners it is generally a success?—My

experience is that the life of a car paint depends on the varnish, and it must be so, I should think, with other vehicles. I do not care what you have underneath, if you do not attend to the varnish you are very soon in queer street. We should keep the varnish right whether we used white lead or substitute, and then we should have no trouble.

5155. (*Chairman.*) Do you say that it does not matter what you have underneath?—Yes.

5156. Is that opinion of yours a very emphatic one?—Yes.

5157. If you had ordinary lead would it fall to pieces in the same way as the non-poisonous paint?—Once the varnish is gone it does not matter what you have underneath, it is not long before you have to repaint the whole job—to get right down to the bare wood.

5158. (*Mr. Kinggate.*) How many coats of varnish do you give a new car?—Two.

5159. (*Mr. Robins.*) With regard to the men washing, do you consider that the habits of the men since you first came into contact with painters in the tramway industry are more cleanly now than they were 11 years ago?—In my experience they are. You may take it that since this case of lead poisoning, and since the men have been threatened with dismissal if they did not wash properly, they have been driven to that position, and now they appreciate it, I think.

5160. (*Chairman.*) Do you provide hot water?—Yes.

5161. And nail-brushes and soap and towels?—Yes.

5162. How many men to a basin?—About three to one basin.

5163. You give them five minutes out of the Corporation's time?—Yes, out of our own time.

5164. (*Mr. Mason.*) What kind of driers do you use for your white uppers?—This is the analyst's report with regard to a sample of patent driers that we are using (*handing the same to the Committee*).

5165. I notice that it contains a small portion of lead oxide—about 4·58 per cent. of lead oxide?—Yes.

5166. (*Chairman.*) That is the percentage of lead in the driers?—Yes.

5167. It would be infinitesimal in the bulk of the paint?—Yes.

The witness withdrew.

## SEVENTH DAY.

Monday, 15th May 1911.

### PRESENT :

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. A. L. C. FELL.

Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*).

Mr. ERNEST BAILEY (63, Blenheim Gardens, Cricklewood, W.) examined.

5168. (*Chairman.*) You are one of the witnesses selected to give evidence on behalf of the Institute of British Carriage Manufacturers?—Yes.

5169. Are you a carriage manufacturer?—At present I am head muster of a school.

5170. What is the name of the school?—The Polytechnic, Regent Street.

5171. What length of experience have you had in the carriage trade?—About 32 years in the carriage-building trade.

5172. How many men have you had in employment under you?—I have never counted them. At times I have had as many as 16 or 18 going at the same time—all body-makers.

5173. You have been in comparatively a small way of business if you have employed only 16 men?—I have only been an employer indirectly. I have only been a piece-master in the trade.

5174. How many cases of lead poisoning have you known?—None absolutely—not fatal cases. But I

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Mr. ERNEST BAILEY.

[Continued.]

have come across two where they have been ill through it.

5175. Do you know that in the carriage-building industry, taken as a whole, there have been 767 cases of lead poisoning recorded by the Home Office in the 11 years 1900 to 1910?—I was not aware of it.

5176. And that of these 47 were fatal?—I was not aware of it.

5177. There has been no apparent reduction in the rate of attack during that period?—I was not aware of that.

5178. As there has been no reduction in the average number of cases reported each year, I am sure you will recognise that something must be done to remove the evil?—Yes, I should say so, if what you say is correct, certainly.

5179. Do you contend that the risk of lead poisoning arises almost entirely in certain classes of works?—I should say, yes, it does.

5180. Of which class have you the most experience?—The best class.

5181. Of motors or carriages?—Both.

5182. Are you aware that, of 376 cases of lead poisoning reported in the five years from 1905 to 1909, 46 arose from motor-car works?—No, I was not aware of that.

5183. And out of 697 cases reported in the 10 years 1900 to 1909, 297 arose in the ordinary coach and carriage-building works of the country?—I was not aware of any of those.

5184. Have you tried substitutes for white lead in your painting works?—Never.

5185. Do you think it would be possible to prohibit or greatly restrict the use of lead without inflicting a hardship on the industry?—I think if it is done under the present process there should not be any cause for white lead poisoning at all. The old process of dry white lead, which was frequently used, caused a dust to arise, and inhalation, whereas now it is nearly all done by the wet process and there is not that danger.

5186. Then how do you account for the fact that the lead poisoning cases have not been reduced during the last 10 years?—Carelessness and dirtiness on the part of the workmen, and possibly the addition of drink.

5187. Do you want to put that in your evidence?—I should say it was quite possible. The two together would certainly have an effect on the human system—a very material effect.

5188. Do you speak from your own knowledge on that point?—I do.

5189. What is your knowledge on the question of the effect of alcohol on the system with regard to lead poisoning?—My knowledge is that those workmen who are dirty very frequently drink, and I take it that there is the possibility that the two poisons might affect a person far more than the lead would affect an ordinary healthy person.

5190. Are you aware that it has been proved beyond question that some of the men who observe the most cleanly habits are among the most susceptible to lead poisoning?—I should say, then, that they were men who were suffering from some skin disease or something of the sort.

5191. But supposing I told you that they suffered from no such skin disease, and that they were still among the most susceptible people to lead poisoning, what would you say then?—I should say that it was very extraordinary indeed, because I never came across such a thing myself.

5192. You would agree, no doubt, that if a substitute could be found that would be in every way as good as white lead, the use of the latter should be prohibited?—Yes, if it was in every way as good, certainly.

5193. Do you know that for the past six years the Midland Railway Company have used no lead in their carriage and waggon works?—I know that there is a substitute used, but I did not know that they used it.

5194. And that they are entirely satisfied with the results obtained from a mixture of zinc and baryta?—I believe that one of our witnesses will give evidence on that point. I will not touch on that.

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5195. We have also had similar evidence from the representative of the Bradford Corporation Tramways Department?—I do not know anything about that either.

5196. Are you surprised to hear that?—Yes.

5197. Are you aware that white lead is no longer in use in the Daimler Motor Car Works at Coventry?—No, I was not aware of that.

5198. You still think that white lead is the most perfect substance that can be used?—I do.

5199. How did your work compare with that of, say, the Daimler motor-car bodies?—I should say that there was no difference.

5200. Are they not one of the largest firms in the industry?—I believe so.

5201. They turn out work of the highest finish, do they not?—I cannot say that.

5202. But are not some of the motor cars which they turn out of the highest finish?—They are very good, but I do not say that they are of the highest finish. I should think there are some turned out in London equally as good.

5203-4. Are the buyers of Daimler cars about the same class as the customers of other leading coach-body firms?—Yes, I should say so.

5205. The witness representing the Daimler Company told us that they are entirely satisfied with the substitute that they are using for all purposes for which white lead is commonly used in coach-building works?—Yes.

5206. Are you astonished to hear that?—Yes, I am rather.

5207. The Daimler Company have used no white lead for two years, and they have had no complaints from customers. Are you surprised to hear that?—Yes.

5208. They claim that their paint work is thoroughly durable?—I should doubt that.

5209. If it was not thoroughly durable, do you not think that the customers would complain?—I think they do, very likely.

5210. But we were told that they had no complaints?—I am surprised to hear it.

5211. I repeat, are you surprised to hear that the Daimler Car Company's paint is thoroughly durable, and that their customers make no complaint?—Yes.

5212. They also tell us that it is a little more economical than when they were using white lead?—I am surprised at that, too.

5213. Do not these considerations dispose you to modify your views?—Yes, they do.

5214. If the Daimler Motor Car Company can do without the use of lead in painting their cars, do you think that any great hardship will ensue if this Committee should recommend that any other motor-car people should be prohibited from using lead?—Yes, I do, because, as I say, I feel doubtful still, though I have answered your question, whether there is the finish and the lasting, when it is done with their substitute, that there is in our white lead finish.

5215. But do not you think that the Daimler Company, which is a very large commercial undertaking, would hesitate before they abandoned the use of white lead until they were absolutely certain that it was going to give satisfaction to their customers?—Yes, I should think they would.

5216. Do not you think that the Home Office car take that as a standard, and tell all the other motor-car makers that they must use a similar material?—I think when you have heard the other witnesses you will alter your opinion, too.

5217. It is not my opinion. I am not putting my opinion. I am asking you for yours?—Candidly, I do not believe that there is a better finish than the carriage painted with white lead.

5218. You do not answer the question. What I am trying to get you to admit is this: if it is good enough for the Daimler Company to discontinue the use of lead, and they get a finish that is highly satisfactory to their customers both in appearance and durability, do you think that any hardship would ensue if the Home Office insisted on all motor-car people doing the same thing?—If the finish is good, I should

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say that there would be no injury whatever, but I have a doubt about that.

5219. Do you contend that the danger of lead painting can be practically eliminated by regulating the various processes?—Yes, I do.

5220. But surely the most simple way would be to prohibit the use of lead?—Unfortunately, I believe, although there are a lot of paints on the market which they say there is no lead in, if you have to paint white on black they would tell you, those very manufacturers, that you must put two or three coats of white lead on to get the white.

5221. But that does not answer the question, if you will excuse me. I asked you whether the simplest form of precaution would not be the abolition of the use of lead?—I could not say.

5222. That is the simplest form of precaution, is it not?—Certainly.

5223. Are you prepared to answer questions regarding the various processes in detail?—Yes, I think so.

5224. First, with regard to the body-maker; he uses jointing paste in putting together the different portions of the woodwork, does he not?—Yes.

5225. What material did you use for jointing paste?—White lead and linseed oil, as a rule, or white lead and gold size.

5226. Is a lead paste generally used for jointing?—Yes. It is the best thing that can be used.

5227. From your point of view?—Yes.

5228. But not from the Daimler Company's point of view?—No, I do not say that.

5229. Where a lead jointing paste is used it must, of course, be attended with danger?—I cannot say that I see where the danger comes in.

5230. For example, in making up the paste, does the worker use dry lead compounds?—No, wet.

5231. In any case, he can hardly avoid the lead paste getting on his hands and clothing, can he?—He would if he was a careful man. There is no reason why he should not prevent it if it is carefully stirred up in mixing. The paste should be quite free from lumps and that sort of thing when it is used. When it is taken out of the tin it should be placed in a fairly large pot, and only sufficient oil should be put in to make it thick enough for his absolute use.

5232. Then, in your opinion, there is no danger at all in mixing?—As I say, I have never come across a case of lead poisoning in all my experience from a body-maker's point of view.

5233. I have told you that there are a very large number of cases?—I admit that.

5234. You have been very lucky, that is all?—I admit that probably I have been fortunate.

5235. You must remember that the Home Office have to deal with the facts which they have before them; and, although you have been immune from any lead-poisoning cases, that does not alter the fact that it is a very terrible evil?—I have used a great quantity myself.

5236. My first question is, whether you think there is any danger from the lead paste getting on the hands and clothing of the workman?—Not, if he carefully washes his hands before meals. That is what I say.

5237. But if he does not do that, then there is danger?—Certainly. He is then eating it.

5238. What special precautions can you take to safeguard the worker in this operation?—Ensure that there is ample lavatory accommodation.

5239. I will ask you further about that later. Why is jointing paste used?—When dry, it simply holds the joint and prevents it moving.

5240. There are a number of leadless jointing pastes in use, are there not?—Yes.

5241. Are those as satisfactory in every respect as lead pastes?—I have tried two, and I have not found one yet.

5242. In what respect are they inferior to lead paste?—They do not seem to keep the wet out. The main object is keeping the wet out of the joint.

5243. And yet the Daimler Company has a formula which is quite satisfactory. How do you account for that?—I cannot account for a thing that I have never

seen. I have never seen any material used, as I have already stated, that I consider as satisfactory as white lead for the purpose. I cannot speak of a thing that I do not know anything about.

5244. But you can speak on the general principle. I bring before you the question of the Daimler Company. I say that the Daimler Company turn out these excellent cars; they satisfy their customers, and they do not use any lead in the jointing?—I think that they are very fortunate.

5245. Do not you think that other people might try to be fortunate too?—Certainly. There is no reason why they should not try it.

5246. You do not seem to have made any experiment with non-lead paste?—I have not with the particular thing they use.

5247. The carriage-maker attaches the ironwork to the wood, does he not?—Yes.

5248. He uses lead in this operation in the same way as the body-maker, does he not?—Yes.

5249. Would what you have said with regard to the jointing of woodwork apply equally to the attaching of ironwork to wood?—Yes; it is the same operation practically.

5250. When the carriage is ready for painting, is it first given priming coats?—Yes.

5251. How many?—Three, as a rule.

5252. Does the priming you use contain lead?—Certainly.

5253. Is the work sandpapered between successive priming coats?—No, we do not sandpaper priming coats.

5254. Can you dispense entirely with rubbing down between the priming coats?—Yes. There is no necessity to rub down between the priming coats at all.

5255. Is it the general practice in coach-painting to sandpaper between the various priming coats?—It used to be. It is not now so much; in fact, it is practically done away with.

5256. What is done instead?—It is rubbed down with pumice-stone and water.

5257. The wet process?—Yes, the wet process. I am talking about after the filling. There is no sandpapering done in the three first coats.

5258. Is this operation generally carried on in the body-making or carriage-making shop?—In the body-painting department.

5259. The body next receives a number of coats of filling, does it not?—Yes.

5260. Is the filling you used a leadless one?—No. There is some lead in it. It is a silicate really—the filling-up is.

5261. Why is lead frequently added to the filling material?—To make it harder and denser and generally better.

5262. The filling is not rubbed down between successive coats?—No.

5263. Then with regard to stopping, what stopping did you use on coach bodies?—That is where so many have the dangerous point. The white-lead stopping is generally made of dry white lead, but this would not, if done properly, cause any injury, because it should be put on between the coats of filling up, so that when it is rubbed down it is rubbing down only on the filling, not on the stopper. Therefore there is no dust.

5264. Is it the general practice to use hard stopping made from dry white lead and gold size?—Yes.

5265. Does the man mix the stopping himself?—Yes.

5266. In the process of mixing there must be danger arising from handling the dry white-lead powder?—That is the only danger. If it is carefully used it need not be dangerous.

5267. What special precautions did you take to safeguard the workers against this danger?—There are none as far as I know.

5268. You admit that there is a danger?—As I say, if you look at it like that, yes, that is the most dangerous part of the whole business.

5269. So far you have made no attempt to cope with that danger?—None at all.



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5270. After the filling and stopping have been applied, a coat of staining is generally added, is it not?—Yes.

5271. What is the purpose of this?—To guide the rubbing down—to see that there is a nice surface. It is a sort of guide to the rubber.

5272. Is the whole surface then rubbed down until the staining has been removed and the flat surface left?—Yes.

5273. Is this always done with pumice-stone and water?—Yes.

5274. The danger in this process is confined, then, to the lead which may have been used in the filling and stopping?—The stopper is really the only dangerous place.

5275. In any case, it is of necessity wet?—Of necessity wet.

5276. The above answers apply to bodies only?—Yes.

5277. The carriage under-work is generally sandpapered, is it not?—Yes.

5278. And the wheels?—Yes.

5279. This sandpapering gives rise to a great deal of dust, does it not?—I believe it does.

5280. Does this dust not contain a large proportion of lead?—It need not. They sandpaper the filling if it is filled up instead of using pumice-stone and water to face it down. They do not sandpaper the actual white lead. There is a small proportion of white lead in the filling, as I have already mentioned.

5281. You have told us that there is lead in the filling?—But you see that there is not a large proportion of lead in it, and therefore I should not think it very dangerous. It is the filling that forms the dust.

5282. There would be some white lead in the dust, which these men might breathe in the process of rubbing down?—There would be some.

5283. A considerable amount of hard stopping is used on the wheels, is it not?—There ought not to be a large amount.

5284. And on the woodwork of the under part of the carriage?—Yes, on the woodwork.

5285. The sandpapering of such surfaces must create a considerable amount of dust?—It does create dust, undoubtedly.

5286. And there is a good deal of lead in the dust?—There is a good deal of lead in it.

5287. That, from our point of view, is an extremely dangerous operation?—Yes.

5288. How is the risk to be overcome?—By using a wet process again; I should say, pumice-stone it down.

5289. Is it possible to use wet methods of rubbing down such work?—Yes, I believe it is.

5290. Would your industry object if it were made compulsory?—Yes, I think they would object.

5291. Why?—From a commercial point of view, I should think it would take too long and it would be too costly.

5292. What would you suggest should be done as a remedy to combat that evil?—I cannot suggest any.

5293. Do you think it is impossible to invent anything to collect the dust? I do not know of any method.

5294. Does what you have said with regard to coach-building apply equally to the manufacture of motor-car bodies?—Yes. There is only one thing about it that I might mention, and that is that in the old carriage bodies we rarely used metal panels; now metal is used very largely for panels, and therefore so much white-lead filling is not required. It is really a very important point, because panels are the largest surfaces that we have to cover.

5295. But you said just now that there is not any particular danger in filling?—No, but there is in the stopper.

5296. You admit there is danger in stopping?—I told you that was the only danger I consider there is, because that is the only place where you use the dry white lead.

5297. Lead is not used in attaching the metal under-work to the body of the motor-car, is it?—No, not to the same extent.

5298. Is it used at all?—I believe so, a little.

5299. Now, in preparing the bonnet, the curved work of the chassis, and other under parts of a motor car, is it not necessary to use a great deal of hard stopping?—No, I do not think so.

5300. Do you know any firms who use hard stopping for these purposes?—I do not.

5301. Did you finish the roofs of your closed cars with canvas?—The outside, yes.

5302. How was that bedded?—Dipped in glue generally, and spread over and pulled very tight.

5303. Is it usual to bed canvas in white lead?—No, I have never seen it done. It has been done for what I call the common vehicles—carts and vans—but not carriages.

5304. Are you aware that the Daimler Company have dispensed with white lead in this us in other processes?—I never used it there.

5305. I will ask you a few more questions about the precautions that must be taken where lead is used. You attach, I understand, considerable importance to personal cleanliness on the part of the men?—I do.

5306. Did you provide washing accommodation?—Certainly.

5307. What proportion of basins to the number of men employed have you known to be provided in your experience?—We did not have basins, you see. We had a utensil, and each one could have that utensil to himself.

5308. What utensil?—A pail. The water was brought up, and they washed their hands before every meal on leaving the premises.

5309. Was hot water as well as cold laid on?—Warm water could always be obtained.

5310. Was it laid on?—Yes, it was laid on.

5311. It was not brought to them in a can?—Yes, it was brought to them in a pail.

5312. Then it was not laid on?—It was laid on, but a boy fetched it. They did not fetch it themselves.

5313. But was it laid on so that the men could go to the trough and wash their hands?—No. It was made hot.

5314. It was brought to them in cans by a boy?—Yes.

5315. Were clean towels supplied regularly?—The men supplied their own towels.

5316. When were they generally cleaned?—Once a week.

5317. How long do you think they remained clean?—I insisted on their being cleaned once a week.

5318. One towel for each man per week?—Yes, one towel.

5319. Did you ever have those towels inspected?—I cannot say that I did.

5320. Do you think that one towel a week for each man is sufficient?—No, I do not. I should say that one towel per week for some men is not enough.

5321. Then why did you only make it a rule to have a clean towel once a week?—Because some of them were not earning as much money as others, and so I insisted on it at least once a week.

5322. Were soap and nail-brushes always available?—Yes, they were.

5323. Who provided the nail-brushes?—I supplied those.

5324. And the soap?—Yes.

5325. Was time allowed to the men for washing before leaving off work and before meals?—No, it was not.

5326. Then if they washed their hands they had to do it out of their own time?—Yes.

5327. Were they not rather apt to scamp the washing in that case?—I do not think they did, but there is that possibility. You see, most of them had their meals at the works.

5328. Was a room provided for the men to take their food in?—Yes; there was a room in the factory to which they could all go for meals. They did not all go.

5329. Was a room always set aside for the men to take their meals in?—Precisely.

5330. Was it warmed in the winter?—Yes.

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5331. Was it provided with suitable tables and chairs?—With tables and chairs all ready for them; and somebody was paid to look after it every week.

5332. Was the room kept cleanly?—Perfectly clean.

5333. Was provision made for the storage of the food brought by the workers, so that it need not be taken into the working room?—The meals were kept in their own bags, and they took them back. They only left the utensils there.

5334. But I want to know, did they ever take their food in the rooms where they were working?—Yes, they did.

5335. Of course that could not be allowed in the future?—No, I suppose not.

5336. Did you provide overalls for your men?—No.

5337. Is not that a necessary precaution?—I have never found it so.

5338. You have been so fortunate in not having any cases of lead poisoning that you have not taken any precautions?—I have not. There was no necessity to take any precautions but those I mentioned. I insisted on their washing before meals.

5339. Did not the men's ordinary clothes get covered with dust?—I never noticed it. If they did they brushed them down.

5340. The very fact of a person brushing down is dangerous?—Just so. Under the circumstances it is.

5341. Had you impervious washable floors in your painting shops?—No, ordinary wooden floors.

5342. Are you aware that in other factories where lead is used the Home Office insist on impervious floors being adopted?—I believe so.

5343. Would your people object to the provision of impervious floors?—I could not say, now that I am out of it; you see.

5344. Were the floors cleaned down wet?—Yes; they were generally sprinkled with either damp sawdust or something of the sort, and then swept up.

5345. What were the usual hours worked by your coach-painters per week?—I think it was 56, but I am not quite sure.

5346. Did they frequently have to work overtime?—I should not say frequently, but they did work overtime, and generally about this season of the year.

5347. Do you know that a very great deal of overtime is worked in certain branches of the trade, such as motor-car body-making?—In motor-car bodies I believe there was a great deal of overtime worked, but I do not think there is so much now.

5348. Would you welcome a strict limitation of the hours of employment, say, to 48 hours per week?—I cannot say that I see the necessity for reducing it.

5349. That has been the limitation recommended in the potteries, and the Home Office may wish to limit the hours of labour to 48 hours in this industry. Do you see any objection to it?—I do not see the necessity for any reduction in the hours.

5350. Did you have a periodical examination of your workers?—No, only when there was an epidemic.

5351. Then how do you know that they never suffered from the ill-effects of lead?—I think the effects are so disastrous to the person that you could not fail to see them.

5352. That is not always the case. Lead poisoning is a most insidious thing and of a slow growth?—But ultimately they are very ill, are they not?

5353. A man may go on absorbing lead in very small doses, and it may take years before it breaks out into a case of lead poisoning, and his general health may be being impaired all the time. How do you know you have never had any cases, if you have not had medical examination?—If that is the case, I do not know.

5354. Do you withdraw your original statement?—I have certainly only known of those cases where they have been ill.

5355. Where there have been marked signs of lead poisoning?—When the doctor has said they have had lead poisoning.

5356. You have never had a doctor to examine all your men?—It is impossible for me to act as a witness at all if I have to say that.

5357. The practice of periodical examination obtains in all important industries where lead is used, except in this industry that you represent and the house-painting industry. You are not aware of that?—No.

5358. Would you welcome a system of periodical medical examination in your industry?—Certainly, if it is necessary.

5359. Together with compensation for any workers who are suspended by the doctor on account of doubtful health?—That is a very awkward question to ask me now, because, you see, at present I am not an employer.

5360. You would rather not answer that?—I would rather not.

5361. Do you realise the very great expense which the industry would have to bear in connection with stringent regulations for lavatories, meal-room and cloak-room accommodation?—I do not think that the mess-room should be a great obstacle.

5362. Also overalls, washable floors, medical examination and the like?—It would pretty nearly ruin the trade, I should think.

5363. To this you must add the cost of compensation whenever a man is withdrawn from work in lead?—Yes.

5364. Also the cost of installing efficient exhaust draught apparatus, wherever it is possible to apply it, for the removal of dust?—Yes.

5365. You must also take into account the cost of setting up a system which will secure continuous observance of all the regulations?—Yes.

5366. You realise, do you not, that the first duty is laid on the employer of securing the observance of the regulations?—Yes. I believe all the regulations, so far as the Factory Acts are concerned, are carried out most religiously.

5367. The factory inspector can only visit at more or less long intervals. Are you prepared to provide the necessary inspection within your own works to secure full observance from day to day and from hour to hour?—The factory inspector was permitted to enter at any moment.

5368. Taking all these points into consideration, do you still consider it would be better to regulate the industry than to prohibit the use of lead?—If what you say is correct, I should certainly say, if we can find a substitute that will do this work, we had better do without lead.

5369. Do not you think that, in view of what I have said about the Daimler Company, it would be possible for you to find a substitute if you tried?—I should certainly like to have some experience of the material before I answered that question.

5370. But would not your experience in the past be sufficient?—No, I do not think it would.

5371. (*Lord Henry Bentinck*). Is the finish on a motor car as high as the finish on horse-drawn vehicles in the old days?—No, not so good.

5372. You admit that the atmosphere is often very dusty?—I admit that it is sometimes.

5373. But you said in the beginning of your evidence that it was only the men who were dirty in their habits who got lead poisoning?—That is so; I said so from my experience.

5374. Is a man who is dirty in his habits more liable to inhale the dust than a man who is clean in his habits?—I have never known of a man suffering from the inhalation of white lead at all, you see.

5375. But that is the way in which it is got?—It is got in other ways as well.

5376. That is a fallacy, I am afraid?—I am afraid it is not.

5377. What is your idea of how it is got?—My opinion is that white lead can be taken in from round the nails, and it can only be taken by eating food with dirty hands covered with white lead.

5378. That is the same as swallowing dust?—Perhaps so.

5379. I do not think it is true that you can get it through the pores of the skin or a cut?—Then why is it that a person who is subject to cuts in the hands and blistering of the hands is more likely to get it than anybody else?

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5380. (*Dr. Collis.*) Is he?—Well, I say yes.
5381. (*Chairman.*) You are not stating it as a medical expert?—Might I give an instance?
5382. Certainly?—I have been for 30 years in that trade, using and seeing white lead used every day, and I have not come across more than two cases (both cases of dirty men) of men who were ill from it. I have been teaching now for six years. One of the boys left my school two years ago. I said to him on leaving, "You will have to be very careful with your hands and wash them every day. You have hands that are subject to white lead poisoning." He had not been away for six months before he came back with a poisoned hand.
- (*Lord Henry Bentinck.*) He might have got that from anything.
5383. (*Dr. Collis.*) Was it lead poisoning?—The doctor said it was.
5384. He had a poisoned hand; you do not mean that the poison was in his system?—I do not mean that he had a poisoned hand. He had a festered finger and white lead got into it, and the doctor said he was suffering from white lead poisoning.
5385. (*Lord Henry Bentinck.*) He might have got anything from a festered finger?—That was the doctor's opinion.
5386. How many pupils have you in your school?—Counting the evening class, about 120.
5387. Are they all engaged in the trade?—They must be.
5388. Are none of them affected?—I have not known any to complain. It may be I am not sufficiently expert to know, after what I have been told.
5389. But do they complain?—They do not.
5390. I thought you said they do. They are all healthy boys?—Yes, apparently. They are not all boys. Some of them are men. Some of them are 40 years old, and they come for the purely technical side of it.
5391. Do you use lead paint in the Polytechnic?—Very little; we do not use much. Only once a week we have our painting class, and we do not use lead at all for putting our joints together, because we do not think it necessary.
5392. You do not think it necessary?—Not in teaching them to make joints in our school. Our school joints are not exposed. They do not go out as part of the carriage.
5393. You teach in the school a different practice from that of the shop?—Not at all; we say that the joint must be put together with white lead. We show them how to make it, but we do not use it.
5394. Why not?—Because we do not see the necessity to make a model joint and put white lead in it.
5395. You use no lead?—None at all.
5396. You do not use any substitute?—No. We do not have to keep water out.
5397. (*Sir Godfrey Baring.*) Have you had any experience in using substitutes for white lead in paint?—Only glue instead of white lead.
5398. How, then, can you speak with such authority on no substitute being satisfactory?—Because, of all those I have heard of as being used, I have never known or seen one satisfactory that was under my immediate notice.
5399. Have you seen work painted with substitutes for lead which was unsatisfactory?—I have seen material used which they said there was no white lead in, and it has been unsatisfactory.
5400. You have known in your experience two cases of white lead poisoning?—Yes.
5401. What work were those men engaged in who suffered from white lead poisoning in those two cases?—One was a painter and one was a body-maker.
5402. You said that the leadless paste for jointing was unsatisfactory?—The one I have seen was very unsatisfactory.
5403. Have you tried leadless paint?—I have not tried it, but I saw some.
5404. In what way was it unsatisfactory? Did it let in the moisture?—Yes, it parted and let in the moisture.
5405. In your opinion sandpapering is a dangerous process?—Yes, if it is done to any extent. I should say that is the dangerous part of it.
5406. You cannot suggest any way of meeting the danger of the inhalation of lead dust?—No.
5407. You admit that however clean and careful a workman might be, if he was sandpapering, he could not help inhaling a certain amount of lead dust?—No; I should say it was impossible to prevent inhaling.
5408. No cleanliness or precautions on his part would save him from that danger, you think?—No.
5409. (*Dr. Collis.*) I understand that you are of opinion, with regard to the way in which lead causes poisoning, that it is due to dry compounds?—Yes; it is the dry compounds that I should say were most dangerous.
5410. In the use of paints do you prefer matured paints to new paints?—It is always better, I have understood, to let a paint settle, and not use it at once. A newly mixed paint does not cover so well as when it has settled a little.
5411. How long would you allow paint to mature?—An hour, or something of the kind, would be sufficient.
5412. When you are buying paints you prefer them to be matured longer than that, I believe?—I do not think so. Varnish we do, but not paints. Varnish we like matured, but I have never heard of paint maturing to any extent. There is the necessity for a certain time for saponification in the mixture of the stuff, but that is all.
5413. I have heard differently. I wish to go into a few medical points. Are you aware that an examination of the blood will indicate if a person is exposed to the influence of lead?—Yes, I have been told that.
5414. Are you aware that Professor Baly, of Liverpool, has recently shown that wet paint gives off, at the ordinary temperature of the air, an organic lead compound?—No, I was not aware of that.
5415. You will not be aware, probably, that an individual in a house which has been spring-cleaned and painted this year, one of the inhabitants, was found with blood showing traces of lead absorption, although, naturally, not being a working person, the lady in question had never had anything to do with touching or coming in contact with either the paint or the dust. Taking those matters into consideration, do you think it would ever be possible to safeguard the workpeople against inhaling this volatile lead compound which Professor Baly has shown to exist?—Very likely they would throw up their work altogether if you made them use something of the sort suggested to prevent it.
5416. You have not followed my question. Do you think it would ever be possible to safeguard the workpeople against inhaling this volatile lead compound which Professor Baly has shown to exist?—I suppose it would be possible.
5417. In what way?—I have heard of a helmet being used.
5418. By whom?—I was reading a piece in an art journal the other day where it stated that helmets had been used, but I do not know with what success, and I know nothing about the composition of the helmet.
5419. You have not seen it used?—No, I have not seen it used.
5420. Are you surprised to hear that that was only an experiment, and that it had never been put to practical use?—No, I should not be surprised to hear that.
5421. Is that the only method which you think might be adopted?—Other than doing away with the use of lead altogether.
5422. You have stated that you consider that lead may be absorbed through the skin, have you not?—Yes.
5423. Are you aware that it is the custom with surgeons, when a person sprains his leg or a joint, to dress that sprain or joint mostly with acetate of lead lotion?—No, I did not know what the composition was.
5424. And probably there are hundreds and hundreds of gallons of acetate of lead lotion put on to the limbs

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[Continued.]

of the population of the British Isles daily, and no one has ever seen the slightest sign of lead absorption. Do you think that surgeons would continue to use it if lead could be absorbed through the skin?—I should not think so.

5425. Do not you think that your statement is rather an extraordinary one?—I do not think it is. I am speaking from what I have actually seen.

5426. Have you seen lead going in through the skin?—I have seen a person suffering from that; at any rate, that is what the doctors have said.

5427. I am telling you the opinion of doctors as a doctor myself, sir, and I tell you that lead acetate lotion, the most absorbable salt of lead, is put in hundreds of gallons on people's limbs daily, and no one has ever heard of a case of lead absorption. Do you still maintain your opinion in face of the opinion of the whole medical profession?—Are the whole medical profession of one mind?

5428. They are practically of one mind on this point?—I am glad to hear it.

5429. Otherwise do you think they would continue to put lead lotion on people?—Certainly they would not.

5430. I think that is sufficient. You will allow, then, that the only danger is from dry white lead, that it is not absorbed through the skin, and that it is practically impossible to protect the worker against the danger to which he is exposed?—Yes, I do not see any method by which the ordinary coach-maker can be protected, at any rate if it is only by inhalation and you do not know when he is suffering from it. I am going by the facts put before me.

5431. (*Mr. Fell.*) You are speaking as a coach-maker and not as a painter?—As a coach-maker.

5432. Therefore it is from a coach-maker's point of view that you are approaching the subject?—Certainly.

5433. Were these gangs that you had working under you, where you were working as a piece-master, constantly changing?—Yes.

5434. So that you would not have any particular men under your observation for a very long time?—Yes, I should. Some of them were working with me for 14 or 15 years. They were not all changed, but some of them changed.

5435. You have come across painters to a very considerable extent?—Yes. You know what a workshop is. You see the painters every day, the same as other workmen.

5436. Do not you think that, even with a most careful painter, you would get splashings with a fine spray?—Undoubtedly, I agree.

5437. And that in time would dry and form dust?—I do not know about that. The paint that dries on a carriage does not form dust. If it dries it sticks there.

5438. But if the paint falls on the floor?—It equally dries there, I suppose.

5439. It must get pounded up again into dust, in time?—Possibly in time it does—by being trodden on, you mean, and that sort of thing.

5440. My point was, that if in the majority of cases lead poisoning is caused by this dust it would not depend on the cleanliness of the workmen?—I say that in those cases that I have met where they have suffered from lead poisoning they have been dirty people. That is all I can say. I cannot say that it is the general cause of it—not at all—I simply say that it happens to be so.

5441. I understood you to say just now that you had never used white lead for bedding canvas on high-class coach-work?—No, I never used it. When we used the whole leather on carriages, the stretched hide, it was always a trimmer's paste that was used. That was made principally of flour and alum and several other constituents. That was made into a paste and rubbed on the body where the hide was to cover. When we did away with the leather work we put on a canvas. That was glued on, and no white lead was used at all in it.

5442. Do you know that canvas bedded in white lead is used very extensively at the present time?—In coach-building?

5443. On motor-car work?—All I can say is I have never seen it used. I have known white lead to be used for rough canvas which goes on those covering hoods of vans, and so on.

5444. Have you had any experience of tramcar building?—No.

5445. It is used very extensively in connection with that class of work?—I dare say it is; I have never experienced it.

5446. Have you ever tried to use any substitute for white lead stopping?—No.

5447. You cannot say whether it is satisfactory or not?—No, I cannot.

5448. (*Mr. Kinggate.*) A point you have brought forward several times is with regard to carelessness, dirtiness, and the drinking habits of the workmen. Your experience is somewhat equal to mine. Have not the habits of workmen during the last 30 years materially improved?—Yes, my word, wonderfully.

5449. Is it a fact that the cases of lead poisoning to-day are as many as they were at the time men were drinking so much?—The Chairman tells me so. I am not aware of it.

5450. Do you withdraw the statement that drink is the cause of lead poisoning?—I do not say drink alone. I put the two together, and, with less drink, we ought not to have as much lead poisoning. On the other hand, you must remember that during the last 30 years the use of white lead and the number of persons engaged in the car and carriage trade has much increased, and therefore you are increasing the number of poisoning cases possibly.

5451. You have never tried any substitute whatever?—No.

5452. You have never seen any leadless jointing paste substituted?—I have seen it but not used it.

5453. You know that Cox and Company, of Manchester, one of the largest firms in the trade, do not use white lead in the jointing?—So I am told.

5454. For many years they have not, and they find it perfectly satisfactory?—Do they?

5455. With regard to the finish of ——— cars in the last exhibition that was held here, you will admit that the finish was as good as anything in the show?—I saw nothing particularly brilliant about theirs, but I did not study them and compare them with others.

5456. They appeared quite equal to the others?—To the ordinary passer-by I should say they were.

5457. Now, what has led to do with the finish of a car?—It has more to do with the ground-work than finishing.

5458. You said that you did not think it was possible to finish a car without lead?—Just so, because the ground-work is the basis on which the other coats come, and a bad ground will give a bad finish. A good ground will give a good finish.

5459. What is the object of using lead in the first place in painting?—Because we have never found anything better.

5460. But what is the object of the lead—not whether it is good or bad?—For one thing, it preserves, and we have found no better substitute for it.

5461. That does not answer the question. I want to know what is lead used for. First of all, is it not used with the main object of filling up the grain?—Yes.

5462. If something could be found to fill up the grain equal to lead, should not that be used?—Yes, if it will do so as well.

5463. We have found this with regard to the Daimler, because we have had before us a man who, I might almost say, tumbled across an invention or system of doing his work—a very excellent painter, one of the best we have in the country, and I have known him many years, and I have had a considerable amount of painting experience—he has found out a very simple matter which fills and closes up the grain equally with lead, and the finish is obviously quite equal to-day to that of any other car in England. Now, with regard to

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body-makers, you said that if they were very careful there was no occasion to get lead on the hands?—Yes.

5464. It is impossible to put plates on without getting lead on the hands?—Yes, that is right.

5465. Now, I can hardly agree with you, with regard to keeping water out of the joints, that lead is for that purpose. If water got to where the joint is, what would the effect be on the coach?—That is just it.

5466. But you never find a body where the joint gets exposed to water like that. I am speaking as a practical man. The joint must be covered?—Certainly.

5467. When once the paint gets off so that the water can get to the joint, what condition must the vehicle be in?—But what happens if the joint gives, and then the paint cracks and so lets the water in?

5468. If the joint is properly fixed it is a very rare thing indeed?—That is not my experience.

5469. The vibration will ultimately move it a bit, but the white lead is more for the purpose of keeping the joints together than for keeping the water out?—We used to build our carriages 12 months before they ever went out of the shop in the old-fashioned carriage-making. The motor car goes out in a few weeks. In the old carriage works you rarely saw the joint, but with the present motor car, however well built, you see the joints.

5470. That is mainly because of the way in which it is constructed?—In the old days the white lead had time to get set. In the present case it has never set, and the joints open.

5471. (*Lord Henry Bentinck.*) Then there is very little use in putting in white lead?—That is true, but if the joint was given a fair chance it never would open.

5472. (*Mr. Kinggate.*) It is not a question of water getting to it that causes it to shift?—No.

5473. How long has sandpapering been left off between the coats?—I never saw a priming coat sandpapered at all. What is the good of sandpapering when you put half-a-dozen other coats on?

5474. You always sandpaper to take the rough off?—I have never seen it done.

5475. That is my experience of 35 years. Any painter will tell you it is the practice. It may not be so far as your knowledge is concerned?—I have never seen it done.

5476. With regard to gluing canvas on the roof, I have never heard of it. It may be put on with japan, but not with glue. You know how susceptible glue is to wet and damp?—It does sound rather peculiar, but we have made a very great success of it. Every bit of the canvas must be saturated with glue, otherwise, on the first hot day, up comes a blister.

5477. It is put on in many cases with lead in tram-car work and motor-car work?—I believe so.

5478. With regard to lavatory and washing accommodation, I know that your experience with the firm you were with is exceptional. Do you know another firm in London that has had such an experience in the years you were in the trade; I do not mean the last year or two?—My services were so wanted there that I never had much opportunity of going to other firms in London at that time.

5479. The firm in which you were employed had a room in which the men could have their meals, but I know of no other shop in London that allowed that, or even washing accommodation. The Committee may think from your statement that it is general, but it is not so. Now, with regard to sandpapering?—I maintain that that is due to the bad finish of previous work.

5480. Instead of putting on a number of coats some spokes have a good deal of sap in, and they plaster them over with dry white lead, then it is sandpapered?—Yes.

5481. (*Mr. Robins.*) I have been a painter for 30 years up and down the country, and I can truly say that within the last 15 to 20 years the painter has become much cleaner and much soberer in his habits than ever he was. I should like to ask you how it is, considering these better conditions amongst the working classes, these cases have not been decreased. It is known to me that there are all these cases which have been stated. I fully agree with you that the ordinary working man works under very much better conditions and he is a better man than he was 30 years ago?—I am quite willing to admit that. I see every evidence of it.

5482. I believe you said in your evidence that you had about 16 body-makers in your employ when you were a piece-master?—Yes.

5483. Much of your time would be taken up, naturally, as a piece-master with those men?—Yes.

5484. I should think that you had very little opportunity to study the theory or the practical part of painting?—That was largely done during my apprenticeship.

5485. I may take it that the conditions of the paint shop to-day are very far different from what they were when you were apprenticed, which would be much the same time that I was apprenticed?—Very different indeed.

5486. Now, you said that some of the men worked for short periods and some for long periods with you. Would there be many changes, or would most of them work for long periods?—I had about four that were with me from 6 to 12 years.

5487. You spoke about the wheels being filled up. Thirty years ago or more the wheels were filled up, and only the bed and so on of the carriages were rubbed down. You know it would be impossible to rub wheels down in the spokes with stone?—Unless it was shaped.

5488. It would be a most expensive process, and never could be accomplished. With regard to wheels, they would have two coats of lead colour?—Yes.

5489. Between each of those coats they would be sandpapered?—It is done sometimes with wheels, I know. I was referring to bodies when I said there was no necessity to sandpaper down between the priming coats.

5490. Your experience is very different from mine. In nine cases out of ten a body receives it, and it is beneficial. There may be burr or grain or what not on the wood that should be removed, and in nine cases out of ten in my own experience sandpapering is done between coats?—Is it?

5491. Now, with regard to stopping on wheels, is it mostly done with sandpaper?—Yes.

5492. We are glad to think that is a practice that is going to be discontinued?—Yes.

5493. You admit that there is great danger from sandpaper stopping?—I do. I consider that that is the greatest danger.

5494. You mentioned a matter with regard to metal panels. You said in your evidence that they did not require as many coats as wood did in the olden times?—Yes.

5495. I certainly disagree with you, because from practical experience I find that the beaten panels of a motor car require more filling and more stopping, which is highly dangerous when done with white lead, than the ordinary carriage, on account of the panels being hammered?—I know a lot of painters who paint aluminium panels and never put any filling at all.

5496. Should you be surprised to know that there are more steel-beaten panels used now than aluminium?—I admit that.

5497. It is the steel panels I principally refer to, and those are principally in use to-day. It requires more white lead stopping on the beaten panel than there ever was on the wood panel that was made in the olden times?—I follow.

The witness withdrew.

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Mr. F. A. MAYTHORN.

[Continued.]

Mr F. A. MAYTHORN (Biggleswade) examined.

5498. (*Chairman.*) You are attending to-day as President of the Institute of British Carriage Manufacturers?—That is so.

5499. What is your business?—I am a carriage-builder and motor-car body-builder.

5500. What length of experience have you had?—My father was a carriage-maker before me. I went into business with him immediately on leaving school, with the exception of a short time when I went to town and was apprenticed to heraldic painting.

5501. How many men do you employ?—About 150 at the present time.

5502. How many cases of lead poisoning have you known?—None at all.

5503. Have you consulted the doctors practising in your town with regard to lead poisoning?—I have letters from four of them here, the whole of the doctors practising in the town, and they have not had a case in the last 10 years. I did not ask them to go farther back than that.

5504. To what do you attribute this gratifying immunity at your works?—Principally to general cleanliness and the system of painting which we employ.

5505. Does your firm use less lead in the priming processes than some carriage-builders do?—I think so.

5506. Are your men continually sponging the surfaces and washing their sponges in pails of water, so that very little falls on the floor?—That is so. Rubbing down is done with block pumice-stone. Rubbing down the surface we call filling-up. There are about six coats which are put on over priming coats, and when that is hard we put on a guide coat of black—a staining coat. The object of the black is that wherever that is seen it must be hollow, and must require rubbing till it is all gone. The man keeps washing off with a sponge in order that he may see where the black is left. The pumice dust and the rubbed-off filling-up go into his pail to such an extent that our drains get choked. We have to take them up and regularly dig them out sometimes.

5507. Do you do any rubbing down between the priming coats?—No, they are not rubbed down.

5508. I am very glad to hear of such an excellent record as you have just given us of immunity from lead poisoning, but I am not surprised. You are doubtless aware that in the Potteries there are a very large number of works which have been immune for many years?—I do not know much about the work in the Potteries.

5509. You see, the trouble is that even some of the very best works are not immune. A great number of works that have been free from lead poisoning for many years will sometimes have a succession of cases quite unexpectedly?—I understand what you mean.

5510. It is no test because you are immune?—I quite understand. I put it down to some extent to good fortune, but I do not think it is entirely that, because we use very little lead.

5511. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—As far as I know, we have not any special clause put in on that account.

5512. Do you know that, in the carriage-building trade, taken as a whole, there have been 787 cases of lead poisoning recorded at the Home Office in the 11 years from 1900 to 1910?—I did not know it until I read of it recently.

5513. And of these 47 were fatal cases?—Is that 47 fatal cases amongst carriage-builders?

5514. Yes?—I was not aware of it.

5515. It includes the whole of the carriage-building industry. There has been no apparent reduction in the rate of attack during that period; that is to say, on the average of eight years, 1900 to 1907 inclusive, there were 661 cases annually. In 1908 there were 70 cases; in 1909, 95 cases; and in 1910, 70 cases. As there has been no reduction in the average number

of cases reported each year, I am sure you will recognise that something must be done to remove the evil?—I quite agree that it is a very serious thing, and we are desirous that our men should work under the most favourable conditions; but my feeling is that we, who subject our men to much less risk than many coach-builders or people classified with us may subject their men to, will suffer to some extent by any restrictive measures which are made. If it simply means a matter of extra cleanliness, we being already fairly clean, it will not make much difference to us or to our men, but if I might mention it, I should deprecate the use of anything like a helmet to prevent inhalation.

5516. My question to you was this: I am sure you recognise that the Home Office must do something to remove this evil?—Certainly.

5517. Now, do you contend that the risk of lead poisoning arises almost entirely in certain classes of works?—Yes, I should think so.

5518. Of which class have you the most experience?—I should think of my own class of work, coach-painting. I do not think I follow what distinction you mean to draw. You are speaking only of coach-painting, I take it.

5519. Yes. Are you aware, that of 376 cases reported in the last five years, 1905 to 1909, 46 arose in motor-car works?—I was not aware of it. Do you mean motor-car works or motor-body building works? We make a difference, you see; there are motor-car works where they make their own bodies, but we coach-makers do not make the chassis.

5520. I mean, by motor-car works, works where they make the various parts of a motorcar?—In the engineering part lead would be used in very much greater proportions than by the coach-builder. We have the chassis and we put the bodies on them. Then there are motor-car builders who have a coach-building department. You would have to take a tremendous lot in to take the whole of those works in. There would be men there who are using lead who would never be classified as painters.

5521. The cases I am putting to you are only cases that have arisen when painting motor-car bodies in motor-car works?—Very good, I only wanted to understand.

5522. Out of 697 cases reported in the last 10 years, 1900 to 1909, 297 arose in the ordinary coach and carriage-building works of the country. Have you tried substitutes for white lead in your painting works?—No, not direct substitutes. We have used a great deal less in our mixtures, but we have not tried to exclude the use of white lead entirely, and we have not used any of the so-called substitutes.

5523. Do you think that it would be possible to prohibit or greatly restrict the use of lead without inflicting a hardship on the industry?—I think it would. In many cases I think a substitute could be found. The only difficulty, I think, is as to the permanency of it. That we have not been able to test at present.

5524. The durability?—The durability.

5525. You would, no doubt, agree that if a substitute could be found which was as good as white lead the use of white lead should be prohibited?—There are so many purposes for which lead is used. We might find a substitute perfectly satisfactory in one place for one object, but for another it might be unsuccessful.

5526. But I say, if a substitute could be found which would be as good as white lead the use of lead should be prohibited?—If I could find a non-poisonous substitute as good as white lead I would use it in preference.

5527. Do you know that for the past six years the Midland Railway Company have used no lead in their carriage and wagon works?—I did not know that.

5528. And that they are entirely satisfied with the results obtained by a mixture of zinc and baryta?—I did not know that.

5529. We have also had similar evidence from the representatives of the Bradford Corporation Tramways

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[Continued.]

Department. Are you aware of that?—I was not aware of that.

5530. Are you aware that white lead is no longer in use at the Daimler motor-car works in Coventry?—I do know that; I have heard it.

5531. Do you still hold that white lead is the most perfect substance that can be used?—For some purposes I certainly think that no substitute has been found.

5532. In your experience, how does the general work of motor-car companies compare with Daimler motor-car bodies?—In point of quality of work, do you mean?

5533. As regards both quality and durability?—Durability I cannot speak about.

5534. Then as to quality only?—For quality Daimler work is quite all right.

5535. As good as anybody else's?—I think so.

5536. The Daimler are, in fact, one of the largest firms in the industry, are they not?—Undoubtedly.

5537. And I suppose that they turn out work of the highest finish?—Yes, I think that I may say that.

5538. I suppose that the buyers of Daimler cars are of about the same class as the customers of your own or other leading coach-body firms?—Certainly.

5539. And they would demand the same finish, would they not?—I have seen Daimler cars in the show alongside my own, and they have been beautifully finished, but I cannot say what happens otherwise.

5540. The witnesses representing the Daimler Company told us that they were entirely satisfied with the substitute that they were using for all purposes for which white lead is commonly used in coach-building works. I want you to realise this point—that the Daimler Company have used no white lead for two years, and that they say that they have had no complaints from customers?—I follow.

5541. They claim that their paint work is thoroughly durable?—Yes.

5542. And that it is, in fact, a little more economical than when they were using white lead?—I quite believe that.

5543. Do not these considerations dispose you to modify your views at all?—No, I am afraid not, on certain points. That is a big ground to cover.

5544. But surely, if the Home Office have evidence of a company like the Daimler, who say, "We have done without white lead. We find it cheaper to work without it, and that the work is as durable, and we produce just as good a finish," do you not think that the Home Office will think that, if a firm like that can do without white lead, you must do without it?—If you say that we must, we must. As I said on another occasion, if it is a matter of using a helmet, I shall not use white lead.

5545. We are sitting here, as a Departmental Committee of the Home Office, to inquire into lead poisoning in this industry?—Quite so.

5546. When we report to the Home Office and tell them that an important firm like the Daimler have been doing without white lead for two years, and that in every respect they, themselves, and their customers are satisfied, do you not think that the Home Office might reasonably say to other people, "You must do without it, too"?—I went the other day to the Building Trades Exhibition, where a large number of motor-cars and paints, and so on, were being exhibited. A great number of firms were exhibiting very beautiful white enamels, and I was particularly attracted to one. The surface was very lovely. I asked, "How many coats have you put on that?" and the answer was, "We have put one coat of filling-up stuff on the wood, two coats of matt, as you see over there, and one of enamel." I said, "That is zinc." "Yes, there is no lead in it." If we could get, without lead, a surface like that which I saw it would be pounds and pounds in our pockets. I went into the stand to look at the matt. I said, "Do tell me candidly, if I have a black surface to cover, how many coats would it take to make a surface as white as this?" The answer was, "I should put on two or three coats of lead first." I said, "That does me, because I want to be able to say I have

"not used any lead." Lead is more opaque than any other white. I think that must be granted.

5547. If all the firms were in the same position there would be no hardship, would there? You have not quite answered the question. We have the evidence of the Daimler Company, the Midland Railway Company, and the Bradford Corporation Tramways Department. The Home Office will naturally ask, "If these people can do without white lead, why should not others be made to"?—Are you sure that, in excluding lead and getting a substitute, you will not get a worse poison?

5548. Will you, please, deal with my point first?—Lead and zinc are the principal whites.

5549. But will you answer my question?—I could not admit that the Daimler are better judges than I am; if you ask me to admit that, I cannot.

5550. If Parliament, the supreme authority, and the Home Secretary have the evidence of firms like the Daimler, who have proved beyond question to us that the disuse of lead by them has had no ill-effects, but that, on the contrary, they have satisfied their customers entirely, do you not think that they will be justified in telling other motor-car makers that they must abandon its use?—No; because two years' life with regard to a carriage is nothing.

5551. How often is a motor-car repainted?—It ought to be varnished once a year, or twice, perhaps. It need not be fundamentally repainted.

5552. If Daimler motor cars last for two years without showing any ill-effects, is not that a sufficient test?—I do not think so.

5553. Not if motor cars are usually painted or varnished once a year?—The foundation might go entirely wrong. We have had a car come in, and we have faced it down to the filling and repainted it, and had to take it all off to the wood.

5554. What period of test do you consider sufficient before you would agree that the Daimler formula is satisfactory?—Well, you see, ours is an ancient craft.

5555. (Mr. Kinggate.) You are conservative?—I quite agree that we are conservative. I should say that 10 years would be a much more satisfactory period.

5556. (Chairman.) I want you to be reasonable?—I hope to be reasonable.

5557. You would not like it to be put in your evidence, as the opinion of the president of this very important association, in answer to my question, that a reasonable period of test would be 10 years, would you, when no motor car will ever last for more than three or four years?—The cars may not, but the bodies will. Our carriages had to last for 30 or 40 years.

5558. I do not want to press you unduly. You maintain that a proper test would be 10 years?—Yes, I think so.

5559. That answer will be put in your evidence and made public?—I am quite agreeable to that.

5560. Do you contend that the danger of lead-poisoning can be practically eliminated by regulating the various processes?—I think so. I contend that there is no danger if the work is carried on properly.

5561. (Chairman.) Have you, as a society, taken any steps to test the merits of the different substitutes on the market?—No.

5562. Or to institute any inquiry as to the precautions which are necessary to combat the evil that exists in many branches of the industry?—Not so far as I know.

5563. Now, first, with regard to the body maker, he uses jointing paste in putting together the different portions of the woodwork, does he not?—Yes, he uses white lead.

5564. Is a lead paste generally used in jointing?—Yes.

5565. Where a lead jointing paste is used it must, of course, be attended with danger?—I was not aware of it.

5566. For example, in making up the paste does not the worker use dry lead compounds?—No. The compound is a thick white lead paste. It is white lead ground in oil. What we call tub-lead is ground in oil,

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and we mix oil and gold-size with it to make it set. It liquefies a little bit.

5567. Is he not exposed to the danger of poisonous dust?—There is no dust at all.

5568. Whatever the form of jointing paste that you use, must the worker not get it on his hands and clothing?—On his hands occasionally.

5569. What special precautions can you take to safeguard the worker in this operation?—We can only give him every opportunity of keeping himself clean.

5570. Why is jointing paste used?—To prevent the possibility of moisture getting into the joints.

5571. There are a number of leadless jointing pastes in use, are there not?—I have heard of one coach-maker, one of our members, who is using a substitute. He told me that for this purpose he was using yellow ochre and oil, or something of the kind.

5572. Does he say that is satisfactory?—Yes, I believe so.

5573. The Daimler people say that their leadless paste is satisfactory?—I do not know what they use. The gentleman to whom I refer uses oil or varnish, or some medium and yellow ochre. That is an earth and perfectly non-poisonous.

5574. The carriage-maker attaches the ironwork to the wood, does he not?—Yes.

5575. Does he use lead in this operation in the same way as the body-maker?—Yes, the work is bedded in lead.

5576. Does all that you have said with regard to the jointing of woodwork apply equally to the attaching of ironwork to wood?—Yes.

5577. When the carriage is ready for painting, is it first given priming coats?—In our case it is. We rub it over with a preparation first—a wood filler.

5578. How many coats?—We give it two coats of wood filler. That is a thing which we buy. I believe it to be plaster of Paris and oil. It is all rubbed off and you could not tell that anything had been done.

5579. Does the priming which you use contain lead?—A certain proportion of lead is used. It is not pure lead. There is no lead in the first process that I was describing.

5580. Is the work sandpapered between successive priming coats?—No; not after the application of the priming containing lead.

5581. Is it the general practice in coach-painting to sandpaper between the various priming coats?—It is not our practice.

5582. Is it the practice in other works?—I should not think so.

5583. The body next receives a number of coats of filling, does it not?—Yes.

5584. Do you use a leadless filling?—No, not leadless. It contains a very small proportion of lead.

5585. Why is lead frequently added to the filling material?—Partly to bind it.

5586. Is it absolutely essential to use lead in the filling?—I do not know that it is absolutely essential.

5587. Would you agree on behalf of your institute to have it prohibited?—No, I could not do that. I have not at present used any substitute, but I think that lead might be done away with.

5588. The filling is not rubbed down between successive coats, is it?—No.

5589. What stopping do you use on coach bodies?—Generally white lead.

5590. Is it the general practice to use hard stopping made from dry white lead and gold-size?—I think so.

5591. Does the man mix the stopping himself?—Yes, as a rule.

5592. In the process of mixing there must be danger arising from handling the dry white lead powder?—I think not. I was half a mind to bring a sample of lead with me, but I thought that you might have plenty of samples here. Lead is such a very heavy powder that I believe that pulverised white lead would hardly be blown about. I do not think that any powder would arise in the mixing of white lead, or that any inhalation would occur then.

5593. Would you explain to the Committee why, in your opinion, there is no danger in this process of stopping?—The material is only used in very small

quantities at a time. A little is taken on a palette with the medium. The medium is usually gold-size. I do not think that much dust occurs.

5594. Other witnesses have told us that there is danger?—If it were dealt with in large quantities there might be danger from handling, but there is a very small quantity on the palette and palette knife, and I do not think there would be any danger.

5595. After the filling and stopping have been applied, a coat of staining is generally added, is it not?—Yes, but in our case the stopper goes on before the filling-up. We have six coats of filling on the top of our stopper, and it is a very, very rare thing for the lead to show through anywhere. If it is left very bold it sometimes does occur that a little white patch comes through.

5596. Is the whole surface then rubbed down until the staining has been removed and the flat surface left?—Yes.

5597. Is this always done with pumice-stone and water?—Yes, it is always done with pumice-stone and water.

5598. The danger in this process is confined, then, to the lead which may have been used in the filling and stopping?—Yes.

5599. What you have told us applies to bodies only?—Yes.

5600. The carriage underwork is generally sandpapered, I believe?—It is.

5601. And the wheels?—The wheels are sandpapered. We treat the broad parts of the chassis in the same way as the body, but the wheels we lead-colour, or prime them with partly lead-colour.

5602. This sandpapering gives rise to a great deal of dust, does it not?—I contend that it does not. The pigment does not dry hard enough, or quickly enough, to make a dust. The result of sandpapering paint as mixed by us, or most people, would be that a very, very fine curl would occur. I do not think anything can possibly arise so as to be inhaled.

5603. In regard to some of these operations there is much difference of opinion?—It is elastic, like rubber, and will cling together. The sandpaper cuts it into little ribbons, and there is not an atom of dust.

5604. It creates a certain amount of dust, does it not?—Very little.

5605. The dust contains a large proportion of lead?—It would be half and half.

5606. A considerable amount of hard stopping is used on the wheels, I suppose?—No, not much.

5607. On the woodwork of the under part of the carriage?—No, not much.

5608. Is sandpapering used in this process?—Yes.

5609. Must that not be rather dangerous?—I can only speak from experience. I do not think there is any danger.

5610. Is there not a considerable amount of dust?—No; and what dust there is falls immediately on the ground. It does not rise. If this room were sandpapered, immediately there would be a line of white on the ground. The dust falls vertically.

5611. I suppose that the dust must fall on the workmen's clothes?—I do not think it does, as a rule.

5612. But you cannot have dust around you without some of it clinging to your clothes?—I say that it falls vertically. It does not rise.

5613. You would get dust on the lower part of the body?—A man does not have his legs under his work. He does not sit down and work at it. He stands like *this* (demonstrating).

5614. Do you affirm that there is no danger whatever in the process?—I reply that there is no danger.

5615. Is it possible to use wet methods of rubbing down such work?—Not the under parts.

5616. Why?—Pumice-stone is not flexible. You could not very well rub down intricate work with pumice-stone.

5617. So that if there is any danger in this process you can suggest no remedy to combat it?—No.

5618. Would it be possible on curved surfaces to use a wet method of rubbing down?—It was the small



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curved surface that I was thinking of; the wet method would be difficult there.

5619. Is it practicable to apply a local exhaust draught generally to remove the dust in this process?—I suppose that it would be practicable where anyone had sufficient power for the apparatus, but in many cases the coachmaker would have to put up the power to get the exhaust.

5620. In all other industries where lead is used and where dust is generated, the Home Office have insisted hitherto on exhaust fans being introduced to remove the dust. Do you think that that would be a regulation which your Institute would welcome?—I think that it would simply close down a great many factories.

5621. Why?—Because they would have no chance of getting an exhaust fan. The small coach painter could not afford an engine to run a fan or luxuries like electric power.

5622. I am only telling you the system that obtains in other industries where the use of lead is permitted and where dust is generated. In those cases the Home Office insist that there shall be an exhaust draught apparatus to remove the dust?—I understood you to ask me whether I recommended it. I could not on behalf of my Institute.

5623. I will ask you, do you think it possible to introduce such a system of exhaust ventilation?—Of course I know that, as an engineering problem, it is quite easy to put up exhaust apparatus to get rid of dust.

5624. But you think that the cost would be prohibitive?—Yes, in nine cases out of ten it would be prohibitive in the case of the coach-painter.

5625. Now, with regard to finishing coats. After the filling has been rubbed down, the body gets about two coats of lead colour, I believe?—Yes.

5626. Are these faced with pumice stone and water as a rule?—Yes.

5627. Are they ever sand-papered lightly?—They might be, but not with us.

5628. Is the work then ready to receive its finishing colour and be varnished?—Yes.

5629. Is it, in your opinion, possible to dispense with all sand-papering in the final stages of the body work?—Yes; in fact you could not use sand-paper in the final stages, I think.

5630. Now, as to motor-car work. Does all that you have said with regard to coachbuilding apply equally to the manufacture of motor-car bodies?—Certainly.

5631. But lead is not used in attaching the metal underwork to the body of a motor-car, is it?—No, we usually use japan.

5632. Lead is not generally used?—No, not between the chassis frame and the body.

5633. Then, if it is not generally used in connection with motor-car body-work, why cannot it also be dispensed with in ordinary carriage work?—We never try to hide the joints between the body and the chassis frame, but in the case of what you were speaking of before, what we call the under-carriage, where a piece of thin wood has a top and bottom covering of iron, when that is properly painted you could never tell iron from wood. It looks all one piece. I think that practical gentlemen would agree with me there. But in regard to the chassis, when the body goes on the frame there is a hard and fast line which we never seek to hide.

5634. In preparing the bonnet, the curved work of the chassis and other under-parts of a motor-car, is it not necessary to use a great deal of hard-stopping?—No. We do not put much stopper on it. It would not do to put much on the bonnet.

5635. Wherever hard-stopping is used on such surfaces, it is usually sand-papered, is it not?—Yes, I believe such surfaces would be.

5636. Could all this sand-papering be dispensed with by doing more facing with pumice stone and water?—Yes, I think so.

5637. And in some cases by substituting stove enamelling?—I do not think the stopping would be effected by stove enamelling at all—in fact, I doubt if you would be able to do stove enamelling over stopper.

5638. No, but instead of it?—It is in substitution. Stove enamelling is excellent, but it is putting enamel directly on to iron. If you had softer materials in between, there would be trouble.

5639. Would you go so far as to advocate the prohibition of all dry rubbing down in this process?—I am perfectly prepared to do that.

5640. Do you finish the roofs of your closed cars with canvas, or some similar material?—Yes.

5641. How is that bedded?—It is usually bedded with japan and varnish.

5642. Is it not usual to bed canvas in white lead?—I do not think so, but I do not know. We do not do it.

5643. Have you anything to tell us with regard to railway or tramcar work?—No, I do not know anything about them.

5644. Now, I will come to a few precautions which I think the Home Office might wish to introduce into this industry if lead is permitted to be used in the future. You attach a good deal of importance to personal cleanliness on the part of the men?—Yes.

5645. Do you provide washing accommodation?—Yes.

5646. What proportion of basins to the number of men employed do you advocate?—About one to five.

5647. Is hot water as well as cold laid on?—No, not with us. They can get it, but it is not laid on.

5648. Do you think that it is imperative that hot water should be laid on?—I do not think so.

5649. Do you not think that it is important that hot water should be available for the men?—Yes, I think that it ought to be available.

5650. Are clean towels supplied regularly?—Yes.

5651. How often?—I think twice a week, but I do not remember. The storekeeper has that in hand, and I have not thought about it.

5652. I suppose that you would agree that it is very important that they should have clean towels at frequent intervals?—Certainly. One man is in charge of the soap and towels and nail brushes and everything.

5653. The Home Office regulates the supply of towels to workmen in other industries?—It does with us.

5654. Are soap and nail brushes always available?—Yes.

5655. Have you any system by which the soap and nail brushes are watched and cared for?—One man has charge of the whole business of replacing them when necessary.

5656. Are the nail brushes sufficiently good to enable the men to clean their nails with them?—I think so.

5657. Is that carefully looked into by your people?—Yes, I believe so.

5658. Is time allowed to the men for washing before leaving off work and before meals?—Yes.

5659. How much time?—I forget how long; I think five minutes.

5660. Is that allowed out of the employers' time?—Yes.

5661. Is a room provided for the men to take their food in?—No. They go home for all their meals except that when working overtime they stop and have tea. The painters are not allowed to eat anything in the paint-shop. They usually retire into the trimming shop next door.

5662. Are any of your men allowed to have their meals in rooms where lead is used?—No.

5663. Is provision made for storage of food brought by the workmen so that it need not be taken into the working room?—No.

5664. Where do they take their food when they bring it with them in the morning?—The only food taken in the place is tea, when men are working overtime. Their children bring it at six o'clock, and when the bell rings the men sit down, and then the children take the things away.

5665. Where do they have tea?—In the shop.

5666. Where they are working?—Yes.

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5667. Then they do take a meal where lead is?—The painters are not allowed to have it in the paint shop: Are you speaking of painters only?

5668. I am speaking of all classes of work people. I want to know whether, on any occasion, tea, dinner, or anything else, they are allowed to have their meals in a room where lead is used?—I suppose that the body makers might.

5669. That is breaking the law?—I did not know that it was. The painters are not allowed to have meals in the paint shop.

5670. Do you provide overalls for the men?—No, most of them find them themselves.

5671. Do you know how often they are washed?—I should say once a week. Are you speaking of painters or of other men now?

5672. I am speaking of the men who come into contact with lead?—Painters do not use overalls. The body-makers use overalls, and very effective ones, and they are washed at least once a week.

5673. Do you know that of your own knowledge?—Yes.

5674. Do you make that a condition of employment?—No, we do not make it a rule.

5675. How do you know, then, that they are washed once a week?—I can judge by seeing them on Monday morning in very bright clean clothes.

5676. Is a cupboard provided for storing them when they are not in use?—No; there is no store for them.

5677. Do they take them home with them in their bags?—They take them home to be washed; I do not know how they carry them.

5678. Do they take them home every night?—No.

5679. Where do they keep them in the day time?—They hang them up on the benches, I imagine.

5680. I suppose that after a few days they are covered with lead dust?—Not with lead dust. They might have wood dust on them, but not lead dust.

5681. They are covered with dust which they come into contact with in their work, are they not?—The dust which they come into contact with is principally wood dust.

5682. You have said that there is a certain amount of lead dust in some of the operations?—I am speaking now of one shop, and I think that you are referring to another.

5683. I am speaking of overalls, and I asked you whether there is not a certain amount of accumulation of lead dust on the overalls in the course of two or three days?—I do not think there is. I will explain. A coach body-maker only uses lead, as I have already said, in a thick paste, which lead creates no dust whatsoever. If I am strictly obliged to say it, a coach body-maker is in a place where there is lead because he uses lead for his purposes, and he wears overalls. He gets very dusty, but I contend that there is no lead dust.

5684. Then what is the object of his wearing overalls?—To keep himself clean and save his clothes. They used to wear an apron in body-making, but now a body-maker has a suit of overalls, which covers him entirely. He wears overalls simply for the sake of his clothes and for comfort.

5685. You have told us that painters do not use overalls?—No.

5686. Are they not the very people who should use them?—I do not think so. They use an apron usually—that is all.

5687. A certain amount of paint falls on the floor and is kicked, and dust is created?—There is not very much.

5688. I said a certain amount, and these little amounts tell?—Our floor is covered with a patent preparation to stop dust. We have found that very effective. It is not quite like a drawing-room floor, and I cannot keep it as near that as I like, because the men have a nasty habit of throwing things down just where they happen to be.

5689. Is a separate cupboard or cloak-room provided for outdoor clothing put off during working hours?—Not a separate cupboard for each man. The men have a place to hang things in.

5690. Is that separated from the ordinary workshop?—No, I cannot say that it is, but it could easily be.

5691. Have you impervious washable floors in your painting shops?—No, they are ordinary wooden floors done over with the patent material that I have just spoken about.

5692. What are the usual hours worked by your coach-painters per week?—Fifty-eight is the usual number of hours.

5693. Do they frequently have to work overtime?—Not very frequently, but fairly frequently.

5694. Do you know that a very great deal of overtime is worked in certain branches of the trade, such as motor-car making?—I believe so.

5695. Would you welcome a strict limitation of the hours of employment, say, to 48 hours a week, the same as in the Potteries?—No. If you gave us double the number of men that we have, we should like to work less hours, but we cannot get them.

5696. Do you have a periodical medical examination of your workers?—No.

5697. You know that in other industries where lead is used the Home Office insists on a monthly, or even weekly, examination by the certifying surgeon?—I did not know it.

5698. If you have never had your men examined by a doctor, is it possible that some of them may be suffering from the slower and more insidious forms of poisoning?—I do not think so.

5699. But you do not know?—No, I do not know.

5700. Do you know that lead poisoning frequently undermines the health without immediately developing acute symptoms?—I did not know that.

5701. Then would you welcome a system of periodical medical examinations in your industry?—Yes, if it is going to do any good.

5702. Do you know that there is practically no important lead industry in existence now where periodical medical examination is not insisted upon?—I did not know it.

5703. If, as I suggest, the Home Office introduced periodical medical examination, would you agree that compensation should be paid for any workers suspended by the doctor on account of doubtful health?—I could not agree to it, speaking on behalf of the Institute, as their President.

5704. But that would be a corollary?—I suppose that it would follow from that.

5705. Now, with regard to the cost of regulations. Do you realise the very great expense which your industry would have to bear in connection with stringent regulations for lavatories, meal-room and cloak-room accommodation, overalls, washable floors, medical examination, exhaust apparatus, compensation, &c.? Do you realise that probably the Home Office would insist on all those?—I realise that it would kill the industry if you do it. That is all. It would not, perhaps, matter to me. I could set up abroad.

5706. Will you be kind enough to take into account the cost of setting up a system which would secure continuous observance of all the regulations that I have foreshadowed?—Do you mean as against the doing away with using lead?

5707. I am coming to that in a moment. I have put the whole position before you?—I quite realise that it is pretty awful, if that is what you mean.

5708. And you realise, do you not, that the first duty is laid on the employer of securing the observance of all these regulations?—Yes, I realise that—more work for the poor employer.

5709. Taking all these points into consideration, do you still consider that it would be better to regulate the industry than to prohibit the use of lead?—It would be the same thing in my case, and I think that you realise that too. I should simply do away with lead. It has only a certain value, and gold can be bought too dearly. I think that it is quite possible that you might pay too much for lead.

5710. I understand you to mean that that would be the case if these restrictions which I have foreshadowed are introduced?—Yes. They will not affect

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me. If people want a white car they must go elsewhere to get it.

5711. They are restrictions which obtain in other lead industries to-day. Rather than have these restrictions you would agree to the prohibition of lead?—Certainly.

5712. (*Lord Henry Bentinck.*) It would only affect, then, the people wanting white cars?—We should have to paint them with something. As my friend at the exhibition told me, they put white lead underneath to make it solid. But that is a detail.

5713. You said that the jointing paste was applied in a semi-moist state, did you not?—Yes; it is really quite moist.

5714. How soon is it dry? Is it dry before the body leaves the shop?—Yes.

5715. Therefore it is liable to create dust?—Oh, no, it would not create dust. If it made dust it would not be any good. It has to set very, very hard, like cement. It must not create a dust.

5716. Then it is not sandpapered, or anything of that sort?—No. It is wiped off, you see, with cloth or a piece of canvas.

5717. Do you work much overtime?—A good deal.

5718. On Saturdays?—No.

5719. Never on Saturdays or Sundays?—We may do so just to finish a car if a man wants to take it away, but not as a regular thing.

5720. Is it very difficult to find men now?—It is extremely difficult.

5721. For how long has that been so?—I do not know. It has been a growing difficulty in the last year or two, and now we are all in the same boat, I think. We all want men.

5722. Do you have a slack time every year? Is it a seasonal trade?—We do have a slack time. I do not think that many motor-body builders have been slack for the last year or two. We have a boom now—we are perfectly willing to admit that. A slump will come by-and-by.

5723. (*Dr. Collis.*) You were speaking of tub-lead. Do you mean lead paint as issued by the paint manufacturer?—What is known as ground white lead is what we call tub-lead.

5724. As it comes from the factory to you?—Yes. There is dry white lead and there is tub-lead.

5725. I mean the mixed?—Ground white lead is what we call tub-lead.

5726. Do you prefer to have that matured at all, or do you use it as fresh as the manufacturer can let you have it?—We usually want it of a certain age.

5727. How old?—What we specify for, as a rule, is about three years old.

5728. Are you aware that recently Dr. Baly, of Liverpool, has shown that lead mixed with oil gives off at the ordinary temperatures of air a volatile organic lead compound?—I did not know that.

5729. And that this compound is specially given off by lead which has been mixed with oil for a certain period—what is known as matured lead?—Would that occur if it were covered with water?

5730. If the paint were covered with water, do you mean?—Yes, if the surface were covered with water.

5731. From his experiments, probably not, but he is not satisfied on that point yet. It is not covered with water when you are using it, is it?—Tub-lead is always covered with water.

5732. But not when you are using it?—No, not when you are using it.

5733. Then you would have the compound given off apparently?—Yes, I suppose so.

5734. You have suggested that, in sandpapering, there is little or no dust getting into the air?—Yes, that is so.

5735. Would you be astonished, then, to hear that tests of air taken at the breathing point of the worker during sandpapering and dusting show (to give four or five of the determinations) in one experiment 193 milligrammes of lead in 10 cubic metres of air, 135 in another case, 182 in another case, 278 in a fourth, and 258 in a fifth? It may be interesting to you to know, for comparison, the amount of lead found in the air in other industries. In the

whole of the earthenware and china industry no test by the same investigator ever showed more than 13. In potteries, exhaust fans are applied in most instances; but in regard to the 13 the note that I have against it is "Bad exhaust"?—May I say that I do not think that I made a general statement that I did not think that danger would occur from the dust. I can imagine danger from what is known as the dry sandpapering. Where that is applied there might be a great deal of dust. You see it means that a man sandpapers at a high angle. I think that my remarks with regard to dry sandpapering were principally with regard to the under-works, where a man works above his work. I can imagine that if a man is sandpapering up here (*pointing*) a certain amount would come within his ken.

5736. (*Chairman.*) You really led me and the Committee to believe that there was no danger in the process at all?—No, I did not mean to imply that. I was only speaking of a certain process.

5737. (*Dr. Collis.*) This is the sandpapering of car bodies?—I cannot go against your statistics. The only thing is how the thing occurs.

5738. Would he be likely to be above or below a bench board?—He would be above a bench, I suppose.

5739. After one coat of lead colour and sandpaper stopping, the air was taken at the breathing point of the worker, and was found to contain 182 milligrammes per 10 cubic metres of air?—Do you mean 182 milligrammes of lead?

5740. Yes; found in every 10 cubic metres of air. So that you will allow, therefore, that the dust from sandpapering gets extensively into the air which is breathed by the worker?—It rather looks like it from your figures.

5741. (*Chairman.*) This is a special investigation that has been made by a Home Office official for this Committee?—I follow.

5742. (*Dr. Collis.*) I would like to know whether you can verify these figures: a painter is occupied in sandpapering one or two hours per day; a brush-hand from two to three or three and a half hours a day; and a painter's labourer from four to five. Would that be about a fair proportion?—I should imagine so. Some people would keep a certain class of man doing all sandpapering, I suppose. I do not say that that is out of the way.

5743. So that, although these people would be employed at a dangerous process for, perhaps, only one-third of the time per day, still during that time they would be exposed to something like 90 times the amount of dust in the air, as, for instance, in the china and earthenware industry. I gave you 13 as the highest, but it runs 1, 2, 2, 2, 6, and 1. These people are getting 182, 278, and 258; so that there must be at least 90 times as much dust in the air as there was in the china and earthenware trade. It may interest you on that point to know that in one case with motor-car wheels, after two coats of lead colour and after sandpapering, when the exhaust was not running we got the lowest reading—38·7; but when they had their exhaust running even then it only fell to 14·7, which is higher than anything apparently in the china and earthenware trade?—It seems to me that it would be very difficult to put the exhaust so as to clear the whole shop. You can hardly say where a man is going to work. I have seen it very satisfactorily used in a wood-working shop. I have seen a wood-working shop almost like a drawing-room. Then you have machines, and you can arrange the apparatus so that you exhaust the waste material right away, and off it all goes; but painting could not be done quite like that. You see we have things of such varying size to work on, and they are movable things:

5744. The difficulty would be almost insuperable, I think. I quite agree?—It is quite expensive at a wood-working machine, but it is possible there. Everything has to be brought to the machine. The work is fixed, and the exhaust is put over the machine.

5745. Having considered the extreme difficulty of applying exhaust to remove the dust, and having further, too, considered the volatile lead compounds

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which Dr. Baly has shown to be given off by wet lead paints, do you think that it would be in any way reasonably possible to protect the worker against the dangers to which he is exposed?—I do not know any means. I believe in a place being ventilated. We have Boyle's ventilators and torpedo ventilators, which take off a great deal, but they are not sufficient from that point of view.

5746. (*Mr. Fell.*) Do you provide the same washing accommodation for your body-makers and for your painters?—No.

5747. Only body-painters?—Only body-painters. One lot of body-makers have it—working at a newer place—they have a lavatory; but the old body-shop has not been at present fitted with it.

5748. Have you any regulations in your workshop as to men washing who are working at body-work?—No.

5749. So that there is no accommodation for them of any sort?—One lot have, but the other lot have not. In the old body-shop there is not any accommodation.

5750. Do you wash down the floors of your paint shop?—Yes.

5751. How often?—Well, they are not washed, but they are done over with this stuff and they are swept up twice a week. They are done over with this dust-preventing material, which is always moist.

5752. The floor is always moist?—Yes. It looks something like tar. I believe it has some affinity. It is not tar, but it looks rather like a thin coat of Stockholm tar put on the floor.

5753. Have you tried any methods of exhaust in your shop?—No.

5754. How do you ventilate your shop?—I ventilate with Boyle's ventilators and torpedo ventilators.

5755. Does that send the air up towards the roof?—Any wind makes an upward draught, blow how it will.

5756. So that if there is any dust blowing about the tendency is to draw it up?—Yes. There are case gratings with inlets in the walls.

5757. The inlet is on the ground?—Yes.

5758. The exhaust is above?—The exhaust is above. The inlet does not come direct on the ground. It has a shaft.

5759. (*Dr. Collis.*) A Tobin tube it is called?—It is a sort of tube—a wooden casing.

5760. (*Mr. Fell.*) How do you heat, except the forge shop?—By hot water exclusively, except the forge shop.

5761. Where is the heating apparatus placed?—The pipes are down below.

5762. So there is a current of warm air constantly arising?—Yes.

5763. (*Mr. Mason.*) Do I understand, with regard to this impervious floor, that the Stockholm tar or similar preparation is put down on the principle of a fly paper to catch the dust?—I think that that must be the idea of it. I cannot tell how it works. I only know that my coach painter asked me for a new supply which he put down only on Saturday. He said it was very satisfactory.

5764. Is this put down once a week?—No. It is two or three months since the first lot was put down.

5765. Does it remain tacky?—I do not think you can call it tacky.

5766. How do you brush it up?—They brush over it in the ordinary way. It comes up apparently clean.

5767. It is rather a mystery to me?—It is a mystery to me. It seems to be very satisfactory. I cannot say that it stops all dust, but we have had a great deal less dust since then. Dust is a great bugbear to us apart from any lead in it?—It is the greatest possible bugbear we can have.

5768. (*Mr. Mason.*) Would there be any advantage in having an impervious floor in a paint shop?—You mean like a fireproof floor made of concrete?

5769. A blue brick floor, for instance?—I would not like a blue brick floor. It would be an advantage in swilling down, certainly.

5770. (*Chairman.*) We agreed, in the Pottery Inquiry, that the floors of the painting shops should be swilled down every morning?—Yes. Then you must have them impervious. I should like to say that a good many larger coach-builders than ourselves have, in their rubbing-down shops, impervious floors, so that they can swill them right down. I have only been giving you my own personal experience, but I know that a great many people do have them.

5771. (*Mr. Mason.*) It would be satisfactory not only to have them impervious, but also smooth?—Yes, they should be smooth.

5772. (*Mr. Robins.*) With regard to applying this tar to your floors, from a painter's point of view is it not rather to hold down the grain of the wood and make it possible that you can swill down your shop with greater ease than if the shop was constantly being worn by the traffic of people up and down throwing the grain up in the floor?—That is not the object. The thing which we employ is a preserver. It is a patent thing that is supposed to prevent its rising. We bought it and put it down in good faith, and we seem to be perfectly well satisfied with it.

5773. What do you consider is the life of a motor-car, with regard to the painting of it?—That depends a great deal on the treatment it receives. It might want repainting in a very few months.

5774. Would you think that two years was a good test? If a motor-car wore two years, would you think that a fair test of its durability?—I should certainly think that if a motor-car was in good condition after two years' hard wear it was very well painted.

5775. Would you think that that car would require painting every two years?—I should think it would not have much paint left on it at the end of two years, if it had had much wear.

5776. You would think that if it wore satisfactorily for two years it was satisfactory?—Yes, it was a good job.

5777. I believe we had it in evidence from the Daimler Company that they had tested non-poisonous paints for two years, and they had found them satisfactory. Would you think that that was a fair test?—That is to say, that they have been using them for two years, and they have found them satisfactory. That is not quite the same thing as saying, "Here is a car which has been painted two years. What do you think of it? Is it all right?"

5778. The process has been in operation for two years?—The process has been in operation two years. You can hardly expect the Daimler Company to come here and say that their cars want painting every six months.

5779. You know that a motor-car has harder wear than a private carriage, and if any motor-car, whether it was painted with non-poisonous paint or not, wears satisfactorily for two years, you would consider it was satisfactory?—If it was thoroughly good at the end of two years I should think it was very satisfactory indeed.

5780. Would you think it would want painting at the end of two years?—If it was mine, and I thought I could afford it, I should have painted it to preserve it.

5781. You said that in sandpapering wheels the lead colour came off in ribbons or strips?—Yes, not in dust.

5782. Would you consider that sandpapering under those conditions was satisfactory to get a smooth surface, because I should consider myself that if you were sandpapering you were ripping it off, and you would never produce a level surface. You would be ripping it up, and consequently you would find that your sandpapering was getting clogged all the time, would you not?—If you had a very fine sandpaper you would get most of it off, except what was in the grain.

5783. With regard to the sandpapering, you said that it would all fall to the ground?—Yes.

5784. You know, do you not, that the wheel-horse is very near to the man, to start with?—Yes.

5785. He is sandpapering almost direct to his mouth?—Yes.

5786. How is it possible that all that is going down without affecting his breathing and his clothes, when

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he is standing by the wheel?—If any of it rises or floats, he must get it, I am afraid.

5787. You must admit that as it falls it gets on to his clothes?—On to his boots.

5788. And on to his trousers, too. I have seen men look like millers from sandpapering the wheels?—I have never seen men like that. The only time I have seen them look like millers is when we have had a spring clean, and they have been taking the whitewash off the ceilings.

5789. Would you not have just the same effect if you were sandpapering filling. It is bound to fall when you sandpaper a wheel, and you get it on your hands. It is coming off all the time—there is the motion?—Of course, with quick stuff that may be so.

5790. The motion is stirring it up all the time?—If it is quick colour that would be so, but we do not do it like that.

5791. (*Chairman.*) Have you anything else to add?—I should like to say that the Institute sent out a number of letters to its members asking them if they had had any cases of lead poisoning within the last 10 years, and the Institute had 103 answers all disclaiming having had any lead poisoning in that period. I have not those letters with me, but if it is desirable, the Committee can have those.

5792. Are the names of the firms given?—I have not the names of the firms.

5793. I think if you give us those with the names of the firms it may be useful?—Very well.

5794. How many firms are there in the whole industry?—I am afraid I could not answer that question.

5795. I understand that you have made inquiries from your local practitioners as to the number of cases of lead poisoning which occurred in your district in the last 10 years?—Yes, that is so.

5796. What were the replies to those inquiries?—The reply in all cases was that they had no cases. All four replied that there were no cases.

5797. Owing to the fact that you have had no medical examination of your workers, you cannot be quite sure that there have not been slight cases of lead poisoning. Is not that so?—Certainly, but my point is that if anybody had been ill, they must have gone to one of those doctors, and I wanted to know whether such illness was traceable to lead poisoning.

5798. (*Mr. Kinggate.*) Is it a fact that many men may be suffering from lead poisoning and never go to a doctor?—I should imagine so.

5799. (*Chairman.*) Will you also let me have the number of members in your Institute?—Yes.

5800. If your secretary would come and be examined at some time, I can ask him the question when he has got the particulars?—Very well.

The witness withdrew.

Mr. ABRAHAM MEIER examined.

5801. (*Chairman.*) I think your business is in Red-hill?—Yes.

5802. You are one of the witnesses selected to give evidence on behalf of the Institute of British Carriage Manufactures?—Yes.

5803. Are you a carriage manufacturer?—I am.

5804. What length of experience have you had?—All my life.

5805. How many men do you employ?—55 or 56.

5806. How many cases of lead poisoning have you known?—One.

5807. I am very pleased to hear such an excellent record, but I am not surprised. You are doubtless aware that in the Potteries there are many large works which are immune for many years?—Yes.

5808. The trouble is that even some of the best works are not immune?—Yes.

5809. Moreover, a works that has been free from lead poisoning for many years will sometimes have a succession of several cases quite unexpectedly?—That is a surprise to me.

5810. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—I insure my men under the usual policy which I suppose embraces that—I am not clear.

5811. Do you know that in the coach building industry, taken as a whole, there have been 767 cases of lead poisoning recorded by the Home Office in the eleven years from 1900 to 1910?—I was not aware of that; that is a surprise to me.

5812. And that of these 47 were fatal?—All this is news to me.

5813. And that the average for the last eight years has been 66½ cases annually in the United Kingdom?—I do not know that.

5814. In 1908 there were 70 cases, in 1909 there were 95 cases, and in 1910 there were 70 cases. As there has been no reduction in the average cases reported each year, you will recognise that something must be done to remove the evil?—Yes, I suppose so, if there is an evil it ought to be rectified.

5815. Do you contend that the risk of lead poisoning arises almost entirely in certain classes of works?—Inasmuch as I have come across no cases except the one I mentioned, I hardly know how to answer that.

5816. Of which class of work have you most experience?—Carriage building in all its various branches—the old-fashioned style years ago, and now during the

last 15 years, I have built motor bodies in particular; the old style of carriage being practically dead.

5817. Are you aware that of 376 cases of lead poisoning reported in the five years, 1905 to 1909, 46 arose from motor car works?—I was not aware of that.

5818. And out of 697 cases reported in the 10 years 1900 to 1909, 297 arose in the ordinary coach and carriage building works of the country?—I did not know it; I never heard of it; it is a surprise to me.

5819. Have you tried substitutes for white lead in your painting work?—No.

5820. Has your institution made any combined effort to take precautions against the evils which exist?—Our attention has never been drawn to it whatever. I have been a member of the council for many years, and there has never been anything mentioned about it at all. We have never heard of any danger or difficulties at all.

5821. Are you aware that white lead is no longer in use at the Daimler Motor Works at Coventry?—I was only told so to-day; I did not know it before.

5822. Do you still hold that white lead is the most perfect substance that can be used?—Absolutely.

5823. How does your work compare with the Daimler motor car bodies?—I consider my work is as good as their's, anyhow, if not better.

5824. I suppose they are one of the largest firms in the industry, are they not?—Undoubtedly.

5825. And they turn out work of the highest finish, do they not?—It looks so.

5826. The buyers of Daimler cars are of about the same class as the customers of your own, or other leading coach-body firms?—I should say so.

5827. And they would demand the same finish, would they not?—I should say so.

5828. The witness representing the Daimler Company told us that they are entirely satisfied with the substitute they are using for all purposes for which white lead is commonly used in coachbuilding works. The Daimler Company have used no white lead for two years, and they have had no complaints from customers. What do you say to that?—I do not believe that a carriage painted without white lead can possibly be so durable as one which has a white lead foundation. I would never believe it.

5829. The Daimler Company have used no white lead for two years, and they have had no complaints from customers. What do you say to that?—I cannot understand it.

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[Continued.]

5830. I suppose they are a practical business body?—Yes, exactly, but two years is not a sufficient life of a carriage to judge.

5831. They claim that their paint work is thoroughly durable?—I would never believe it. It cannot be. In two years it may be, but two years is not sufficiently long.

5832. Surely the customers would point out to them if the work was not good?—Two years is not sufficiently long. Five or six years would tell the tale, one as against the other.

5833. Are you aware that the Daimler Company affirm that their substitute is a little more economical than when they were using white lead?—I do not know, but I should imagine it is more economical, and that is the reason why they use it.

5834. Do you contend that the dangers of lead painting can be practically eliminated by regulating the various processes?—Most emphatically.

5835. We have had before us the President of your institute?—Yes.

5836. I suppose you would feel inclined to corroborate anything he said in regard to the various processes in this industry?—Considering he is a practical carriage builder, I should say yes.

5837. I will confine my questions to you entirely to priming. When the carriage is ready for painting, it is first given priming coats?—Yes.

5838. How many coats?—Two or three coats; three if time permits it.

5839. Does the priming you use contain lead?—Yes, certainly.

5840. Is the work sand-papered between successive coats of priming?—No.

5841. What process do you use?—We put two or three coats of priming one on top of another, one each day, and the following day we put on what we call filling-up. We put about six coats, a coat each day. That helps to fill up the pores or grain in wood. When that is dry we put a coat of thin black over it, which black is a guide for the men who have to rub it down.

5842. Could sand-papering for priming coats be prohibited?—It is absolutely quite useless. I do not admit it in my place at all. It is not necessary, it is utter waste of time. If men do it, it is to prolong time wastefully.

5843. The body next receives a number of coats of filling?—Yes.

5844. Do you use leadless filling?—It is used, but for good work a very tiny piece of lead is allowed, and rightly so.

5845. What do you call a very tiny piece of lead; about what per cent.?—About one-twentieth or one-thirtieth part only—a little knob as big as a small fist for a big pot of filling.

5846. About 5 per cent.?—Yes, that is about it, roughly. That is all that is necessary.

5847. Why is lead necessary for the filling material?—In order to make a substance for those five or six coats of filling—to make it more dense. Without it that rubbed down surface would be somewhat porous, and would then absorb the next coat of paint more than it would otherwise. The lead makes it of a glossy surface after it is rubbed down, with less absorption for the next coats.

5848. What stopping do you use on coach bodies?—It is made of white lead.

5849. Does a man mix the stopping himself?—The head painter usually does it for his men.

5850. In the process of mixing there must be danger arising from handling the dry white lead powder?—No.

5851. Why not?—Simply because the white lead in its dry condition is very heavy, as we are all aware. That is put on a stone, and a little gold size is mixed with it, or japan, and that is simply mixed up into a kind of paste, until it forms the substance of a paste or dough. Therefore there is no dust whatever, the dry white lead being very, very heavy. It is simply squashed, and made quite fine on the stone until it is of a doughy nature, as I say, and then it is applied with a knife in the little screw holes or pin holes on

the body to an extent to fill them up, which is very, very tiny.

5852. Is the rubbing down of the body done with pumice stone and water?—Yes.

5853. Do you finish the roofs of your closed cars with canvas or similar material?—Yes, canvas or moleskin.

5854. How is that bedded?—We put a strong coat of gold size on the panel, and when it is nearly dry, when it is sticky, we spread our canvas over it, and force it on like a drum, very tight.

5855. Is it usual to bed canvas in white lead?—Not often; we usually use japan. It is like the priming on the body, there is no dust whatsoever. The bare panels receive two coats of lead colour, then pin holes are stopped up, followed with a thick coat of stout, sticky japan, to which the canvas is sleeked on tightly.

5856. Have you realised that if lead is allowed to be used in this industry, in the future, there will be very costly regulations introduced to protect the workman?—I am very sadly aware of that.

5857. Are you aware that in all the important lead industries there is a code of regulations issued by the Home Office which the employer is obliged to observe?—No, I was not aware of it.

5858. Let me give you a few illustrations. In the first place you would have to provide lavatory accommodation, supply hot and cold water, introduce a system by which the men could get soap and nail-brushes without any question; towels would have to be provided at stated intervals. Mess-room accommodation would have to be provided; a cloak-room for the men's clothes put off during work; overalls which would have to be maintained and washed at the employer's expense; washable impervious floors would have to be introduced so that the floors could be swilled down regularly once a day; and medical examination of all the workers. I might say, in passing, that it is only when you have medical examination that you can find out truly whether the men are suffering or not from lead poisoning. Then you must add to these the cost of compensation whenever a man is withdrawn from work in lead, and also the cost of installing efficient exhaust draught apparatus, wherever it is possible to apply it, for the removal of dust. You must also take into account the cost of setting up a system which will secure continuous observance of all the regulations, and I hope you realise that the first duty is laid upon the employer of securing the observance of this special code of regulations?—Yes.

5859. To sum it all up, the question I want to put is this. Taking all these points into consideration, do you still consider it would be better to regulate the industry than to prohibit the use of lead?—In order to have best quality work I would do almost anything rather than do away with lead. If lead is done away with, our good quality of work hitherto produced will suffer in proportion.

5860. But supposing the prohibition was to cover the whole of the trade, in what way would you suffer?—Then we should be all alike, but the clients would not get such good work, that is all.

5861. But the Daimler Company, and the Midland Railway Company, and the Bradford Corporation Tramways Department use no lead at all in any of their carriages?—I can only go back to my original idea, that two years' test is not sufficient to prove that their work without lead is as good as ours with lead.

5862. You have told us that the manufacturers, as a body, have made no serious attempt to find a substitute for lead. Is that so?—Personally I have never been asked to use it. It has never been offered to me at all in my factory. Nobody has offered me any.

5863. Then you are not quite sure that there is not a suitable substitute in the market?—I believe there is, but in such a small degree that, strange to say, I never heard of it at all until to-day. If the law imposes all this upon us, God help us.

5864. What I want you to realise is this, that Parliament has introduced Factory Acts?—Yes, I am aware of that.

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[Continued.]

5865. The Factory Acts are administered at the Home Office?—Yes.

5866. In all dangerous industries the Home Office introduces special regulations for the protection of the workpeople?—Quite right.

5867. It has been proved most conclusively that the evils existing in the carriage building trade are very serious, by the statistics which I have read out to you to-day. Now I am certain that you, as a humane employer of labour, would wish to do something to eradicate that evil?—If the evil exists, I should be the first man to do all in my power to prevent it.

5868. There are two ways of doing it. The first way is to prohibit the use of lead altogether, which at once removes the danger. The second way is to introduce regulations for the protection of the workpeople?—Yes.

5869. Those regulations I have outlined to you?—They frighten me to death.

5870. They are the same which are in vogue to-day in every important industry where lead is used. Now what I want you to consider with your colleagues is this: This Committee has been formed to institute the most searching inquiries into this evil, and to suggest a remedy. We want you employers to help us?—I shall be pleased to do so to the best of my ability.

5871. But as far as I can see, at the present moment, there are only two alternatives. One is the prohibition of lead, and the other is the code of regulations which you so strongly deprecate. It is for you employers to tell us whether you can help us?—Do you wish me to give my opinion which of the two I prefer?

5872. Yes?—For Heaven's sake do away with white lead. The other is simply awful—absolutely. The regulations which you have mentioned would make me mad, and the men themselves would simply go cranky. Do away with lead, please.

5873. (*Dr. Collis.*) How long do you think would be a fair period to have used non-lead paints to get a reasonable test?—Four or five years would be much better than two years.

5874. Do you think that a test for about five years would be reasonable?—Three or four years would be reasonable. Two years is hardly sufficient.

5875. Then you accept the opinion of the Midland Railway Company who have been using non-lead paints for six years?—Yes, if they say in six years it is as good as work painted with lead, I should accept it, certainly.

5876. They have been doing so for six years, and I presume they would not continue unless they had had good results?—I understood it was only two years.

5877. That was the Daimler Company. It is the Midland Railway Company I am speaking of now?—I bow to their decision.

5878. They have used it in painting their carriages—not in the rest of their work, I am bound to admit, but in their carriage building department?—Six years is ample—more than ample.

5879. Have you men in your employ who are painting, and also making bodies?—Yes, both.

5880. Do you insure your men as a whole?—Yes.

5881. There is no distinction made between those who are using lead paints, and those who are not?—No, I have never been asked by anybody.

5882. Has there been any difference in the rates you have been paying insurance companies in the last five or six years?—No.

5883. They have not varied in the slightest?—No, nothing at all. The question has never been raised.

5884. They have not fallen at all?—No, and they have never been raised. They are just the same.

5885. Has there not been a tendency for the insurance rates for the workmen's compensation to fall in the last few years?—The last two or three years the companies have come and asked me to insure the men at the lower rates.

5886. But up to the present you have made no arrangements, at any rate, for any reduction in their insurance?—No, but it is pending now.

5887. For the last four or five years?—For the last six months only.

5888. They have only come to you quite recently, then?—Yes, only quite recently.

5889. So that you have not participated in any way in the general reduction that has taken place in the insurance rates since the first Workmen's Compensation Act came in?—No, not yet, except that the last six months the companies have been writing, and they want me to insure for the lesser rate than I have hitherto insured at.

5890. (*Mr. Fall.*) In regard to your emphatic sentence that lead is the most perfect substance, have you made any enquiries at home or abroad as to the use of other paints which have not got lead in them?—No, I have not. I have used nothing but lead all my life, from boyhood up to now, and I never thought there was any substance equally good as white lead to maintain the durability of a painted carriage, but if we all use no white lead, of course, we are equal. I maintain that the work would deteriorate, it would go down instead of up; but, if we are all alike, we are all alike.

5891. (*Mr. Kinggate.*) With regard to the cases of lead poisoning we have had, how do you know that you have not had some of your men suffering from lead? Do you get a doctor's certificate every time a man is off from his employment?—No, but I have been singularly fortunate. I have had hardly any cases of illness the last many, many years. It may have been a coincidence.

5892. You are situated in a pretty healthy spot, of course?—Probably. I live in the country, in Surrey.

5893. In many cases men suffer from lead, and you do not know it. We know perfectly well that men are occasionally off from illness which is the result of lead, but it is not directly brought to your knowledge?—It may be.

5894. You may have a good many men suffering from lead, and not know it?—That I cannot answer. Now and again, of course, a man is unwell, and he stays away, and comes back again. We do not know why he has been unwell. I have been unwell myself at the thought of the danger in front of me, *i.e.*, the danger of extremely worrying legal restrictions which are threatened. If these things are enforced I would like to sell my business and go away. It means awful trouble.

5895. If it could be proved, as it has been proved, that there is a substance equal in every way to white lead, what is your objection?—I have an open mind. If there is a substance which I do not know of which is as good as white lead, I should be most anxious and happy to use it, and do away with white lead.

5896. The only point is the proof that it is equal to white lead?—I have not sufficient knowledge at present to say whether the substitutes are as good as white lead, but I would rather have white lead than shoddy work.

5897. I do not think any of us in the painting trade want shoddy work?—No.

5898. But we want some substitute which is equally good?—Yes.

5899. If it can be obtained, you are willing to use it?—Yes; I long to do it.

The witness withdrew.

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Mr. S. C. L. FULLER.

[Continued.]

Mr. S. C. L. FULLER examined.

5900. (Chairman.) Do you carry on business at Bath?—Yes.

5901. You are one of the witnesses selected to give evidence on behalf of the Institute of British Carriage Manufacturers?—Yes, as a coach-builder; I cannot speak for them as a body, but I represent the institute.

5902. Are you a carriage manufacturer?—Yes; I have had 40 odd years in it.

5903. How many men do you employ?—From 60 to 80.

5904. How many cases of lead poisoning have you known?—I have never known a case of lead poisoning—not a pure case. I have known men who have been ill, but I have never had a case of lead poisoning.

5905. I am very glad to hear such excellent records, but I am not surprised. You may not be aware of it, but in the Potteries there are a large number of works which are quite immune from lead poisoning?—Yes, I happen to have read for some years a great deal about that.

5906. And the trouble is that even some of the best works are not immune, and, moreover, a works that has been free of lead poisoning for many years will sometimes have a succession of several cases of lead poisoning, quite unexpectedly?—I am surprised to hear it. I have never had it myself.

5907. Do you insure against the liability to pay compensation for lead poisoning under the Workmen's Compensation Act, 1906?—We insure against employer's liability.

5908. Do you know that in the coach-building industry, taken as a whole, there have been 767 cases of lead poisoning recorded by the Home Office in the 11 years, 1900 to 1910?—I have just heard it to-day but it is absolute news to me. I have never heard anything like it.

5909. And that of those there were 47 fatal cases?—I maintain that it cannot be in the coach-building proper.

5910. There has been no apparent reduction in the rate of attack during the last eight years?—I quite accept that.

5911. In the average of the eight years there were 66½ cases annually. In 1908 there were 70 cases; in 1909 there were 95; and in 1910 there were 70?—I am quite open to correction, but I have never heard of it, and I took the trouble, after I was appointed a member of this deputation, to write to all the leading coach-makers proper in the West of England, and I have their letters. They all, without exception, say that they have never known a case of lead poisoning in their own shops.

5912. There are statistics which you cannot explain away, and there has been no reduction in the average number of cases reported each year. I am sure you recognise that something must be done to remove the evil?—I quite agree. We are open to that and we are anxious to do it.

5913. Do you contend that the risk of lead poisoning arises almost entirely in certain classes of works?—Yes, it must do.

5914. Of which class have you the most experience?—Only the road coach-building proper.

5915. How do you define coach-building proper?—Not trading wagons and not trestle wagons, and not railway work and not perambulator work.

5916. Have you, as a society, to your knowledge, taken any steps to test the merits of the different substitutes for white lead on the market?—No, I have never heard of it. We have always had them offered to us as individuals in the competition of trade.

5917. Have you ever heard of lead poisoning in your industry?—Yes, I have heard of it.

5918. Have your institution made any inquiries as to the precautions necessary to combat the evils which exist in the industry?—We maintain that it does not exist in our industry.

5919. Has your institution ever made any combined effort to combat the evils?—No, it has never been a

serious evil in our trade. We have never realised that it was a serious evil in our trade. I should like to look over those statistics and analyse them.

5920. Have you anything special to say with regard to the jointing in the carriage-makers' work?—Yes. I have been general manager to our works almost from my earliest days. We use invariably white lead for the body-making, and white lead for jointing up all the ironwork. As coach-builders we are notorious for using an unusual quantity of forged work in the carriage work instead of using so much wood. We use almost entirely all iron, and in fitting the splices white lead is used, but the amount of white lead that we use under those conditions, with the body-makers and the others, is not 5 per cent. of the labour. The labour and time, when they are using white lead, is not 4 per cent. of the total job.

5921. I suppose you realise why this Committee has been called together?—Yes, I quite realise it, and I quite accept. I heard this and I quite agree. I am not objecting to the Committee at all, and should be only too pleased, as a man, to help them.

5922. The Committee has been called together because of the deplorable figures which have been presented showing the evil existing in this industry?—It is absolute news to me; I cannot understand it. As I said before, I have only known of one case of wrist drop, and that was due to drinking from a lead pipe.

5923. In every other important industry where white lead is permitted to be used the Home Office, under the Factory Acts, introduces a special code of regulations to protect the workpeople. Let me tell you what those regulations are. In the first place the Home Office insists on lavatory accommodation being provided for all the people who come into contact with lead. The rules also require that hot and cold water should be readily at hand; that a supply of soap and nail-brushes in good repair must be always at hand; that towels should be supplied periodically, but frequently enough to ensure their being clean when they are used; that a messroom should be provided, properly heated in the winter, with proper tables and chairs, so that they can have a decent meal away from any contact with lead; that cloakroom accommodation should be provided, so that the men can hang up their clothes free from any contact with lead dust; that overalls should be provided at the employer's cost and washed by him at least once a week, and, in fact, in some industries more frequently than that; that washable impervious floors should be put down in all the workshops, so as to allow daily swilling of such floors; that medical examination should be introduced at the employer's expense, so as to ensure that every workman who was feeling any effects of lead poisoning should be at once notified, and that compensation should be given to the workman who is withdrawn from working in the lead processes. There is also the cost of installing efficient exhaust draught apparatus to carry away the dust wherever it is possible. Then you must take into account the cost of setting up a system which will secure continual observance of all these regulations. I feel sure that you realise that under the Factory Acts the first duty is laid upon the employer of securing the observance of these regulations?—Yes.

5924. Now, taking all those points into consideration, do you consider it would be better to regulate the industry by such a code of special regulations, or would you, as a manufacturer, prefer the prohibition of the use of lead?—In the first place, as a sensible man, I do not admit that there is any necessity for such regulations in our particular trade.

5925. Let me recall this fact to you once more, that the figures I have read out to you, showing the evils of lead poisoning, are, in the view of the Home Office, deplorable. This Committee has been formed with the sole object of arriving at some plan to remove that evil. I have pointed out to you what the system is in other important industries, where lead is used, and I ask you this question: whether, in your view, you would prefer a code of regulations, such as I have fore-



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shadowed, or would you, as a manufacturer, agree to the prohibition of lead?—At the expense of the reputation of British work, we should like to give up lead in preference to any further factory restrictions, but at the same time I say that in the way of jointing the amount of white lead used is not a large proportion of the work. I have asked the others, and we have been discussing the question, and we all agree that 5 per cent. of the time will amply cover the whole time the men in question are using the white lead.

5926. That is not the point. The point is this: we have in these statistics a state of affairs which is deplorable?—I quite agree with that.

5927. When Parliament sees these statistics in our report they will insist on something being done to relieve the men of this evil. The only way it can be done is by introducing a code of regulations or special rules which would bring your industry up to the same level as the other industries?—What about engineers? We use it the same way that engineers do. They are using white lead every day.

5928. Do I understand you to say that, rather than have this serious and stringent list of regulations, you would prefer that white lead should be prohibited?—We do not use the dry-lead process.

5929. Would you, as a manufacturer, prefer that white lead should be prohibited rather than have this code of regulations introduced?—It does not apply to our men, but, if necessary, we must put up with it.

5930. If you use any white lead at all you must put up with the code of regulations?—We all work with poisons more or less, but we do not try to eat them or absorb them.

5931. (*Dr. Collis.*) Do you maintain that there are many cases of lead poisoning that occur from such things as you suggest, like drinking from lead pipes?—I know one absolute practical case. I know of one man personally who was reported to be suffering from lead poisoning, and it was proved that he was continually drinking from a lead tap in his father's house.

5932. But we have notifications of lead poisoning received under the Factory Acts at the Home Office week by week, and we have no such statistics coming in of these industries such as you suggest, for instance, the engineering industry. Do you suggest that we should put them under the regulations at the same time? We have no such statistics showing that there is the illness in their occupation, so why should we?—I say that in our trade the use of white lead, except with painters, is entirely on all fours with the engineers.

5933. But the painters are rather a large number of men?—But not one of these master coach-makers of our own standing have had a case of lead poisoning.

5934. I think it has been suggested to you by the Chairman that, as we know perfectly well, many big factories go for a long time without any case—perhaps 10 or 15, or even 20, years or more. Their confrères, at the same time, may be having lead poisoning; and it may be their turn to have lead poisoning while their confrères are free?—The men I have communicated with all say that they have not known it in the course of 30 years.

5935. Are you drawing any distinction between the painter and the carriage-maker?—The carriage-maker is a technical term for the constructor or erector. The words "carriage-maker," as such, are applied to a man who puts the carriages together. He receives the axles, wheels, and springs, and he makes the turntables and puts them together.

5936. He is not in the paint shop, is he?—No, he is not in the paint shop, and he uses the white lead. That is the part I call the fitting.

5937. Are you drawing a distinction between the painter and the body-maker?—Yes, because the body-maker and the carriage-maker, as a rule, work together. The painters are a separate body, very often working in a separate building or a separate loft.

5938. The contention which you are putting forward now is that the painter does not require protection, but the carriage-maker does, is it not?—Against

this, not against the white lead. I say it is harmless with the body-maker.

5939. The painters ought to be protected against the use of the dry white-lead process, the sandpapering down, and so on. That is an objectionable process which you consider the painter should have some protection against; but your point, for the moment, is that you do not think that the body-maker is exposed to a similar danger?—I do not think so. It is so infinitesimal in its use. Using as much as he could, or is likely to want, it is very, very small. I have never heard a complaint of it from them, or of any trouble. If you provided them with lavatories alongside their bench I do not think they would use them. They would think that they were not required.

5940. (*Mr. Fell.*) Do you provide the same washing accommodation for your body-makers and your painters?—No, the body-makers never want it and never use it; they are clean.

5941. But, surely, in jointing they are apt to get a certain amount of white lead on them?—Very little. In making a brougham body there is 15l. spent in labour, and there is not two days out of the seven or eight weeks spent in using white lead. They simply have a pot, say, about that size (*indicating*), and they do not use a quarter of that pot on a brougham.

5942. Have you tried any substitutes for that, such as jointing paste or anything of that sort?—They have used red lead occasionally for the ironwork, but white lead is better.

5943. For the woodwork?—No, except varnish work. We have never had it suggested, and there has been no inducement to the manufacturers to have substitutes.

5944. I suppose you would be quite prepared to use a substitute?—Quite so, if it is going to benefit the men. It is not a question of cost or anything of that sort.

5945. (*Mr. Kinggate.*) You say that, with regard to the body-maker, he does not need any washing accommodation. Is it possible for a body-maker to put on edge plates or bracket plates without getting his hands covered with white lead?—He always has a piece of rag or paper beside him that he can wipe it off with.

5946. But he cannot do that without getting his hands dirty?—He gets a certain amount on.

5947. He needs washing accommodation for that purpose if he is going to have his meals, does he not?—They can generally get a wash at home, or they can go down below and wash. There is a row of basins there.

5948. You do not provide washing accommodation for the body-maker?—No, but he can go down in the room below and wash there.

5949. You do not object to his washing?—No, painters, carriage-makers, body-makers (if they like) are all—with us—free to use the basins with taps, &c. in middle floor of factory.

5950. With regard to carriage-making, we are speaking now, of course, of a different class of carriage-making. The carriage-maker, as a rule, would work much more than 5 per cent. of his time with lead?—Not much more. There is all the carving of the beds and putting on the plates, but putting on the plates with the lead is not much more than 5 per cent. of it. That is the actual time of using the lead.

5951. When a man is putting a carriage together from beginning to finish, is he not using lead all the time with every bolt head and every clip?—With all the clips, but then he has to make it up as well.

5952. I have made hundreds of carriages myself, so I know something about it. Is not he using it all the time?—Not actually using it.

5953. Is it not the practice also that the body is frequently taken into the carriage loft and the priming coat is done while the carriage-maker is hanging it?—That is so, sometimes, but he is not touching the lead.

5954. Apart from using it, the lead is being used in the same workroom?—Yes.

5955. (*Dr. Collis.*) He is in the workroom when the paint is used, is he not?—Yes.

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5956. I asked you specially if he was in the work-room where it was being painted, and you said no?—It is being painted while he is there.

5957. (*Mr. Kinggate.*) He gets smothered with it sometimes, does he not?—The carriage-maker is never smothered with the paint. You would very soon have a complaint about that. He would not tolerate it.

5958. (*Chairman.*) If the regulations are introduced, they would doubtless apply equally to the carriage-builder as to the painter?—Of course, if you stop the use of paint with white lead you would stop the other.

5959. But the regulations issued by the Home Office apply to all workpeople who come into contact with lead?—They do.

5960. (*Dr. Collis.*) As that point has been brought out, that they are in the same room where paint is used, I want to ask you this question. Are you aware that it has been shown that wet-lead paint gives off a volatile, organic, lead compound, quite apart from any dust or anything else, which affects people when they breathe it?—If you tell me that, as a chemical fact I will accept it.

5961. It is a fact which has been brought out quite recently in Liverpool by Professor Baly?—As a matter of fact, I have always been accustomed to thoroughly well ventilating every place, and we have never found any unpleasant smell from it whatever.

5962. So the distinction between the body-maker and the painter, since the body-maker is often in the room where the paint is laid on, does not hold good?—Of course, in every shop the bodies are shifted about, and they are painted where they are.

5963. (*Mr. Robins.*) Is it not a fact that on nearly every body-maker's bench and carriage-maker's bench his white-lead pot stands?—They all have their pot of lead.

5964. It is on their bench, and they are constantly breathing the smell of it?—It is generally covered with oil.

5965. Would you hold that it is a healthy practice for these men to have that pot of thick paste, white lead, on their benches?—There is generally one to about four or five of them. He is always working in proximity to the pot of white lead, but the average ordinary painter is always with his nose over the pot of paint.

5966. Is it not the practice that generally the priming coats are put on in the carriage-maker's and body-maker's shop, and very often the coats are put on and finished and the filling-up done in the carriage or body-maker's shop?—Undoubtedly sometimes it is so.

5967. Do you not think that these men in the body-maker's shop or carriage-maker's shop are placed in equally as dangerous a position as the painters?—No, because the painters have the danger of sandpapering.

5968. I quite admit that danger, but at the same time the men are constantly coming into contact with white lead, apart from the painting?—How is it that our men are so seldom on the sick list? I am not disputing your statistics, but at the same time I say, with regard to those who use pure white lead and

who use pure oil, you do not get that abominable smell like you get in some painters' shops.

5969. (*Mr. Kinggate.*) Of course you do not know, when the men are off work, whether they are suffering from lead poisoning or not?—They are not away on the sick list from it.

5970. You do not know that, do you?—Very seldom.

5971. It may be attributed to other things, not directly to lead, although lead may have been the cause through the lowered vitality of the man. You do not have a doctor's certificate from your employés when they are away, do you?—We have a sick club and they are always carefully checked for that, and they are never off for intestinal troubles.

5972. It may not be intestinal, because that is not always the result of lead poisoning?—I am not a medical man, qualified to argue on these points. There is one point about the white lead for the painter which I wish to make. Mr. Maythorn said that the use of tub-lead, as such, ought to be allowed for decorative purposes of striping and what not, but there is no substitute for paint at all that would enable us to get the finish and the fine lines that tub-lead will give. For instance, take a spoke of that size (*indicating*), very often there are four lines of white on that.

5973. (*Chairman.*) Is that put on by hand?—Yes, with a pencil.

5974. There is no sandpapering done, or anything of that sort, is there?—No, there is no dust. It is put on and the next morning it is varnished.

5975. (*Mr. Robins.*) Is that for decoration?—Yes.

5976. (*Mr. Kinggate.*) It is a better white, is it not, than dry lead? It does not go yellow so quickly?—It ought to be mixed with oil to go on.

5977. (*Chairman.*) Do I understand you mean that, if lead is prohibited generally, you want to be allowed to use it for that purpose?—That is the point. A question was asked about the tub-lead being used, and Mr. Maythorn said that for artistic purposes we want to be allowed to use that occasionally for white striping.

5978. If we recommended the Home Office to prohibit the use of lead generally, you want the right to use it for that purpose?—We want to be allowed to use it for that purpose, for artistic purposes. I will put it in that way. I am not talking about ordinary white painting or filling, but we should be allowed to use it for artistic purposes on the surface.

5979. (*Mr. Mason.*) I understood you to say that you used zinc-white for fine work?—Zinc-white is a very pure white.

5980. That can be used for fine lining?—Yes, and it can be used for glazing. If we wanted a very, very clear, clean white we would use zinc-white.

5981. Then why do you want to use lead?—It will not do for any other colour, only white. It would break your heart to try and paint a thing with zinc-white.

5982. But it is suitable for fine lines?—Not for ordinary fine lines. You must have the tub-lead for that. I know of nothing else. Of course, there can be little or nothing from that in the way of lead poisoning.

The witness withdrew.

Mr. PETER CROALL examined.

5983. (*Chairman.*) Do you carry on business in Edinburgh and Kelso?—Yes.

5984. You are one of the witnesses selected to give evidence on behalf of the Institute of British Carriage Manufacturers?—Yes.

5985. You are a carriage manufacturer?—Yes. I was, of course, a carriage manufacturer, but we are now motor-body manufacturers really.

5986. Your business is a very high-class one, I believe?—It is.

5987. What kind of vehicles do you make?—We hardly make any open motors at all. It is all the large closed bodies, and a few horse carriages—not many.

5988. How many men do you employ?—We employ over 80 in Edinburgh and 40 at our other works.

5989. How many cases of lead poisoning have you known?—We have never had one.

5990. To what do you attribute this immunity of your works?—I think the men usually take something to eat before they come out in the morning, and they are very cleanly in their habits. We insist on their washing their hands before they go away to their homes, and we never have any illness with any of the men.

5991. You may not be aware of it, perhaps, but in the Potteries there are also very many large works which have been immune from lead poisoning cases

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for many years?—No, I have not heard of it. I do not know anything about the Potteries.

5992. And even some of the best works are not immune; moreover, a works that has been free from lead poisoning for many years will sometimes have a succession of several cases quite unexpectedly. Do you insure against your liability for the payment of compensation for lead poisoning?—No, we never mention lead poisoning in our insurance.

5993. Do you insure against the risk of claims under the Workmen's Compensation Act, 1906?—Yes.

5994. Do you know that in the coach-building industry, taken as a whole, there have been 767 cases of lead poisoning recorded by the Home Office in the 11 years from 1900 to 1910?—I never knew that until to-day.

5995. And that of those, 47 were fatal cases?—I do not think there can be many among the real coach-builders.

5996. There has been no apparent reduction in the rate of attack during that period?—Is not that partly owing to the men not taking care of themselves and washing their hands?

5997. That is not the point. The average for the last eight years shows 60½ cases annually. There were 70 cases in 1908, 95 cases in 1909, and 70 cases in 1910?—Then they are decreasing again.

5998. No, the figure for 1910 is higher than the average of the last 10 years. As there has been no reduction in the average cases reported each year, I am sure you recognise that something must be done to remove the evil?—Yes, certainly.

5999. Are you aware that, of 376 cases of lead poisoning reported in the five years 1905 to 1909, 46 cases arose from motor-car works; and out of 697 cases reported in the 10 years 1900 to 1909, 297 cases arose in the ordinary coach and carriage building works of the country?—I think it must be carelessness on their part to have so many.

6000. Do you know whether your Institution have made any united effort to combat this evil?—I know very very little about the Institution, because I never attend any of the meetings. They only just wrote and asked me to come and be a witness.

6001. Have you tried substitutes for white lead in your painting works?—No. We have never thought of doing so. We have never had any cause to do so.

6002. Are you aware that white lead is no longer in use at the Daimler Motor Car Works at Coventry?—Just about two months ago we had one of the Daimler motor cars in our place which was finished by themselves, and we had to scrape all the paint entirely off because it was so badly cracked. It was very badly painted indeed.

6003. Do you still hold that white lead is the most perfect substance that can be used?—Yes.

6004. How does your work compare with the Daimler motor-car bodies?—After our bodies have been out for two years they just require a coat of varnish, but they do not require painting.

6005. But the Daimler Company are one of the largest firms in the industry, are they not?—They are.

6006. And they turn out work of the highest finish, do they not?—When it goes out first it is of the very highest finish, of course.

6007. Are the buyers of Daimler cars of about the same class as the customers of your own or any other equally high-class firm?—Yes, because they buy them from the agent.

6008. And would their customers demand work of the same finish?—Yes, of course they would.

6009. The witness representing the Daimler Company told us that they are entirely satisfied with the substitute they are using for all purposes for which white lead is commonly used in coach-building works?—That is not my experience.

6010. You are surprised to hear that?—Yes, I am.

6011. The Daimler Company have used no white lead for two years and have had no complaints from customers?—That one car had to be scraped right down and all the paint taken entirely off.

6012. I am speaking about the Daimler Company's own people. I suppose you will admit that they are a very responsible business body?—Yes.

6013. And they would not be likely to agree to do without lead unless they found it could be done with commercial prudence?—No, one would not fancy so.

6014. They claim that their paint work is thoroughly durable?—I do not think it will stand nearly as well without the white lead.

6015. They say it does, and they say also that it is a little more economical?—I do not know anything about that, of course.

6016. Do those considerations which I have put to you with regard to the Daimler works dispose you to modify your views at all?—Judging from what I have seen of their work coming in in that way, I do not consider that their work stands in anything like the same way.

6017. Would not their customers be the first to complain, and would not their shareholders be the very first to insist on the introduction of lead, if the work was not turned out satisfactorily?—One would fancy so.

6018. Then the Midland Railway Company, for the past six years, have used no lead in their carriage and wagon works. Are you surprised to hear that?—Yes, I am.

6019. And the Bradford Corporation have had similar experience. They have used no white lead for a considerable period. Are you surprised to hear that?—I am.

6020. Have you anything to say about the finishing work?—If you abolish white lead it will be very very difficult to draw the lines.

6021. The decorative lines?—The fine lines. They are done with the hand, and you require white lead to fill out the line, because it runs smoothly with that.

6022. Do I understand you to suggest to the Committee that, in the event of the Home Office deciding to prohibit lead, they should allow white lead to be used for these decorative lines?—We would almost require that.

6023. Mr. Maythorn went very fully into the various processes. Are you prepared to accept his dictum on those points?—Certainly.

6024. You know why this Committee is sitting, do you not?—Yes, I quite understand.

6025. We are called together to see what can be done to remedy the evil, which the Home Office thinks is deplorable?—Yes.

6026. As far as I can see there are only two ways of doing that; one is to prohibit the use of lead altogether, and the other is to introduce a code of regulations which will bring this industry, in regard to the care for the workpeople, up to the level of all other large industries where lead is permitted, and I will just give you an indication of what those special regulations would be. In the first place there would be stringent regulations introduced in regard to lavatories. I think the regulation is that you must provide washing accommodation to the extent of at least one basin for every five people; that soap and nail brushes must be provided and properly looked after; that sufficient clean towels should be provided every day; that a messroom should be provided so as to make it absolutely sure that the men have no meals where they can come into contact with lead, and further, that cloak-rooms should be arranged so that it should be quite certain that the men's clothes put off during working hours do not come into contact with lead; that overalls should be provided at the employer's expense, and washed, so that they would be quite sure that there was no accumulation of dust in those overalls which the men might come in contact with; that washable impervious floors should be introduced so that they may be swilled down regularly every day; that a medical examination of each lead-worker at the cost of the employer should be introduced, and that the cost of compensation, whenever a man is withdrawn from work in lead, would have to be paid by the employer, and also the cost of installing efficient exhaust draught apparatus, wherever it is possible to apply it, for the removal of dust. You must also take into account the cost of setting up a system which will

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secure continuous observance of all these regulations, for you realise, I have no doubt, that under the Factory Acts the first duty is laid on the employer of securing the observance of the regulations. Now I want to ask you this question. Taking all those points into consideration, and having in view the fact that we must introduce some remedies for the evil which undoubtedly exists, do you still consider that it would be better to regulate the industry by these special rules, or would you, as a manufacturer, rather see the use of lead prohibited?—I consider that the industry could not stand these regulations.

6027. Then do I understand as an alternative that you would rather see the prohibition of lead?—Certainly, but then what about the fine lining?

6028. That the Committee would of course bear in mind?—But we use so very little white lead in our trade. Could not higher-class coach builders have been put on a different footing?

6029. It would be impossible to exempt a particular kind of goods. That would include others. The Home Office regulations would apply irrespective of the class of goods. They would apply entirely to where lead is used, and these restrictions would have to be introduced to protect the workmen who worked with lead. I am only putting this before you, not that this Committee has made up their mind in any degree as to what they shall do, but to show you what is the practice in other industries where lead is permitted to be used?—It is hard on us when we use so very little of it.

6030. But you injure more people in your industry than they do in some other industries where such regulations are in force?—It is very strange. I had never heard of white lead poisoning before this.

6031. But you see the importance of it, because the lead poisoning evils in this industry are greater than in other industries where these regulations are in force?—Yes.

6032. (Dr. Collins.) When you say you use so little white lead in your industry I do not quite follow you. Do you mean you use very little white lead in painting motor-car bodies?—Yes, in painting a motor-car body I should say the whole thing will run to about 10 lbs. of white lead altogether on a whole body.

6033. How much less paint do you use in painting a motor-car body than you do in painting a similar surface of a brougham?—We use just about the same quantity. There is a bigger surface on the motor body than there is on the carriage.

6034. Then the workpeople who do the painting are continuously employed?—They are.

6035. I do not quite follow your point?—They are employed, but it is all wet white lead in our case; we have practically no dry white lead at all.

6036. You are not aware of the fact that we have had shown to us recently that wet lead paint gives off a volatile organic compound?—I am not aware of that.

6037. Which when inhaled will affect you in just the same way as if you were inhaling the dust?—Then I fancy the reason that we have been exempt is that we have large premises, and there is plenty of air in the premises.

6038. That may have its influence, but it only shows you what a subtle material you are dealing with. You have not merely got the question of the dust to take into consideration, but you have also the compound, which you cannot control, practically given off from the wet lead paint. I do not quite follow your point when you say you use so little. If I follow you, you mean that the amount of lead paint used to the coat of a motor car as compared with the amount of lead paint used to the coat of a brougham is less?—I consider that we have never used a great amount of white lead in our manufactory.

6039. But you have a certain number of employees constantly using white lead in your business?—Yes, certainly; but after putting on the flat colour and the varnish colour they use ground pumice-stone and water to flatten it, and the flattening takes longer to do than the coating.

6040. Is not that the same with a brougham?—It is the same with a motor and the same with a brougham, yes.

6041. I cannot follow your distinction when you say that there is a smaller amount of lead used. The men seem to be constantly employed at it?—But for the number of men we have we do not get through much white lead at all.

6042. When you speak of your trade, do you mean the trade of carriage building and motor-car building?—Yes, both.

6043. But we have our statistics showing that lead poisoning occurs very frequently in this trade?—Yes.

6044. Have you ever taken out the statistics of illness among your workpeople?—No, I have not, but we have very, very little illness.

6045. Little is a comparative term. Have you ever taken it out in another trade?—If there had been any case we should have heard, I am sure.

6046. I do not agree with you at all there. I have so frequently found that employers have not a knowledge of the health of their workpeople. That is our constant experience?—But our painters are practically never away ill, to my knowledge.

6047. What is the average age of all your painters?—It would be about 40, I should say—40 to 50.

6048. Do you know how much invalidity is suffered by a man who is 20, on an ordinary average?—No.

6049. Do you know how much is suffered by a man who is 60?—No.

6050. If you do not know these points, how can you possibly state that there is little illness going on among your workmen?—Because they are so seldom off work for illness.

6051. These are very intricate points, and you come before us and make a statement that there is very little illness when it is absolutely proved statistically?—I can actually prove it by my books if I have the time.

6052. But you can only prove it by your books if you compare it with the other trades. You must have a comparison before you can say whether a thing is big or small?—Yes.

6053. You must compare the amount of sickness among your own people with other people in other trades before you can make the statement that you have little sickness. I only wish to draw your attention to the point that personal opinion, as I know too well from my own experience, is not to be trusted until you get the figures?—I would be very glad to give you figures on that point. I could take any of the men's time for a year, and you will find that they are only off for perhaps half an hour or an hour in the morning sometimes. It is hardly ever that they are off work.

6054. Until those figures are collected, the statement that you have a small amount of sickness among your workpeople is only a personal opinion?—I will be very glad if my official will call and look at our books.

6055. You have given me the average age of your workers at about 40. Do you know what the average age in another trade would be? Is that a high average age of workpeople, or is it a low one? I am referring to painters?—It is not a high age just now.

6056. Have you men who are not in any way exposed to the influence of lead, either wet lead or dry lead, in your works?—Yes.

6057. Men who never come near the paint work?—Yes.

6058. Men who are employed continuously by you?—Yes.

6059. Will you find out the average age of those men as compared with the average age of the men who are exposed to lead—that is the average age of the living men?—Yes.

6060. We know as a matter of fact that the average age at death is younger, considerably, of those exposed to lead than those working not exposed to lead in the same trade. Will you look out the statistics on that point from your own books?—Yes.

6061. (Mr. Mason.) You seem rather to doubt the lasting qualities of the Daimler cars apparently from your own experience; but, as the Chairman pointed out, the customers by this time would have complained

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[Continued.]

had the quality of the cars not been up to the standard. Do you consider that the average customer would know whether his painting was right or wrong?—Certainly he ought to know, but I do not think that so many customers who use motor cars had carriages. There are a great many who have motor cars who never had carriages, and they do not know so well how long it will last.

6062. Under those circumstances, what evidence do you think this Committee ought to have before suggesting such regulations as the Chairman has just mentioned, if the Daimler experience is not sufficient?—It would certainly be very nice if we could get a substitute, after all those cases, but it would be a great pity if white lead were abolished, and then we looked for substitutes, and did not get one that really took its place.

6063. What evidence would you be satisfied with in order to change over from white lead to a non-poisonous paint? You do not want to take a leap in the dark, and you would want to be satisfied first that there was some reasonable chance of making it a success with this substitute?—Yes.

6064. What sort of evidence would you require?—I suppose you would require to know how they had stood for a few years.

6065. How many years?—Three or four years.

6066. (Chairman.) In the interim you would not object to the introduction of these regulations to protect the workpeople?—I think we would be better out of the trade if we are to have these regulations.

6067. But you say you would want three years' exemption, and you would not wish that these men should go on suffering for those three years without any protection, would you?—No. Of course, speaking personally, I do not think that they have suffered.

6068. But you cannot get away from the statistics. I am basing everything on these statistics. They are not my statistics, they are the Home Office statistics. My question is this. If you want three years to look round and find a substitute, you would not object to special rules being introduced which would protect the workmen in the interval?—I should certainly object to all those regulations.

6069. Then you prefer the abolition of lead within a reasonable time to the regulations?—Yes, certainly, I prefer it to that.

6070. (Mr. Kinggate.) Do you think that the fact that you had a car of the Daimler Company which was so badly painted is sufficient to condemn the system?—Perhaps it is hardly fair, I admit.

6071. You know that bad painting may come from other sources than from the fact of not using lead; for instance, if a thing is painted very hurriedly—what we call hot stuff, or presto?—Yes, but they are supposed to paint all their cars well. They usually take time.

6072. All coach makers are supposed to do that, but you know perfectly well they are sometimes painted hurriedly, and have to be done hurriedly because the customer says it must be done by a certain time?—Yes.

6073. Is it not possible that that was the cause of the car that you saw having all the paint taken off? You have no evidence that it was caused by the method of painting?—No, I have no knowledge.

6074. Have you any knowledge of the method of painting which the Daimler Company adopt?—No, I did not know until to-day.

6075. Do you know that they do not exactly use a substitute, but that it is a different method of painting?—I was told to-day that they use a substitute.

6076. Not a substitute in the sense that we mean a substitute. You do not think that it is sufficient to condemn the method of painting simply from the fact that you saw one car that was badly painted?—No.

6077. The object of lead first of all is to fill up the grain, is it not?—Yes, and to bind it.

6078. There is practically very little of it left at the finish. The coats of priming, for instance, are practically all rubbed off again, except what is filled in the grain?—Exactly.

6079. So that really there is not so much in that, so long as you can get some substitute to fill up the grain?—It is not so much that as to bind it. You want it properly bound, it is the filling that fills up the grain.

6080. The lead first of all goes into the grain of the wood?—Yes.

6081. As long as you can get something to stop that suction there is not much in it. The object of the whole of the filling and the priming is to stop up the pores, or to stop up the suction of the wood, so that you can get a good surface?—Yes.

6082. If something could be got to do that, if it were durable, could not that be used instead of lead?—Yes, I should think that would be a very good plan.

6083. If this Committee has proved to it that a substitute can be found or a method can be adopted which would be as good as lead, do you not think that lead should be prohibited, having regard to the statistics?—Yes.

6084. With regard to illness in your firm, do you require a doctor's certificate if a man is off ill?—No.

6085. So you have no definite knowledge as to whether he might not be suffering from something brought about by lead?—No. I will look into that, because I can give you the proper statistics of the painters.

6086. Of course, the carriage makers would use more lead than the painters?—Not a large quantity of lead. It is just coated over the plates, I think.

6087. The bolts, and the clips, and the rivets, and so on?—Yes.

6088. I know one of your carriage makers who suffered with lead poisoning many years ago?—Yes. I spoke to old Mr. John Croall just before I came away here, and I asked him about it, and he said he knew of no case.

6089. I have been over your firm on occasions, and I know that a man did suffer from it. I am only pointing this out, that there are many cases that are not attributed to lead, but which we know are due to lead?—Yes.

6090. (Mr. Robins.) With regard to the case that you mentioned of the motor-car that you examined, and that you thought had worn very badly, I suppose you have considered the different conditions that a motor-car has to experience to what a private carriage had to in years gone by?—Certainly.

6091. Do you think it would be possible, after a car had been running a journey, to go and wash that car down, the same as you would wash a brougham after it had done a journey? Could you wash it with the ordinary method of sponge, leather, and water?—You require the hose.

6092. With the hose and all, do you think you can get that car clean with your hose, sponge, and leather?—I should say no.

6093. In nine cases out of ten the cleaner of the car has to put paraffin or petrol in his water to help him to clean the grease that is constantly flying from the speed of the car?—With the wings that are put on now, I consider that no grease should go up on the body. The wings are protected on the inside entirely, and the platform steps have either leather or steel running right along underneath. We close ours entirely at the front, so that I consider there should be no grease going on the body.

6094. But in nine cases out of ten paraffin or petrol is used in the water to wash the car, and I maintain that that has a great effect on the varnish. Of course in keeping paint good there is use and abuse, and I maintain that it would be impossible to clean a car out with water, sponge, and leather. The second point is that you laid special stress on this: that why you were sorry to abandon white lead was because of the greater difficulty of a painter putting fine lines on?—Yes.

6095. With regard to lead, it has always been experienced that lead for fine lines is very heavy?—For cream lining what would you use?

6096. You have to add yellow to it, which makes it a little lighter still. If you had pure white you would have to have blue with it to a certain extent to produce

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[Continued.]

the white. The zinc white I use myself, and the painters under my charge use it, and I prefer it. A better colour can be made to run; it is lighter on the pencil, and it produces quite as satisfactory an effect, and it is better for the painter to use than white lead for drawing a fine line, because if you use white lead to make a fine white line, you have to

adulterate it with a little blue, whether you have white lead, or whether you have zinc white?—But if you have this drying colour, it does not draw nearly as well, does it?

6097. You can make oil colour from zinc white as well as you can make oil colour from lead?—I have never used zinc white.

The witness withdrew.

MR. WALTER JOHN ARNOLD examined.

6098. Are you in business in Dublin?—Yes.

6099. You are one of the witnesses selected to give evidence on behalf of the Institute of British Carriage Manufacturers?—Yes.

6100. Are you a carriage manufacturer?—Yes.

6101. What length of experience have you had personally?—28 years.

6102. How many men do you employ?—It varies with the time of the year—from 60 to 75.

6103. How many cases of lead poisoning have you known?—One.

6104. Mr. Maythorn, the President of your Institute, has spoken of the processes generally, but it will not be necessary, unless you wish it, to ask you to corroborate all those details. Are you content with his opinion on the main questions?—I am quite satisfied.

6105. We have had evidence about the bodies. You wish to speak principally about the wheels, do you not?—Yes.

6106. These are usually sand-papered, are they not?—They are sometimes, if they are in a rough condition.

6107. Are they generally sand-papered?—Sometimes. It is just according to the condition.

6108. What proportion of them are sand-papered?—Perhaps one in six.

6109. What is done to the others?—We have adopted a system by which we get ground pumice stone in three different grades. It is like flour. A man has a box and puts it into that with water, and he gets a rug and rubs it on. It is a sort of wet pumice-stoning of the wheels; not with pumice stone in a lump, but with ground pumice stone.

6110. When rubbing down is done, it must produce a certain amount of dust, must it not?—It does, but I have found, on looking at it, that it is more like paint coming off. It is not like sand-paper dust, but it is more like little curls of paint.

6111. Wherever that dust is formed, it contains lead?—Yes, it does.

6112. How is that danger to be overcome?—I could not suggest that. The lofts are swept every morning. They are dumped first and then swept every morning.

6113. Have you known of any cases of lead poisoning in your works?—Only one.

6114. Do you know that in the coach-building industry, taking it as a whole, there have been 787 cases of lead poisoning recorded by the Home Office in 11 years from 1900 to 1910?—I am surprised to hear it.

6115. And that of those 47 were fatal. Does that surprise you?—It does, because before I came away I made inquiries from the coach-builders in the City, from the insurance companies that insure us, and from several doctors, and not one of them has come across a case.

6116. I am not surprised altogether to hear that, because I know of my own knowledge that there are a large number of factories in the Potteries where they have had no cases of lead poisoning for many years. The trouble is that even some of the best works are not immune, and, moreover, a works which has been free from poisoning for many years will suddenly have a succession of cases. But the real facts are these: I have given the number of cases in the last 10 years, and apparently there has been no reduction in the attack rate during that period. The average number of cases in the last eight years is 66½ per annum, and the attack rate in 1908 is 70 cases, in 1909, 95 cases, and in 1910, 70 cases. Now, as there has been a reduction in the average cases reported each year, I am

sure you recognise that something must be done to remove the evil?—Yes, I should think so.

6117. What particular kind of work are you engaged in?—Carriage building and motor-body building and painting, and all works connected with carriage building.

6118. Are you aware that out of 376 cases reported in the five years, 1905 to 1909, 46 arose from the motor car works, and out of 697 cases reported in the 10 years, 1900 to 1909, 297 arose in the ordinary coach and carriage building works of the country?—It surprises me; I have never heard of it.

6119. Have you ever tried substitutes for white lead in your painting work?—No, we never have.

6120. I suppose you would agree that if a substitute could be found which would be in every way as good as white lead, the use of lead should be prohibited?—Certainly, I would prohibit it if there was something as good.

6121. Do you know that the Midland Railway Company for the past six years have not used lead in their carriage and wagon works?—No, I am not aware of it.

6122. We have had similar evidence from the representative of the Bradford Corporation Tramways Department?—I am not aware of that.

6123. Are you aware that white lead is no longer being used in the Daimler Motor Car Works in Coventry?—Yes, I am aware of that.

6124. How does your work compare with the Daimler motor car bodies?—They do very good work. It looks well, but I doubt whether it will stand so well as work that the white lead has been used on.

6125. They are one of the largest firms in the industry, are they not?—Yes, they are.

6126. And they turn out work of the highest finish?—They do.

6127. The buyers of Daimler motors are of about the same class as the customers of your own or other leading coach-body firms?—Yes.

6128. And they would demand the same finish, would they not?—Yes, they do.

6129. The witness representing the Daimler Company told us that they are entirely satisfied with the substitute they are using for all purposes for which white lead is commonly used in coach building works?—As a coach builder I do not think the Daimler people have had long enough experience yet to be able to say how the work will stand.

6130. At any rate, their customers are perfectly satisfied. Is not that the test?—If they have had long enough experience of the thing.

6131. The Daimler Company have used no white lead for two years, and they have had no complaints from customers?—Two years is a short time. I would like to see some of our carriages out five or six years and see how they would compare.

6132. The Daimler Company claim that the painting of their cars is thoroughly durable. Do you think they would continue to use it if it was not durable?—No, I do not think so.

6133. Does it not rather weigh with you that they should have abandoned the use of lead entirely after this two years' experience?—Yes, I should think so, if it is giving satisfactory results without the lead.

6134. I do not propose to take you through all these questions, as you have already told me that what Mr. Maythorn said you would accept; but I should like to point out to you, as I have to other witnesses, the position that this Committee occupies. We are

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[Continued.]

sitting here to find some solution for this very deplorable state of affairs, and we have two alternatives, and only two. The first one, which is the simplest method, would be to prohibit the use of lead. The other is to regulate the trade by special rules, such as those which obtain in all the leading existing lead industries. Those special rules involve the following stringent regulations. First of all lavatories; proper provision being made for washing accommodation. That regulation is, I think, one appliance for five people?—We have that in the paint loft.

6135. You would have to supply soap and nail-brushes?—We do so.

6136. Towels, frequently changed?—I must say, although we put them up, we do not get all our men to use them. They still stick to the old idea of using a piece of horse-hair. Every painter is provided with a pail in our premises which he uses for washing down his carriage, and he prefers washing his hands in that pail to using the wash basin.

6137. But if the regulations apply to both the workpeople and the employers, they can be punished for not complying with the rules. The usual enactment in other industries is that a mess-room should be provided so as to avoid the possibility of the men eating their meals in a room where they can come in contact with the lead?—None of ours eat their meals in the paint lofts.

6138. And that cloak-rooms should be provided?—We have no cloak-rooms.

6139. The idea of the cloak-room is, as has been enacted in the potteries trade, to provide a cloak-room where the man can hang up his clothes while he is at work and then take them home again and so avoid the danger of dust and contamination. Also that overalls should be provided at the employer's expense. Do you provide your men with overalls?—No. They have some overalls or coverings, but we do not provide them.

6140. That washable impervious floors should be provided, so that they may be swilled down regularly once a day, and that a medical examination of all the employes at the employer's expense should be introduced; and, added to that, it must be remembered that the cost of compensation, which is payable to a workman whenever he is withdrawn from working with lead, would have to be paid by the employer?—Of course we have all our men insured.

6141. Then a very important innovation would be, where it is possible, the installing of an efficient exhaust draught apparatus for the removal of dust?—We have two or three ventilators in the roof.

6142. I mean local appliances, so that the dust can be withdrawn from the men while they are at work. Then you must take into account the cost of setting up a system to secure the continuous observance of these rules. Now the question I put to you is this. Taking all those points into consideration, do you consider that it would be better to regulate the industry by this special code of rules, or would you, as an employer, prefer the prohibition of the use of lead?—I would sooner do without the lead.

6143. (Mr. Mason.) In speaking of the rubbing down of wheels, do you apply this wet pumice powder with horse-hair?—No, with an old piece of rag, generally an old piece of plush or cloth.

6144. Do you find that gives a smooth finish and gets out all the hollows?—Yes, if the lead paint is put on properly it is only the little nibs that want to be taken off. It is only a matter of smoothing it before the next coat goes on. We do not rub off the lead; we want to leave the lead on as a ground colour for what comes after. It is only a little thing like a hair out of the brush, or out of the horse-hair,

that would have to be taken off, or a little nib or some dirt.

6145. You find that the wet rubbing down is perfectly satisfactory?—Yes.

6146. And that you can do away with the dry rubbing down of wheels entirely?—Yes, I do, generally speaking. Of course with varnish work we use a good bit of sand-paper, but there is not much harm in that. We do not rub it down.

6147. That is for finishing colours?—Yes, varnished wood.

6148. (Mr. Kinggate.) Do you mean that you use the wet pumice powder for the first priming coats?—Yes.

6149. Does not that raise the grain of the wood again?—No, not if the lead is put on properly.

6150. The majority of the spokes are a little rough, are not they?—Yes.

6151. When you have given it the first coat of priming, you must rub it into the wood if you want a proper surface, and if you get wet upon that what is the result?—My difficulty is that our spokes are waxed before they come to us, and they do not hold much.

6152. You say some of them are waxed?—Yes.

6153. It all depends whether you make your own or buy them?—They are nearly all machine made spokes now, and they are waxed. They are so smooth that they scarcely hold the paint. You have to give them two or three coats. We have less sand-papering and rubbing down now than ever we had, because the spokes are so smooth, there is not the same grip on the smooth spokes that there is on the rough ones. We might put two or three coats of lead colour on before we would rub it.

6154. Do you use any hard stopping on yours?—Not on the wheels.

6155. On the felloes?—Not as a rule: now and again. We used to use a little on the best carriages, years ago, but not now.

6156. You do not paint these so well as you used to the old carriages?—If you go to paint a vehicle now, there is not so much care taken with it, except on a good motor car, as there used to be before.

6157. I have never seen it done with wet rubbing down on the priming coat?—Do not think I am saying that it is done on the first coat; it might be the second or third coat before we thought it necessary to do it.

6158. But it would depend on the spokes?—Yes.

6159. (Mr. Robins.) Do I take it that you use no stopping on the wheels at all?—Very rarely.

6160. But when you use stopping on the wheels you have to sand-paper it off?—Yes.

6161. You made another point about the painter preferring to wash in his pail rather than go to a lavatory to wash?—Yes.

6162. I do not think much of the painter, because he has got his water greasy and his sponge and water full of soap. I should not like that method, and if I were the employer I should certainly stop him at it?—I do not know that you can dictate to a man about that.

6163. You can when the special rules are introduced, because the workman must keep the rules just as much as the employer?—Yes, if that is so. The paint loft is a place I am very much in during the day, and for many years I have looked after the paint loft department. I go upstairs a quarter of an hour before we knock off at night, and I always catch half-a-dozen of them washing their hands ready to go away. I may say it is very different at the dinner hour.

6164. Do you give them time to wash their hands?—We give them five minutes' grace every day. They do not do it in the dinner hour.

The witness withdrew.

## EIGHTH DAY.

Tuesday, 16th May 1911.

## PRESENT:

SIR ERNEST F. G. HATCH, BARR. (*Chairman*).

Lord HENRY BENTINOK, M.P.  
 Sir GODFREY BARING, Bart. M.P.  
 Mr. E. L. COLLIS, M.B.  
 Mr. F. G. RICE.

Mr. W. G. SUTHERLAND.  
 Mr. A. GARDNER.  
 Mr. J. PARSONAGE.  
 E. A. R. WERNER (*Acting Secretary*).

Mr. J. PUTTBELL examined.

6165. (*Chairman*.) Do you attend to-day as the representative of the National Association of Master House Painters and Decorators?—Yes.
6166. What is your business?—Painting and decorating.
6167. How long have you been in the painting business?—Fifty-eight years.
6168. Were you apprenticed to the trade?—Yes.
6169. How long have you been an employer?—Forty-nine years.
6170. Have you held office in any trade society?—Yes.
6171. Please give particulars?—I was the president of the National Association in 1909. I am the president of the Sheffield and District Master Painters' Association for the present year, and I was president last year.
6172. What is the average yearly number of painters employed by your firm?—About 50.
6173. Have you known any cases of lead poisoning or painter's colic?—I have only known of one case—an apprentice—some 15 years ago.
6174. I am not surprised to hear that you have had no cases, because you may be doubtless aware that in the Potteries there are many large works which have been immune from lead poisoning for many years. The trouble is that even in some of the best works, and in works that have been free from lead poisoning for many years, they sometimes have a succession of cases quite unexpectedly. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—Yes.
6175. Do you pay a special rate for that?—We pay an increased rate.
6176. Have you known men who have broken down temporarily on account of lead absorption?—No, we have not had any—only this one young man.
6177. Have your men had occasional days of sickness due to lead?—No, they have not suffered from sickness due to lead.
6178. Do you have a periodical medical examination of your men?—No; we have no need.
6179. Then how can you say for certain that your men never suffer from slight attacks of lead poisoning?—They do not to my knowledge.
6180. But they may suffer without your knowledge?—Yes, they may, of course.
6181. Now you take a prominent part in the work of the Master House Painters' Association?—Yes.
6182. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—Sometimes.
6183. What has been the result of such discussions?—At the last meeting I was at, I could not hear of a single case of lead poisoning in their shops; and that was last week.
6184. Did you take any steps to discover how much illness there was among the men employed by your members?—No. Well, there is no illness—only perhaps a man having a cold or something of the kind.
6185. But you have heard that the prevalence of lead poisoning is very serious, have you not, in the trade?—Yes, I have heard.
6186. Were not you surprised to find that not one of the members of your association had any case to report?—Yes, seeing that there is so much talk about it.
6187. Did not your association think it necessary to make any further investigations?—Well, we had nothing to investigate. Our men are healthy and well.
6188. But you must have heard of the prevalence of lead poisoning amongst the men who handle lead paints?—I have heard more about it since the liability has been included in the Workmen's Compensation Act.
6189. But did your association never attempt to collect statistics concerning the number of days' absence from ill-health among their employes as compared with workers not in contact with lead paint?—We have not had it. There may have been people who may have had colds.
6190. Did your association ever consider the advisability of having a medical examination made of persons employed by them, with a view to discovering the proportion of those showing any symptoms of lead impregnation?—They have spoken about this, but they have not decided upon anything. The question of the liability is so great that we wondered if we had to really have our men examined, or examined before we employed them.
6191. Do I understand that the idea of having a man examined medically was occasioned by the extra rate charged by the insurance companies?—And the prominence given to the question of lead poisoning.
6192. Has your association ever taken any collective measures to discover a substitute for white lead in paint?—We have talked it over in our association.
6193. Have you done anything else but talk it over?—We have not found anything that we consider equal to white lead.
6194. Have you collectively taken any measures to discover a substitute?—Only by each of us trying for ourselves various articles that are put upon the market.
6195. Have you employed a chemist to make scientific investigations into the chemical properties of different pigments and vehicles?—We have not.
6196. There are a number of substitutes offered on the market, the makers of which claim that they will successfully replace white lead?—Yes.
6197. Has your association carried out any practical tests with them?—We have tried various articles that are put upon the market—pigments.
6198. Can you tell us of any other steps which your association has taken to find a remedy?—We are trying to educate our young people.
6199. In what form are you trying to educate them?—In teaching them to be careful and clean in their habits, and clean in their bodies. We teach them to wash their hands before they have their meals, and to wash their hands when they have finished.
6200. In what way is this teaching performed?—We have our technical school in Sheffield, and it is brought before the apprentices in the technical school



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Mr. J. PUTRELL.

[Continued.]

In our own shops, we each one of us impress upon the young people the duty of keeping themselves clean.

6201. Is the technical school confined to Sheffield only?—No; the technical school in Manchester is larger than that in Sheffield.

6202. How many attend the technical schools?—In Sheffield they have a class of about 70—a school of Art.

6203. How many painters are there in Sheffield?—About 800, I should think.

6204. So that only a very small proportion enjoy the benefit of this teaching?—Yes.

6205. Are the 70 students all painters?—Yes—apprentices.

6206. Is the practice of indenturing the boys as apprentices, then, kept up in Sheffield?—Yes; we think it better.

6207. Have you any idea how many apprentices there are in Sheffield, approximately?—No; I have not come prepared to answer that question.

6208. Are there a large number?—No; if there are only 800 men, I should think there would be about 120 apprentices.

6209. Then 70 out of 120 go to the technical school?—Yes. We also teach them how to use their paint can and brushes (that is a very important matter in teaching youths) so as to keep free from the paint.

6210. Do you think that the members of your association realise the magnitude of this lead poisoning evil?—I think so.

6211. Do they know that the Registrar-General has recorded no less than 284 definite deaths from lead poisoning among house painters in the last ten years?—Yes.

6212. They know that?—Yes, I think so.

6213. And that his mortality figures show for painters a death rate considerably higher than the normal, from troubles which are the frequent effects of exposure to lead, such as Bright's disease and nervous diseases?—Yes.

6214. Do they know that?—Yes, we know that in the trade.

6215. Do you know that about 2,000 cases of lead poisoning in the trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the same ten years?—Yes, I have heard that.

6216. Do they realise that these cases, reported voluntarily, are only a fraction of the whole, inasmuch as the Home Office have no legal right to pay for such reports and are therefore bound to discourage reporting to some extent?—Yes, quite so.

6217. I am sure you agree with me that all this sickness and death is very deplorable?—Oh, yes, there is no doubt about that.

6218. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes.

6219. And that the use of white lead has been prohibited to an appreciable extent abroad?—It has in some cases.

6220. And that the work of painting has been most strictly regulated in many countries where the use of white lead is still allowed?—Yes.

6221. Do not you think it regrettable that this country should be behind other nations in this respect?—Yes, if there is a remedy.

6222. But do not you think it, in any case, regrettable that this country should be behind other nations in such a matter?—Yes. We ought as a nation to find out something to take its place.

6223. We ought to be abreast of foreign nations, do not you think, in preventing this evil affecting our workmen?—Some of those countries have changed their front a bit.

6224. I want you to answer the question: Do not you think that we ought to be abreast of foreign nations in protecting our workmen against the evils of lead poisoning?—Yes; we ought to do it as far as possible.

6225. A great many small dangers attend the use of lead, for instance, the risk of contamination of food by unwashed hands?—That is a serious matter.

6226. Do you teach the importance of personal cleanliness on the part of the men?—Yes.

6227. Then you consider lavatory accommodation essential?—I do.

6228. Including a supply of hot water for washing?—Not necessarily hot.

6229. But can you wash paint off your hands with cold water?—Yes.

6230. In any kind of weather?—Yes.

6231. Have you tried it yourself?—I have done it.

6232. I understand that in some cases the men have only a minute allowed them to wash their hands. Do you say that a man with cold water on a winter morning can get the lead washed off in a minute?—A man can do better if he can have hot water.

6233. But I ask you: do you think it possible that a man on a winter morning, with perhaps a temperature of 30° to 40°, can get paint off his hands in one minute in a pail full of cold water?—I consider he can get it off in that time—in one minute.

6234. You think he can?—Yes.

6235. But you think that hot water would be better for him if he can get it?—There is no doubt about it. It is better than cold water.

6236. Is it generally practicable for the men to have hot water to wash in?—Generally.

6237. For example, when the exterior of a house only is being painted and the men are not expected to go inside for any purpose, can they get hot water then?—The householders are always pleased, or as a rule they are, to supply what the workmen require.

6238. But they are dependent on getting it from the householder, are they?—The householder would allow them to have hot water.

6239. But they are dependent on getting it from the householder?—Yes, they are dependent.

6240. Do you advocate definite rules regarding the wearing of overalls?—Yes, I approve of wearing overalls.

6241. How can you ensure these being kept in a cleanly state?—The men ought to attend to it for themselves.

6242. How often should they be washed?—Every week.

6243. What do the workmen do with their overalls when they have finished work?—They put them in their bags.

6244. In the bag that they carry their luncheon in to their work?—Some may.

6245. And their tools?—Yes, some may do it.

6246. Is not that rather asking for trouble?—Well, a man, of course, can keep them quite away from his food.

6247. But if he puts them in the bag which contains his food, some dust must accumulate in the bag, and the next morning he is mixing his food with lead dust. It is in actual contact with it?—Yes. Some leave them on the jobs ready for the next morning.

6248. Where can the overalls be kept from day to day when men are working continuously on the job?—It is only a question as to whether he can find a place at the house or the premises where he works.

6249. But supposing he is working outside a house, where can he put them then?—In some of the out-buildings.

6250. Are out-buildings always available?—As a rule.

6251. Do you advocate a rule requiring meal rooms, so that a man shall not eat his food in the place where paint has been handled?—I do not think that a man ought to get his food where his paint has been mixed or used.

6252. Would you go so far as to say that he ought not to eat his food in any place where lead dust accumulates?—It is better to be away from it.

6253. I may tell you that in all other industries where lead is used there is a prohibition, and a very strict prohibition, against allowing men to come into contact with lead dust in any respect. The men are not allowed to eat their food in any room where it can come into contact with lead dust?—Quite so.

6254. It is against the law?—Yes.

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6255. Can a place always be found quite free from risk of contamination where the painter may eat his food during his working hours?—As a rule he can. He can find a place generally.

6256. Are you sure of that?—That is my impression.

6257. Are you quite sure that, in the majority of cases, a man has an opportunity of eating his food away from the place in which he is doing his work?—Sometimes a man has to sit outside. He would in weather like this.

6258. Yes, I know, but, generally speaking, is it possible for a man to find a place to eat his food in the winter where he will certainly be away from the contamination of lead dust?—Sometimes he may and sometimes it may be difficult.

6259. But do you think that it ought to be made an absolute rule that he should not be able to eat his food where lead is handled?—It is a difficult question as to whether a man might really be able to find a place. Generally, at houses that we work at, there is an outbuilding, and in offices very often there is a room set apart.

6260. Do you think that it ought to be made a definite rule that under no circumstances should a man be allowed to eat his food in the place where he has been doing his work, when he is likely to come into contact with lead dust?—I do not think that he ought to get his food where the paints are.

6261. That is not my question. I am not speaking about mixing paints. I asked you the definite question whether you think a man ought to be prohibited in the future from eating his food in any place where he can come into contact with lead dust?—No; I think it is better to avoid it.

6262. And you would agree that it should be a fixed rule?—Yes.

6263. Now these precautions of washing hands and so on which I have just described to you as well as others, are insisted on in other industries for the mitigation of lead poisoning risks. Would it not be exceedingly difficult to carry them out faithfully in connection with house-painting operations?—I do not see that it would.

6264. At the best such precautions would not deal with the most important risk, namely, the risk arising from dust and spray which the workman can inhale during the whole of his working hours?—There is not much of the lead dust knocking about as a rule.

6265. I did not speak about the quantity. I said the risk arising from dust and spray which the workman can inhale during the whole of his working hours?—Yes. Well, there is not much dust from the work as a rule. We rub down with pumice-stone and water.

6266. Do I understand you to say that there are no dangers in the various operations?—There is very little dust. We rub down with pumice-stone and water, so I take it that the danger is very slight.

6267. Then in your opinion, the danger to the house painter is a very small one?—In being in the room where we are preparing for the painting and rubbing down with water, there is not much danger.

6268. Then how do you account for the enormous number of lead poisoning cases which the Home Office have had reported to them?—Because of the carelessness of the workmen.

6269. During their work?—During their work. A man will handle a brush covered with paint, and rub it on his hands and rub it anywhere.

6270. Do you think that he does that wilfully?—I know of men that do it and they do it carelessly. They are quite indifferent.

6271. Quite indifferent to their own health?—Yes.

6272. Now as regards dry rubbing down with sand-paper, I understand that this process is indispensable?—It can be done without.

6273. But I understand that the wet process cannot be substituted for dry rubbing down between the first and second coats when ordinary paint has been used?—It is only in the first-class work that we rub down the second coat.

6274. But in the first-class work a certain amount of dust is created in rubbing down?—There is very little dust from a newly painted surface.

6275. There is a certain amount of dust?—It is dust from the sand-paper more than anything else.

6276. Do you mean to say that the wall rubs the sand-paper off and not the sand-paper the wall?—The sand-paper of course rubs off any little particles.

6277. You rather suggested just now that it was the dust from the sand-paper and not the dust from the wall which collects?—More dust comes from the sand-paper than from the wall.

6278. Then the wall rubs down the sand-paper; that is what it comes to?—Yes.

6279. I will ask you this: Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing some of the lead dust?—By putting something on to cover his nostrils.

6280. Is that the only method?—I do not know of any other.

6281. Could you use an exhaust fan to remove the dust?—It would be a very difficult matter, and the dust is so small a portion that it is far-fetched to think about it.

6282. The amount of dust arising from this sand-papering, we have been told, is very considerable?—Not very much.

6283. We have been told that it covers the man's clothing as well as the floor and surrounding objects. Now, how is it possible to save the workman from the very serious danger involved in breathing this dust? You think it is very small and other people think it is very large?—You are perhaps alluding to the places where, before the first coat of paint is put on, it is rubbed down with sand-paper. Then there is bound to be a lot of dust. I say we do not do that. We rub down with pumice-stone and water.

6284. I want you to realise the question. Where they do rub down with sand-paper, how are we to protect the workman from breathing this dust which we know to be very injurious?—I take it, if it is in the second coat, there is very little dust stirring, and it is of a moist kind—just little particles that have been moistened with oil.

6285. You say just now that it is the sand-paper that created most of the dust, but I am asking you now how we are to deal with the small amount of dust that arises from the rubbing down after the second coat and the large amount of dust which you spoke of just now?—I do not see how you can deal with that. Whatever paint you have you are faced with that difficulty.

6286. Then are the Committee to understand that there is no remedy for the amount of dust, whether it is much or little, that is created by the process of rubbing down with sand-paper?—Only having fresh air in the room, and keeping the room swept up.

6287. Those are the only things?—Yes.

6288. Might not fresh air rather disperse the dust than otherwise?—You must have fresh air in a room.

6289. But might not fresh air, a good draught, tend to blow the dust about that was collected on the floor and make it worse?—I would sweep it up.

6290. But how often would you sweep it up?—As often as necessary.

6291. Every hour?—It depends how much has been done—every hour, if necessary; or oftener, if necessary.

6292. Would not that be rather an expensive operation?—We should leave it to our men.

6293. The men would have to do it as part of their work?—Yes, certainly.

6294. Now the next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

6295. This gives rise to splashes which frequently fall even on the face of the workers?—Yes.

6296. How can you deal with the spray which arises in this operation?—You cannot deal with it very well.

6297. Could you have an exhaust draught to catch the spray?—You cannot very well.

6298. Then again we are confronted with the problem of how to save the worker from the grave danger involved in breathing the spray?—With regard

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to inside ceilings, I would suggest that lead might be done away with.

6299. For that particular work?—Yes, for inside ceilings.

6300. But who is to tell whether there is any lead in a paint pot or not?—There are articles on the market now that might be used.

6301. But who is to know whether the particular master painter is observing the rule as to not allowing lead paint for this particular operation?—I take it that the master painter, as a rule, if any law was passed, would fall in with it.

6302. But who is to prevent them breaking the law if they wish to do it?—No one. Anyone can break the law.

6303. Do you think that that would be an efficacious suggestion, when they could not be checked as to whether they were breaking the law or not?—I think if a law was made that no ceilings inside a house or premises should be painted with white lead, we should want to carry it out.

6304. You would all want to carry it out?—Yes, I think so.

6305. You think all the employers in your industry would want to carry it out?—Yes, I think so. Taking it as a rule they would do so.

6306. Now, precisely the same conditions apply to the process of stippling, do they not?—Yes.

6307. It would be impossible, I take it, to protect the workman from the dangers involved in stippling?—Yes, but not so much comes off with stippling.

6308. The other day I saw the process myself, so that I know exactly how much comes off. I agree that it is not very much, but you know in this lead poisoning trouble it is the multiplicity of small things which makes up the great evil. I quite agree with regard to stippling that there is not very much in it, but we saw a splash fall into a man's eye?—From the painter, not the stippler.

6309. It was the stippler's eye?—The splash would be from the painter.

6310. But in the stippling: The drop of paint fell into the stippler's eye—caused, I agree, by the painter. They were working very close together, one man painting like that, and the other stippling like that (demonstrating)?—Nothing comes from the stippling, but it is from the man that is painting.

6311. I do not agree. A certain amount must come from the stippler, but not much. Tiny drops come down, they are almost imperceptible, but they are there. Now my question was this: How are you to protect the workman from the evil effects of stippling?—By prohibiting the use of white lead on those surfaces.

6312. Do you have old paint burnt off with a spirit or charcoal burner?—With spirit.

6313. How can you prevent the worker from inhaling the fumes which arise from this process?—You cannot very well.

6314. It seems impossible?—You cannot avoid swallowing fumes when you are in the street from taxicabs.

6315. But you do not swallow them all day long, do you?—Nearly all day, when you are in London.

6316. Where do your men mix their colours?—They generally have an outhouse, or else a corner of the yard where they are working.

6317. Do you adopt any precaution to deal with the dust that arises when colours are handled dry?—We do not use dry colours.

6318. But some people use them dry. Do you know of any precautions which could be introduced to deal with the dust that arises when colours are handled dry?—No, I do not know anything except compelling that they shall be used in paste form.

6319. Compelling the painters to use them moist?—Compelling the manufacturers who produce them to put them on the market in paste form.

6320. It appears from your evidence that there are certain indispensable processes, in carrying out which a painter must necessarily inhale some dust, spray, or fumes containing lead. I understand you to suggest, first, that in some cases no remedies can be introduced,

and, secondly, that lead should be prohibited in some of these particular operations?—Yes.

6321. Now is it possible to remove the danger entirely in any other way than by using a substitute for lead?—Only, as I say, by taking care to educate your apprentices and men to be clean.

6322. But I ask you, is it possible to remove the danger entirely in any other way than by using a substitute for lead?—No, not entirely; I do not see that there is any other way.

6323. Various witnesses have told us about non-poisonous substitutes for lead. Have you had any personal experience of such substitutes?—Yes.

6324. I understand that you have tried some zinc paints. What results have you obtained?—We have used zinc paint occasionally. I used it over 30 years ago, but I was never satisfied with it. It has not the wearing quality or covering power of lead, and I have never found it so satisfactory.

6325. The Office of Works and others have succeeded in obtaining efficient non-lead paint. I suppose you would agree that if an efficient substitute could be found, the use of lead should be prohibited?—I should be quite agreeable.

6326. What are the usual hours worked by your painters per week?—About ten hours a day—36 hours a week.

6327. Would you welcome a strict limitation of the hours of employment, say, to 48 hours a week?—We should be willing, of course, to adhere to that if it was the law.

6328. Paying the same wages?—That is another matter. We pay our men by time.

6329. Do you not pay them so much per hour?—Yes, that is it; so much per hour, and we find that our men prefer to work for many hours.

6330. Naturally; but in other industries where lead is used, it has been determined that 48 hours should be the limit of employment. The trade unions, of course, look after the rate of wages?—Yes.

6331. Now, you do not have a periodical medical examination of your workers?—No; we have had no need to do that.

6332. You think that you have had no need?—We think so.

6333. Do you know that in other industries where lead is used, the Home Office, acting under the powers conferred upon them by the Factory Act, insist on a monthly, or even weekly, examination by a certifying surgeon at the cost of the employer?—Yes, I know that that is done in regard to lead workers in lead factories and in the Potteries.

6334. Would you welcome a system of periodical medical examination in your industry?—We should be willing to fall in with it, if you felt that it was necessary.

6335. And to pay the cost of it?—We should have to pay the cost, of course.

6336. Together with compensation for any worker suspended by the doctor on account of doubtful health?—If an Act was passed that it should be done, we should, no doubt, fall in with it.

6337. You realise that if the free use of lead is allowed to continue, the Home Office would have to insist on the rigid observance of precautionary measures in the same way as in other industries where workers handle lead?—Yes.

6338. And you realise that the hours of labour would probably have to be reduced, as has been done in other dangerous trades?—Yes, if necessary.

6339. Again, this would involve an extremely complicated and elaborate code of regulations. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess-rooms, washing accommodation, avoidance of dust, exhaust ventilation, limitation of hours, and all other such matters?—I think that I should give up the business. I think that the workmen themselves ought to provide their own overalls, and I think that the workmen or their wives ought to see that they are clean. I do not think that an employer ought to be compelled to do it.

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6340. I am only telling you now what obtains in another industry—the earthenware and china industry. The employers on the Departmental Committee which dealt with lead poisoning in that industry agreed to provide the overalls and to see that they were washed, and I think that that is a principle which might be adopted with regard to all other lead industries, for this reason—that if the employers are allowed to use a dangerous element in their business, that is to say, dangerous in the sense that it affects the health of their workpeople, they must apply all the precautions which are necessary to obviate the evil. Now do you not think that under the circumstances it would be better for us to recommend the prohibition of the use of lead rather than to have to insist on all these precautions being introduced?—I think it would be better, of course, to throw the responsibility on the nation—that is, upon the ratepayers.

6341. That is a little bit too vague. You may give a little dissertation later on on some further burden on the ratepayers, but my question was this: Do you not think that under the circumstances, in view of these precautions which must be introduced, or a great many of which must be introduced, it would be better for this Committee to recommend the abolition of lead, or at any rate to restrict it to, say, five per cent.?—Personally, I do not think it is necessary to make all these regulations.

6342. I know; but may I say this—that we are not asking you what you think is necessary; we are sitting here as a Committee to devise some means of protecting these workpeople who suffer so sorely. I have fore-shadowed to you the restrictions which obtain in other industries; and you may be certain of this, that most of those restrictions and special rules will be introduced into your industry, if the unrestricted use of lead is allowed to continue. In view of your remark just now that you would have to give up business if these regulations were introduced, I ask you whether you think, under the circumstances, that it would be better for this Committee to recommend the abolition of lead rather than the introduction of these precautions in the shape of special rules?—I should think so.

6343. (*Dr. Collis.*) What is the extent to which your liability for insurance has risen during the course of the last three years, compared with what it was six years ago?—It has been rising continually since the beginning of the insurance.

6344. Yes, but to what extent. Could you give me the figure that it stood at in 1905, for instance. We have not had the figure at any time?—No, I could not. Mr. Sutherland can through the association.

(*Mr. Sutherland.*) It was 12s. 6d.; it went up to 1l., and then it went up to 30s.

6345. (*Dr. Collis to the witness.*) Under the Act of 1906, which came into force in 1907, it has gone from 12s. 6d. to 30s.?—Yes.

6346. That represents entirely liability for lead poisoning?—No.

6347. That is the only difference between the old Act and the Act that came into force in 1907?—No.

(*Mr. Sutherland.*) There was contributory negligence under the old Act, and there is not such a thing under the new Act. Then there is the question of "arising out of." That is another clause which has brought in a lot of compensation cases. There was a 14 days' limit under the old Act, and there is only a week's under the new.

(*Mr. Gardner.*) A painter very seldom came under the old Act. A painter working on a house might meet with an accident, but he did not come under the Act at all. A painter in a shipyard came under the Act right away. Not 25 per cent. of accidents in the house-painting trade came under the Act until it was revised in 1906.

(*Mr. Rice.*) Height of building is another point.

(*Witness.*) There is this point in regard to liability—that if we set a man on to-day and next week we find that he has lead poisoning, we are responsible, although we have only had him for a few days, and although he may have contracted it elsewhere.

6348. (*Chairman.*) But that works equally all round, you know?—I know that it does, but that is one cause of the raising of insurance rates.

6349. (*Dr. Collis.*) Would you go as far as to agree that the main reason for this rise from 12s. 6d. to 30s. is the liability which you are now under to pay compensation for lead poisoning?—No; that is a great portion of it, but there are other things.

6350. I gather that it is not all?—No.

6351. Now I understand that you have been attempting latterly, at any rate since your attention has been drawn to it by the extra amount of premium that you have to pay, to educate your apprentices?—We have done all along.

6352. For how long?—Ever since we have been in business.

6353. Have you ever investigated yourself how lead poisoning is caused, or have you called in medical skill to tell you how it is caused?—No. We know.

6354. How do you know?—It is caused by a man handling paint and getting paint on to his hands.

6355. But how do you know that that causes lead poisoning?—Lots of men and lads too will get paint on their hands and then they will perhaps eat their food with dirty hands, and they are bound to take some particles.

6356. Yes, but you have jumped to the conclusion that that is the way in which lead poisoning is caused, and you have never called in any medical experts to tell you the real way in which it is caused. You have never studied the question?—No. I tell you that we have had no cases in our shop.

6357. That is not the point that I am asking you about. I ask you whether you ever studied the way in which lead poisoning is caused before you undertook to teach people how to avoid it?—Do you mean to say that washing the hands and keeping them clean is not one step?

6358. I say that if every man washed his hands and he never touched lead, out of 100 cases you would not save five by personal cleanliness. I undertake to say that without the slightest hesitation?—But there are other means helping to teach them.

6359. But you say as a point in your favour that you have been teaching people how to avoid lead poisoning. I now ask you whether you have ever studied the way in which it is caused, and I put to you the point which has been raised on the question of the amount of dust that gets on to a man being very small. We have had certain experiments carried out recently with sand-paper, showing that the amount of dust caused by sand-papering may rise to 250 milligrammes of lead in a cubic metre of air. A man in breathing breathes 17 cubic metres of air in an hour, that is to say about 140 in an eight-hours' shift, so that if there was only one milligramme of dust in a cubic metre of air he would then have inhaled 140 milligrammes purely by breathing?—Yes.

6360. Now 140 milligrammes is a considerable amount. If he had that on his hands when he was eating he would be soiling his food. You may teach him to get rid of that by washing, but he is breathing 140 milligrammes, so that it is straining at a gnat and swallowing a camel?—You are coming to the conclusion that there is a lot of dust.

6361. We have had experiments carried out?—But we do not experience much of that.

6362. Attention has been rather concentrated on the dry stuff at present, but are you aware that white lead paint at the ordinary temperature of the atmosphere gives off a volatile organic compound?—Yes.

6363. You are aware of that?—I am not a chemist.

6364. I wonder whether you might possibly have heard of the investigations that are now going on. Can you suggest any way in which you are to teach the worker to avoid breathing that volatile lead compound which comes off paint as he applies it to the wall?—I do not see how you can, except by getting as much fresh air in the place as possible.

6365. I agree that fresh air might be valuable there, but is it always possible, when you want your paint to be open near a dusty road?—It is not often the case that they are near a dusty road.

6366. Sometimes, I suppose, you want to let the paint dry in as clean an atmosphere as possible for the

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work's sake?—Yes. I do not know that I can say anything. You gentlemen should know best about that.

6367. You have been undertaking to educate men to avoid lead poisoning, but I want to understand whether when you have undertaken this education you have really known what to educate them against, because it seems to me rather a bold thing to undertake to teach people something when you do not know what you are teaching them?—Surely the question of lead poisoning has been sufficiently to the front to help to bring the matter before us.

6368. Yes, but not the way in which it is caused, I think; at least it does not appear that you have paid attention to the way in which it is caused, so that you could teach people how to avoid it. For instance, you yourself have allowed the possibility of inhaling dust, but have you ever called upon your workpeople to wear respirators? That is an old thing?—We are not subject to much of this dust that you talk about, because our work is rubbed down with pumice-stone and water.

6369. Yes, but is that so in the whole of Sheffield, do you think?—Yes; the bulk of the work is rubbed down with pumice-stone and water.

6370. (Mr. Parsonage.) That is before the first coat is put on. Pumice-stone and water is generally used not only in Sheffield but everywhere else?—Yes.

6371. But the point is after it is applied, do you use sand-paper?—Exactly.

6372. (Dr. Collis.) There is a certain amount of dust caused?—Yes.

6373. Have you ever suggested respirators to your apprentices? A very small amount comes up to an appreciable amount in time?—We have not found it necessary. If you say it is, very well.

6374. You have stated that there is little or no illness among your workpeople, but the amount of study that you, as representing the National Association, have given to the subject of lead poisoning seems to be small?—Well, I have only told you part.

6375. We want to know all?—Supposing this inkpot is a paint can and the paint is put into it, I should teach a man or a lad that he should simply use his paint from one side, and that he should take his brush, and if he wants to put his brush down he should put the bristles on like that (*describing*) so that *this* side is kept perfectly clean. When the man takes it up again he has a clean brush. Many of the men and lads are careless. They will wet *that* side and they will wet *this* side, so that when they want to put the brush down they put it on the wet paint and it is on their hands at once.

6376. (Mr. Parsonage.) After he had found that out, he would still be so stupid as to do it again?—Yes, he would do it again. If you are a practical man you will know that that is one of the things that we teach our lads—that they should just keep one side of the kettle wet, where it is necessary, and that the other side should be kept perfectly clean so that there is no need to get any paint upon the body. If he is carrying this can he has a clean side to carry against himself.

6377. (Dr. Collis.) May I repeat my point? I do not hesitate for a moment to agree that you have been taking a great deal of trouble in teaching them, but you have not found out first what you were teaching them to prevent. My contention is that this will not prevent five out of a hundred cases, and the other ninety-five will go on notwithstanding what you are teaching?—I am speaking now as a practical man.

6378. I am speaking as a practical physician?—You may be a master painter. I do not know.

6379. I am not; I am a doctor?—If you were a painter you would understand what I say, and that is, that as a practical painter I want to keep one side of my can clean, and I want to keep my brush clean. If that is done workmen will not get the paint upon their person in any shape or form.

6380. (Mr. Parsonage.) Do you think that a painter wants showing what you have said?—Yes. If you are connected with the trade you will know that it is done.

6381. Is it necessary to show a man that?—It ought not to be. Personally I think that the question

has come so much to the front lately that people are being educated to avoid these dangers.

6382. (Dr. Collis.) You rather miss my point. I do not suggest for a moment that you do not teach, and teach carefully. My point is that you have not studied what you teach and that your teaching may be useful in its way, but it would not stop five out of a hundred cases if it was all completely done, simply because you have not discovered the way in which the lead enters the human body, namely, not so much by eating off the hands, which may be the cause of five cases out of a hundred, but by breathing and inhaling, which causes ninety-five cases out of a hundred. Could all the teaching that you could ever think of and devise prevent the ninety-five?—It is only a question of whether we get a medical man and bring the matter before our apprentices and others occasionally.

(Dr. Collis.) You miss my point, but it is no good labouring it further.

6383. (Mr. Gardner.) You are thinking of absorption through the skin?—Yes, and not only through the skin.

6384. (Dr. Collis.) Take it from me that it is a fact that lead is not absorbed through the skin at all?—Not at all?

6385. Never. You may practically take that as an accepted medical fact. I, as a medical man, can make that statement?—I am surprised to hear that it is not absorbed at all through the skin.

6386. Let me suggest something that, perhaps, has not occurred to your mind. Are you aware that surgeons, in dressing sprains and bruises, constantly apply the most soluble lead salt—acetate of lead—and that there are probably hundreds of thousands of gallons a day applied to the human body, and that no one has ever known of lead poisoning occurring through the skin by the application of all that amount of acetate of lead. That is a plain point if you have any doubt as to its absorption in any other way?—I do not doubt your word.

6387. By keeping the hands clean you are not going to stop lead poisoning. I want to clear your mind on that point?—That is only one thing.

6388. It does not represent more than five out of every hundred cases. It is a minor thing?—I beg your pardon, I think it is a lot more.

(Dr. Collis.) I will not bow in deference to your opinion, because I hold my own.

6389. (Mr. Parsonage.) You have had no lead poisoning cases in your shop at all?—Not that I am aware of.

6390. You take a great interest in the trade in Sheffield and in painters?—Yes.

6391. Would it be possible for a public meeting of operatives to be held in Sheffield without your being aware of it?—I dare say that it might, but it is not very feasible. The operatives could have a meeting without my knowing.

6392. In December last year, there was a largely advertised public meeting of painters held in the Co-operative Hall, and there were full reports in the Sheffield newspapers the following day?—Yes.

6393. The chair at this meeting was taken by a Sheffield town councillor, whose name I forget. He is not a Labour man at all, but a gentleman who came to take the chair. The meeting was for the purpose of presenting a cheque for 100*l.* to a painter who was paralysed from lead poisoning. It would not come to your knowledge at all?—Not for a while after.

6394. It has not done so up to the present?—Not for a while after.

6395. Not until to-day?—I have heard of it.

6396. You have heard of it before to-day?—Yes.

6397. I understood you to say that up to the present you had not come in contact with any lead poisoning?—Not in my shop.

6398. You are about the largest employer in Sheffield?—Well, I am one of them.

6399. Would you like to see this man about whom I am speaking, to satisfy yourself, because I will send him round to see you, and you can see him for yourself? He is still in Sheffield. He is totally deformed and paralysed?—Quite so.

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[Continued.]

6400. I should have thought that you would have known of it?—I should be pleased to see him.

6401. I can give you several other instances of cases?—If you will do so, I shall be pleased.

6402. The name of the man to whom a grant of 100l. was paid is Walker. So that you see there are cases of lead poisoning in Sheffield?—Oh, yes.

6403. Now, with regard to your technical school, it is not for the purpose of warning the boys to be careful against the dangers of lead, and the boys do not attend for the purpose of being taught cleanliness. They attend to learn a trade. They are educated in their own business?—I take it that even teaching them to avoid certain things is educating them.

6404. But you do not apply your mind to lead poisoning? The question of lead poisoning never enters into your mind?—This thing has only been on the tapis for a little while. There is no doubt we shall bring the matter more distinctly before the boys, and I hope the men as well.

6405. Do you think it would be a good thing if a law were passed that all painters shall be total abstainers? Do you think that that will have a great effect?—I do.

6406. We have been told before that painters generally suffer more on a Monday morning than at any other time. It is a singular thing which must apply to Sheffield just the same as to anywhere else, if it exists. Personally, I dispute the contention?—Do you not agree that the body would be purer if they were abstainers?

6407. Well, I do not see why a painter should be a total abstainer any more than any other man. With regard to lead poisoning, what I want to suggest to you is that there may be scores of cases of lead poisoning in Sheffield, and even in your own shop, that would not come to your notice whatever. Do you agree with that?—Yes, there may be.

6408. So that your evidence, really, with regard to the prevalence or non-prevalence of lead poisoning is of no value?—Only to this extent—that I have a list in my pocket of 18 men who have worked for me, and the average years they have worked for me is 22, and none of those have suffered.

6409. You have not the 18 that have suffered?—They are men who have worked for me for over 20 years, some for 30 and 40 odd years. I have nine apprentices who have served not less than 15 years' service.

6410. You have not nine apprentices at the present time?—No. I am talking of men now.

6411. (Mr. Rice.) You mean nine men working with you who were apprenticed?—Yes.

6412. (Mr. Gardner.) When you say that you did not know of any cases of lead poisoning having taken place in your firm, I suppose you mean cases of painter's colic or dropped wrist?—Yes.

6413. Men may have been off work through illness which was indirectly due to lead without your knowing that it was indirectly due to lead? It may have been so.

6414. Such as Bright's disease and some of the other troubles that affect painters more than anybody else?—It may have been so, but we have not known it.

6415. Of course you do recognise that the handling white lead is to a certain extent dangerous?—Yes.

6416. Because you have told us that you advised them always to keep their hands clean, and their pots and brushes clean?—Yes.

6417. But while you have done that you have done nothing to provide washing places for the men while at their work?—We provide them with soap, and there is always water for them.

6418. (Mr. Sutherland.) And buckets?—Yes, plenty of buckets.

6419. (Mr. Gardner.) In sending out men to an ordinary job where they are doing two or three rooms,

would you always send soap and towels and so forth for washing?—Yes. Our men, as a rule, have soap in their basses with them.

6420. Provided by yourselves?—Provided by ourselves.

6421. (Chairman.) You say "as a rule." Do they always have them?—Yes, they always have them.

6422. (Mr. Parsonage.) Where do they get the soap from?—We supply it in the shop.

6423. Does each man go to the shop and get soap and take it with him?—We give him some. In addition to that we have a barrel of soap that they all help themselves to.

6424. Soft soap?—Yes.

6425. For use for washing the stippler?—Yes, or anything they like. They help themselves to what they require.

6426. (Mr. Gardner.) Although you have recognised the danger, no action has been taken by the employers all through, except that they have said, "You can have soap for washing your hands. You must get hot water if you can, but if you cannot get it, you must do without." You have not made any provision for hot water?—We have not made any provision for hot water.

6427. You spoke of having used zinc paints 30 years ago?—Yes.

6428. Have you used them quite lately?—Yes.

6429. The zinc paint of to-day is not the zinc paint of 30 years ago?—No; but still I think there is not the quality in it, and there is not the covering power, that there is in white lead.

6430. But you have not experimented with it in any degree. You have just taken it and used it in the ordinary fashion?—Yes.

6431. We are told about fumes being thrown off, and about volatile substances, such as turps, that are used in the paints?—Yes.

6432. Do you not think that a substitute for turpentine is a dangerous article?—We do not use it.

6433. (Mr. Rice.) The precautions that have been suggested would, of course, make the work very much more costly?—Yes.

6434. And the public, or the employers, would have to pay that extra cost?—Yes.

6435. You were rather surprised to hear that only five per cent. of lead poisoning cases are caused through the want of washing the hands, were you not, or that it only saved five per cent.?—That is different.

6436. You were rather surprised to hear that washing the hands would only save about five per cent. of lead poisoning cases?—I am surprised. I thought that by neglecting to wash their hands they would get it on their food, and would inhale it, and so get poisoned.

6437. Do you think that the facilities which you give your men for washing their hands are a sufficient remedy, seeing that washing the hands only saves five per cent. of the men?—I think that it saves more than five per cent.

6438. But would you give sufficient facilities to save five per cent.?—Yes, we should be willing to give that, and we ought to.

6439. (Mr. Sutherland.) You, in your local association, have not taken steps to discuss this question, because really it has not forced itself on you in the way of a question properly?—No, it has not.

6440. It is only by the collected statistics that the magnitude of it has been shown?—Yes.

6441. In your own experience your men are generally very healthy?—Yes.

6442. So that there is no reproach attaching to the association for not investigating this?—I think not. We shall be willing to do what we can to help to mitigate the evil.

The witness withdrew.

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[Continued.]

Mr. J. R. CHAPPELL examined.

6443. (*Chairman.*) Do you attend to-day as the representative of the National Association of Master House Painters and Decorators?—Yes.

6444. What is your business?—Painter and decorator.

6445. What town do you represent?—Leeds.

6446. For how long have you been in the painting business?—33 years.

6447. What is the average number of painters employed by your firm?—About 25.

6448. Have you known of any cases of lead poisoning or painters' colic?—No, not one case.

6449. Do you insure against your liability for the payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—Yes.

6450. Has the rate increased in the last few years?—Yes.

6451. Why is that, do you think?—Well, I expect on account of lead poisoning for one thing.

6452. Have you known men who have broken down temporarily on account of lead absorption?—Not to my knowledge.

6453. When did the insurance companies first put up their rates?—I do not know—perhaps three years ago.

6454. Do you have a periodical medical examination of your men?—No.

6455. Then is it possible that some men suffer from the slower and more insidious forms of poisoning without your knowing it?—I do not think so.

6456. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—From experience, I do not think that I am troubled with it, and I am amongst it constantly, and men who have been with me and my father for a long period are all right.

6457. You take a prominent part in the work of the Master Painters' Association, do you not?—Yes.

6458. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—Yes, we have talked about such things.

6459. Have you taken any steps collectively as an association to discover how much illness there was amongst the men employed by your members?—No, not that I know of.

6460. But you have heard of the prevalence of lead poisoning amongst men who handle lead paints?—We hear about it certainly.

6461. Has your association never attempted to collect statistics concerning the number of men who have become ill?—I do not know that they have—not to my knowledge.

6462. Why have they taken no steps to collect statistics?—That is a difficult matter to answer. I do not know.

6463. But you knew that there was a very great deal of lead poisoning about, did you not?—From my own experience, no.

6464. But the fact of the insurance companies having put up your rates gave a clear indication to you, did it not, that there must have been a good deal of lead poisoning about?—Taking it from a general standpoint, we should regard it as an indication, but from a personal standpoint I should not.

6465. But collectively, when you had the information before you that the insurance companies were putting up their rates, you took no action to mitigate the evil?—No.

6466. Did your association ever consider the advisability of having a medical examination made of the persons employed?—Not that I am aware of.

6467. Have your association ever taken any collective measures to discover a substitute for white lead in paints?—Yes.

6468. Collectively?—Yes.

6469. What steps have they taken? It will be very interesting to know what they have done?—We have had boards painted with different pigments and sent out all over the country to see the different

atmospheric effects of different towns—seaside towns, inland towns, and manufacturing towns.

6470. Did you employ a chemist to make scientific investigations for you?—No. What I have spoken of is in hand at the present time.

6471. The question of employing a scientific man to make investigations for you has not occurred to you?—It has not come to that stage yet.

6472. Do you realise yourself the amount of injury which obtains in your trade?—Well, from my own personal standpoint I say again I do not realise any great danger.

6473. Do you know that there have been 234 definite deaths from lead poisoning in the last 10 years?—No, I do not.

6474. And that the death-rate from Bright's disease and nervous diseases due to work in lead is very high?—I am not aware of that.

6475. Do you know that about 2,000 cases of lead poisoning in the trade were reported to the Home Office voluntarily without any legal compulsion whatever in the last 10 years?—No; it is news to me.

6476. Do you realise that these cases, reported voluntarily as I have said, are only a fraction of the whole, inasmuch as the Home Office have no legal right to pay for such reports and are therefore bound to discourage reporting to some extent?—I can only speak from experience.

6477. I am sure you will agree with me that all this sickness and death is very deplorable?—There is no doubt about that.

6478. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I know that there has been controversy in different countries about the same thing.

6479. And that the use of white lead has been most strictly regulated in many countries where the use of white lead is still allowed?—Yes.

6480. Do not you think it regrettable that this country should be behind other nations in this respect?—Well, if a proper substitute can be found for white lead, I should be one of the first to grasp it.

6481. Do not you think it regrettable that this country should be behind other nations in protecting their workpeople?—Just so. I think we ought not to be behind.

6482. Do not you think that we ought to level up to other nations?—Certainly. I am quite of that opinion.

6483. Even if it means the prohibition of lead?—I should be satisfied if there was something else.

6484. I am speaking of protecting the workpeople. I ask you again, do not you think that we ought to be abreast of other nations, even if it means the prohibition of lead?—I certainly think we ought to be up to other nations; I quite admit that.

6485. A great many small dangers attend the use of lead; for instance, the risk of contamination of food by unwashed hands. Do you attach much importance to personal cleanliness on the part of the men?—I think that is the first and the most important factor—that every man should wash his hands before he has a meal.

6486. Then you consider lavatory accommodation essential?—Certainly.

6487. Including a supply of hot water?—Hot is certainly better, but cold will do all the same if you cannot get hot water.

6488. Do you think it possible for a painter to wash his hands, in the very limited time which he has allotted to him, in cold water in severe winter weather?—Yes; if he can get the soap to lather he can wash in cold water.

6489. The time allotted to him is about one minute, is it not?—No. I think no master painter would complain of a man washing his hands. He would not stint him the time, surely. That is my opinion.

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[Continued.]

6490. I will put it in another way; would you agree to allow a painter sufficient time to wash his hands in cold water if he could not get hot?—Certainly.

6491. And take it out of your time?—Certainly.

6492. Whether he uses hot or cold water?—There is nearly always an opportunity to get hot water.

6493. You think hot water better than cold water?—Certainly.

6494. Do you advocate definite rules regarding the wearing of overalls?—Yes. Every man is expected to wear overalls, if you call overalls an apron and long jacket. I do not mean trouser overalls. Some do that even, but not many.

6495. Do not you think that trouser overalls are important?—No, I do not.

6496. But is it not true that a workman in the course of his operations gets his trousers covered with some of the lead dust?—He may do so—a little bit.

6497. Is not that a source of danger?—I should not think so.

6498. You may take it from me that it is a very great source of danger and that any dust of that sort accumulating on a man's clothes is likely to be breathed by him and he is likely to be poisoned?—I do not think I have taken much harm.

6499. That does not prove anything, because there are some people who are quite immune from lead poisoning like they are from other diseases?—Exactly.

6500. I have seen men who have been working in the potteries for 40 years under the very worst conditions who have escaped, but I have seen other people who have been in it only a few weeks under the very best conditions who have contracted lead poisoning?—Quite so.

6501. How can you ensure that these overalls are kept in a clean state?—I cannot. Every Monday morning a man brings a clean set of overalls.

6502. But supposing he does not bring them clean at all?—Then he should not start work.

6503. Who would prevent him?—I should prevent him.

6504. Could that be generally applied?—He would know if he did not come with clean overalls he would not start work.

6505. Would you make that a condition of his employment?—It is understood.

6506. Would you make it a general condition of his employment?—In my own shop?

6507. No. Would you make it a statutory condition?—Yes. I think no painter who thinks anything about himself would attempt to come in dirty clothes on Monday morning.

6508. Would the Home Office be right in introducing a special rule to the effect that no painter should commence work unless he had clean overalls on Monday morning?—Yes.

6509. How would you enforce such a rule?—It would be a man without much pride that would come without clean clothes on a Monday morning.

6510. Supposing a man put his pride in his pocket, how would you enforce such a rule?—I should let him have a day's holiday.

6511. If the workman has to take the overalls with him in his bag, will they not come into contact with his food?—No.

6512. Why?—Because a man's food would be carried in a different bag from his tools.

6513. Does every painter carry two bags?—They generally carry their food in a piece of paper. More than anything it is in paper. Or it is in a cloth or handkerchief perhaps, or something of the sort.

6514. Where are the overalls kept from day to day when he is working continuously on a job?—In his bag.

6515. Can you always provide a place for a painter to hang up his coat where there will be no risk of dust falling upon it when he is working?—If they were doing this room, their clothes very likely would be in another room.

6516. Can you always be sure of that?—You cannot always be sure. They may be only doing one room.

6517. If they are only doing one room they have to keep their clothes in the room they are working in?—They find ante-rooms or passages or something of the sort to keep them in.

6518. Would it be true to say that there are some cases where the men have to keep their clothes in the room where they are working?—It might occur in odd places.

6519. That would be a source of considerable danger to the men?—In isolated cases it might occur.

6520. In might occur in some cases?—It might possibly.

6521. Would you agree to a rule being introduced prohibiting that?—Yes, I should not be against it.

6522. Do you advocate also a rule requiring mess-rooms, so that no man shall eat his food in the place where paint is being handled?—Yes.

6523. Or where work is being performed?—Yes.

6524. You would make that a special rule?—Yes.

6525. Can you always provide a place quite free from the risk of contamination where a painter may eat his food after his work?—Yes, I think that could be done.

6526. Throughout the country?—Yes.

6527. All these precautions, as well as others, are insisted on for the mitigation of lead poisoning risks in the potteries, but would it not be exceedingly difficult to carry them out faithfully in connection with house painting operations?—I think the white lead in the potteries and in house painting are two different things altogether.

6528. The dangers in house painting are very much more severe than in the other?—I should not have thought so.

6529. At any rate, at the best, such precautions as overalls and washing hands, and so on, would not deal with the most important risk, namely, the risk arising from dust and spray which the workman can inhale during the whole of his working time?—I do not know how to reply with regard to that. I do not see much danger myself in it.

6530. You do not see much danger in the dust that arises from various operations, such as dry rubbing down?—Certainly there is danger in dry rubbing down.

6531. I will put the question again. Supposing we can get rid of some of the dangers by washing the hands and wearing of overalls, there are other dangers which exist from dust and spray which the workmen come in contact with during their work?—Yes.

6532. Now I will ask you a few questions about the latter. First, as regards rubbing down with sand-paper: I understand that this process is indispensable?—There is bound to be a certain amount of rubbing down with sand-paper. I quite admit that.

6533. Is the dry method not invariably applied to newly painted surfaces on which the paint has already dried?—Yes. They are rubbed down slightly between each coat.

6534. I understand that the wet process cannot be substituted for dry rubbing down between the first and second coats when ordinary paint has been used?—No.

6535. Now, where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—The only way is by damping the sand-paper. That is the only point that I can think of.

6536. But damping the sand-paper would not prevent dust coming from the operation, would it?—Yes.

6537. (Mr. Parsonage.) Is that ever done?—Yes, at odd times.

6538. You have seen it done?—Yes, damping with turpentine.

6539. (Chairman.) I must ask you my question again. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—There is no prevention that I know of.

6540. The amount of dust arising from this sand-papering I am told is very considerable?—I have never seen it then.



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[Continued.]

6541. We have been told that it covers the painter's clothing as well as the floor and surrounding objects, but whatever it is, large or small, you say that you consider that there are no possible means of preventing the workpeople from breathing it?—I have never had any occasion to think of anything for getting over that difficulty in my own business.

6542. The next process I want to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work?—Yes.

6543. This gives rise to splashes which frequently fall even on the face of the worker?—Yes.

6544. How can you deal with the spray which arises in this operation?—I do not know that there is any way of dealing with it.

6545. You could not use an exhaust draught to catch the spray?—No.

6546. Then again we are confronted with the problem of how to save the worker from the grave danger involved in breathing the spray?—I do not know of any way.

6547. Then with regard to stippling, there is a certain amount of splashing and spray from that. How would you deal with that?—Well, I do not know that there is a remedy.

6548. Do you have the old paint burnt off with a spirit or charcoal burner?—With spirit.

6549. How can you prevent the worker from inhaling the fumes that arise from this process?—It is impossible.

6550. Where and how do your men mix their colours?—On the job.

6551. Do you adopt any precautions to deal with the dust that arises when colours are handled dry?—We do not use dry colours. All our colour is in paste form.

6552. It appears from your evidence that there are certain indispensable processes in carrying out which a painter must necessarily inhale some dust, some spray or fumes containing lead. How are these dangers to be met?—Well, I do not know. As I said before, from my own experience, I do not all much.

6553. Is it possible to remove the danger entirely in any way than by using a substitute for lead?—Not that I am aware of.

6554. Now, various witnesses have told us about non-poisonous substitutes for lead. Have you had any personal experience of such substitutes?—No. I have used zinc, if that is what you mean.

6555. What results did you obtain with zinc paints?—I find that zinc is all right for inside, but it will not do for outside work. I use zinc pretty freely for inside work.

6556. The Office of Works and others have succeeded in obtaining efficient non-lead paints, both for inside and outside?—Indeed!

6557. And the Office of Works have told us that after four years' trial they find them very satisfactory. What do you say to that?—I should not consider four years long enough to test them.

6558. What would you consider would be long enough?—If it was like a job I have been on this week, which was done 50 years ago, and still looks beautiful, I would give in at once and say they had found something better than lead.

6559. I want a serious answer. What do you say seriously?—I think that is a serious answer. I am on a job now that my father worked at 50 years ago. That is beautiful, and if a job done with non-poisonous paint were anything like that, I should at once come to the conclusion that something better than lead had been found.

6560. I ask you what do you consider would be a reasonable time?—I should think 10 years.

6561. What are the usual hours worked by your painters per week?—They start at 7.30 in the morning and leave off at 5.30.

6562. What does that come to per week?—Nine hours a day—50 hours a week. They work 7.30 to 12.30 on Saturdays.

6563. Would you welcome a strict limitation of the hours of employment, say, to 48 a week?—No, I should

not. I think they work short enough. They would like to work longer, and they do work longer.

6564. They sometimes work overtime?—They work as long as they like in my shop.

6565. In the pottery industry the working hours are to be restricted to 48 per week for men who work in lead. You would not like that introduced into your industry?—No.

6566. Do you have periodical medical examination of your workers?—No.

6567. You know that in other industries where lead is used, the Home Office insist on monthly or even weekly examination by a certifying surgeon?—Yes, but then painting is a healthy occupation. A man is very often outside and he has plenty of fresh air. It is not like working in a lead mill.

6568. And yet the incidence of lead poisoning among house painters is greater than it is in the Potteries?—That seems strange to me.

6569. It may seem strange, but it is true?—Particularly when I have not had one case of lead poisoning, nor my father who started business in 1868.

6570. It is not strange to me, because there are over 500 potteries, and out of those two-thirds have never had a case of lead poisoning, so it does not astonish me to hear master house-painters come to tell me they have had no cases. But what we have to consider is that the incidence of lead poisoning in the house painting industry is greater than in the china and earthenware industry, so that the question of medical examination becomes a very serious matter for us to consider. Would you welcome a system of periodical medical examination in your industry at the employers' cost?—No, I should not from my own standpoint.

6571. Would you like to give compensation to any workers suspended by the doctor on account of doubtful health, which rule obtains to-day in the earthenware and china trade?—We have to pay compensation when such a case arises.

6572. These are doubtful cases that I am speaking of?—We have to pay according to the doctor's certificate.

6573. But you only pay to-day for cases that are absolutely certified. Under the scheme of regulations for the earthenware and china trade, a certifying surgeon goes in and examines the men once a month and he says, "That man has no actual lead poisoning, but he looks very much as if he might have." The doctor has power to suspend him, and in that case the employers have agreed to pay half-wages for a certain period. I want to bring out this point: If this industry is levelled up to the earthenware and china industry with regard to special rules, you would have medical examination of your workpeople, for which employers would have to pay, and they would also have to pay compensation to any workers suspended by the doctor on account of doubtful health. Would you welcome those two provisions?—If I take my past experience, I should not be against it.

6574. You would have to pay for the examination in any case?—Yes. I have never had to pay.

6575. You realise too that, if the free use of lead is allowed to continue in your industry, the Home Office would have to insist upon the rigid observance of precautionary measures in the same way as in other industries where the workers handle lead?—Well, as I said before, if there is something better to be brought out it is a different matter.

6576. I only want you to say whether you realise the position?—I would rather you put it again, because I have scarcely grasped it.

6577. I want you to realise that, if the free use of lead is allowed to continue in your industry, the Home Office will have to insist on the rigid observance of all the precautionary measures which this Committee may suggest in the same way as in other industries where the workers handle lead. You realise that?—Yes. Well I should have to abide by it of course.

6578. And you realise that the hours of labour would probably have to be reduced, as has been done in other dangerous trades?—I see no reason for that.

6579. But you are not asked for your reason. You may see no reason for it, but the Home Office

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[Continued.]

may. We had the best medical witnesses the country could produce, including Sir Thomas Oliver, before the Potteries Committee, and they convinced them that it was essential to keep the men out of lead as long as possible, and so the committee recommended the restriction of the hours of labour to 48 hours a week. Now the special rules would involve an extremely complicated and elaborate code of regulations. Are you fully prepared to set up the necessary machinery in your business to secure complete observance of all the regulations relating to overalls, lavatory accommodation, mess-rooms, avoidance of dust, limitation of hours of employment, and all other such matters?—I do that now, and if the law passes I shall have to do practically as I do now. There are odd cases certainly.

6580. The dangers you agreed are very serious. We shall have to suggest something to remove them?—Well, I do not agree with it.

6581. Now taking all these points into consideration, and not forgetting that the periodical medical examination which would be insisted upon would have to be paid for by the employer and that payment of compensation to workers withdrawn from work in lead would have to be borne by the employer, would you say that you would prefer that the industry should be regulated by such special rules as I have foreshadowed or as an alternative that the use of lead should be prohibited or very closely restricted?—Speaking from my own experience, there is no need to prohibit the use of lead, and I have no need to go into all those regulations.

6582. But I am putting the two alternatives. I want you to realise this. This Committee has been called together to deal with a very serious evil. We have to do one of two things; we must either prohibit the use of lead or restrict it within very close limits, or we must introduce a code of special rules to deal thoroughly with the evils as they exist. I have foreshadowed to you what that list of regulations would be, and I ask you this question: which would you prefer as an employer—the prohibition of lead or its restriction to a very low amount, or a code of rules such as I have suggested to you. I ask you to consider the two alternatives?—I should think perhaps a code of rules. A well-managed shop is governed by rules.

6583. Supposing that it is found impossible to introduce such a code of rules as would deal with the great evil, then would you be surprised if the Committee suggested the abolition of the use of lead? You have told us to-day that there are certain operations which we consider to be dangerous for which you can find no remedy. You cannot remove the danger?—Just so.

6584. Supposing the Committee came to the conclusion that those dangers are so serious that they can only be overcome by the abolition of lead, would you be surprised at that decision?—No. I should think that the evidence that you have gathered from different experts would lead you to the best conclusions, and that you would frame the law accordingly.

6585. And you would loyally abide by that?—I should loyally abide by whatever was done, or I should try to do so.

6586. (Sir Godfrey Baring.) As an experienced man, would you think it a very serious matter for the trade if lead was prohibited by this Committee?—I should. I think there is nothing on the market that is as good as lead for exterior work—speaking of that more particularly than interior work.

6587. (Dr. Collis.) The question of the amount of dust which is caused has been under consideration. You say that you do not consider it very much. I am, of course, referring to sand-papery?—Well, I am probably in a peculiar position. I carry on a business that was established by my father in 1868. My father is out of the business now really, but still he dodges about and if he came on to a job he would start sand-papery. He would do the dusty work. He revels in the sand-papery, and he is 71 years of age. If this was going to do him any harm it would have done it long ago.

6588. But the point I was raising was not the amount of dust which your father caused, but whether

you considered there was much dust. You think your father causes some dust?—I think he does a bit, but I think it has done him no harm to look at him.

6589. But that is not the point. The chairman has already drawn your attention to the fact that what is one man's food is another's poison?—Exactly.

6590. Some men seem able to absorb into their systems amounts of lead which would kill another?—Yes.

6591. Have you any idea of the amount of lead which is present in the air where sand-papery is being done?—No.

6592. Would you be astonished to hear that experiments, carried on at the breathing level of a man who was sand-papery in the coach-painting trade, showed that the air contained from 180 to 250 milligrammes of lead per cubic metre of air, while in the Potteries, to which you have probably had your attention called by the public agitation which has taken place concerning lead poisoning there, in a process where the exhaust ventilation was not working, and therefore you would have expected the proportion of lead present to be high, 13 milligrammes was the highest amount found, and the investigator who made these experiments on behalf of this Committee found in only one trade he investigated previous to this present inquiry as high as 124 milligrammes of lead, and in no other trade did he ever get above 60. In dealing with sand-papery he found 180 to 250 milligrammes?—That depends in a great measure on the preparation before the sand-papery comes about. If I was going to do these walls, for instance, I should rub them down with pumice-stone and water for a start. They would not require so much sand-papery afterwards. The door would be rubbed down in the same way. It would be sand-papery between each coat. I am speaking to practical men.

6593. (Mr. Parsonage.) Supposing you go into a house where a room is to be fluted and it had been finished in flut two years previously, you would not trouble to rub that down with pumice-stone and water. Before you painted it, you would sand-paper it down?—Not at all necessarily.

6594. You would use pumice-stone and water?—Certainly, from more than one standpoint—for cleanliness, to get rid of the dirt and bring down the grease.

6595. (Dr. Collis.) I want to know whether you appreciate the fact of the danger in what looked to you infinitesimally small amounts of dust. If you went round some places in the pottery trade you might think there had been a lot of fuss there about nothing; because you would not see the danger. It would not be obvious to your eye. I want to know whether you appreciate the fact that the lead contained in the dust at the breathing level (I am not talking about the dust that falls to the floor) of the workmen has been found to be 10 to 20 times the amount that is present in a shop where the pottery lead-worker is working?—No, I cannot go against that.

6596. You said that you used your paint in paste form?—Yes.

6597. Do you prefer matured paint or new paint? You get white lead in paste, do you not?—I like old lead better. I do not know why. I am using some lead at the present time that we have had in stock three years, if that answers the question.

6598. That is what I wanted to know. That is a preference in the trade, is it not?—Yes; we like old lead.

6599. Are you aware that old paint or matured paint (to use a better phrase for it) gives off a volatile lead compound?—No.

6600. Which comes off when it is applied wet and may be inhaled by the workman and have a bad effect on him, and that traces of such absorption have been found in the blood of ordinary inhabitants of a house where painting has been going on?—It is news to me.

6601. This investigation is practically new work. It is probable that you would not have had an opportunity of knowing it. So that I want you to grasp that there is danger, as we have had proved, from the dust that is present in the air; and that, even if you got rid of the dust, the emanation which wet lead paint

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will give off at the ordinary temperature of the air—what you know as the smell of lead paint in other words—really does contain lead and may be in itself sufficient to poison a worker?—I should have scarcely thought that, but of course I must not go against what you put to me.

(Dr. Collis.) The latter point has been brought out by Dr. Baly, of Liverpool, during the course of the last two months.

6602. (Mr. Parsonage.) You know of no lead poisoning cases at Leeds at all?—I do not know about Leeds, but I can speak for my own shop.

6603. You have none in your own shop?—No. My father established the business in 1868, and, as I said before, there has not been one case of lead poisoning of a man who has worked for us at all in the whole of that time.

6604. I can assure you that I have known several cases?—In Leeds?

6605. Yes, in fact we have a solicitor who takes up all our cases there, and he gets a good deal from us in the course of a year, so that you have been very fortunate in your shop?—Yes. Coming down in the train I made a list of the men and the periods they had worked for my father and myself. Is that any guide, or is it wasting time?

6606. (Dr. Collis.) Have you their ages?—In the first place one man was apprenticed with my father, and he has been 34 years with us and is with us yet. Another man apprenticed has been with us 32 years. Another man who was not an apprentice has been with us 28 years. Another man who was not an apprentice has been with us 25 years. Another man apprenticed has been with us 16 years. Another man who was not an apprentice 15 years. Another man who was not apprenticed 13. Another man that was apprenticed 10 years. Another man that was an apprentice 8 years. Another man who was not an apprentice 6 years. Another man who was not an apprentice 6 years. Another man who was not an apprentice 5 years, and another who was not an apprentice 4 years. That stuff is kept on practically the year round.

6607. (Mr. Sutherland.) That is your permanent staff?—That is our permanent staff.

6608. (Dr. Collis.) Even those figures which you have produced, which sound very long, after all do not establish a case. If you allow the apprenticeship time to be 20 years of age, I gather that the oldest of those men would not be 60?—One of these men is just about 60.

6609. An average age at death of 48 to 49 we look upon as rather young. If the oldest man you are producing to us is 60, what has happened to the people between 60 and 70. It is rather against you than for you. The figures sound big, but when analysed they do not establish the point?—We have not had a chance of keeping the men on until they reach 70. We lost a man a short time ago who had been with us from 1868. He died from cancer a few months ago. He had been with us 40 years.

6610. You follow my point. You give us negative instead of positive evidence?—I hope to go on longer.

6611. (Mr. Parsonage.) We place our men on superannuation benefit at 60 years of age. That would be some guide?—I might say that my father was an indoor apprentice. I am speaking of painters. In the winter time he had to grind his own material, as you know an indoor apprentice had to do. He had to be found something to do, and in those days he had to grind his own material, and he is nearly 72.

6612. You do not find that painters take up any other occupation than painting as a rule, do you, in the slack season?—No, a painter is a painter till he dies.

6613. That agrees with my own view?—I could mention several old men who are painters, master painters, in Leeds alone.

6614. (Mr. Gardner.) You agree with me that the apprentice in the old days, such as your father was, would be more exposed to lead poisoning than men are to-day?—Certainly.

6615. What explanation would you give of the fact that lead poisoning is as prevalent to-day, if not more so, than it was 50 years ago?—They, perhaps, called it by another name 50 years ago, the same as they did appendicitis.

6616. You said that you had not come across cases of lead poisoning, but I suppose you would call a case of a man suffering from lead poisoning a man who was suffering from colic or dropped wrist. A man who was suffering from cancer, or Bright's disease, or phthisis, you would not put down to the credit of white lead?—No.

6617. You realise that working painters are more subject to cancer, and Bright's disease, and phthisis than any other trade?—This man that I was speaking about just now who died from cancer was a grainer and varnisher the whole of his time. He did not come into contact with white lead very much. He was an apprenticed grainer. He was one of the old sort—apprenticed to be a grainer.

6618. Have you worked as a journeyman?—I was apprenticed to the trade. I have been through the mill from spout cleaning to sign painting.

6619. You do not work at the trade now, do you?—I do occasionally now. I worked yesterday morning just before I set off. I was mixing paint.

6620. You have heard of lead poisoning cases you say, and that there are such things as cases of lead poisoning in the trade and in the town, but the employers there collectively took no action to ascertain how many there were?—No.

6621. The insurance companies raised your rates largely, you think, through the inclusion of lead poisoning, and you did not object to their raising your rates?—We had no option.

6622. If a man says to you, "I will charge you so and so because of a certain contingency," and you say, "But that contingency does not arise," as a business man you object?—We did not like paying 5*d.* for an ounce of tobacco, but we had to pay it. They made us pay it because of the combine.

6623. That is a different thing?—There is a combine in insurance.

6624. But there is a little bit of difference that comes in in that. The employers might have said as a body, "Shall we pay this extra insurance. It is monstrous?"—We did so.

6625. But you are surely large enough to form a mutual society, and then having the employers as a body, if they refused to give you a rate that you agreed with you could arrange the insurance yourselves?—No, we are not.

6626. The great Shipbuilders' Association does it. You believe in personal cleanliness as being a preventive against lead poisoning?—Yes.

6627. And that washing materials should be provided?—Certainly.

6628. Does your firm, or other firms to your knowledge, provide washing materials for the men on jobs?—I should think so for their own credit's sake.

6629. Yes, but quite apart from their own credit's sake, do you think that they do it?—Yes, I think so. I know that I do in my own shop.

6630. Do you take steps to see that the men get hot water for washing purposes?—Yes.

6631. If they are working in an empty house?—They would see to it themselves as a natural consequence.

6632. They cannot always see to it themselves. In a suburb, where can a man get hot water if the house is empty?—There is always more or less opportunity for getting it.

6633. If a man goes into a house to do out one room, he is compelled to take his food very often in the room he is working in?—I think if there is a public-house they will go there rather than eat in the open.

6634. But public-houses are not always there, and we do not want men to go to public-houses to take meals?—Quite so.

6635. As a general rule, if a man goes to a house to paint one or two rooms, he has to take his food where he works?—No.

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6636. Where is he to go?—A man will go into the fresh air to get away from the paint if he thinks much about himself, and he will get out of the paint.
6637. He would scarcely take his tea or his dinner and go and sit down on the street kerb. He would prefer to take it in shelter than go outside?—Yes, but he would find a place.
6638. (Mr. Parsonage.) I have seen a man turn a can upside down in the paint shop and sit on it?—We do have that sort of thing sometimes.
6639. (Mr. Gardner.) You think that zinc would not do for outside work?—That is so.
6640. Have you ever made any definite experiment with it for outside work?—Yes.
6641. You tried it in different forms?—Yes.
6642. And you were not successful?—No, I have never been successful with it.
6643. (Chairman.) What trial did you give it? For what length of time?—It has had different lengths of time. I have had it under my own personal observation, and it has been a failure.
6644. (Mr. Gardner.) Have you tried it with varnish?—Yes, I have tried it with varnish. I have made a kettle of stuff, and the next morning it has been "livery," and could not be got out of the can.
6645. (Chairman.) Have you actually painted outside places, and given it a good trial?—Yes. The zinc undoubtedly flakes off.
6646. (Mr. Gardner.) Was it sulphide or oxide of zinc?—Oxide.
6647. (Dr. Collis.) Have you used the sulphide?—I do not know; I might have. I cannot say about that.
6648. (Mr. Gardner.) You used what you got from the manufacturer as a zinc paint without knowing what you got?—Yes.
6649. (Mr. Sutherland.) It would be the sulphide?—You do not go into the mixture when you buy the paint. We asked for a zinc sulphide or oxide, as the case may be.
6650. (Mr. Gardner.) Do you think that we could abolish dry rubbing down absolutely without any serious consequences?—I think that it would be a difficult matter to abolish it altogether.
6651. But would it impose any serious inconvenience in regard to the finish of the work or in regard to anything else connected with the work?—That would get rid of a great deal of the complaint that at present is laid against white lead. I should not, from my own personal standpoint, like to abolish rubbing down entirely.
6652. (Mr. Parsonage.) You could not substitute pumice-stone and water between coats?—No, the paint is not hard enough.
- (Mr. Sutherland.) By careful first-coating and careful rubbing down, the other coats could be done without any rubbing down at all.
6653. (Mr. Parsonage.) It is an impossibility to do away with the entire rubbing down, is it not?
- (Witness.) Next door to an impossibility in ordinary painting work.
6654. (Mr. Sutherland.) It is your opinion that the painting trade, as a trade apart from this aspect of it, is a healthy trade?—It is.
6655. And the men work under pleasant conditions?—They do.
6656. The Chairman asked you whether we should not be abreast of other nations. Do you know that Germany have considered the question of the use of lead, and have come to the conclusion that they cannot do without it?—Yes, and I think that we shall come to the same conclusion.
6657. Do you know that the Dutch Government, after very serious consideration, in their report say that for certain positions nothing can replace white lead?—I am of that opinion.
6658. And that the Government of America have not taken any steps for the prohibition?—Yes.
6659. So that, having regard to Germany, Holland, and America, even if we retain white lead we shall be fairly abreast of other civilized communities?—Yes.
6660. I have not the report that Dr. Collis is submitting to us as to the collected dust in a room, but in the normal way of rubbing down it would be something very light?—Yes, I think so.
6661. In the ordinary way of sand-papering it would be very light?—Yes. We must not expect to get the same body of colour off a door. If a door is well rubbed down in the first instance and then painted, the men would not want to rub down to fetch all the paint off again. It would want a slight rubbing down, and in my opinion there would not be much dust connected with that.
6662. That is the normal rubbing down?—Yes.

## Mr. ARCHIBALD WILTSHIER examined.

6663. (Chairman.) Do you attend to-day as a representative of the National Association of Master House Painters and Decorators?—Yes.
6664. What is your business?—Ours is a painters' business.
6665. What is the name of your firm?—A. Wiltshier. I am in business for myself.
6666. Whereabouts is your business situated?—Watling Street, Canterbury.
6667. How long have you been in the painting business?—Twenty-two years.
6668. What is the average number of painters employed by your firm?—I should say about 40 or 41, taking the average number.
6669. Have you known any case of lead poisoning or painter's colic?—Yes, I have known one, not a serious one.
6670. Only one case in how many years?—Twenty-two years.
6671. I am not surprised to hear that there are some firms, especially in the country, exempt from lead poisoning cases, because, as you may be doubtless aware, in the Potteries there are many large works which are entirely immune from the evil. The trouble is that even some of the best works are not immune, and moreover a works that has been free of lead poisoning for many years will sometimes have a succession of several cases quite unexpectedly. Do you insure your liability against payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—Yes.
6672. Do you know that insurance premiums have been raised in the painting trade in recent years?—Yes, I do know that.
6673. Have you known men who have broken down temporarily on account of lead absorption?—I have known one man, to my knowledge.
6674. Have your men had occasional days of sickness due to lead?—No, I think not.
6675. Do you have a periodical medical examination of your men?—No.
6676. Then it is possible that some of them may be suffering from the slower and more insidious forms of lead poisoning?—I think not.
6677. You know, I presume, that lead poisoning frequently undermines the health, without immediate violent manifestations?—No, I cannot say I do.
6678. Do you take a prominent part in the work of the Master House Painters' Association?—Not a very prominent part.
6679. Has the question of the serious prevalence of lead poisoning among house painters been discussed at the meetings of the association?—I have not been to many; I am too far away.
6680. You do not know whether your association has ever taken any collective measures to find a remedy for the evil existing?—Yes, I think they have.
6681. What are they?—I know they have tried experiments with non-lead paints.
6682. Do you realise the magnitude of this lead poisoning evil?—Yes, I realise it.
6683. Do you know that the Registrar-General has recorded no less than 284 definite deaths from lead

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poisoning amongst house painters in the last 10 years?—Yes.

6684. And his mortality figures for painters show a death rate considerably higher than the normal from troubles which are the effect of frequent exposure to lead, such as Bright's disease, and nervous diseases?—Yes.

6685. Do you also know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the 10 years?—No, I was not aware of that.

6686. And that these cases, reported voluntarily, are only a fraction of the whole?—No, I was not aware of that.

6687. But you have realised that this lead poisoning evil in the house painting trade is a very serious one?—I have realised that anything which causes the illness or death of a man is a serious question.

6688. And you knew that the rate of mortality was a very high one?—I knew it was 284 deaths in 10 years.

6689. Have you taken any steps yourself to mitigate this evil?—I take every precaution amongst my own men—in fact, I am always on to them about cleanliness and open windows.

6690. I am sure you agree with me that this sickness and death is very deplorable?—Any sickness and death is deplorable.

6691. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes.

6692. Do you not think it regrettable that this country should be behind other nations in this respect?—I do not know that we are behind other nations.

6693. Yes, we are; we have no rules at all regulating the trade. A great many small dangers attend the use of lead. For instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—Yes, very much importance.

6694. Then you consider that lavatory accommodation is essential?—Yes.

6695. Including the supply of hot water for washing?—Hot water is very essential, if you can always get hot water. My men in my shop can always get hot water.

6696. Is it generally practicable for the men to have hot water to wash in?—It depends on the circumstances. When they are out on a job, I think you might say in six out of 10 cases there is a hot water tap where they can get hot water.

6697. You agree that hot water is very much better to wash the paint off the hands than cold water?—I must say it is better, but at the same time at times it is difficult to get.

6698. Do you advocate definite rules regarding the wearing of overalls?—Yes.

6699. How can you insure those being kept in a cleanly state?—Once a week every man must have a clean overall.

6700. Is that the rule in your firm?—Yes, if the man does not have a clean overall on Monday morning, he is told to go home and get one, and if he has not got one he is suspended until he has got one. I will not allow a man on Monday morning to start off with the overall which he has been wearing all the previous week. He might wear it from 6 o'clock until breakfast time, but not longer.

6701. (Mr. Parsonage.) If he has had a clean job the previous week, you allow it, do you not?—No, a man cannot wear an overall for a week, even if he is very clean, without getting it dirty.

6702. (Chairman.) What becomes of the overalls when the men have finished work every day?—They are put down with their basket, and their tools, and so on.

6703. Do the men take their overalls home with them in their bags?—Not every night.

6704. Where can the overalls be kept from day to day when working continuously on one job?—If there is anywhere to hang them up, they hang them up.

6705. Whereabouts are they hung up? Are they hung up in the room where they are working?—Yes.

6706. So any dust that has accumulated in the room can collect on their overalls?—I do not think you would get much dust accumulating.

6707. But any dust that has accumulated can collect on their overalls?—Yes, any dust that will accumulate. The overalls are in the room as a rule. You might have cases where the overalls are down in the stables, or anything like that, when you are doing up a country house.

6708. Can you always provide a place where the painter can hang up his coat, where there will be no risk of dust falling on it?—Yes.

6709. Do you advocate a rule regarding meal rooms, so that no man shall have his food in a room where paint is being handled?—Yes.

6710. Can a place always be provided quite free from risk of contamination?—Yes.

6711. Are you quite sure of that?—Yes.

6712. But supposing the men are working in one room in the winter, where would they have their meals?—They would not have them in the room; they either go down in the kitchen parts, or in most of our cases they go home to their meals. If it is a country house, where they do not get home to their meals, there is always somewhere. It is a very rare thing for a man to have his meals in the room.

6713. Where do the men keep their food during working hours?—Generally, where they hang their coats up, but it is away from all paint.

6714. Where do they hang their coats up?—In an off room, or anywhere like that.

6715. (Mr. Parsonage.) In the room where the paint bench is?—Yes, sometimes in the room where the paint bench is. As a rule that is not in the room where they are working.

6716. But it is where the paint is kept. The foreman will lock that room at night, and the men will leave their overalls there?—Yes.

6717. (Chairman.) And their clothes during the day?—Yes, that might apply, but not in every case. They always endeavour to get a room, so that if they are coming with their breakfast and their dinner they can leave it.

6718. I want you to realise that it is a multiplicity of small dangers that make the big evil?—Yes.

6719. If the men are allowed to hang their coats in any place where there is a likelihood of any lead dust collecting on them, that in itself is a source of danger?—Yes.

6720. And in the pottery district that is not allowed. I suppose the risk arising from dust and spray which the workman can inhale during the whole of his working hours is a very serious danger?—I do not think so.

6721. Not under any circumstances?—Not under the circumstances where one is particular about the eating and cleanliness.

6722. Now I will go through the processes with you. First, as regards dry rubbing down with sand-paper. I understand this process is indispensable?—There is not very much of it done—not the dry rubbing down—in my business.

6723. But where it is done, I suppose it is done because it is indispensable?—Yes.

6724. I understand the wet process cannot be substituted for dry rubbing down between the first and second coats when ordinary paint has been used?—That is right.

6725. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—I take it you cannot prevent him.

6726. Can you use an exhaust draught to remove the dust?—No.

6727. We are told by some witnesses that the dust arising from this sand-papering is very considerable?—Yes, from sand-papering you get a good bit of dust.

6728. As far as you are concerned, you can suggest no remedy by which the workman can be relieved from the dangers of that dust?—I suggest that you should do away with the dry rubbing down.

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6729. Could you do away with dry rubbing down in every case?—You get the dust when you go to prepare the work in rubbing down, but you do not get very much dust between each coat of paint. You can do away with the dry rubbing down at first, by the wet process. That is practically 95 per cent. of the dust, I should say.

6730. But still there would be a certain amount of dust in the rubbing down between the first and second coats?—There must be a little, but it is a little.

6731. And you can suggest no remedy?—No, I cannot suggest a remedy for doing away with the little dust between each coat.

6732. The next process I want to ask you about is the painting of ceilings having moulded or relief designs. In doing this work, a brush has to be pushed into the background of the ornamental work, I suppose?—That is right.

6733. This gives rise to splashes which must frequently fall on the face of the worker?—Yes.

6734. How can you deal with the spray which arises from this operation?—It is very little; it is very seldom one has to paint a ceiling in that manner. The other alternatives that there are now give you quite as good an effect and at a less cost. Duresco, or any of the water paints, give you just the same effect.

6735. But where the operation is in practice, you have no suggestions to put before us to relieve the workman of any danger that may ensue?—No, not where they are in practice, but I think you will find them very rare.

6736. Then we are confronted with the problem of how to save the worker from the danger involved in breathing the spray?—Of course, if you do not do it, you do not get the spray.

6737. I am speaking of spray which does exist. Have you any suggestions to make?—No.

6738. Then with regard to stippling, there is a certain amount of droppings from that?—Yes, but with a careful man there is very little.

6739. There is a certain amount?—It is a small amount.

6740. Have you anything to suggest as to how we can remove that danger?—Directly the ceiling is done they wash their brushes, and if there are any splatters on their hands they remove them.

6741. What about the splashes on their faces?—The same thing would apply; in fact they would remove them before they had done the ceiling, I should say.

6742. Do I understand that, with your men, they are instructed to wash their hands after they have done any of this?—Yes, always.

6743. Immediately afterwards?—Yes.

6744. How many times does that involve their washing their hands a day?—I do not mind if they wash their hands 20 times a day.

6745. Is that taken out of your time?—Yes, out of my time: it is the custom. I never grumble if I see a man washing his hands.

6746. Do you have old paint burnt off by a spirit or charcoal burner?—Mostly by spirit.

6747. How can you prevent the worker inhaling the fumes which arise from this process?—I cannot prevent him inhaling them. You will always see, when any burning off is done, the whole of the windows are wide open to get rid of the fumes.

6748. You cannot prevent the man breathing a certain part of the fumes?—No.

6749. Where and how do your men mix their colours?—They mix them on the job.

6750. Do you adopt any precautions to deal with the dust which arises when the colours are being handled dry?—Only the same precautions.

6751. What are they?—Cleansing the hands, and so on, when they have mixed it.

6752. Is it possible to remove the dangers entirely by any other way than by using a substitute for lead?—If there are any dangers, I do not know what other way.

6753. Various witnesses have told us about non-poisonous substitutes for lead. Have you had any

personal experience of such substitutes?—Yes, I have tried zinc oxide.

6754. What results did you obtain with zinc oxide?—Not very favourable.

6755. What were the defects which you found with zinc oxide?—The principal one, I take it, is the lasting or the standing, which is considerable; the second one is that the covering power is much less; the third one is that you do not get such a smooth surface, in my experience.

6756. The Office of Works and others have succeeded in obtaining efficient non-lead paints. Why cannot other master painters adopt the same formula?—I think the materials used by the Office of Works sometimes are far from the best materials for lasting. In fact, I have used some myself for the Office of Works. I think, again, the same applies as in my previous answer on the question of cost, and the same applies to the question of leaving the job smooth.

6757. But the Office of Works have given evidence before this Committee, and they have told us that they are perfectly satisfied, after giving it four years' trial, with the formula which they have in use to-day. Is not that fairly conclusive?—I do not think so.

6758. In what respect do you think it is inconclusive?—The lasting.

6759. But they have had four years' experience, and they say it is perfectly satisfactory?—Of course, there is another thing, and that is with regard to cost.

6760. With regard to cost, they say it is cheaper than the old formula, which they used, which contained lead?—I do not agree with that.

6761. I am telling you some facts now. The Office of Works have said that it is durable; they have given it four years' trial, and they tell us it is cheaper. I want to ask you why other master painters cannot adopt the same formula?—If the Office of Works have got a substitute for white lead, I should be only too pleased to use it.

6762. What are the usual hours worked by your painters in the week?—56½ hours.

6763. Would you welcome a strict limitation of the hours of employment to 48 hours?—That means the wages going up.

6764. That is a corollary, I suppose. Would you agree to that?—If it is beneficial to the men in the end, I would agree with it.

6765. You do not have periodical medical examination of your workers, do you?—No.

6766. Do you know that in other industries where lead is used, the Home Office insists on a monthly or even weekly examination by a certifying surgeon?—I was not aware of that. I have heard of it now.

6767. Would you welcome the system of periodical examination for your industry?—If it is beneficial to the men, I would.

6768. At the cost of the employer?—I think the employer has to pay enough now.

6769. I am asking you this question because that is the custom which prevails now in the other industries where lead is used?—I cannot agree to that.

6770. Further, would you agree to pay compensation to any worker who was suspended by the doctor on account of doubtful health?—I think I would agree, if it is solely connected with the painting.

6771. It would only apply to any workshops or any places where lead was used. The men would be medically examined by a certifying surgeon at the cost of the employer, and if there was a case of doubtful health, and the certifying surgeon suspended the man, you would have to pay him half wages till the certificate was cancelled?—If a man is in ill-health the doctors are very sharp to put it down to lead when he is in the painting trade. Of course, part of that rests with the insurance company. We are rather in the hands of them. If they accept it, I accept it.

6772. You realise that if the free use of lead is allowed to continue, the Home Office would have to insist on the rigid observance of all precautionary measures in your industry, in the same way as in other industries where the workers handle lead?—Yes.

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[Continued.]

6773. Do you realise that the hours of labour would probably have to be reduced, as has been done in other dangerous trades?—Yes, if the client does not object to paying more.

6774. The point is that the painting trade is a very dangerous trade, and it stands to reason that if precautionary measures are introduced they will be introduced to protect the men in precisely the same way as that which obtains in other dangerous industries. I want you to understand this?—Yes.

6775. And all these special rules which I have foreshadowed will involve an extremely complicated and elaborate code of regulations?—Yes.

6776. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess-rooms, washing accommodation, avoidance of dust—that is, exhaust appliances, wherever they can be introduced—limitation of hours, and all other such matters?—That covers rather a lot. I might agree to a good many of those, but you cannot build a mess-room on every job you might have. I have now possibly 30 jobs, and perhaps two men at a job. In a large job they always provide a mess-room.

6777. But, generally speaking, those are the general rules that you would have to observe?—Yes.

6778. Now, taking all these points into consideration, and not forgetting the periodical medical examination which would be insisted on at the expense of the employer, and the payment of compensation to workers withdrawn from work in lead, would you say that you prefer that the industry should be regulated by special rules, or would you prefer that the use of lead should be prohibited or very closely restricted?—I think, speaking personally, I should say to that question: prohibit lead; but, of course, there are other things to follow. If you prohibit lead, you say you get over a lot of these difficulties, but there are far greater difficulties, I think, which would arise. If you can find, as the Office of Works tell you they have found, something as good as lead, there is an end of it.

6779. What I want to ask you is this. The regulations that would be introduced would be so specific—we shall take care of that as a Committee—that every possible danger which the men undergo will be protected?—I agree to that.

6780. But you do not like the limitation of hours?—I do not object to the limitation of hours, if it benefits the working man.

6781. You objected to some of these suggested regulations?—The limitation of hours means increased wages.

6782. You objected to that; but what I want to ask you is, whether you prefer a strict code of regulations, or whether, on the whole, you think it preferable to prohibit the use of lead?—If you can give me a substitute for lead I should prefer that.

6783. It is not a question of a substitute. I want you to realise that this Committee has been called together for one specific purpose. The Home Office have figures which show a deplorable state of affairs in this industry. We are met here to find a remedy. There are two ways of doing that. The easiest way is to prohibit the use of lead. If that is not done, then we shall have to frame regulations, and enforce them, similar to those which are adopted in all important industries where the use of lead is permitted. Which of the two would you prefer, this code of special rules or the prohibition of lead?—If the prohibition of lead is going to save the death-rate of painters, I agree to it. I agree to anything to help the working man.

6784. (Dr. Collis.) Do I understand that your paint is all mixed on the work?—You would not get 75 per cent. mixed at our paint shop. The materials are taken out and mixed on the job.

6785. Do you buy your lead dry, or do you buy it already mixed as a paste?—Mixed as a paste—the white lead.

6786. Do you prefer matured old paint, or do you prefer to use it new?—Old.

6787. You have had, within your knowledge, no cases whatever, except the one that you have mentioned, of illness among the workpeople?—Yes, which has been

termed as lead poisoning, and that was with a casual man whom, at the busiest time of the year, we had to have. He was a very dirty man indeed. Times out of number I told him to wash his hands.

6788. How long had he been with you before he suffered from the trouble?—I cannot tell you exactly—only a few months.

6789. Are you aware that this question of cleanliness gives no immunity against lead poisoning?—From what you have told me, from your figures, I agree.

6790. And that many of the cases which have occurred have been with men who have been scrupulously clean in their habits, and as careful as they can be in the use of the material?—Yes, I take that.

6791. Do you know that white lead, after it has been mixed with the oil to make paint, for some time gives off a volatile lead compound, which may be breathed by the man who is working with it?—Yes.

6792. Can you see any way in which inhaling that compound can in any possible way be prevented?—Not directly, but by means of plenty of ventilation, and all that, I think it would be greatly diminished.

6793. Turning for the moment to the question of the age of the paint: if you use paint which is not matured, is it so good?—I do not think so. I prefer myself to get old paint.

6794. Do you think that newly mixed paint, not matured, could be placed in the same category with the zinc paints?—I think the lead paint would be far superior.

6795. You think even the non-matured lead paint would be better, in your experience?—Yes, you have lead in it.

6796. But I thought you said it was inferior, if it was not matured?—It is not inferior, I think, but it is not so good as the old lead paint.

6797. I want to get out how far you consider now lead paint is less satisfactory than old?—I should say it is hardly to be compared.

6798. (Mr. Parsonage.) It is a question of how far it will go, a compound of old paint and a compound of the new?—I think not only it goes further, but I think it is better, and I think it is more standing.

6799. (Dr. Collis.) I want to know, from your experience of the lead substitutes, how far other paints compare with these lead substitutes?—I do not think you can compare it. Mine is a business in which we do not do a lot of cheap work; ours is a fairly high-class business, and I might say that in doing a contract job I do not week by week go about and see how it is paying. I finish the job off properly and do the thing properly.

6800. The evidence which has been given before this Committee shows, as far as I have been able to judge, that the value of the substitutes for lead paint, and lead paint, is so close, that although individuals prefer the lead paint, there is not a very great deal of difference, so that when you mention that non-matured lead paints have a distinct difference from matured lead paints, I want to know whether that difference is comparable with the difference which we have had given to us, which is very small, between paints which do not contain lead and matured paints which contain lead?—Of course, if you come to the point of what the Office of Works are using, which you say is as good as white lead, then, of course, the answer is that there are substitutes as good; but I do not know of a substitute as good.

6801. From your experience, you think still that the non-matured lead paint would be superior to the non-lead paint?—Yes. I should like to see the composition used by the Office of Works.

6802. You have not had experience of it?—I have used the Office of Works paint.

6803. Have you used any other non-lead paint?—No.

6804. (Mr. Parsonage.) What hours do your men work at Canterbury?—The average is 56½ hours per week, 10 hours a day, and 6½ hours on Saturday.

6805. Starting at six o'clock in the morning?—Yes.

6806. If they reduced the hours to 48 hours per week, you would have to raise the men's wages?—I presume so.

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[Continued.]

6807. What would be the rate of wages in Canterbury?—The rate of wages in Canterbury is very low indeed.

6808. Is it 6½d.?—6d.

6809. 6d. per hour?—Yes.

6810. That is a very low rate of wages?—It is a low rate.

6811. Do the men serve an apprenticeship to the trade?—That is one of my points. I think the Government should enforce apprenticeship, and not have these ready-made painters, old soldiers, and so on.

6812. How can you expect anything else at 6d. an hour?—Some of my men are paid more than 6d. If a man is apprenticed and brought up in the trade and is a good workman, I pay him according to his work. You may be paid 6d., and this man may be paid 7d., and that man may be paid 7½d.

6813. You pay them according to their abilities?—Yes. The apprenticeship system should be enforced if possible. You bring a man up from a boy and you teach him. It is the same as with a child. You teach them at the beginning, and it is in them for life. In the summer time, when you are busy, you get heaps and heaps of men coming round saying: "Is there any chance of a job?" I say: "What are you?" He says: "A painter." In fact, a man last week, who had never handled a brush in his life, assured me that he was a painter.

6814. You would get so many of these casual men that you would not know how many men get lead poisoning in your shop?—This very man who had lead poisoning I found out had had lead poisoning at his other shop.

6815. About how many men do you keep on in the winter time on the staff?—We keep most of them on. There are certain men we take on in the summer time, but we average 40 all the year round. I should say we keep 32 to 35.

6816. In the winter and all?—Yes. When you have really a good man, even if you have nothing to do, you find him a job. The apprentice system would solve a lot of that difficulty, if you could only bring the boys up to it and teach them their business when they are young and teach them to be clean.

6817. I agree it would be better to teach them to be clean, but that would not obviate the dangers of getting lead poisoning?—No, not according to your figures, and I will take your figures.

6818. (Mr. Sutherland.) You are also a plumber, are you not?—Yes, I am a registered plumber.

6819. How do plumbers compare in point of sickness or anything of that kind? Are they off at all?—No, I cannot say that they are. I think a plumber is hardened much more. You cannot have a ready-made plumber. A plumber must be brought up to his trade, and go with a mate, and so on, and he is bred and born in it, but I think with a lot of these ready-made painters, they come in contact with the paint, perhaps, at middle age. I have not found that the plumbers sicken.

6820. (Mr. Parsonage.) These men cannot do the painting properly who come into it like that?—I know they cannot, but what have you to do. You are full driving. You are worried out of your life for men.

6821. Fully qualified men do not come out of their way round to you for 6d. per hour, do they?—I have had a man who was employed by one of the best shops in London, Sturm and Knights.

6822. They employ very few men, do they not?—I gave him a job at Broadstairs last year.

6823. (Mr. Sutherland.) What was your experience of the Office of Works paint? What did you use it for?—The outside of the post office.

6824. Did you supply the paint?—No.

6825. Where did you get it from?—It was Zopessa paint. They stipulate that you have to use it.

6826. That is the granitic paint?—Yes.

6827. When did that take place?—The last time was this last year.

6828. What was the character of the paint?—No covering whatever.

6829. Was it a varnish paint?—An enamel paint.

6830. Was it supplied in bottles ready mixed?—It is all ready mixed in drums.

6831. Mr. Patterson told us it was cheaper?—I cannot tell you exactly.

6832. I worked it out and it did not come out cheaper?—No, I do not think it is.

6833. How did it go on in the working?—It went on fairly well, but I might mention that our post office has been rebuilt, and it was all painted by the contractor, I think it was two years ago, and yet last year it had to be all done over again, after only one year.

6834. Painted all again?—Yes, outside.

6835. Had the old paint worn off?—Absolutely. In fact I remarked on it at the time to the Office of Works man, and I asked him whether he was going to paint every year. He painted last year and he painted the next year.

6836. What have you tried in the way of zinc paints?—I have tried the zinc white.

6837. Did you order it as zinc white, or as zinc oxide?—Zinc oxide.

6838. Was it pure zinc oxide, or was it a prepared paint?—This was rather more of a prepared paint.

6839. That is really a zinc paint. I do not think it is a zinc oxide. I think it is a zinc white. With regard to the hours of work, 52 hours, half his time the painter will not be working?—That is so. The painter is not always working.

6840. (Mr. Parsonage.) Fifty-two hours in Canterbury is very different to 52 hours in the West End of London?—Yes.

6841. (Mr. Sutherland.) But during the man's weekly employment, a great deal of his time will be employed in preparing and distemping and stippling, and so on?—Yes. Sometimes he may not have a paint brush all the week, and sometimes he may have it all the week.

6842. He would divide his time in the whole year between painting and other processes?—Yes, I should say it is about 50 per cent. Of course, I agree you cannot compare 52 hours in London with 52 hours in the country, surrounded by beautiful trees, and birds singing, and so on.

6843. You have had experience of these water distempers?—Yes.

6844. They are very good for flattening or ceiling work, are they not?—Yes; and I think sometimes you get a better effect.

6845. Particularly for relief decoration?—Yes.

6846. My own experience would lead me to say that 80 per cent. of the work is now done with these water paints which are non-poisonous. What do you say to that?—Yes, quite 80 per cent.

6847. You do not mix dry colours? There is very little dry colour except for decorative purposes?—That is so.

6848. But not for painting purposes?—No.

6849. (Mr. Parsonage.) Do you use lead for filling?—Sometimes we use putty; sometimes we use Walpamur filling, or anything like that, or Paripan filler, but I should say 75 per cent. is the Walpamur and all these others, in preference to lead filling.

6850. (Mr. Sutherland.) Do you think that dust is generated in rubbing down an ordinary room?—In rubbing down an ordinary room, in our class of trade, there is no dust at all, because you rub down by pumice-stone and water, and you cannot get dust then.

6851. But even between the coats of paint, after you have first coated it, do you think that the dust you create by that process is a serious item in the health of the men?—No.

6852. But in an ordinary room the proportion of dust to the atmosphere of the room would be infinitesimal?—Yes.

6853. (Mr. Parsonage.) You do not use flat sharp colour so much?—No. There you would get the dust.

6854. You get far more dust in sharp colour?—Yes, you get dust from the sharp colour.

6855. It is sharp colour that is used in all the large towns, different to the country places like Canterbury, is it not?—Of course, then you would get more dust.



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[Continued.]

6856. In Manchester and London, and so on, it is absolutely necessary to use sharp colour. You would not get ordinary oil colour to dry?—Not outside.

6857. I am speaking of inside work?—Yes.

6858. You get very little oil inside in London?—Yes.

6859. They generally mix in varnish and turpentine, do they not?—Yes, but I take it these washable distempers are used.

6860. They would use them more in a country place than they would in London, where there is a lot of dust and heat; they do not use the washable distempers so much in London?—Of course you are under different circumstances in London entirely.

6861. (Mr. Sutherland.) You understand that we undertook that experiment with the painted panels with a view to this question that might arise, and to ascertain what were the available substitutes or alternatives to white lead?—Yes, you sent me some down.

6862. You have them now exposed, have you not?—Yes. We have given them a good test. We are close to a gasworks, close to a tan yard, and close to a brewery. It gives them a good test. It is no good putting them in the country.

6863. (Chairman.) I want to ask you a few questions about this paint that you used for the Office of Works. What were the buildings that the Office of Works asked you to paint?—The Post Office.

6864. When did they ask you to paint the Post Office?—Last year.

6865. What month last year?—I did not do it the month they asked me.

6866. When did you paint the Post Office?—I could not tell the exact month, but it was very favourable weather.

6867. About when was it?—Getting towards the autumn.

6868. I understand they wrote to you, and said they wanted the Post Office painted, and they specified the particular paint that should be used?—Yes.

6869. You thought the paint was not at all good?—They wrote and told me I could get it from the Granitic Paint Company, and I wrote and got it, and used it. When I say it is not at all good, that is my only experience of the paint. I was compelled to use it.

6870. Then you used the paint on the Post Office, and did you condemn that particular job?—No, I did not condemn the job, I condemned the paint in my own opinion.

6871. You did not condemn the job of the Post Office, but previously to that you had used the paint, and you found that it did not answer?—I had never used this Astrium before; the time they did it before they had Gay's.

6872. Do you know when they did it before?—Yes, the contractor did it after he built the Post Office.

6873. Do you know when that was done?—I should say about 12 or 15 months before.

6874. And that did not answer?—It had to be painted again.

6875. Do you say it was all worn away?—Yes. I assure you that is a fact. We always reckon four years for outside painting, and I will go as far as this: I think before four years are up it will want doing again.

6876. Do you think four years is a good trial to give any paint?—I think white lead paint will last four years.

6877-8. Do you think four years is a good trial to give any paint?—Yes, very often; but, unfortunately, some of our customers make it go five years.

The witness withdrew.

## NINTH DAY.

Wednesday, 17th May 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (Chairman).

LORD HENRY BENTINCK, M.P.  
SIR GODFREY BARING, BART., M.P.  
MR. E. L. COLLIS, M.B.  
MR. F. G. RICE.

MR. W. G. SUTHERLAND.  
MR. A. GARDNER.  
MR. J. PARSONAGE.  
E. A. R. WERNER (Acting Secretary).

Mr. JOHN WILLIAM BARKER examined.

6879. (Chairman.) Do you attend to-day as a representative of the National Association of Master House Painters and Decorators?—I do.

6880. What is the nature of your business and where is it carried on?—It is carried on at 21, Market Street, Leicester; general house painter and decorator.

6881. How long have you been in the painting business?—All my life.

6882. What is the average yearly number of painters employed by your firm?—The average number would be about 27 to 30. There are 40 men employed to-day.

6883. Have you known any cases of lead poisoning or painters' colic?—I have.

6884. Will you give us your opinion about them?—The first case was that of a youth, an apprentice, who was away from work some 15 or 16 days. A local doctor that he went to said he was suffering from lead poisoning, but the official doctor, Dr. Bryan, refused to give him a certificate for that and said that he ought to

have seen him within a day or two of visiting his local doctor. I had a conversation with Dr. Bryan, who said he might have suffered from lead poisoning, but when he saw him he could not certify him to that effect. The second case was that of Richard Wilde, a workman about 31 or 32 years of age. He was away nearly three weeks. The third case was that of an old employé named Thomas Smith. He would be about 50 years of age. He appeared to be suffering very acutely for the first few days, and after that he thought that he ought to stay away and get quite well, and I suggested that he should, especially as work was falling off and he had been paying into his clubs, and such like. I asked him what he was in receipt of, and I found that he would get compensation from us, his employers, and I worked out his remuneration, which came to rather more than if he had been at work, and so he remained away a considerable time. I have questioned each of these men, first the youth, afterwards Wilde, and lastly Smith, and they all declare that to-day they feel no ill effects from their illnesses.

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Mr. JOHN WILLIAM BARKER.

[Continued.]

6885. What period do these three cases cover?—Nearly two years.

6886. The last two years?—One was in the last year.

6887. The three cases occurred in the last two years?—Yes.

6888. Do you insure against your liability for payment of compensation?—I do.

6889. Has the rate been increased recently?—I think it has.

6890. Is that on account of the incidence of lead poisoning having increased?—It may have been so.

6891. Have you known men who have broken down temporarily on account of lead absorption?—No other cases than those I have named.

6892. Have your men had occasional days of sickness due to lead?—Very seldom.

6893. There may have been some cases?—There may have been some cases.

6894. Do you have a periodical medical examination of your men?—No.

6895. Is it not possible that some of them may be suffering from the slower and more insidious forms of lead poisoning?—I could not answer that: they may be.

6896. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—I should think it possible.

6897. You take a prominent part, I believe, in the work of the Master House Painters' Association?—I do.

6898. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—It may have been, between ourselves—in a casual way.

6899. Did you take any steps to discover how much illness there was amongst the men employed by your various members?—I have not done so.

6900. Did the association?—Not that I am aware of.

6901. Have you ever had a paper read to you on lead poisoning at the meetings?—I think there may have been in one case, but I do not know definitely.

6902. You must have heard of the prevalence of lead poisoning among the men who handle lead paint, I suppose?—I have heard more of it by reading the simple accounts in the paper, and in the ordinary sort of way, but more particularly with regard to the Potteries.

6903. Did your association never attempt to collect statistics concerning the number of days absence from ill-health amongst lead painters as compared with men not coming in contact with lead?—I do not think so.

6904. Then collectively your association has done nothing to meet the evil?—We have not felt it so serious an evil.

6905. Were not you cognisant of the number of cases that were occurring year by year?—Only those that came under personal observation.

6906. Did not the association, as a body, take sufficient interest in the matter to go thoroughly into it?—I do not think they have done up to the present.

6907. Did your association ever consider the advisability of having a medical examination of the persons employed?—It has not been recommended to us.

6908. Would not this have been the best way to discover the proportion of painters showing symptoms of lead impregnation?—I should think it would be a suggestion worth considering.

6909. Has your association ever taken any collective measures to discover a substitute for white lead in paints?—The manufacturers are always putting forward substitutes.

6910. But have your association ever taken any collective measures themselves?—They have put some material under tests, during the last year particularly.

6911. Have you employed a chemist to make scientific investigations?—We have a chemist always at our disposal.

6912. But have you employed this chemist to make an investigation of the chemical properties of the different pigments and vehicles?—Only to get the results as to the purity or otherwise of the materials,

6913. We have been told that the extent of the danger of lead poisoning to which house painters are exposed is not fully realised by many master house-painters. Is that your experience?—I think, considering that I have had more than 40 years' experience in the trade, and only know of three cases, and those of very recent date, one could hardly be expected to realise it was so serious. No death has occurred that I know of, and I know of no other cases in our locality.

6914. But surely you, as an association, ought to have taken steps to realise the extent of the danger and to bring home its seriousness to all your members?—I think it would be a good thing to take the matter up and do that.

6915. The incidence of lead poisoning is published by the Board of Trade every month; do you not see their publications?—Yes, we get the Board of Trade Report.

6916. You can see there the number of cases that occur year by year and month by month, can you not?—Yes.

6917. Did you ever discuss this amongst yourselves?—No.

6918. Do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—Among painters?

6919. Yes?—I should scarcely think it, but it might be.

6920. And that the death rates from Bright's disease and nervous diseases, due to work in lead, are very high?—That may be so.

6921. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the same 10 years?—I am very much surprised to hear it.

6922. These figures were all returned month by month in the Board of Trade returns, and were quite open to your members, if they wished to see them, were they not?—Yes.

6923. And do you realise that these cases, reported voluntarily, are only a fraction of the whole, inasmuch as the Home Office have no legal right to pay for such reports and are, therefore, bound to discourage reporting to some extent?—I am very much surprised.

6924. Have you seen a copy of the Labour Gazette, issued by the Board of Trade, published yesterday?—I have not.

6925. On page 187 of that issue it shows a definite increase in the death rate from lead poisoning among painters; 18 deaths in the first four months of this year and only 12 deaths in the first four months of last year. Do not you agree with me that that is a most alarming increase?—I think if those are the facts it is very alarming indeed, and I am very much astonished because, as I have stated, up to very recently, within the last two years, I had no cases of lead poisoning.

6926. I am not surprised to hear that at all, because in some of the potteries, in fact a large number of the potteries in Staffordshire, they have had no cases there at all; and then, quite unexpectedly, without any warning, a firm which has been immune has a crop of cases?—I look at it in this way, that while there may have been cases of lead poisoning slowly going on, they may not have been brought to our knowledge, and men may have been poorly and not known the cause, and now possibly, like other diseases, it may be diagnosed by the medical profession a good deal more definitely than formerly.

6927. From the figures which I have read out to you, the gravity of the danger is seen, if you compare these figures with those for all lead industries under the Factory Act, in which there have been 10 deaths in the first four months of this year, and 15 deaths in the first four months of last year. So that there has been a decrease in this instance, but in the house painters' trade there has been a large increase, and the deaths from lead poisoning in the house painters' trade are more numerous than in all the other industries where lead is used—all of them taken together. I want you to realise that?—Yes.

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[Continued.]

6928. I am sure, from what you have told me, you agree with me that all this sickness and death is very deplorable?—Certainly.

6929. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes, I know that.

6930. That the use of white lead has been prohibited to an appreciable extent abroad, and that the work of painting has been most strictly regulated in many countries where the use of white lead is still allowed. Do you know that?—Yes, I know that a good many restrictions are laid down.

6931. Do you not think it regrettable that this country should be behind other nations in this respect?—I think it is regrettable that we should be behind in anything.

6932. Do you consider lavatory accommodation essential?—I think it is very useful.

6933. But is it not essential?—In what sense?

6934. To enable the workers to wash their hands regularly?—Certainly.

6935. Including the supply of hot water for washing?—I think hot water is much better to wash with than cold.

6936. Is it generally practicable for the men to have hot water to wash in?—Our work varies so much. It is practicable where a number of men are together, but when men are singly engaged, or perhaps two of them, just a man and his mate, it might be more difficult. When a number of men are together, a youth or a labourer prepares the water for breakfast and the water for dinner, and it is not difficult.

6937. But you cannot always ensure the men having hot water?—It is not possible.

6938. Do you advocate definite rules regarding the wearing of overalls?—Certainly; we insist upon it.

6939. How can you ensure these being kept in a cleanly state?—If a man came on Monday morning with his overalls dirty we should ask him what he took us for, and say: "Are you fit to go on to your job this morning," and his reply would be to make some excuse. Then we should say: "Then you must get a new set."

6940. Where are the overalls kept when the men have finished their work?—Usually hung up on the job.

6941. In the room in which they have been working?—It all depends on the class of work.

6942. But does it sometimes happen that the overalls are hung up in the rooms in which the men are working?—Yes.

6943. So that they come into contact with any dust that may be in the room?—There would not be very much dust in the room.

6944. I am not speaking about the quantity. I want to know whether the overalls would come into contact with any dust that might be in the room?—Men as a rule take off their overalls and fold them up, and put them sometimes in their basket or their bag. At other times, if there is plenty of accommodation, they will hang them up.

6945. In the room in which they have been working?—That depends entirely on the circumstances.

6946. Does it sometimes happen?—Yes; but it entirely depends upon the building in which they are working.

6947. Does it sometimes happen that the men may leave their overalls in the room in which they have been working?—Certainly; but I ought to qualify that, if you will allow me. If the work is of a limited character, that would certainly apply, but if it covered a large number of rooms the men would very often leave their overalls where they have their food—in another room. They would not mess in the same room as the paints are, if there is another room at their disposal.

6948. But if there is not another room at their disposal, what happens?—They have to mess there, and they would leave their overalls there.

6949. Then it is possible for the men on some occasions to be obliged to leave their overalls in the room in which they have been working?—Certainly.

6950. I want to ask you about the workmen's outdoor clothing. When they take off their coats to

begin work, where do they hang those coats?—They would hang them where the overalls are hung.

6951. In the same room in which they are working?—If the conditions obtained that the accommodation was limited; but it so frequently happens that there is more than one room being treated.

6952. But if there is not more than one room?—They are bound to be there.

6953. And there is the same risk of dust accumulating there?—Yes.

6954. With regard to the men's meals, do they sometimes have their meals in the room in which they are working?—Sometimes.

6955. I suppose it is impossible to always provide a place quite free from risk of contamination?—No, not in good weather. It is nice to sit out-of-doors in nice weather.

6956. But it is not always possible?—No, it is not always possible.

6957. With regard to the risk arising from dust and spray which the workman can inhale during his working hours. First, as regards dry rubbing down with sand-paper, I understand this process is indispensable?—I do not think it is indispensable, but it is very largely used.

6958. Would you agree, as a master house painter, to the prohibition of any sort of sand-papering?—No, not any sort.

6959. Then I am quite right in saying that this process is indispensable in some cases?—It is so, but may I qualify that? I think that anyone connected with the trade will agree, while the sand-paper makers are almost millionaires, we have not had the improvement in sand-paper that we ought to have had. Our sand-paper is made to-day as it was 25 or 30, or even 40 years ago. We ought to have a sand-paper that would wear longer, and, if not moist, would be in a semi-moist condition.

6960. But that does not quite answer my question. I want to know whether sand-papering is not indispensable in some operations to-day?—It is indispensable. We could not do without it to-day. But there is nothing to prevent us having sand-paper in a medium.

6961. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—I should think more falls on to the ground than gets in the atmosphere.

6962. But it must get into the atmosphere on its way to the ground?—The only way to prove that would be to sand-paper a door or a piece of a wall, if you wish; and then you would find that the great quantity of dust is directly below where you have been sand-papering.

6963. We have had an investigation of sand-papering in the coach-painting industry, and it is a more dusty process than occurs in any other lead industry to which the tests have been applied in this country. Could you use an exhaust draught to remove this dust?—I do not know how we could. I have not thought of that.

6964. The next process I wish to ask you about is the painting of ceilings, having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

6965. This gives rise to splashes, which must frequently fall even on the face of the worker?—Yes.

6966. How can you deal with the spray which arises in this operation?—I do not see how we can deal with it. Of course there is not so much of that work done as there used to be because of the introduction of water paints.

6967. Can you use an exhaust draught to catch the spray?—I do not think so. He does not get so much on his face as he gets on his hands, because he does not work exactly over his head.

6968. But he gets it on his clothes and on his hands?—Yes, he does. He gets a lot on his hands, but not on his face so much, because it would make his eyes smart.

6969. Then, again, we are confronted with the problem of how to save the worker from the grave danger involved in breathing this spray. What do you say to that?—I do not know any way, myself, to get over that, unless he wore a respirator.

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[Continued.]

6970. Then with regard to stippling, the same considerations apply there, too, do they not?—Scarcely.

6971. In stippling, the man gets a certain amount of fallings?—I do not think so.

6972. I have seen it myself. I do not say it is a very large amount, but he certainly gets some of the fallings?—The stippler is a large brush (*describing it*), and he thumps it on the ceiling.

6973. As he does that, it would remove the paint to a certain extent, and a little of it would fall on to his clothes?—I have not noticed it.

6974. There is another danger with regard to stippling, that is, that the man is very adjacent to the painter, and splashes made by one man may fall on the other?—That is so.

6975. Do you have old paint burnt off with a spirit or charcoal burner?—Spirit.

6976. How can you prevent the worker from inhaling the fumes which arise from this process?—I do not think it is possible.

6977. Where and how do your men mix their colours?—They are usually mixed by the chieftain on the job.

6978. Are they mixed dry?—No, all in paste form, except a few colours that may be used for painting purposes.

6979. It appears from your evidence, then, that there are certain indispensable processes, in carrying out which a painter must necessarily inhale some dust, spray, or fumes containing lead. How are these dangers to be met?—That is a very difficult question to answer. I am not a scientist and must speak from the practical side of the trade. I should say, with regard to the spray which might come from the stippling or actual work overhead, a respirator is the best thing I know of or could think of, and, with regard to sand-papery, I should not object to a man wearing a respirator if he was sand-papery; but I want to find a better sand-paper than we have found up to the present. With regard to burning off, I do not think there is very much that is injurious from burning off the old paint.

6980. I want you, in answering the questions, to recall to your memory these figures which I have read out to you, showing that this prevalence of lead poisoning is a very real one. It is no use giving your answer assuming that there is no danger anywhere?—No, but although you have figures, I must go on my definite knowledge, and I have quite as much right to what I have seen and what I have come in contact with, as actual figures that have been presented.

6981. I do not think Parliament would take that view of it. Parliament would say: "There are a certain number of men who have been injured year by year in this industry, and, although some firms may be exempt, that does not dispose of the actual facts?"—Just so.

6982. Is it possible to remove the danger entirely in any other way than by using a substitute for lead?—I have not found a substitute for lead at present.

6983. It is not a question of whether you have found one or not. I ask you whether it is possible to remove the danger entirely in any other way than by using a substitute for lead?—That would remove it.

6984. But is there any other way of removing it?—I do not know of one.

6985. Various witnesses have told us about non-poisonous substitutes for lead. Have you had any personal experience with such substitutes?—We have tried a few samples that have been sent to us.

6986. What results did you obtain with those samples?—Very poor results.

6987. The Office of Works, and others have succeeded in obtaining efficient non-lead paints?—I am very much surprised to hear that.

6988. And the former have used the non-lead paint for four years, with the most excellent results?—That is not very long.

6989. What period do you consider would be sufficient as a test?—Was that inside or outside?

6990. Both inside and outside?—I should say it was scarcely any test inside: it would be a slight test outside.

6991. What would you consider would be a proper test for inside and outside, for any paint?—Outside painting should be done, of course, in four years, but a good deal of it is not done in that time. Inside, it goes on for 25 and 30 years sometimes, with a cleaning down. It all depends on the class of work. I do not think that four years is a sufficient test.

6992. How many years do you think would be sufficient?—I should want twice four years at least. I should like it to perish. I should like to see the actual wear.

6993. What are the usual hours worked by your painters per week?—56½ hours per week in the summer and about 42 in the winter.

6994. Would you welcome a strict limitation of the hours of employment, say, to 48 hours per week as the maximum?—We could not possibly work at 48 hours a week.

6995. I only mention that limit, because that has been adopted by the Departmental Committee, composed of employers and employed, in the pottery trade?—But ours is a season trade.

6996. All the medical evidence that has been taken shows very conclusively that it is essential to limit the number of hours working with lead. You do not have a periodical medical examination of your workers?—I have never thought of it. I should not object.

6997. Do you know that, in other industries where lead is used, the Home Office insists on a monthly or even weekly examination by the certifying surgeon?—I was not aware of that.

6998. I have told you that lead poisoning frequently undermines the health without immediately developing acute symptoms?—Yes.

6999. Then you would welcome a system of periodical medical examinations in your industry?—I should not object to that at all.

7000. At the cost of the employer?—There has been enough cost put on the employer. I would not be unreasonable.

7001. That is the custom which prevails to-day, that the cost of the medical examination has to be borne by the employers?—Yes, I would not object to that.

7002. Together with compensation for any workers suspended by the doctor on account of doubtful health?—We have got a few that would be sick very often—no, I cannot go that far.

7003. I may tell you that that also has been adopted in the earthenware and china trade?—Yes, but that is all under cover, I take it.

7004. It is not a question of the kind of work a man does: it is a question of the amount of risk that he comes in contact with?—But we work under all kinds of conditions. Our work is not localised. He might be at work at the Home Office to-day and at the Foreign Office a week hence, or a private house, or he might be sent to a hotel.

7005. The incidence of lead poisoning in your industry is greater than in any other?—I noted what you said about that.

7006. I ask you, therefore, whether you would agree to pay compensation, as is done in the earthenware and china trade, for any workers who are suspended by the doctor on account of doubtful health?—If it was an Act of Parliament we should be obliged to.

7007. Then you realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the rigid observance of all precautionary measures, in the same way as in other industries where the workers handle lead?—I should agree to any conditions that would improve the condition of the workmen.

7008. Of course this will involve an extremely complicated and elaborate code of regulations?—They might be simplified.

7009. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to the following: first of all, overalls?—They provide their own.

7010. In other industries it has been decided that they shall be provided by the employers?—They work under different conditions.

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7011. That is not the question?—But they go to one place every morning to begin their work. We go to one place for two days and one place for a week; or it may be three weeks; or it may be five weeks; and we might go to two or three places in one week, and that would be rather difficult.

7012. I am only telling you what prevails in other industries. I am not telling you what this Committee are going to recommend; because we have not decided that?—I hope you will not attempt to enforce a condition of that kind.

7013. I am only telling you what is the condition in other industries. First of all, providing overalls by the employer and seeing that they are properly washed—taking the responsibility to see that they are properly washed, then taking care that a mess-room is provided, and that in no case whatsoever are any of your workmen allowed to take any of their meals in a room where lead is used?—I think we should agree to that.

7014. That under no circumstances whatsoever would the men be allowed to leave their overalls in the rooms where they might come in contact with lead?—We are speaking now of inside work. There is a very great deal of outside work.

7015. I am telling you exactly the conditions which the Home Office have laid down in other industries. Neither would they be allowed to leave their clothing in any room where the clothes might come into contact with lead; that washing accommodation should be introduced (one basin to every five workers); that soap and nail-brushes should be provided by the employers?—Soap is already provided, but not nail-brushes.

7016. And a sufficient supply of clean towels, so as to prevent what I saw happening the other day, when five men were found washing their hands in one bucket; and they dried their hands, all of them, on their pocket handkerchiefs. Of course, that would not be allowed. Then provisions would have to be made for the avoidance of dust, for which you have told us that you cannot suggest any remedy?—Only a respirator.

7017. That would not be sufficient—something would have to be done to provide means of getting rid of the dust which these men come in contact with. Then there might be a limitation of the hours of labour to bring this industry up to the level of the other lead industries, and other provisions of a similar nature. Is it possible to subject painting operations to systematic and thorough inspection?—I should think it was very difficult.

7018. Taking all these points into consideration, and not forgetting the periodical medical examination which would be insisted on at the expense of the employer, and the payment of compensation to workers withdrawn from work in lead, would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed, or, as an alternative, that the use of lead should be prohibited or very closely restricted?—That is rather a comprehensive question. There are very great advantages to the employer in the case of lead being restricted, because we would not have to pay such a heavy rate of compensation. If lead is continued, the restrictions that might be placed upon the use of it seem to me almost impossible to carry out.

7019. On the whole, supposing that it was to be prohibited, and you were all alike, would you prefer the prohibition to this very stringent set of regulations?—I think so, if you can give to me the formula.

7020. You must not put that as a proviso?—I say, if another medium could be produced to give the same result as white lead, I would like to use it.

7021. That is not the question put to you. This Committee has been instituted to try and remove this evil. There are two ways of doing it. The one is, to remove the element of danger altogether, which is the lead; and the other is to have rules from one end of the industry to the other, which are to go to check the evil as it arises, which we call a special code of regulations. Now, I have foreshadowed to you what this special code of regulations would be, and I ask you this one simple question: Would you, as an employer, prefer to have this stringent set of regulations, which you would have to keep, or would you prefer, as the alternative, the

prohibition of lead?—Do away with the white lead and let them put up with what was provided; and away with the conditions.

7022. (Lord Henry Bentinck.) Do not you think that, if white lead were prohibited, very soon you would find a satisfactory substitute put on the market?—We should have to use the best there was, and the public would have to take the responsibility, the employer would not. If the Government insists upon any material or medium being used we should have to do the best we could, and; I think, as a whole, we should be prepared to try to do the best we could with it.

7023. It would not damage your interests in any way?—No, and we do not want the workmen damaged. We want our old workmen to live as long as we can possibly keep them. I have men in my employ that have been in my employ for 30 years; and I am as much to them, and I hope they are to me, as it is possible for workmen to be. I speak to them, and I am interested in their families, and all the rest of it.

7024. What did you mean by saying that you paid a heavier rate of compensation?—I think that the rate of compensation was increased some short time ago. I really could not tell you exactly, but when you have to do these things you do them and you let them go.

7025. Do you mean compensation against sickness?—I suppose compensation altogether.

7026. You insure your men, do you?—Yes.

7027. Against what?—Against employer's liability.

7028. And you pay a higher rate than you used to?—Yes.

7029. Then you admit that it is rather a dangerous trade. It is rather contrary to your evidence given at first, is it not?—No.

7030. I understood from your evidence, at first, that you were rather sceptical about its being a very unhealthy trade?—No, I accept the figures, because I am not able to disprove them; but, speaking from my own experience, the only cases I know I have given to you, faithfully and truly. I want to assist you. It is no use our being here unless we assist each other, and I am sure if I could give you any information which would help you I should be very pleased.

7031. (Sir Godfrey Baring.) I understand you have never tried any zinc substitutes extensively, have you?—Not extensively. What we have tried has been prepared by good reliable firms—we do not buy from everybody that calls upon us—and we have found that the zinc paints spread well and are very fine, but they do not possess the body of lead, so that we coat up in lead and finish with a coat of zinc frequently, especially if we want to leave any of our work white.

7032. Where have you tried the zinc paints, inside or outside?—Inside—never outside.

7033. How long ago is it since you first tried zinc paints?—It would be about five years.

7034. And the result has not been, in your opinion, satisfactory?—Far from satisfactory, except in the cases I have named, where we have been able to coat up in white lead, getting our body, and finishing with a white finish.

7035. (Lord Henry Bentinck.) Is that true of all shades of colour?—No. It is principally in the white that we want to do it.

7036. (Mr. Sutherland.) You have not used it for colours, have you?—No, not at all. For instance, take this room. If we were asked to paint the ceiling and cornices here, and it was very dirty indeed, we should prepare it and give it two or three coats of white lead, and finish it with a coat of Griffiths' white, or some other zinc compound.

7037. (Sir Godfrey Baring.) Do you think zinc paints have been improved lately, in the last year or two?—If we read the advertisements they are perfect, but if you ask me the question from the practical side, as I think you do, I say they are still floundering about.

7038. You have not found any satisfactory zinc paint, have you?—I have not found one.

7039. (Dr. Collis.) I should like to ask one or two questions concerning the health of the workpeople. Do you think you had the same opportunity of becoming acquainted with illnesses due to lead in the old days, to

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[Continued.]

the same extent that you have had since the Workmen's Compensation Act came into force in July 1907?—I do not think there has been very much appreciable difference.

7040. But the point that I have in my mind is this, that the workman now, if he has lead poisoning, and gets it so certified, comes to you to get compensation. The apprentice you mentioned, you told us, applied for a certificate, so it came to your knowledge?—Yes.

7041. Did Wilde get compensation for his three weeks?—Yes.

7042. And also Smith?—Yes.

7043. So that those three cases which have occurred during the last two years have all come to your knowledge owing to the fact that the men applied for and obtained compensation?—I have not any actual knowledge of those, but I think that those cases have come to us from the knowledge that is conveyed to the workmen from their respective societies. It is generally known now that if an illness can be traced to lead poisoning there is every chance of compensation.

7044. The point I was upon was this: that these three cases have come to your knowledge owing to the men having applied for compensation?—Not in the three cases—two.

7045. The other did not get it?—The youth did not apply in the same way.

7046. But it came to your knowledge through his making an application for it?—Yes; but he was given his compensation straight away.

7047. But my point is this: had we been in the early nineties, instead of the date we are at now, these three cases might have passed without ever coming to your knowledge, and then you would not even have known of those three cases?—I think we should have known of them.

7048. Do not you think it is a curious thing, after your long experience in the trade, that it is only since compensation for those illnesses has been paid that you have come to know of those three; and that is only since the Workmen's Compensation Act came in?—I do not think it is at all remarkable. If you will allow me to say so, the workmen know as soon as any Act is brought in for their benefit. It is fully advertised and talked about, and they are, like ourselves, of course, ready to take the first opportunity, and quite right too.

7049. Do you follow my point? I say it is curious that it is not until then that you know that any illness among your workpeople had been caused by lead?—I do not know.

7050. If these three cases had been spread over the whole period that you had been acquainted with the painting trade, one would have said certainly you had had knowledge of the cause of illness among your workpeople, but there is this curious point about it, that these three cases of lead poisoning, or people who were said to have been influenced by absorbing lead, as regards their health, have occurred during the last four years of your experience in the trade, during which four years the Workmen's Compensation Act, for this illness, has been in force?—I think the men might have suffered before and not made a claim for compensation.

7051. That is my point, that probably this incidence of illness has been occurring, but you have not had it certified and known what it was?—That is so.

7052. You tell us you have about 25 to 30 workers?—Yes.

7053. These three cases, spread over the four years that the compensation has been in force, give us an incidence of 2.5 per cent. per annum in your own trade. Of course, the figures are very small, but it does give us 2.5, and in the whole of the pottery industry it is only 1.4?—Yes.

7054. Although you have not much knowledge of there being danger in your trade, and you have heard a good deal about the agitation in the Potteries, still your figures, which you yourself give us, present a case which is one and a-half times as bad as the Potteries?—Certainly. I may go on for years without a case.

7055. You said, when you suggested a respirator, that you have no objection to the men wearing a respirator?—Not the slightest.

7056. But do you think the men would have an objection?—I think it would rather cover the nose than the mouth.

7057. But would they object to it?—I do not know.

7058. (Mr. Parsonage.) If you have an improved glass-paper, would that in any way prevent the dust?—Not unless it was used moist. I think it is possible to get a very good effect, if you use oil with sand-paper.

7059. We have been told by one or two that they have used turpentine?—I do not mean bare oil; it would have to be a mixture. You would have to use spirit with it in a small proportion, but the bulk would be oil.

7060. Half and half?—I think rather more than that; but I do not think we have got the right sand-paper by any means.

7061. With regard to lead poisoning cases my experience is that Leicester is rather a bad town for it. At the present time I have two cases on my list of men who are certified as being totally incapacitated from paralysis and lead poisoning in Leicester?—I do not know of any other cases than my own.\*

7062. And I could give you a list of cases that we have settled within this last 12 months, where we have recovered over 200l. of compensation in Leicester. These two cases at the present time are awaiting settlement on our list. We have paid one case this year. All those cases in Leicester practically belong to my society, the National Amalgamated Society. I have here the quarterly report from January to March. I have three cases, all directly certified lead poisoning cases—one at Liverpool, a man of 56 years of age, lead poisoning; one at Taunton, a man of 25 years of age, plumbism; and one at Dublin, a man of 56 years of age, lead poisoning. During the last four weeks there have been three inquests on painters. In each case the verdict has been lead poisoning. That is in Manchester alone. One of these cases is a master painter; the other was a foreman and the other was a workman. This is within these last four weeks—three fatal cases—coroner's inquests—in Manchester alone from lead poisoning. I know that Leicester is rather bad, because we have a good many cases?—Yes.

7063. You have been exceptionally fortunate in not getting them in your shop?—Yes.

7064. But you realise that it is far more prevalent than you had any idea?—I am astonished at the Chairman's figures.

7065. (Mr. Gardner.) Just one question on the point of substitutes for white lead. Is it not the fact that because white lead has been so handy and has been in so general use that you have not bothered to try and find a substitute?—We have tried to find a substitute, because we found that white lead was affected a good deal by the atmosphere, and zinc white kept its colour better.

7066. But you have not experimented at all or tried the combination of zinc with different mediums?—Yes, we have—one of the principal ones.

7067. But you have just taken what the manufacturer gave you?—Certainly.

\* Mr. Parsonage supplied the witness with the names of the two cases to which he referred. The witness, upon personal inquiry, found that one of these cases only was lead poisoning, the other the result of an accident. The following details were supplied by the witness in a letter, dated 30 May 1911:—

In the course of my cross-examination, Mr. Parsonage, in reply to my statement that I knew of no cases of lead poisoning in Leicester other than the three cases in my own experience, stated that there were two of their members, at present in Leicester, suffering from paralysis due to lead poisoning. He gave me the names of A and B.

I have inquired into the case of A and find that he is suffering from a severe accident due to falling from a ladder last July, when he fractured his thigh, for which he got heavy compensation. This being the case, I can only express my surprise that the Committee should have been so misled, and respectfully ask you to allow this letter to be read to the Committee, and if the questions appear in the evidence to have them corrected by this letter. I have communicated with our Secretary, and I believe he has the papers to prove that what I say is correct.

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[Continued.]

7068. The master painter has not experimented on his own account, with regard to finding a substitute for white lead?—Yes, we are trying now.

7069. But you are only trying what manufacturers are putting on the market?—Yes. What we are trying now is this—and I think it is the right thing to try. At the technical school we have an excellent teacher, an old painter, a Mr. Townsend, 70 years of age, a fine old tradesman. He is a man who is interested in the mixing up and combination of things, and he is always trying it.

7070. You tell me that during the last five years you have only used zinc compounds, and that you do not know that there has been any betterment during that time?—That is so.

7071. I have used zinc paint between 25 and 30 years, and before I left the trade I knew a great deal about it. To-day there is a vast difference in what we have to use. Personally, I may say, I have experimented with zinc and varnish and steam-boiled oil?—That works very well, zinc and varnish, does it not?

7072. If you mix it with what we call steam-boiled oil, what Mr. Patterson referred to as refined boiled oil. It is used largely in the shipyards?—We have not come across it.

7073. (Mr. Sutherland.) Who paid the apprentice that you said got compensation? Was it yourself who paid it or was it the insurance company?—Both.

7074. Although there was no legal claim?—No legal claim.

7075. Your experience is the experience of a large number of our members that we have had before us, and I believe it is the experience of the great number of the members of our association, that white lead as regards poisoning has not come before them as a serious matter, except through published reports which many of them do not see?—That is so.

7076. So that it is not in any way a reflection on our association, or on the members, that they have not, as a body, or individually, investigated this question?—In reply to that, I should say that I ought to take responsibility myself. If I had as many cases during the next two or three years as I have had in the past, I shall want to take some precautions.

7077. But if a body of men are in general good health, they are not worrying about the doctor, are they?—That is so.

7078. I do not want anything like a reproach to go out against the association in this matter of neglecting what is obviously now, and especially to this Committee with all the facts before it, a very serious matter?—I think we should take it up now.

7079. You think that as an association we shall be able to respond to the position?—I do, and I think we shall fall short of our duty unless we do that.

7080. There is another point of view that I should like to bring out. In your opinion there is nothing as a point equal to white lead?—I know of none.

7081. When I say a paint, I do not mean a special preparation, or enamel, or anything like that; but taking ordinary paint, is there anything in your opinion equal to white lead?—We have not found it yet.

7082. As a protector—especially for outside work?—We have not found it yet. We are prepared to try one.

7083. Therefore, the question has an interest from a public point of view, and if you are going to set aside a paint which has been used for so many years, and has given good results in protecting property and public buildings and structures, it should be set aside only after very careful and very great deliberation?—I think those who set it aside ought to take on themselves the responsibility of making it good if it fails.

7084. That is a responsibility which they will not accept?—I will not accept it. I shall say to my client: "The Government ask me to use this material for you; I believe it is the best they have any knowledge of on the market; I shall use it, and you must hold them responsible; I will not be responsible."

7085. (Chairman.) The Home Office are not likely to specify any particular formula which you are to use?

—I know that, but you will pardon me if I just divert a little. Almost every month some representative of a decent house comes along with the perfect thing; it may be a lead; it may be a colour; it may be a medium, a mixture of lead and zinc; it may be a compound of one kind or another; but he has got the perfect thing, and he says: "If you will use this, the Home Office are using it, they have booked an order for so-and-so." I say: "Look here, do not talk to me about what the Home Office or the railway companies are doing; if it goes wrong will you undertake to make it good?" He says: "Well, that depends." I say: "Then I will not try it." If a man comes along backed up by the most perfect scientific knowledge and he prohibits lead, he should take that responsibility.

7086. (Mr. Sutherland.) Do you think that before this Committee makes recommendations there should be something like a prolonged test of different substitutes, not for the purpose of recommending any particular firms, but paint made up on different formulæ?—I think it is necessary. I think that this inquiry is only the preliminary to that.

7087. If the Government is going to abolish a paint that has stood the test for 150 years, and given good results, it should take some little trouble to give something satisfactory in the way of a substitute?—They should take all the trouble that is necessary and then recommend a substitute.

7088. Do you think we could abolish dry rubbing down as the alternative to the prohibition of white lead?—For the moment I should say it would be difficult, but I do not see with careful application that it could not be overcome.

7089. A good many of our scientific and professional witnesses have expressed the opinion that work is better when it has a priming on wood of white lead, and that zinc does not make a good priming. Mr. Patterson, of course, said that they had found the formula for that after repeated experiments?—My experience is that white lead is the best priming, and from experience I come to the conclusion that white lead is the best base, as a priming coat, that you can possibly have, but not used alone. If the work is to be finished dark I should prime my work with the white lead stained.

7090. That is only incidental; that would not dispense with the lead?—No.

7091. You say white lead is the best?—Yes.

7092. You said it was impossible to get hot water in some cases. That is a very extreme case, is it not?—Not very exceptional. There are exceptional cases where it is difficult for the men to get hot water.

7093. Do you mean when the house is empty?—Yes; but as a rule when they are working inside there must be a fire to melt size and to boil water for their breakfast and dinner. We provide them with a large kettle for that purpose, and when the fire is made it is not impossible to get hot water.

7094. With regard to the clothes being hung in the room where the workman is painting, that does not often take place, does it?—Not often, but it does take place.

7095. You think he could not dispense with the use of the lamp by solvents?—I think it would be very difficult. It is so messy, and very dirty indeed. I think that we might, with the best solvent, do more work probably than is done with it, if we were assured that the workmen suffered from the use of the lamp.

7096. With regard to the other conditions, do you think it would be better to regulate the industry, however irksome the conditions might be, than to abolish white lead?—I think, from the statistics given by the Chairman, it is absolutely necessary that some restriction should be laid down.

7097. But do you think that the inconvenience to the master painters would be greater by restriction than by abolition?—It depends how numerous the restrictions are.

7098. They would be irksome?—They would be irksome, but if we had to fall into line we should try to do the best we could.

7099. (Chairman.) You have not, if I may say so, adhered to the answer you gave to me. I asked you which you preferred, the imposition of a special code of

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[Continued.]

regulations, which I foreshadowed, or the abolition of lead, and you said the abolition of lead?—Certainly, if the regulations are going to be numerous.

7100. (Sir Godfrey Baring.) The cost of restriction would be far greater than the cost of abolition?—Yes.

7101. (Mr. Rice.) It would increase the cost of work?—Yes; and besides that, everybody who comes into contact with the British workman to-day, or any workman—I do not want to run my own countrymen down: I have employed Englishmen and Frenchmen—knows that one man will be careful and carry out his

The witness withdrew.

Mr. FREDERICK GRUNDY examined.

7104. (Chairman.) Do you attend to-day as the President of the National Association of Master House Painters and Decorators?—Yes.

7105. What is the nature of your business and where is it carried on?—Painting and decorating only—no plumbing—and it is carried on at 25, Baxter Gate, Loughborough, in Leicestershire.

7106. How long have you been in the painting business?—I myself have been in it 49 years.

7107. What is the average yearly number of painters employed by your firm?—The average is about 10.

7108. Have you known of any cases of lead poisoning or painters' colic amongst your men?—Not amongst my men. I had one apprentice attacked with it.

7109. When was that?—I should think it is 10 years since.

7110. And you have had no cases since?—No, I have not had any cases since.

7111. Of course you employ very few men, and it is quite likely that you have had no cases?—Yes.

7112. Do you insure against your liability for payment of compensation?—I do.

7113. Have you known any of your men who have broken down temporarily on account of lead troubles?—No, I do not think I have.

7114. Have your men had occasional days of sickness due to lead?—No, I do not think they have.

7115. Do you have a periodical medical examination of your men?—No, I have no examination.

7116. Is it possible that some of them may be suffering from the slower and more insidious forms of lead poisoning without your knowing it?—They are very seldom away on account of illness.

7117. But I suppose they are away sometimes?—Some odd times. It is usually a cold, or something of that sort.

7118. But I suppose you know that lead poisoning frequently undermines the health without immediate violent manifestations?—I do not know. I have not known it to be so in my case.

7119. Is it possible for the men to be suffering from a mild attack of lead poisoning without your knowing it?—It is possible, no doubt.

7120. As president, you take a prominent part, of course, in the work of the Master House Painters' Association?—Yes, for the year I do.

7121. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—The last meeting or so, I think, only.

7122. Have you ever taken any steps to discover how much illness there was among the men employed by your members?—No, I have not personally.

7123. You have heard, of course, of the prevalence of lead poisoning among the men who handle lead paints?—Yes, I have.

7124. Does the knowledge of that cover a considerable number of years?—I think my knowledge goes back to the apprenticeship I had.

7125. Have you or any of your colleagues ever attempted to collect statistics concerning the number of days' absence from ill-health among painters they employed?—No, they have not.

7126. Did your association ever consider the advisability of having a medical examination made of persons employed?—No, we have not.

instructions faithfully and zealously, and another man will be just as indifferent to them.

7102. (Chairman.) And unfortunately we know this, as a matter of fact, that even the most careful painter, or the most careful potter, may be more susceptible to lead poisoning than the careless one. I do not say that the careless man does not increase his risk, but he may be less susceptible than a careful one?—That may be so.

7103. (Mr. Sutherland.) If the use of white lead is prohibited, our association will not take exception to it?—That is so.

7127. Would not this be the best way to discover the proportion of painters showing symptoms of lead impregnation?—I think it might be, if it was necessary.

7128. Has your association ever taken any collective measures to discover a substitute, for white lead in paints?—Yes, I believe they have. I believe we tried them, and I believe we have prepared a board now exposed to the weather in different situations.

7129. But have you ever made any collective attempt to discover a substitute, or have you simply taken those which have been offered to you and tried them?—We have not tried to discover a substitute.

7130. You have never employed a chemist to make scientific investigations of the chemical properties of different pigments and vehicles?—The association employs one, but I have not.

7131. Has the association ever employed a chemist to find a substitute for lead paints?—No, I think not.

7132. Do you think that the extent of the danger of lead poisoning to which master house painters are exposed is fully realised by the master house painters collectively?—Yes, I think it is.

7133. But they have taken no steps to realise the extent of the danger and to bring home its seriousness to all your members, have they?—The members themselves should take those steps.

7134. I am asking you whether the association as a body have taken any steps to bring the extent of the danger before the members generally?—No, I do not think they have.

7135. You think that they realise the extent of the lead poisoning evil?—Yes, to an extent.

7136. And they have done nothing to combat it?—No, I think not, as far as I remember.

7137. Do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—No, I was not aware of it.

7138. And that the death-rates from Bright's disease and nervous diseases due to work in lead are very high?—I was not aware of it.

7139. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same 10 years?—No, I was not aware of it.

7140. And that these cases reported voluntarily are probably only a fraction of the whole?—I am not aware of these statistics at all.

7141. Have you seen a copy of the Labour Gazette, which was published yesterday?—No, I have not.

7142. Do you ever see the Board of Trade Labour Gazette?—Yes, I do occasionally.

7143. The table on page 187 of the last issue shows a definite increase in the deaths from lead poisoning among painters: 18 deaths in the first four months of this year as against 12 deaths in the first four months of last year. That is a very grave increase, is it not?—Yes, it is, if it is amongst actual painters.

7144. The gravity of the danger is seen if you will compare these figures with those for all lead industries under the Factory Act. The deaths were as follows: 10 deaths in the first four months of this year as against 15 deaths in the first four months of last year?—Then there is a reduction there.

7145. Yes, but in the house painters' trade there is a very marked increase. I am sure you will agree with



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me that all this sickness and death is very deplorable?  
—Yes.

7146. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I have heard of that in France—yes.

7147. Do you not think it regrettable that this country should be behind other nations in this respect?—I do not wish it to be: I wish it to be before them.

7148. A great many small dangers attend the use of lead, for instance, the risk of contamination of food by unwashed hands?—That is the chief cause.

7149. Do you attach importance to personal cleanliness on the part of the men?—Yes, that is everything.

7150. Then you consider lavatory accommodation for washing essential?—I consider it necessary that they should wash their hands before they touch the food.

7151. Do you include as essential the supply of hot water for washing?—No, not necessarily.

7152. Can you get paint off the hands with cold water as well as with hot water?—You can get the evil influence off easily with cold water.

7153. What do you call the evil influence?—The loose paint.

7154. All of the paint is evil, is it not?—Yes, but you may have your hands stained with it and not suffer from it in eating your food.

7155. But the smallest quantity is likely to come off the hands?—No, if they wash and the paint is removed, that is sufficient for the purpose. If the hands are stained it does not matter so long as the loose paint is away.

7156. You do not think, then, that hot water is essential?—No, not essential.

7157. But it would be better?—I believe it would be—yes.

7158. Is it generally practicable for the men to have hot water to wash in?—Yes, it is generally.

7159. But there are some cases where they cannot get hot water?—Yes, there are some cases—very exceptional though.

7160. Do you advocate definite rules as regards the wearing of overalls?—My men all wear something—an apron and jacket and so forth, or overalls.

7161. But would you make it compulsory for all men to wear overalls?—Yes, I would.

7162. Not only jackets and aprons, but trousers too?—No I would not. I think they should have the choice in that matter—so that they were protected in some way.

7163. How can you protect a man if he does not wear some covering himself?—He uses an apron.

7164. Would the apron cover the whole of his trousers?—Yes, in the front, where the risk is. That is an old-fashioned way for painters.

7165. You would make it compulsory for the workmen to wear overalls?—Not overalls—I would not.

7166. Jacket and apron?—I would give them protection of some kind—a jacket and apron.

7167. To cover some part?—To cover the front part. It does not matter about the trousers behind.

7168. Would you agree that the working garments should be cleaned every week?—Yes.

7169. At the employer's expense?—No, certainly not. I think he has got enough on his hands now.

7170. But in some important industries where lead is used, the employers have to provide the overalls at their cost and see that they are properly washed?—Yes, I think I saw that going through some lead works last autumn.

7171. Do you not think that ought to apply to house painters?—Not in our case; I do not think it applies at all. I think the men should look after themselves.

7172. Why should it apply in the one case and not in the other?—The washing of a painter's overalls should be the same as the washing of his shirt.

7173. These overalls are used by the men to protect them from the evils in the industry in which they work?—Yes, but they are paid.

7174. Do you calculate when you pay them, that they have to pay so much for the washing of their

overalls?—They are paid. Of course they look after all that.

7175. But do you calculate, when the men's wages are arranged, that they have to pay so much for the washing of their overalls?—I presume they get them washed at home.

7176. You have implied, in answer to my question, that the men are paid to wash their own overalls. I want to know whether that is so?—Not a special payment, but the payment they receive covers that. That is what I mean.

7177. You calculate that they have to do that?—Certainly.

7178. That involves taking the overalls home?—Yes.

7179. Is not that a great source of danger?—Not at all.

7180. There must be a good deal of lead paint on the overalls?—There is a certain amount.

7181. Surely, taking home overalls involves a danger which ought to be prevented?—I do not think there is anything contagious at all about paint being moved from one place to another.

7182. But in other important lead industries, the workmen are not allowed to take their overalls home; and I may tell you this, that if the rules regulating this industry are levelled up to other lead industries, the painters will not be allowed to take their overalls home, and then they must be washed somewhere else, because the dirty overall in a home is a source of danger?—In that case they will have to be washed on the job where the men are working. If they are not allowed to take them home from these lead works, then you say that they must not take them from the work where they are, and that makes the painting trade trouble appear as a contagious disease, and I say it is not, because when they take them home the paint which is on them is dry.

7183. But could not they be collected and sent to a common laundry?—They could be, but I think it is quite unnecessary.

7184. That may be your opinion. The Home Office do not think so, because other Departmental Committees have laid it down as an absolute rule that workmen are not allowed to take their overalls home when they are in that dirty condition, because they are impregnated with lead dust, which is a source of very great danger. And you may be certain of this, that if lead is permitted to be used in the house-painting industry, all the restrictions which apply to other lead industries will have to apply to the house-painting industry?—That is a very different thing altogether.

7185. I am only pointing out to you what may be done?—I shall not admit that there is any dust at all.

7186. Where do the workmen hang their overalls when they have finished their job for the night?—They usually throw them across a rail, or something of that sort.

7187. Are they generally kept in the room where the paints are kept?—Yes.

7188. Are they ever kept in the room where they have been working?—Yes, sometimes they would be.

7189. With regard to the men's ordinary clothes, when they take off their coats where do they hang those coats?—They generally hang them in an outside place quite away from the paint as a rule.

7190. But suppose they are only working in one room, where do they hang them?—They are usually put outside. I can hardly answer the question.

7191. Do they ever hang them in the rooms where they are working?—Yes, they do sometimes. When there is only one room to be done, they would perhaps be confined to that.

7192. That would be another matter for prohibition. It would not be allowed in the future, for these men to hang their coats in any place where they can come into contact with the lead dust. Now I want to ask you about the men's meals, because that is another very important matter. In the earthenware and china industry, and in all lead industries, I think, workmen are not allowed under any circumstances to have their meals where lead is used?—Yes.

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7193. Where do the painters generally have their meals?—When they can, if the residence is not occupied, they will have it out of doors, in the garden or arbour.

7194. Do they ever have their meals in the room where they are working?—It may be, sometimes.

7195. Sometimes as an alternative to having them out of doors?—If it is a wet day, for instance; but it is an exception.

7196. You cannot always provide a place quite free from the risk of contamination, I suppose?—No, not always, but my men usually go home.

7197. I am not speaking about your men only, but the general run of the trade?—Yes.

7198. Now with regard to the dust and spray which the workmen inhale during their working hours. First, as regards the dry rubbing down with sand-paper, I understand this process is indispensable?—Yes, it is a necessity, certainly, to rub down with dry sand-paper.

7199. How can you prevent the worker from breathing the dust in that process?—As I said before, I do not admit there is any dust with sand-papering.

7200. Will you tell us what the operation is. Why do they sand-paper at all?—To smoothen the surface.

7201. In smoothening the surface, they must take off particles on the surface?—Yes, there are particles which, I think, are too heavy to fly about, and they fall on the floor and you can sweep them up.

7202. So that, in the process of falling to the floor, is it not likely that they get on to the men's clothes and into the air?—The particles might get on to his clothes.

7203. And if they can get on to the clothes, they must be breathing them?—No, they shake them off.

7204. But are they continually dusting them off their face?—No, I do not know about their face.

7205. Do you mean you can sand-paper a wall, a hard surface, and generate no dust?—Yes.

7206. But you have told us that dust falls on to the floor?—We will call it dust, but it is not the dust which you are representing as floating about the air, because it is too heavy and it will drop down.

7207. We have had an expert from the Home Office who has taken specimens of the air after sand-papering, and the amounts of sand and dust in the air are so large as to be perfectly appalling, and you come here to tell us there is no dust at all?—Yes; I do not believe there is. I have done it myself time after time as a lad and as a man, and I have never had any ill effects from it.

7208. I am not speaking about the ill effects. I am speaking about the dust?—I have not seen any, and I do not think there is any.

7209. Do you mean to tell this Committee that you can sand-paper a hard wall and smoothen the particles down without creating any dust?—I do not think there is any dust at all really—I do not believe there is.

7210. I may tell you that you are the only employer out of a great many employers who has made that statement?—I am a working employer as well. I do not do much of it now, but I have done.

7211. We have been told that there must be a considerable amount of dust from sand-papering?—Not to fly about the walls.

7212. But you say there is no dust?—No dust floating about—not for a man to breathe—I do not think there is.

7213. I am trying to get you to tell us what amount of dust is generated by this particular process. You say there is none at all?—I am speaking from my own knowledge, and I think there is none at all—what I call dust; that is what is floating about in the air.

7214. Will you give us a definition of dust?—Dust is that which is created which will rise and float about. The dust which we get off by sand-papering will not rise; it will fall.

7215. If you are scouring this wall with sand-paper will not a certain amount of dust fall?—Yes, it will fall down.

7216. And that will get on to the man's cloth and he will breathe it, if there is any?—I do not think it is possible for him to breathe it. The particles are so heavy that they fall on to the floor.

7217. (Mr. Parsonage.) You can see them on the floor and then they are swept up from the floor?—Yes.

7218. (Chairman.) The next process I want to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

7219. This gives rise to splashes, which must frequently fall even on the face of the worker?—It depends upon the workman a great deal whether he is splashed or not.

7220. But this process gives rise to splashes sometimes, does it not?—To a certain amount it would.

7221. And splashes might fall on the face of the worker?—Yes.

7222. How can you deal with the spray which arises in this operation?—I used to deal with it by washing it off.

7223. Off your face?—Yes, in the evening when I had finished.

7224. But you admit it has to be washed off to be removed?—Yes.

7225. Which shows that there must be a certain amount of it which falls on his face?—Yes; most of it could be rubbed off dry. I had some on my face last week, which I rubbed off dry.

7226. Can you use an exhaust draught in this case to catch the spray?—I do not think so.

7227. Then we are confronted with the problem of how to save the worker from the grave danger involved in breathing this spray. How would you prevent the worker breathing the spray?—I do not quite understand what the spray is.

7228. The small splashes of paint?—It is impossible to breathe those.

7229. What about stippling. Can he get any on his face when he is stippling?—No.

7230. Can he get any on his clothes?—No, not at all.

7231. Can he get any splashes from the painters who are adjacent to him?—He could not do—certainly not.

7232. I have seen it myself, and I saw that the painter got it on his hands and the stiplers got it on their faces—not a very great amount, but they certainly got it on their faces?—I do not think so, and I have stippled myself.

7233. Do you have old paint burnt off with a spirit or charcoal burner?—By spirit.

7234. How can you prevent the worker from inhaling the fumes which arise from this process?—I do not know if there are any fumes at all.

7235. I do not think you are serious. You do not admit that there is any dust caused by sand-papering a surface or any fumes from burning off?—No, I do not think there are any fumes.

(The Chairman at this point declined to ask the witness any further questions.)

7236. (Lord Henry Bentinck.) You have not experimented with any paint substitutes?—No.

7237. You have not tried them at all?—Yes, I have tried them.

7238. Have you found them satisfactory?—Some of them are satisfactory for the last coat.

7239. Inside or outside?—Both.

7240. Why should not they be satisfactory for all the coats if they are satisfactory for outside?—There is not body enough for the first coat; we have to cover the surface first with the lead.

7241. Do you mean ironwork in the open air, and that sort of thing?—No, I do not mean so much ironwork as woodwork outside—windows, and so on.

7242. Is that from a covering point of view or a durability point of view?—Both the covering and the durability.

7243. You have had no experience of the durability of the substitutes, have you?—Yes, I have, and I have found it to answer. As I bought it, it has been mixed, I believe, part zinc and part white lead, mixed by the manufacturers.

7244. What percentage of white lead was there?—I do not know the percentage.

7245. You have not given the subject very much attention, have you?—No, I have not.

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[Continued.]

7246. (*Dr. Collis*.) You mentioned that, in your opinion, if you removed the loose paint off the hands that was sufficient?—Yes, I think so.

7247. On what grounds do you base that opinion?—Because when you have removed the loose you have nothing else to come in contact with.

7248. Have you ever tried to test the skin after you have removed the loose, as you term it, to see if there was any lead remaining?—I have seen the marks.

7249. Have you ever tested the skin?—No, I have not.

7250. Do you not think your statement is rather a bold one to come and make before a Committee like this?—No, I do not think so, because I have done so myself.

7251. After washing this loose stuff off, have you ever, for the purpose of establishing the confident opinion which you have expressed before this Committee, tested your skin, say, with sulphuretted hydrogen?—No, I have not tested it at all.

7252. And you make this definite statement, which you ask us to accept?—But I know there is no more to come off the skin after I have washed my hands.

7253. But you have never tested it?—I have done it for 30 or 40 years and suffered nothing from it.

7254. We know that one man's meat is another man's poison, but you are making the extraordinary statement that lead will not have any effect?—Lead will affect us if we take it into our system, we know. This apprentice would not wash his hands. I had three at the time. The other two washed their hands and never suffered the slightest, and this lad was a stupid lad, and set us all at defiance, and would not wash his hands.

7255. Leaving on one side this point on which you apparently ask us to accept a statement that you have never taken any scientific steps to prove—that by removing the loose paint off your hands you get rid of all the lead—let us go to another point. Why do you say it is impossible to breathe lead paint in spray?—I do not see how it can be breathed in the state it is. It is mixed up in a liquid form.

7256. You said you thought it was impossible to breathe the spray?—I say I do not think it is possible to breathe it.

7257. Would you be astonished to hear that when paint has been applied by the aerograph lead poisoning has been caused—not to the people using the aerograph or to the people using the paint at all, but to other people doing work in the same room?—I am surprised to hear it.

7258. Would that induce you to modify your opinion at all, that it is impossible to breathe spray?—No, I cannot do it, because I do not see that there is anything to breathe.

7259. (*Mr. Gardner*.) When you said that you did not know of men being off through sickness due to lead, I suppose you meant that you know of no men being off through painters' colic or drop-wrist?—No, I have not.

7260. But you might have had men off with other sicknesses which were indirectly due to lead without your knowing it?—It is possible, but I do not think so, because they are most of them in the club and they are under the doctors.

7261. Although they are in the club, you would not know what the sickness was that took them off their work: they might have been suffering from some trouble which was indirectly due to lead?—I cannot say that at all.

7262. You lay great stress on personal cleanliness?—Yes.

7263. Do you provide all the requisites for personal cleanliness to the men in your employment?—Yes, they have that opportunity always.

7264. Soap, towels and hot water?—Soap, cloths and buckets.

7265. Of course they will not need soap if they can rub the paint off dry from their hands?—I said you could rub the loose paint off, but you must wash your hands.

7266. What is the rate of wages in your district?—7½d. now, this year: it has just gone up ¼d.

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7267. With regard to the dangers from lead poisoning, it is pretty hard on the employers, I think, because you say that you pay the men to protect themselves, and yet you are paying the insurance company to pay the men when they are off work, so that that is a sort of double payment you are making?—Yes, it is.

7268. In calculating a standard wage, how much do you calculate goes to the man's wages for protecting himself?—That I cannot say. I have to leave that to him.

7269. But you said it was calculated in their wages?—I did not intend to put it in that way. They are paid their wages: they must look after themselves with regard to their washing, and so on.

7270. (*Mr. Rice*.) You mean they should look after themselves in the same way as with regard to their feeding, and their homes and everything?—Yes.

7271. (*Mr. Gardner*.) I dare say you agree with me that you cannot clean overalls without boiling them?—We know they take them home to be washed.

7272. Is not that introducing a dangerous element into the home?—I do not think there is any danger, because perhaps they are put in water when they get home. That is the safest plan—to put them in water straight away and let them lie till they are ready to wash them.

7273. I do not know what it may be in your district, but in many of the towns the painter, owing to his average wage not being very high, has to live in a pretty well hand-to-mouth condition?—Yes.

7274. He takes home these overalls?—Yes.

7275. And his wife requires to boil them in a pot?—Yes.

7276. Is not there just a danger of that pot being used for cooking purposes afterwards, although it may be washed out?—She would be a very foolish person if she used it for both purposes.

7277. We have to take life as it is and not as it should be?—I should not think they would do it.

7278. But if they did do it, it would be dangerous?—It would be a folly: I do not know about dangerous.

7279. (*Mr. Sutherland*.) I only want to ask you on the point of the possibility of the employer providing overalls in the painting trade, because in the factory they come to the factory every morning?—Yes.

7280. In the painting trade, if the employer had to provide overalls and wash them, and not take overalls that were dirty to a fresh job, he would have to have a wholesale stock?—Yes, I think he would.

7281. It would not be possible?—And I think we should want a guarantee of safety. We should not see some of them again, I think, if we provided them.

7282. It would not be possible, would it?—No.

7283. (*Mr. Parsonage*.) With regard to glass-papering, you say the particles are so heavy that they fall directly to the floor?—Yes.

7284. You can see them on the floor?—Yes.

7285. And you sweep them up with a duster?—Yes.

7286. There is a quantity, whether it is light or heavy, that does fall on the floor?—Yes.

7287. You can see it on the floor and sweep it up?—Yes.

7288. Your colour generally is about half flat and half sharp colour: it is not all flat, being in a country place?—No, there is very little flattening used now.

7289. Do you think you could do away with glass-papering? Is it possible to do away with dry rubbing down?—I do not think so, but I ought, perhaps, to have said that most of the work is rubbed down with pumice-stone and water.

7290. Before it is painted?—Yes.

7291. Do you ever rub down work with pumice-stone and water after you have given it a coat?—No, never.

7292. That is where sand-papering comes in?—That is where sand-papering comes in.

7293. You could not use pumice-stone on a fresh coat of paint?—No, it would tear the paint up.

7294. So that you would say it is impossible to-day to do away with dry rubbing down?—I think it is necessary.

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Mr. FREDERICK GRUNDY.

[Continued.]

7295. I say it is impossible to do away with it. Do you agree with that?—I have rubbed down with sand-paper on a wet surface.

7296. Taking the ordinary course of work, is it not impossible to do without it?—It is impossible.

The witness withdrew.

Mr. JOHN HENRY McDERMID examined.

7297. (*Chairman.*) Do you attend to-day as a representative of the National Association of Master House Painters and Decorators?—Yes.

7298. What is the nature of your business and where is it carried on?—It is a house-painting business and is carried on in Darlington, with a smaller branch in York.

7299. How long have you been in the painting trade?—I am carrying on the business in Darlington that was established by my late father 59 years ago. I have been in business myself since his death, for some 17 years—previously in his employment.

7300. What is the average yearly number of painters employed by your firm?—The average is probably 20 to 25; in the season, perhaps, a matter of 40.

7301. Have you known of any cases of lead poisoning or painters' colic?—None whatever.

7302. You are doubtless aware that in other industries, such as the potteries, there are a large number of works that are quite immune from the evils of lead poisoning?—I have not a very definite knowledge of these matters. I have latterly heard more respecting them, but I have not any very definite knowledge as to it.

7303. The trouble is that even some of the best works are not immune, and a works that has been free of lead poisoning for many years will sometimes have a succession of cases quite unexpectedly?—Quite so.

7304. Do you insure against your liability for payment of compensation to lead workers for lead poisoning under the Workmen's Compensation Act of 1906?—Yes.

7305. I think the premium has been increased recently?—The rate of insurance was increased about a year ago, and I believe very largely owing to the lead poisoning coming under the scheme.

7306. Have you known men who have broken down temporarily in your works on account of lead absorption?—I have not.

7307. Have your men had occasional days of sickness due to lead?—Not to my knowledge.

7308. Do you have a periodical medical examination of your men?—No.

7309. Is it possible that some of them may be suffering from the slower and more insidious forms of lead poisoning?—Quite possible.

7310. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—Yes, I am prepared to admit that.

7311. You take a prominent part in the work of the Master House Painters Association?—Yes, I think I may say so.

7312. Has the question of the serious prevalence of lead poisoning amongst house painters been discussed at your meetings?—It has really only come before us so very recently that there has been, if I remember rightly, no serious discussion on the question.

7313. But you must have heard of the prevalence of lead poisoning among the men who handle lead paints for some time?—I have heard of it, but I have not any knowledge of any single case in my own district: I cannot speak from any personal knowledge of the case.

7314. But did not your association have that knowledge collectively?—I think it is possible that there may have been instances brought forward in connection with claims.

7315. Your association never attempted to collect statistics concerning the numbers of people who are affected by lead in the course of their work?—I cannot give you a definite answer on that.

7316. Did your association ever consider the advisability of having a medical examination made of persons employed?—I do not think so.

7317. Would this not have been the best way to discover the proportion of painters showing symptoms of lead impregnation?—Yes, I think so.

7318. Then has your association ever taken any collective measures to discover a substitute for white lead in paints?—Yes, I think so.

7319. What measures have they taken?—We have a series of panel experiments with substitutes taking place at the present time.

7320. When did those experiments begin?—I am not very definite on that. It is 12 months ago, I think.

7321. Then do I understand that it is only within the last 12 months that your association have taken any active steps to try and combat with the evil existing?—Collectively, I believe so.

7322. Do you know whether they have employed a chemist to make scientific investigations of the chemical properties of different pigments and vehicles, with a view to substituting some other paint for lead?—I do not think so.

7323. We have been told that the extent of the danger of lead poisoning to which house painters are exposed is not fully realised by many master house painters. Is that so?—I should think it is quite possible.

7324. But do not you think that your association should have taken steps to realise the extent of the danger and to bring home its seriousness to all your members?—I think it would really have done so if the thing could have been brought forward.

7325. But you know the number of cases of lead poisoning in the house painting trade has been published monthly by the Board of Trade?—Yes, that may be so, and yet there would be very few of us as individuals who would take these matters to heart.

7326. Do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—I do know at the moment. I did not know until recently.

7327. And that the death rate from Bright's disease and nervous diseases, due to work in lead, are very high?—No, I did not know that.

7328. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatsoever in the same 10 years?—I did not know.

7329. Or that these cases reported voluntarily are only a fraction of the whole?—No.

7330. Have you seen a copy of the Labour Gazette issued by the Board of Trade, which was published yesterday?—No.

7331. The table on page 187 of that issue shows a definite increase in the deaths from lead poisoning among painters. There are 18 deaths for the first four months of this year and 12 deaths for the first four months of last year. Is not that rather a grave state of affairs?—Is that in the house painting trade?

7332. Yes?—It sounds rather serious.

7333. And the gravity of the danger is seen if you will compare these figures with those for all lead industries under the Factory Act. There were 10 deaths for the first four months of this year and 15 deaths for the first four months of last year?—Yes.

7334. So that the deduction to be made from it is that the number of deaths occurring in the house painting trade is higher than that of all the other lead industries put together?—On this one return.

7335. On this one return, this year?—Not on the average; that is that single return.

7336. (*Dr. Collis.*) It has been the same for the last 10 years?—Do you mean there has been an increase every year for the last 10 years?

7337. I mean that the number has been greater than in all the other industries put together?—Yes.

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[Continued.]

7338. (*Chairman.*) I am sure you will agree with me that all this sickness and death is very deplorable?—Most certainly.

7339. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I believe there has been an inquiry taking place in many of them.

7340. Do you not think it regrettable that this country should be behind other nations in this respect?—Quite.

7341. A great many small dangers attend the use of lead, for instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—Yes.

7342. Then you consider lavatory accommodation for washing hands essential?—I consider it very desirable.

7343. Including the supply of hot water for washing?—Yes, desirable.

7344. Is it generally practicable for the men to have proper lavatory accommodation?—I think it is usually obtainable.

7345. Is it generally practicable for the men to have hot water to wash in?—I think it is generally obtainable if they wish it—if they seek it.

7346. But there may be some cases where they cannot get it?—I should say there may be, but those would be very, very few.

7347. Do you advocate definite rules regarding the wearing of overalls?—We have not any definite rule excepting this, that I should be very loath to employ a man who did not provide himself with them.

7348. How often?—Always.

7349. How often would they be washed?—Weekly.

7350. How can you ensure these being kept in a cleanly state every week?—No difficulty whatever.

7351. Will you tell us how you can ensure it?—The very appearance is quite sufficient. They are sufficiently soiled at the end of the week for you to know in a moment if they have not been cleansed.

7352. How can you insist on their being clean every week?—I can scarcely remember the occasion when it has been necessary for me to object, although I have had some instances when I have told a man that I could not allow him to go to work with the clothes he had left in the workshop—a casual worker in the busy season, I am referring to—unless he could provide himself with clean overalls he must not go to work.

7353. Where are the overalls kept when the men have finished their work for the day?—It would be rather difficult to answer very exactly, but usually I think they are taken home.

7354. Every day?—I think so, usually.

7355. With the lead dust on them?—I do not know whether there is any lead dust on them.

7356. In a dirty condition?—In the condition in which they have been wearing them.

7357. If the men do not take them home with them, where do they keep them?—They leave them on the job.

7358. In the room in which they have been working?—Yes. If it is a larger job there is usually a room set apart for it.

7359. But if it is a smaller job?—If it is a smaller job, probably in the room where they have been working.

7360. Where do the men keep their coats when they are taken off before they begin their work?—The same answer practically applies.

7361. You cannot always provide a separate place for the painter to hang his coat?—It is not always possible.

7362. Or to keep his overalls when he is away from his work?—No, it is not always possible, but at the same time, I may say, it is invariably our custom to endeavour to do so.

7363. Do you advocate also a rule regarding meal-rooms so that no man shall eat his food in the place where paint is being handled?—We have no rule. We always encourage them to leave the working apartments for their meals.

7364. But could you tell us that it is invariably the case that they never have their meals in the room in

which they have been working?—Speaking generally, I should think that is right.

7365. But are there any cases you know of where that is not the case? Suppose a man is working in one room on a small job, where would he have his meals?—If he was working in an occupied house he would invariably seek permission to sit in the kitchen or some of the servants' apartments.

7366. But can you tell us that it is invariably the case that the men never have their meals in the room where they are working?—It is invariably the case.

7367. Are there any variations to that?—There may be isolated cases.

7368. You cannot always be certain, then, that the men have their meals in rooms quite free from the risk of contamination?—I cannot give an absolute guarantee, but, speaking generally, I would say yes.

7369. Now as to the risk arising from dust and spray which the workman can inhale during the whole of his working hours. First, as regards the dry rubbing down with sand-paper; I understand this process is indispensable?—On old work it is not at all indispensable, and in my own practice it is very seldom used.

7370. What about new work?—On new work between coats it is used.

7371. And that is indispensable, is it?—It is not absolutely indispensable, but it is perhaps the easiest and one of the most effective methods.

7372. Would you agree to the prohibition of sand-papering between coats?—Yes.

7373. You could get on with your work without sand-papering?—Yes; but I should prefer, rather than the prohibition, to use it in a wet form.

7374. Could you rub down between coats in a wet form?—I had in my mind for the moment using it on old work, which we certainly can do. It would not be so easy to use it in a wet form between coats.

7375. Could you do it at all with the wet process?—I think I could do it, but if I have to give an answer "Yes," or "No," I should say "No."

7376. Then it is indispensable, as other witnesses have told us. You cannot do away with sand-papering between coats?—Well, I should not like to do away with it.

7377. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—I do not know quite how you could prevent him doing it.

7378. Can you use an exhaust draught to remove the dust?—I could not say.

7379. We are told by some witnesses that the dust arising from this sand-papering is very considerable?—I think that might be so on old work.

7380. But you have told us that on old work you could do without sand-papering?—You could, and personally I do without it.

7381. But some firms do not?—I would rather not speak for other firms.

7382. You said just now, in answer to my question, that there would be a considerable amount of dust if you were sand-papering old work?—Yes, it has been the custom. We have done so, but for a long time past I do not remember cases of rubbing down old work dry.

7383. Then would there be a considerable amount of dust in rubbing down new work?—Falling to the ground.

7384. So that it would impregnate the air?—It never occurred to me in that light. It is weighty. It falls and we sweep it up.

7385. But from the fact of its falling, it must disperse and get on the man's hands and clothes, and so on?—I suppose I should admit that that might be so.

7386. The next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work, the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

7387. This gives rise to splashes?—Yes.

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[Continued.]

7388. Which must frequently fall even on the face of the worker. How can you deal with the spray which arises in this operation?—I cannot conceive any method of preventing it, except covering the face, which would be very awkward.

7389. Can you use an exhaust draught in this case to catch the spray?—I do not know; I do not think so.

7390. Then, again we are confronted with the problem of how to save the worker from the grave danger involved in breathing this spray?—What do you mean by the spray?

7391. Fine splashes. These fine splashes are in the air and the workman must necessarily breathe them in the course of his work?—Yes.

7392. Can you suggest any remedy for that?—I am afraid not.

7393. Then, with regard to stippling, there is a certain small amount that falls in the stippling process?—The stippling process is very nearly becoming a dead letter.

7394. But in some places it is used, and it has not been abandoned?—It is not abandoned.

7395. So that there is a certain amount of danger, I suppose, involved in that?—I should say there was—from the same source.

7396. Do you have old paint burnt off with a spirit or charcoal burner?—Spirit lamp.

7397. How can you prevent the worker from inhaling the fumes which arise from this process?—I could not suggest any means of preventing that.

7398. Where and how do your men mix their colours? Do they mix them dry?—No.

7399. I suppose in the course of mixing they get some of the paste on to their hands?—Naturally.

7400. It appears from your evidence that there are certain indispensable processes in carrying out which a painter must necessarily inhale some dust, spray, or fumes containing lead. How are these dangers to be met?—I am afraid that is a matter that I should have to leave to yourselves.

7401. Is it possible to remove the danger entirely in any other way than by using a substitute for lead?—I should say it was not.

7402. Various witnesses have told us about non-poisonous substitutes for lead. Have you had any personal experience with such substitutes?—Yes, a little.

7403. What results did you obtain with those substitutes?—I have obtained more or less satisfactory results at increased cost—increased cost in more ways than one—increased initial cost and less stability.

7404. The Office of Works and others have told us that they have succeeded in obtaining efficient non-lead paints?—I am very pleased to hear it.

7405. What are the usual hours worked by your painters per week?—Ordinarily 53.

7406. Would you welcome a strict limitation of the hours of employment, say, to 48 hours per week?—Personally I should not have the slightest objection, although I can see there would be a very great difficulty in carrying out our work. It is purely a season trade, and in the season there would be very great difficulty, I think.

7407. The Departmental Committee upon the Earthenware and China Trade agreed to limit the hours to 48 hours per week because all the medical evidence produced insisted that there ought to be a limitation of the hours in which a man worked with lead?—I can see how they could do it so much more easily than we.

7408. That is not my point. I am only foregrounding the sort of rules that would have to be enforced?—Personally I do not think we could get it down to 48 hours.

7409. You do not have a periodical medical examination of your workers?—No, we have not.

7410. Do you know that in other industries where lead is used, the Home Office insists on a monthly or even weekly examination by the certifying surgeon?—I believe that was so in the case of lead manufacturers. I have no knowledge in any other departments.

7411. You know that lead poisoning frequently undermines the health without immediately developing acute symptoms?—Not from personal knowledge.

7412. If I tell you that is the case, would you welcome a system of periodical medical examination in your industry?—I do not know that I would particularly welcome it. It would be a bit of a nuisance, I think. I might agree to it, but I would not welcome it.

7413. Would you agree to a system of periodical medical examination in your industry, the cost to be borne by the employer?—I prefer to say "no" at present.

7414. Together with compensation for any workers suspended by the doctor on account of doubtful health?—Men are away ill occasionally from slight causes which they might then put down to lead poisoning.

7415. Are you quite sure that the illness which these men have is not caused by the lead dust they breathe?—It would be impossible for me to say, I am sure. In my opinion, it is not.

7416. You realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the rigid observance of all precautionary measures, in the same way as in other industries where the workers handle lead?—I am quite willing to admit that may be necessary.

7417. And you realise that the hours of labour would probably have to be reduced, as has been done in other dangerous trades?—Yes, but I do not quite see why that should be in our trade.

7418. This will involve an extremely complicated and elaborate code of regulations. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to the following. First of all, lavatories, one basin for every five men?—Do you mean in our workshop?

7419. I mean when they are on the job. One basin or one bucket, or something similar, to every five men?—Yes, any vessel, I suppose, that would answer the purpose.

7420. Hot water, soap, nail-brushes, and a sufficient supply of clean towels?—I would be a party to agreeing to that, if collectively we could agree. Separately I would not unless I could get my fellows of the trade with me. Of course, you could do that if you made it compulsory.

7421. Of course, it would be a general order issued to the trade?—Yes.

7422. Then with regard to mess-rooms, the exclusion of food from any place where lead is used or stored?—I have no objection to that. It might be a hardship sometimes to the worker—turning him out in the cold, perhaps.

7423. You would have to provide somewhere for him?—I could not agree to that. I cannot say that we would provide that. That is easily done in factories, but it is not easily done in private houses. I would not say "Yes" to the provision of mess-rooms. I would only go as far as to say that I would agree to make a special effort, as I always have done.

7424. That would not be sufficient for the Home Office?—Then take the answer as "No."

7425. Then with regard to overalls: that overalls should be supplied at the employer's expense and regularly washed and entirely at the employer's responsibility?—No.

7426. And a place for overalls. They are not to be placed in a workplace where they can be contaminated nor in a mess-room where they can contaminate food?—We should not have any difficulty about that.

7427. Do you understand what it means. It means, first of all, that the overalls must not be left in a room where the men are working in lead, and the overalls must not be taken into the room where the men have their meals, nor in any room where there is any lead about?—I am, of course, more willing than able in matters of this sort.

7428. I am only putting before you what are the rules enforced to-day by the Home Office in industries where lead is permitted to be used, and of course this trade must be levelled up to those industries because the incidence of lead poisoning is worse than anywhere else?—That would not be easy.

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[Continued.]

7429. Now the cloak-room. With regard to outdoor clothing and coats, they must be kept away from any place where paint is used or stored?—We could manage that.

7430. Where lead is allowed to be used in other industries, the Home Office insists on the removal of dust and fumes by an exhaust draught apparatus. Would you agree to that if it was possible?—I have so little knowledge of how it could be done or what it would mean that I could not say that I would agree.

7431. My next point is the medical examination at the employer's expense. That you have not agreed to?—No.

7432. Now I come to my last question. Taking all these points into consideration, and not forgetting the periodical medical examination which would be insisted on at the expense of the employer, and the payment of compensation to workers withdrawn from work in lead, would you say that you prefer that the industry should be regulated by special rules, or that the use of lead should be prohibited or very closely restricted?—I would prefer to try the system under restriction, I think.

7433. Do you mean the prohibition of lead or the restriction by rules?—I would prefer to retain the use of the lead under more stringent conditions rather than to abolish it.

7434. Then I want to ask you, as a practical man, what conditions you suggest which would remove the evil?—You will probably disagree with me there, but I contend that the greatest danger in the house-painting trade is in the paint itself—not in the dust form; in the paste form:

7435. (*Lord Henry Bentinck.*) It comes to the same thing, does not it? It rubs off in the shape of dust?—I do not know. My idea is that it is eaten, as it is practically, and that the painter conveys it by his hands to his mouth, and that there is not sufficient washing and care in cleanliness. In my case they are clean, and possibly that may be why we are so immune from the evil, as I believe we are. I have no knowledge of any case. Mine is only practical, not expert knowledge from a medical standpoint, but I cannot think that the serious evils of dust are such as you wish me to believe.

7436. (*Chairman.*) I want to point out to you that great medical authorities in the country agree that the dust is the great prevailing evil which has to be met?—And that is practically the danger then.

7437. That is the danger?—Then why give so much consideration to the question of the prevention of splashings, and all that.

7438. Because it is a multiplicity of small dangers which in the aggregate make up the big evil. Every little danger has to be contended with. What you employers must tell the Committee is how you propose to assist us in removing the dangers which undoubtedly exist. I have given you a foreshadowing of what the rules are in other industries?—Would not it meet the case to abolish dry rubbing in any and every form?

7439. But then you have told me that that is indispensable?—Under our present lights, to produce the high finish work that we do in many cases, but I have not the slightest doubt that we would devise means. It is reduced now on all good work to a minimum.

7440. (*Mr. Parsonage.*) Glass-papering is reduced to a minimum on all good work?—I did not say glass-papering; I said dry rubbing. I am glad to have you put it in that way to allow me to correct myself. When I was speaking of the dry rubbing, I was referring to old work.

7441. You can rub down old work with pumice-stone and water?—Yes.

7442. But after you have painted it, it is dry rubbing with glass-paper—after the first coat?—You can rub down the other, if it is compulsory, with pumice-stone and water.

7443. New paint?—Yes, not the day after. How often do we do it?

7444. I should like to know how often you do it, after it has had its first coat, with pumice-stone and water?—Not the first coat, but after the finishing coat—as

often as we are paid for it. Whatever you compel the employer to do, the public will have to pay for.

7445. (*Chairman.*) What I want to ask you is this, whether you can suggest, as an employer of labour, any remedies which would do away with the evils which exist in the various operations which the men have to perform?—I would suggest that as one, and qualify it by separating the two classes of dry rubbing.

7446. What would you do in rubbing down new work?—I am suggesting that you abolish it for old work and continue it for new.

7447. As it is now?—Yes.

7448. So that you admit at once that one of the evils has got to remain?—Yes, I suggest that remains.

7449. Then that is not meeting us, is it?—I think it is. I think it is meeting it a long way.

7450. (*Dr. Collis.*) There is just one further point that I should like to bring out in connection with this matter. The dangers which the Chairman has foreshadowed do not quite cover the whole of the possibilities of getting lead poisoning. Are you aware that it has lately been suggested before this Committee that wet lead paint gives off at the ordinary temperatures of the air a volatile organic lead compound?—No, I cannot speak to that.

7451. Are you aware that the workmen have for some time past considered that they get injury from the smell of lead paint?—No, I am not aware of that. One often has heard, in the days of flatting, of feeling temporarily sickly from the fumes of the turpentine.

7452. Are you aware that those symptoms are not present, although the turpentine is present, if lead is not in the paint?—No, I could not say.

7453. Have you ever heard of the inhabitants of a house which is being painted suffering from any form of illness after the house has been painted, or complaining to any extent of the smell of lead paint?—We have plenty of complaints of the smell; but I cannot speak as to any injury—any cases of illness resulting from it.

7454. I speak of this point as one which this suggestion, which has come from Professor Baly, of Liverpool, tends to explain: that, if there is this volatile organic lead compound given off by the wet lead paint, it would explain the symptoms of which we have all heard in the past, and which are indeed, I may say, familiar to us from boyhood; and, therefore, when you are considering the possibilities of preventing a man from getting contaminated by lead paint, will you have this further point in your mind?—Yes.

7455. My point is this, that if you were able to make suggestions to this Committee as to the way the other evils could be met, and if the experiments which are going on to-day, and which promise to carry out the suggestion which I have just been giving you, should prove incontestably that this organic compound is given off, and that it may cause lead poisoning, all the schemes which you may propose might leave this on one side and so be useless?—I should think it almost certainly would. I do not see how you can devise any means to alter a matter of that kind.

7456. (*Mr. Sutherland.*) Except abolition?—Except abolition.

7457. (*Dr. Collis.*) You might, in considering the point, after giving great time and attention (as I am certain you all will) to the subject, have possibly omitted that point. I am myself, as a medical man, inclined to place very great stress upon the suggestions of Professor Baly?—So would I, but I do not at the moment think that any amount of consideration would remedy a state of that kind if it is existent.

7458. (*Mr. Parsonage.*) We are told that you are having a meeting at York, and you may consider this question of dry rubbing down. You have had a long practical experience of paint as a practical man?—I have.

7459. And so have I. Has it ever occurred to you at any time that it could be dispensed with for new work?—No, it never occurred to me.

7460. You could not at the present time suggest anything to take the place of dry rubbing down for new work?—It would be very difficult.

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7461. You do not think that any suggestion made collectively could alter the individual opinion?—When you are speaking of new work, you mean absolutely fresh.

7462. I mean freshly painted work. Suppose you rubbed that door down with pumice-stone and water, and gave it a coat of sharp colour, and you were going to enamel it, say, and you gave a glass-papery down between the coats: you cannot suggest any substitute for that?—No, I cannot; but I would not say that one could not possibly be devised.

7463. But in the whole course of your experience you cannot call to mind anything which you have had to take its place?—I cannot call to mind anything that we have had to take its place, except that we do use the wet process for the final rubbings, and we could do it between coats if we could get paid for it.

7464. That would not be pumice-stone and water, would it? You would use felt and polish. But that could not be done in the ordinary way. You would do it for some special job, but not in the ordinary way?—We would not do it, but it could be done.

7465. Is it practicable?—Quite as much so as many other suggestions that we have heard, and more practicable than many of them.

7466. You do not think that a man can be ill and get lead poisoning from the smell of the thing?—I would not go as far as to say that he could not, but it never occurred to me during my career that it ever was taken in that way.

7467. That he inhaled it at all?—No, I would not say that he did not inhale it. If he is subject to an atmosphere that is absolutely tainted with dust, then I would agree with you at once.

7468. I am leaving out dust entirely. You know the smell of lead in the kog before it is mixed with the oil or turps?—Yes.

7469. It is a different smell entirely, is it not?—Yes.

7470. Although the smell of that may be poisonous too; when a man is painting a room or painting day after day in the fumes that come off from the turpentine, or whatever it is that carries off the lead, he inhales that, and so gets it into his system?—If it carries poison he may get it in that way, but I was not aware that you did get it in that way.

7471. That is the opinion that has been given to us?—It is not my opinion. I am not contradicting anything. I am accepting and willing to accept expert evidence. It is useful to hear this given and to take it to heart. If your medical expert, Dr. Collis, makes this statement and tells me that that is a proved fact, I accept it at once, and then I should agree with you that the poison could be conveyed in that form.

7472. And if that was proved to be so, none of the other remedies would have any effect, because you could not possibly prevent that?—No, I do not think so. That is practically the doctor's point.

7473. (Mr. Sutherland.) Is it not the case that the painter is very quickly out of the room that he is painting?—Yes. That wants qualifying. I should think the ordinary painter is not half his time—probably not more than a quarter of his time to-day—working with lead paint.

7474. (Chairman.) If they were, I suppose these figures would be very much higher?—They might be.

7475. (Mr. Parsonage.) The conditions are different in London, say, to what they are in a country town. You go into places here where there is no decoration but paint—ceilings, walls, and everything else are painted?—I have had London experience. I have had experience with West End firms in London, working in London and working for them in various parts of the country.

7476. There is a great difference between work in London and work in a country town, is not there?—Yes, to some extent—not very much difference between the work that I did for a London firm and what I have done for myself, except in point of magnitude. And even there sometimes I may undertake and do as big a job as any London job.

7477. (Mr. Sutherland.) What was your experience of the leadless paint: was it outside work or inside work?—Both.

7478. And you say it is less stable and more costly?—Yes, that was my experience.

7479. Did you carefully check that?—Yes.

7480. What were the substitutes you used?—Zinc paint.

7481. Did you buy the paste and mix it yourself?—Yes, in the case of zinc. I have used other things, but long ago I have relegated all those things that are brought to us—proprietary articles—to the waste-paper basket, as it were. I have had such poor experience of them in the past that I do not take any notice of them now.

7482. There is not so much flattening in the ceiling work now?—Practically none.

7483. Water paints, leadless paints, are substituted?—Yes.

7484. You do not mix any dry colours, except for distemper work?—None.

7485. Occasionally there would be one bucket to five men on every job, would not there?—I should say there is a long way more than that, from my experience of the difficulty of finding them at home.

7486. That is the regulation, but there would be more than one bucket for every five men?—Yes.

7487. And you do send soap already?—Yes.

7488. And hot water is in a great number of cases available?—Yes, available—almost in every case; because, where it is not absolutely in the house as a water fixture, we always have our boiling can or bucket on the job, and there is always cold water available.

7489. Do you see any serious difficulty in making provision for the men hanging their clothes in a room where they are not working?—No, I do not see any serious difficulty.

7490. In the great majority of cases?—I think that can generally be done.

7491. In some cases it might be difficult?—Yes, I think in exceptional cases it might be.

7492. (Mr. Rice.) In painting new work between coats, what is the object of rubbing down with sand-paper?—Smoothing purposes.

7493. And if you were to omit the rubbing down, what would be the result?—A rougher surface.

7494. Would you be prepared to agree to the abolition of the use of sand-paper or dry rubbing down?—I should have to give a little more consideration to that before I gave a definite answer. It would be a question whether we were to allow to go forward an inferior finish on our work or, to my mind, use an inferior article.

7495. But that would only be a question of education. The public would soon be educated to a rougher looking paint?—Yes, I am afraid they are getting too rapidly educated to it now.

7496. It is the common practice in the smaller class of work not to use sand-paper, is it not?—Quite.

7497. No sand-paper goes on the job at all?—It does not go on the job at all.

7498. So that it would not be a greater hardship on the public, except less finish, if sand-paper were abolished altogether?—That is so. We should give them a better finished surface from the brush alone than some of the work I could take you to in this building.

7499. You have been very surprised, I suppose, to find this mortality and sickness amongst painters which you have heard of this afternoon?—I am surprised.

7500. And of course it is information which you take rather seriously to heart now, I suppose?—Certainly.

7501. You rather appreciate the action of the Government in bringing it before you, I take it?—I think it is quite the proper course to adopt.

7502. In fact, perhaps, you are rather surprised that they have not done it before?—I am not a man given readily to surprises. I have known in a very matter-of-fact sort of way, but I do heartily agree with action being taken in any case that is going to be for the



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general good, consistent with other side issues, and other aspects of the case.

7503. Have you ever received a circular, as an employer, from the Home Office calling attention to this appalling mortality and sickness?—I am not aware of it. I could not say "Yes" or "No": I do not remember one.

7504. So that really this thing has come to you quite in a new light to-day?—Quite, absolutely.

7505. And had your attention been called to it, you would have taken steps earlier to go into the matter?—Certainly. If a great number of the members of our association had been as enlightened as I am to-day—and, I may say, as I have been more recently—the matter would already have had their very best and serious consideration.

7506. And I suppose that enlightenment has come to you largely as a consequence of the formation of this Committee?—Yes, I agree.

The witness withdrew.

## TENTH DAY.

Friday, 26th May 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

LORD HENRY BENTINCK, M.P.  
MR. E. L. COLLIS, M.B.  
MR. A. L. C. FELL.  
MR. C. L. MASON.

MR. C. KINGGATE.  
MR. W. ROBINS.

E. A. R. WERNER (*Acting Secretary*).

Mr. X. examined.

7507. (*Chairman*.) Are you a coach painter?—Yes.  
7508. What practical experience have you had in the coach painting trade?—It is 30 years next December since I first went into the trade.

7509. Have you worked at railway coach and tram-car painting, or only at carriages and motor cars?—Carriages and motor cars only.

7510. Have you known many cases of lead poisoning among coach painters?—Not many—a few.

7511. How many do you think you have known of in your time?—Perhaps 12 personally.

7512. (*Lord Henry Bentinck*.) Twelve deaths?—No, they have not all ended in death—about three in death.

7513. (*Chairman*.) Are you prepared to answer questions regarding each of the processes in detail?—Yes.

7514. First, as regards the body makers, are they exposed to any risk?—Very little; it is only in the joints—and it is wet lead. Dust does not arise there at all.

7515. Why is lead used in jointing?—I expect it is used for durability, to keep the water out of the joints.

7516. Would you tell us exactly how jointing is done in the case of wood panels and similar joints?—The lead is put on at the bed joints and round the panel before the panel is put on, before it goes into its proper quarters, according to which panel it is.

7517. In what way is jointing done when metal fittings are being attached to the woodwork?—I cannot answer that.

7518. Does the vehicle in course of construction next pass into the hands of the carriage maker?—Yes.

7519. Will you tell us exactly what his work consists of?—There are very few carriage makers about now. There are no carriage makers on the motors.

7520. Does he make the under-carriage of the vehicle and fit the springs of the wheels?—Yes.

7521. And does he supervise the work of the smith?—Yes, he puts the smith's work on, the springs, and so forth.

7522. Does the carriage maker come into contact with lead?—By the same rule, he would use it at times for his clips and blocks, and so forth, but then again it is wet lead.

7523. (*Lord Henry Bentinck*.) Wet lead dries, does it not?—Yes, but that is not the danger.

7524. (*Chairman*.) If the wet lead dries it must create a certain amount of dust?—I think not—not wet lead.

7525. When the carriage maker has completed the work of fitting up, is the vehicle ready to pass into the painter's hands?—Yes.

7526. The first coats of paint applied are termed priming coats, are they not?—Yes.

7527. How many coats of priming are generally applied?—Are you speaking now of the vehicle or the motor?

7528. The horse vehicle?—Three coats.

7529. Does the priming contain lead?—Yes.

7530. Is it practically all lead?—It is, with the exception of a little black.

7531. Is sand-papering done between the successive priming coats?—Yes, occasionally; not always in that case.

7532. Is it generally done?—No, if the question refers to the vehicles only, and not to the motors. There is a lot of difference between the two. One has got a filling on the top of it. No, it is not sand-papered.

7533. Is the next process what is generally known as filling?—Yes.

7534. How many filling coats are put on?—Five in some cases, six in others.

7535. Does the filling material contain lead?—The filling is composed a little of lead.

7536. Do a considerable number of manufacturers still add a proportion of white lead to their filling?—Yes.

7537. There is no rubbing down, I believe, between the successive coats of filling?—No.

7538. Only the last coat is rubbed down?—Yes.

7539. Is stopping generally done after the last coat of filling has been applied?—No.

7540. At which stage is the stopping done in the ordinary course?—That is a matter for the workman. Some workmen will do it before they fill at all, and others will get two or three coats of filling in before they stop. That is a matter of the workman's option. If I were doing it, I should put it on the fourth coat of filling, if I were giving it six coats, simply because you have got half of your holes done for you then.

7541. What is the stopping material made of?—White lead.

7542. By whom is the stopping material mixed?—By the painter.

7543. By the man who applies it?—Yes, by the man who is going to put it on.

7544. Do you consider that the mixing of white lead is attended by danger?—I should say that in

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mixing there is no danger, unless a man is very careless.

7545. But if he is not very careful, it might be dangerous?—That is the same as I have already stated, I think, with regard to cleanliness, if he is not careful and does not wash himself before he has his meals.

7546. I suppose some dust must arise from the handling of the dry white lead powder?—Very little.

7547. Is there a staining coat applied after the last coat of filling, and on top of the stopping?—Yes.

7548. What does that consist of?—If you are making it of black, it consists of vegetable black.

7549. For what purpose is this staining coat applied?—So that you know when you have rubbed your body down, how you have done it, whether you have done it fairly and evenly.

7550. How is the rubbing down done after the application of the filling coat and the staining coats?—It is done by pumice-stone and water.

7551. Is it often done dry, by sand-papering it for instance?—No, it is impossible to do it dry if you have filled it up.

7552. What is the extent of the danger in the rubbing down after the application of filling and stopping?—None whatever.

7553. But if it were done by a sand-papering process, it would be dangerous, I suppose?—Yes, that is where the danger is.

7554. Are the wheels and the carriage underwork treated differently?—Yes.

7555. The wheels are always sand-papered, I believe?—Yes.

7556. And a great deal of dust is caused in that operation?—Yes.

7557. Is this dust of a poisonous nature?—Very.

7558. Then that is also an extremely dangerous process?—Yes.

7559. Would you say that it is one of the worst processes in the whole of the coach painting industry?—Do you mean after it is stopped up?

7560. Yes?—Yes, that is the evil.

7561. Is it possible to use wet methods of rubbing down in this work?—Not on wheels.

7562. It is impossible to do it?—Yes.

7563. Is that owing to the prevalence of curved surfaces, and so on?—Yes, and you have not the foundation to rub on. If you rub with hard-pumice-stone you would soon rub through into the wood.

7564. Is it practicable to apply local exhaust ventilation generally. Could you have an apparatus near the wheels to collect the dust as it arises?—I hardly think so. I should like to see that worked.

7565. After the rubbing down of the filling has been completed, what is the next operation?—Lead again.

7566. Do you mean to say that you apply two coats of colour again?—After the rubbing down, yes.

7567. Are they both faced with pumice-stone and water?—Yes.

7568. Is the work then ready to be painted with the desired finishing colour?—Yes, it is ready then for the colour.

7569. How many coats does it receive then?—Four—that is without the spirit colour. That would make five.

7570. Is the carriage then ready for varnishing?—My last answer would include the varnishing.

7571. How many coats would be applied before the varnish?—Three coats.

7572. Then the carriage is ready for varnishing?—Yes.

7573. Do your answers apply equally to carriage building and to the manufacture of motor car bodies?—No.

7574. Only to carriages?—Only to carriages. I was answering on carriages.

7575. Have you anything to say about motor cars?—Yes, I have this to say about motor cars. I think that is where the principal evil is at the present time that you are dealing with—not on the carriages.

7576. Do you consider that the introduction of motor cars has had any effect on the dangers of your employment?—Yes.

7577. A considerable effect?—Yes.

7578. In what way?—With the motor cars you do not fill them up, or very few of them. Of course, if you have a wood body you would fill it up in the ordinary way, but on the other hand you would not give it filling, you would give it the sand-paper stuff. There is too much of the sand-paper stuff used, which causes the dust.

7579. (Lord Henry Bentinck.) What do you mean by sand-paper stuff?—Soft stuff. You have not the material on a motor car like you have on a brougham.

7580. (Chairman.) Can you tell us anything with regard to the fixing of canvas or moleskin on the roofs of closed vehicles?—No.

7581. You have now told us all the operations in which there is any serious risk of lead poisoning in coach building work. Is it, in your opinion, impossible to remove those dangers?—In my opinion, it is not impossible. In my opinion it is possible to remove them, and I think that is the reason I am here to-day.

7582. You think it is possible to remove the dangers?—The great portion of them.

7583. How would you propose to do that?—This is a preparation which I am not here to divulge. (Producing a sample.) That is with two coats on it. If I sand-paper that down with only two on it I shall get a good surface, but if I put four on it I shall get a better surface. I only did it yesterday with two coats. That does not contain one particle of lead.

7584. Do I understand you to say that it is only possible to remove these dangers by having a substitute for lead?—Yes.

7585. No doubt there are many processes in which the workman cannot avoid getting his hands soiled with the material he is using?—Yes.

7586. Is adequate washing accommodation provided by most of the employers?—No.

7587. Are nail-brushes and hot-water available as a rule?—No, in very few cases.

7588. Is time allowed for the men for washing before leaving off work for meals?—I have not known it done.

7589. Is food often kept and eaten in the work-rooms where lead paint is being used?—Very often—mostly.

7590. Are meal-rooms provided equipped with suitable seats and tables and properly warmed in winter?—Very few.

7591. Do the men have the use of a cloak-room?—No.

7592. Do the coach painters wear overalls while at work?—No.

7593. Can you tell us what are the usual hours of work for coach painters?—Nine hours a day.

7594. Do you think that a restriction of the hours of working in lead processes would be a salutary measure to adopt in the interests of health?—No.

7595. (Lord Henry Bentinck.) Do you think that it is a good thing that men should be at work overtime on Saturdays and Sundays?—I am of this opinion, that I think as soon as you start reducing the hours you reduce the wages—and I cannot stand reducing the wages.

7596. (Chairman.) I am speaking from the health point of view?—We cannot stand wages any lower than at the present time.

7597. Have you noticed any alterations in the hours of employment as a result of the development of the motor car industry?—It is a good many hours at the present time. At present there are some in our trade working 68 to 70 hours a week.

7598. If you were told by the highest medical opinion that working long hours in contact with lead was very dangerous, what would you say?—I should believe them, because I know it.

7599. And you would see the wisdom of restricting the hours?—Yes, but when you talked about the nine hours, I thought if we had a reduction on that we should have a reduction in the wages. I may say that I do not believe in overtime at all. I believe in gardening; that is my hobby.

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7600. (*Lord Henry Bentinck*.) But if the overtime hours were restricted, do you think that would affect your wages?—Yes.

7601. (*Chairman*.) Would it be desirable to have a periodical medical examination by a surgeon of the workpeople?—There is no doubt something of that sort wants doing.

7602. With powers to suspend from employment in lead processes?—Yes.

7603. Is there any other matter you wish to bring before the attention of the Committee?—I have used this now for something like 10 years myself. (*Referring to the sample produced.*)

7604. Would you call that a leadless paint?—This which I have here is leadless, with sand-paper filling—not a particle of lead in it.

7605. Has that been thoroughly satisfactory?—I have tested it myself for my own benefit, because I have to do my own, whereas in shops they generally have labourers to do it. In doing my own I have had to study my own health, and that is the reason I have got this up. One of the manufacturers has asked me to tell him what it is made of.

7606. Has it been satisfactory in its use?—Satisfactory in wear and everything else.

7607. What length of trial have you given it?—I have done two motor cars with it, but I used it on carriages years ago, on small traps. I do not say you could use it on broughams, and so on, because in those cases you put the proper filling on, which is rubbed down with pumice-stone. That is the proper filling. (*Producing a second sample.*) That is the best you could find, with four coats; that is not rubbed down; there is no danger in that.

7608. Have you had any test as to whether those two motors you have painted have lasted as long as others would?—Yes.

7609. When did you paint them?—One last July. That would be 11 months ago, and I see it constantly. The other one I did about eight months ago. This is the one where the danger all is. (*Producing a third sample.*)

7610. (*Lord Henry Bentinck*.) That is the lead filling?—Yes.

7611. Does the paint go over that third one which you have produced as well as on the second one?—Yes, but this second one is the proper filling, the water filling, for rubbing down. I have been dealing with sand-papering, and that is where the danger is, I think. I have heard of an affair brought out, whereby we work in a hood. I think if you trace the lead poisoning cases you will find there are very few of them take it there at all, in either the nostrils or the mouth. I think they take it all through their finger ends, or the greater portion of it.

7612. (*Mr. Fell*.) Do you mean on their food?—No. I am speaking now of sand-paper stopping in their nails.

7613. (*Dr. Collins*.) I want to be quite clear whether the substitute that you are speaking of takes the place of lead for all purposes in the painting of vehicles and motors?—No.

7614. Do you mean that you use lead paints in addition?—I should use lead for the first two coats and leadless after; but you will not come in contact with the lead that you use, because this is on the top of it.

7615. But you have to apply those first two coats, have you not?—Yes.

7616. So that you would only reduce the amount; you would not get rid of the lead altogether?—By putting the two coats on there is no danger there.

7617. That is your opinion?—There is no danger unless you are careless over it. A clean man would never have danger with putting that lead on—not a great amount of danger. I contend that it is all in the dust.

7618. That is not the point I want to get at. Your substitute does not entirely get rid of the use of lead?—Not likely. It would be a clever man who could.

7619. Have you made any experiments in trying to replace the first two coats of which you were just speaking by other paints than lead?—No; and I do not

think I should try. You want something at the bottom for wear.

7620. But you have not tried?—No, I do not know what I should do to try that.

7621. You are not aware, perhaps, that the Daimler Company get up their cars without any lead at all from the first?—Yes, and how do they stand?

7622. They tell us that they stand well, and their finish looks good. I do not know more than that. Your substitute would be of value in getting rid of some of the lead, but it does not get rid of all the lead?—No.

7623. We have had evidence given us that lead paint will give off a volatile lead compound, which the workers inhale as they breathe?—Yes.

7624. So that even those first two coats which you are putting on, if you are using your substitute, would have their danger?—Yes; but which would be the greatest amount of danger?

7625. That is a point which is not yet settled, but we want to get rid of all danger?—Then you will have to get into some other trades besides the lead painting. You will have to get into the printers' trade. They suffer with it.

7626. We want to deal with one trade first?—You want to do away with it entirely?

7627. Yes?—I do not think there is a living man who can do so yet.

7628. (*Mr. Fell*.) You were saying just now that there is much greater danger with motor cars than carriages?—Yes.

7629. And you said that you had come across 12 cases of lead poisoning?—I said from memory I might have come across about 12 during my time.

7630. How many of those 12 are on motor cars and how many are on carriages?—None of them on motor cars at that time.

7631. On what do you base your expression of opinion that the danger is much greater now?—Because of the statistics that have come out of late, since the motor trade has been carried on.

7632. Your opinion is only based on the published statistics?—Yes.

7633. Not on your own knowledge?—No. I do not know of one case since the motors have come out. I know of two very serious illnesses since the motors came out which they thought were due to that, but whether they were or not I could not say.

7634. Do you say that this leadless stuff which you make up could be used for jointing?—No.

7635. Could it be used for bedding canvas?—Yes.

7636. On things like tramecars?—No, not in that case.

7637. It would not stand?—No.

7638. Have you had any experience at all with leadless paints?—I use that as a leadless paint for one. (*Referring to sample produced.*)

7639. I mean paints like zinc white or any of those?—I use zinc white.

7640. Do you find that satisfactory for painting carriages?—I never use it for painting carriages. I always mix it with others as a compound; I have never used it alone.

7641. You have never used any of these patent paints?—Yes, I have, occasionally, when I have had a cheap job, when it would not pay me to go out and get the proper stuff.

7642. Do you find they are not as satisfactory as lead?—Yes, I do. I find there is not sufficient body in them.

7643. (*Mr. Kinggate*.) You say you would not try any other compound. I would like to ask you why you are so certain in this matter?—I am speaking of woodwork. Are you pinning me to woodwork?

7644. Yes?—Because there is nothing like lead for water.

7645. You have not tried a substitute?—I have tried this which I have produced, one of my own making up.

7646. But in the place of lead entirely?—No.

7647. Are you aware that there are substitutes that are quite equal to lead for this purpose?—No.

7648. Then I can hardly understand why you say you would not try them?—You are talking about sub-

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stitutes now. You know what substitutes generally are. There is a substitute for turps out at the present time.

7649. That is different altogether?—You are speaking of substitutes.

7650. If it has been proved, what do you say?—I have not seen it yet.

7651. His Majesty's Office of Works have tried a substitute for lead for both interior and exterior work. In every way it has been found quite equal to lead?—What is the length of time they have tried it?

7652. Four years?—On outdoor wear?

7653. Yes, indoor and outdoor?—Carriage work?

7654. No, on the outside of buildings. A member of our society is the head painter of the Daimler Company?—Yes.

7655. He is a thoroughly practical man and he has adopted a method which has been in use there for four years. All the cars that have been painted for four years have stood thoroughly well—equally as well as they have with lead?—Yes.

7656. You know perfectly well that in our trade there are numerous dangers with regard to lead?—Yes.

7657. Illnesses that are not reported. In many cases men are ill from lead in cases that are not reported?—Yes.

7658. But they have in many cases to continually dose themselves to keep themselves in working order?—Rightly they should do.

7659. It is very necessary, of course, that if possible lead should be done away with?—Yes, I say so—if possible. I am willing to have that.

7660. Are you aware that the Midland Railway Company use no lead whatever in the painting of their carriages and have not done for years?—No, I was not aware of it.

7661. Should not you say that the rolling stock of the Midland Railway Company was equal in appearance and wear to any other railway in the kingdom?—No, I do not know that I should.

7662. Can you mention any other railway which is better?—I think when you are speaking of railways you are not speaking of carriages, because there is a difference between railway carriages and vehicles in the street.

7663. In which way?—In the way in which they are used—for washing purposes. With the Midland Railway carriages the heavier the trains the better they are washed as a rule, but a vehicle in the street has to go through the process sometimes twice a day, and that is where the test for your lead comes in—the wheels and spokes, and so on. Is that material which you are speaking of going to stand that?

7664. Undoubtedly, but when the varnish gets off anything you have to get down to the bottom before you get the effect of the lead?—Yes, that is admitted.

7665. All of it has three or four coats of varnish on it?—Yes.

7666. Therefore, it has nothing to do with whether it is washed or not until the water can get at the lead at the base of it. Your argument, of course, would be that this substitute would not be equal to lead, which you have to get at before you get the effect of it?—I should say so, in my mind, but I would not contradict what you are saying if there is proof of it.

7667. There is proof of it?—I have not had proof of it, therefore I cannot say anything about it.

7668. Take another case. Do you know that the Bradford Corporation in their tramcar works do not use any lead and that the tops of their cars are painted white?—No. I know in the Nottingham Corporation they do.

7669. You know that it is a fact that they do not use any lead in the Bradford Corporation Tramway Department, and their tops are painted white?—Yes.

7670. Therefore, it is rather strange that you should say you would not try any substitute. If there are cases where there has been the experience of using a substitute, why should not you try it?—I said so on those grounds—the wear of the vehicle. I did not say I would not on motors. I was asked if I used this (referring to sample produced), and I said: "No, not on a vehicle in the street, but on a motor."

7671. You are only speaking there of a leadless filling?—Yes.

7672. Not of a ground colour?—No, leadless filling: that is all.

7673. We are dealing merely with the case of lead?—Yes.

7674. There are many leadless fillings on the market now. The lead is only put in to give it more body, so that it faces better?—That which this is composed of mainly does not contain one particle of lead (referring to sample produced).

7675. The filling which is sent out by the manufacturer is leadless filling?—Yes.

7676. It is only the painter who puts a certain proportion of lead in so that it gives it more body, and it faces down harder, and is not so porous?—Yes.

7677. Of course, I agree with you with regard to the carriage maker, that there are few carriage makers about now, but there are a number still?—There are a few.

7678. Do not the evils attending the use of lead apply both to the body maker and the carriage-maker?—I think not a great amount—it is mostly by carelessness.

7679. Not necessarily carelessness. You know that a carriage maker or a body maker putting on body plates cannot possibly keep his hands clean?—He cannot, but after he has done that plate he could wipe his hands and get them clean. He could take the precaution then. They do not take the precaution in many cases; they neglect it till they come out at meal times.

7680. But there is danger attending the use of it, and with a carriage maker especially so. Sometimes for days he is using nothing else but lead?—Yes, after he is fitting up.

7681. Again, in the carriage industry especially, the body is nearly always taken to the carriage maker, and the coats of priming are only given while he is working at it. That you know?—Yes.

7682. When you hear from Dr. Collis that it has been proved that the fumes given off from the drying of the paint are also poisonous, you see, perhaps, the bigger extent of the evil than what you imagined it to be?—I have never put it down as a great amount of evil. Of course, there is an evil from any paint—from the fumes of it—but I have not put it down as a great evil. I think the great evil rests with the sand-papery alone—more than all the other evils put together.

7683. Of course, that applies to sand-papery wheels of carriages especially, or a chassis?—Yes, on the soft stuff.

7684. Or on the lead itself, because the lead colour itself is composed of nothing but lead and a little colouring. It is practically all lead?—Yes.

7685. I think you will agree with me that it is desirable at any rate to do everything possible to save the employes in our trade from the poisonous effects of the use of lead?—Admitted.

7686. If a good substitute could be found, it should be used in the place of lead?—Yes.

7687. (Mr. Robins.) With regard to the question of carriage and body makers in the road-vehicle making trade, apart from motors altogether, is it not a fact that on the body maker's and carriage maker's bench, one of the necessary things which you find standing there is a pot of thick white lead?—Yes.

7688. Do you not consider there is a great danger of that pot of thick white lead being under the nose of the carriage maker or body maker all the time he is at work?—I should not say that there is a great amount of danger.

7689. Considering it has been proved that there are fumes coming from white lead, and more so from matured white lead, do you not think there is a great amount of danger?—No, I should not think so, because that pot of lead that you are speaking of does not cause the fumes to rise; it is only oil with it, not turps. If you get turps with it, you get it to rise. I do not consider there is as great an amount of fumes from the carriage maker's pot on the bench as there is in the paint shop.

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Mr. X:

[Continued.]

7690. But you would admit there is a great amount of danger from having that on his bench?—Not a great amount. I should say there would be a slight danger.

7691. Would you say that it is not free from danger?—Yes.

7692. I think in the course of your evidence you said that there was less stopping up on the motor than there was on the private carriage?—I did not say so.

7693. Less filling?—I say less filling.

7694. From my experience of seven years in the motor industry there is more white lead used on motors than on private carriages?—You were speaking of filling just now, and now you are speaking of white lead.

7695. With regard to a motor, do you consider that there is more dry white lead used on a motor than on a private carriage?—Yes.

7696. For what reason?—Simply because you have not got the foundation there to rub it down with hard stone, and you have to sand-paper it. I am not speaking now of stopping. Do not pin me to stopping, because a carriage has stopping, with a certain amount of holes, but a motor has not that amount of holes, as you know, with the panels.

7697. But although a motor has not the number of holes in it that a private carriage has, still, from the condition of the panels being hammered, in my experience it requires quite as much stopping or more stopping than an ordinary carriage?—Some do, and some do not. They are got up pretty well without the stopping.

7698. The conditions that I find now are that there are more hammered panels, and consequently they require more stopping?—There are some in excellent condition that do not require a great deal. I can tell you that.

7699. With regard to your leadless filling, that would be the only thing that would be free from lead on a carriage that you would paint?—Yes—up to now.

7700. It would only be the leadless filling after the priming, I take it?—Yes.

7701. You are doing away with the slate filling altogether?—It is a kind of slate now.

7702. I take it then you would sand-paper that—rub it down?—Not rub it down, sand-paper it. I should use proper filling for rubbing.

7703. And after sand-paper you would apply proper filling on top of that?—Then I should apply the lead.

7704. That would be lead for colour then?—No, I should apply lead before the colour.

7705. You would have a lead priming?—Yes.

7706. Then the leadless filling in between?—Yes.

7707. And then you would apply lead again?—Yes.

7708. Then your colour?—Yes.

7709. That would be the formula of the work?—Yes.

7710. Then that is, so far, your experience with regard to leadless paints?—Yes.

7711. (*Lord Henry Bentinck*.) You invented this leadless paint in order to improve your own health?—I did. There may be others that know of the same thing, I do not claim to be the only one, but I say I do it myself.

7712. Therefore, I suppose you will agree that, if it is possible to invent a substitute for the other processes, it would be advisable to do away with lead altogether?—I was thinking about the wearing, but our friend says it will wear, and if I take his word for it I am convinced on that.

7713. You think, if satisfactory substitutes could be found, it would be advisable to do away with lead altogether?—Yes.

7714. (*Chairman*.) Do you speak on behalf of any number of your men?—No; I have no instructions to speak for them.

7715. You come entirely on your own account?—Yes.

7716. Do you know the general feeling of the men. Are they anxious to have something introduced?—That I cannot say. Our friend here knows that it is not a matter of Committee business, but it is a matter of a certain meeting.

7717. Have you ever heard your men discuss the question of the necessity of remedies for relieving the evils that obtain to-day?—No, I do not think that we have many men in Nottingham that have that about them to discuss it.

7718. What do you mean by that?—I think they are too avaricious after money, and not their health. That is the reason I have come here. I think I am about the only one who studies his health.

7719. (*Mr. Mason*.) Did I understand you to say that there was more dry white lead used on a motor than on a private carriage?—Yes.

7720. But less stopping?—Yes, only it comes, as our friend said, in the case of the hammering, and then you would use a little more.

7721. What do you use the dry white lead for?—For sand-papering. They do not use the filling, I am speaking now of the hammering out process—not on the landaulette cars. A landaulette body is practically the same as a brougham, but in the case of these bucket seats, and so on, there is not a deal of stuff on them.

7722. I do not think I quite follow that. What was the dry white lead used for?—In sand-papering the paint—one coat on top of the other.

The witness withdrew.

Mr. ARTHUR FELTON MULLINER examined.

7723. (*Chairman*.) You are one of the witnesses selected to give evidence on behalf of the Society of Motor Manufacturers and Traders?—Yes.

7724. Are you a carriage and motor manufacturer?—I have been at the head of a large manufacturing concern for over 30 years.

7725. Do you manufacture motors?—Not motors, only carriage bodies for motors.

7726. You manufacture motor car bodies?—Yes. That is, of course, the principal part of one's business nowadays.

7727. What length of experience have you had?—Practical experience, over 30 years. Previously to that I was at the London and North Western Railway Company's carriage works at Wolverton.

7728. How many men do you employ?—I should think about 350 to 400.

7729. Have you known of many cases of lead poisoning?—Since I was asked to come here I made a point of seeing all those engaged in my painting department; that is all my painters proper, and all the men who do the work of filling up and rubbing down. They number about 60 in all. I saw them nearly all personally, especially those who have been in my employ for a long while. There is one man has been

45 years in my painting department. In the report I have here I have questioned each to obtain his experience both personally and from his knowledge of others, and in only two cases has any one of those men, in all his experience, experienced temporarily any ill effect. In both cases I find the suggestion of lead poisoning was put into the man's mind by the medical man after inquiring what his occupation was. In addition to that, two others had heard of such cases, but many years ago.

7730. Do I understand that about 60 of your men come in contact with lead?—They are employed in painting. We use a very small quantity of lead, but they are employed in using it.

7731. You tell me you have about 400 or 500 men in your employment?—Yes.

7732. I want to know how many of those men come in contact with lead?—Only 60.

7733. Do you think it is a good way of getting information for the employer to ask the men on a matter of that kind? Do you think it is reliable?—I do, because I am on very, very friendly terms with my men, and they treat me rather kindly, as I think I treat them also.

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[Continued.]

7734. Do you know that in the coach building industry there have been 767 cases of lead poisoning recorded by the Home Office in the 11 years 1900-1910?—767 reported cases in 11 years, but only 100 of those refer to carriage body makers. The others are railway painting, which, of course, is a different industry altogether, and tram painting, which is a different industry, and perambulator painting, which is also different.

7735. How many of those men do you say are in your trade?—Only 116 in the motor body or carriage body making, and that would include also the painting of chassis wheels or bodies. I refer to makers of motor chassis. Before they send out the chassis to the carriage builders, or other people, they give the chassis a coat of what they call lead colour, so that it would include those manufacturers as well as the body makers.

7736. Do you know how many men have been employed on making these bodies and chassis?—No, I could not tell you how many there are, but it is a very large number.

7737. May I take it, from the figures, that lead poisoning has been on the increase in this particular part of the industry?—From what my own workmen tell me about it, it must have been very much the reverse.

7738. But the Home Office figures show that, if there is no increase, there is certainly no reduction?—I can only speak from the information from about 60 men who gave me information, which they did very willingly indeed. Only one of those men knew of a case that proved fatal, and that was over 15 years ago. The man both inherited it and was also himself consumptive, so that whether his death could possibly be traced to lead poisoning or not I could not say.

7739. (Dr. Collins.) Do you say he inherited it?—He inherited the consumption. So that I do not think that is a fair case, but that is the only case I can trace in any of my men's experience that I have heard of, and that was over 15 years ago. Of course the experience of 60 men during a lifetime is worth something. I am rather anxious you should not class our type of work with that of railway carriages, because we only look to the high finish of carriages.

7740. (Chairman.) Of course the importance of the figures depends entirely on the number of people that are employed?—I do not know how we should get at the number of people employed. We should, of course, include the number of men employed in the painting of chassis, and so on.

7741. Of course the industry has increased enormously the last four years?—Yes—chassis making.

7742. And body making—the whole industry?—Yes.

7743. You quite appreciate the fact that the number may be large or it may be very small, but it is the proportion?—Yes, those are cases which have been traced during the last 10 years, said to have been due to lead poisoning.

7744. Have you, as a society, taken any steps to test the merits of the different substitutes on the market?—No, not as a society.

7745. Or to institute any inquiry as to the precautions necessary to combat the evil which exists in many branches of the industry?—No, we have not had the matter of lead poisoning up before us.

7746. Have you tried substitutes for white lead in your painting work?—I have substitutes, but, curiously, I have heard of another one to-day, which I have had the particulars of. It is a special filler which is said to be absolutely non-poisonous, and is made from the finest quality of specially selected oxide of zinc, tinted with carbon, and ground in a special varnish medium—absolutely non-poisonous. I only heard of it to-day, and I intend to have some of it and have a carriage painted entirely with it.

7747. Have you tried any substitutes in past years for white lead?—No. Until this matter was brought forward we have never realised the slightest necessity for it.

7748. Then you could not say whether it would be possible to prohibit or greatly restrict the use of lead

without inflicting a hardship on the industry?—I do not think that the results that we obtain would be nearly so good if the use of white lead was entirely abolished.

7749. You have not tried, have you?—No.

7750. Then how do you know what the results would be?—I know what the result is with the Motor Company. They say they do not use any white lead. They use a kind of filling, but whether that filling is absolutely free from white lead I do not know. That is composed, I believe, of sulphate of lead—it is called non-poisonous.

7751. What particular form of hardship have you in your mind if lead was prohibited? What sort of hardship would it be to the industry? Are you thinking of foreign competition?—Of course, if foreigners were allowed to use lead, and their goods come in quite free, it would affect us very materially, probably. Many carriage bodies come in from abroad as it is.

7752. Are you thinking of increased cost?—I do not know that it would necessarily increase the cost.

7753. Or do you fear a reduction in quality?—A reduction in quality, certainly.

7754. But you do not know that from your own experience?—No, not from the experience of my own factories.

7755. You would agree, no doubt, that if a substitute could be found which would be in every way as good as white lead, the use of white lead should be prohibited?—I do not see why it should be prohibited.

7756. I have told you that, even supposing the 116 cases which you have put forward to us were very small, still it is something to combat with?—Yes.

7757. You would agree, no doubt, that if a substitute could be found which would be in every way as good as white lead, the use of white lead should be prohibited?—If it is proved there is any danger at all from white lead in the small quantities we use it, and if it is for the benefit of the workmen, we would do anything for the benefit of the workmen.

7758. The Home Office think there is very grave danger, or we should not be sitting here to inquire into it?—Certainly, but it may not be in our particular industry.

7759. You agree with me that if a substitute could be found the use of white lead should be prohibited?—If a substitute could be found, I should not use the white lead at all. If any danger obtained to the workmen at all, I should think it my duty as an employer not to use it—if it was proved.

7760. Supposing that we can prove to you that there is danger in any particular operation, then you would cease to use it?—I should cease to use it, if it was proved there was any danger to my workmen.

7761. Do you know that for the past six years the Midland Railway Company have used no lead in their carriage and wagon works?—I have no knowledge of what they do.

7762. And that they are entirely satisfied with the results obtained with a mixture of zinc and baryta?—I have no knowledge of what they use.

7763. We have also had similar evidence from the representative of the Bradford Corporation Tramways Department. Are you aware that white lead is no longer in use at the Daimler motor car works in Coventry?—I have been told so by the manager.

7764. Do you hold that white lead is the most perfect substance that can be used?—White lead is what we call a very useful substance. We use it for framings as well as for painting.

7765. Do you hold that white lead is the most perfect substance that can be used to-day in painting?—Up to date, it is the best known substance for the filling up of the grain of the wood. That is what we use it for—in order to get the high surface and finish that we want to get.

7766. How does your work compare with the Daimler motor car bodies?—It is rather an unpleasant thing to have to say anything against another person's work, and I object to do so very much.

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[Continued.]

7767. Are they one of the largest firms in the industry?—They make a large proportion of bodies compared to other people.

7768. And do they turn out work of the highest finish?—Only from their own point of view, I think. We can only look at results.

7769. The buyers of Daimler cars are about the same class as the customers of your own or other leading coach body firms, are they not?—Yes, I suppose they are.

7770. And would they not demand the same finish from the Daimler Company that they demand from you?—The Daimler Company have not been making motor bodies of their own very long—I think only five or six years—and it is only within the last two or three years, at all events, that they have made any quantity of bodies.

7771. The witness representing the Daimler Company told us that they are entirely satisfied with the substitute they are using for all purposes for which white lead is commonly used in coach building works?—Why should he say anything against himself? I have discussed the matter with him myself.

7772. The Daimler Company say that they have used no white lead for two years, and that they have had no complaints from their customers. If there is any defect in their substance, is not that a most remarkable incident?—One sees the results of their work after a few years—yes.

7773. They have had no complaints from any of their customers?—That is rather a broad assertion.

7774. Is not that rather a remarkable statement for them to make?—Perhaps others have had complaints of their work. I know of several instances where very serious complaints have been made of the results of their work.

7775. But their sales have not fallen off; their business is progressing satisfactorily?—It has been up to date. I do not know that it is just at the present moment.

7776. They have had no complaints from their customers and they do not use white lead?—That is rather a broad assertion, I think, altogether.

7777. What the Committee want to ask you is: how do you account for this. A firm like the Daimler Company, of high reputation, with a great business connection, who have used no white lead for two years, are perfectly satisfied with the results, and their customers have made no complaints. I ask you: Why should not the other motor car companies adopt the same formula?—May I ask whether the material they use (which I believe is sulphate of lead) is considered as lead. They use what they call non-poisonous white lead, which is really sulphate of lead. Do you accept the use of sulphate of lead? It has to be proved that it is non-poisonous. You are starting on the assumption that they are using no white lead, but I believe they are using sulphate of lead.\*

7778. Just now you were rather inclined to state that you were not in agreement with them in regard to the perfection of their finish?—Yes.

7779. Now you are rather putting it on the ground that they are using lead?—No. I take it in both ways; that there is probably not so much used in this particular material they use as there is in what we use.

7780. But supposing it is a leadless paint and is perfectly efficacious, why should not this Committee insist on other motor car companies adopting the same formula?—I do not see any reason why you should not insist at all. I think it would be the duty of every employer to use such material, and it would be to his workmen's benefit. I agree with your previous question, that if we can find a really good substitute for white lead we will give up using white lead. I am perfectly prepared to do so myself.

7781. I am now pinning you to a formula which is in use and which the Committee has been told is perfectly satisfactory. I want to ask you why, if it is satisfactory to the Daimler Company, it should not

be satisfactory to a company like your own?—What might satisfy the Daimler Company might not satisfy me.

7782. I am speaking of your customers. If it satisfies their customers why should it not satisfy your customers?—I do not say that the customers are satisfied. I have found a good many customers who were not, because I have had a good many of the carriages to do over again and re-paint. I have rubbed them down and started in the usual way.

7783. Do I understand that your suggestion is that the Daimler Company's work is not as durable as yours, and that you prove that by the fact that the Daimler Company's motor cars have been sent to you to re-paint because the customer is not satisfied?—I do not say that all their carriages are so, but instances have occurred.

7784. Have there been many instances?—To my knowledge about four or five.

7785. Would that be sufficient to allow you to suggest that the formula that the Daimler Company use is not a durable one?—No, it is not—I do not think so—if the result is satisfactory.

7786. Then it comes back to this, that you have not made up your mind absolutely that the Daimler Company's formula is not a good one?—No, I have not. I am perfectly prepared to try the thing myself; in fact I have seen the manager on the subject, and I have told him that, if what he is using has the good result he claims for it, I intend to use it myself. I have given instructions at my works about it.

7787. That is very satisfactory?—It is for the benefit of the workmen.

7788. Then in your opinion the formula that the Daimler Company are using is worth a trial?—It is worth consideration, and also this other one which I have heard of to-day, which I shall also obtain and make use of.

7789. To go back to the number of cases: in the last seven years, there was one case of lead poisoning in 1904 amongst motor body and chassis manufacturers; 4 in 1905; 9 in 1906; 15 in 1907; and it dropped to 8 in 1908; 11 in 1909; and 14 in 1910. So that you may take it that within the last four or five years (when I take it that the increase of this business began to be felt) there has been practically no change?—No. Of course it is a question of the number of cases increasing in proportion to the number of men employed.

7790. But would you not say that in the last five years there has been an average number of people employed?—No. I should say the number is increasing terribly, even now—between last year and the beginning of this year. Of course one has to look at the thing by proportion.

7791. I understand that you are not prepared to answer questions regarding the various processes in detail?—No. I have never been a practical painter. I have been practical in other departments, but not so much in practical painting. It is rather my duty to look at the finished result.

7792. Now I will ask you a few questions about the precautions which must be taken where lead is used. You understand that if lead is allowed to be used there will have to be a special code of regulations introduced?—That is proposed, is it not?

7793. We are obliged to do that under the Factory Act?—That would be in addition to the present requirements of the factory inspector?

7794. Yes. We must have a new code of regulations altogether. I want to bring that home very seriously to the employers, because I want to ask them presently whether they would prefer the abolition of lead or the code of regulations?—The factory inspectors in my place like to have very large airy workshops, and they look after the men. The men have to leave off at a certain time, and I make it a standing rule that they leave off five minutes earlier to go and clean themselves.

7795. Do you attach importance to personal cleanliness on the part of the men?—I do.

7796. Do you provide washing accommodation?—Yes, on every floor.

\* An analysis at the Government Laboratory showed that this paint contains no sulphate or other compound of lead.

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Mr. ARTHUR FELTON MULLINEE.

[Continued.]

7797. What proportion of basins to the number of men employed?—There are different numbers being employed each week.

7798. The regulations which the Home Office have laid down are one basin to every five workers?—Then if we employ 60 men it means 12 basins. I do not know. At our place in London we have more than 12, but I doubt whether we have in the country.

7799. What is the proportion of basins to the number of men, approximately—about one in five or one in six?—I am not quite sure, but I believe it is about one in five. I generally carry out all the instructions of the factory inspector.

7800. Is hot water as well as cold laid on?—No.

7801. Do you not think that hot water is necessary?—I do not think so. There is no difficulty about getting hot water.

7802. Do you not think it is imperative, if you want thoroughly to clean your hands of paint, to use hot water?—I should use it myself, but many people do not take the trouble to do it.

7803. Suppose you have to clean your hands of paint, is it not better to use hot water than cold?—Yes.

7804. Because it is easier to get the paint off?—I do not think hot water is absolutely necessary. I should prefer personally to use hot water.

7805. Are clean towels supplied regularly?—Yes.

7806. How often?—I could not tell you; certainly once a week, perhaps twice.

7807. The Home Office lay down regulations with regard to the supply of towels. If cleanliness is indispensable, the men ought to have everything ready to hand for cleaning purposes?—The instructions to my manager are to carry out all the orders of the factory inspector, whatever they may be.

7808. Are soap and nail-brushes always available?—Yes.

7809. Is time allowed to the men for washing before leaving off work and before meals?—Yes, that is the standing rule.

7810. Is a room provided for the men to take their food?—They do not take their food on the premises at all.

7811. So there is no provision necessary for the storing of food?—No, not in my works.

7812. Do you provide overalls for your men?—No.

7813. Is not a cupboard provided for storing them, when not in use?—I do not know that it is necessary.

7814. It is necessary in other industries where lead dust is generated, and it would have to be insisted on in this industry if lead is used?—Yes, if lead is used.

7815. Do you provide a separate cupboard or cloak-room for outdoor clothing put off during working hours?—They have a room apart from the works.

7816. Have you impervious washable floors in your painting shops?—I have in London.

7817. Are they cleaned down wet?—Yes, we use a great deal of water on the floors.

7818. How often do you clean them?—Every morning the paint shops are done.

7819. The Daimler Company have told us that they keep two men to swill and mop their impervious paint shop floors every day?—I am sure we do. I am very particular about keeping the place clean, and I keep a lot of labourers on purpose for the job.

7820. What are the usual working hours for your painters per week?—I think it is 53. I will not be quite sure.

7821. Do they frequently have to work overtime?—Occasionally they do—one or two days a week sometimes.

7822. Do you know that a very great deal of overtime is worked in certain factories in the motor car trade?—Yes, I believe so.

7823. Would you welcome a strict limitation of the hours of employment, say, to 48 hours per week, as has been recommended in the potteries?—I should consider it entirely unnecessary to do so.

7824. All the best medical evidence in this country has strongly urged the Home Office to restrict the hours to 48 hours per week?—I am very sorry for the workmen, and I am very sorry for their wives and

families. It would be a great hardship on the workmen.

7825. That has been adopted in the potteries?—Yes, but that is quite a different industry altogether.

7826. But it is a question of the danger?—Do you not think it depends on what sort of workshops they work in?

7827. It is a matter of the amount of dust they come in contact with?—If you have very large workshops with plenty of air and ventilation, I do not think arbitrary limitation is necessary.

7828. Did I understand you to say that if the hours were reduced to 48 hours per week, the wages would have to be reduced accordingly?—Nearly all my men are on piece-work, and if they only worked a certain number of hours they could do a less quantity of work, and, therefore, they must have less money.

7829. Do you have a periodical medical examination of your workers?—Not necessarily periodical, but a man is called in occasionally to look round.

7830. Do you know that in other industries where lead is used the Home Office insists on a monthly or even weekly examination by the certifying surgeon at the employer's expense?—I was not aware of it.

7831. If you have never had your men examined by a doctor regularly, it is possible that some of them may be suffering from the slower and more insidious forms of lead poisoning, is it not?—I should think we should find some results from it, if we are employing a large number of men.

7832. You find it out for certain if they are examined regularly, and you do not if they are not examined regularly?—You do not find in stables, and so on, where the men are with the horses all day, that the men are medically examined every day. Surely ammonia is pretty bad.

7833. Do you know that lead poisoning frequently undermines the health without immediately developing acute symptoms?—Very possibly it may do in some industries, but certainly not in the carriage building industry.

7834. You do not have your men examined; do you cannot tell?—It is an assertion which I will not contradict. It is a curious thing that the men do not suffer from it.

7835. You do not know whether they suffer from it or not, because I am speaking of the slower and more insidious forms of plumbism?—I do not think the men suffer any more in the department of painting than they do in any other department.

7836. You do not know that absolutely, you hope that is the case?—We do not find cases in the works. We very seldom have any cases.

7837. Would you welcome a system of periodical medical examination in your industry, so as to be quite sure that the men are not suffering from lead poisoning?—If I saw the necessity for such a thing, I should welcome it, but I do not think there is any necessity.

7838. Together with compensation for any workers suspended by the doctor on account of doubtful health?—I think that is quite unnecessary.

7839. I will repeat again the system which prevails in the earthenware and china trade. Medical examination is insisted upon—and so it will be insisted upon in this trade if white lead is allowed—and if a doctor thinks that a man may have the beginnings of lead poisoning, although it is not marked lead poisoning; he has the power to suspend him, and while he is suspended the employer has to pay compensation. I ask you whether you would welcome that innovation in your business?—I should not welcome it; I should do my best against it. I think I should let my customers suffer and not use any white lead.

7840. Do you realise the very great expense which the industry would have to bear in connection with stringent regulations?—Yes, it would be very expensive indeed.

7841. There is a very real danger to be dealt with. You must assume that that is the case, because the Home Office have found that it is. There seem to be only two ways of mitigating the evil; first, to prohibit the use of lead altogether, and, secondly, to introduce a code of regulations which will bring this industry, in



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regard to care for the workpeople, up to the standard of all other large industries where the use of lead is permitted. I will give you an indication of what these special regulations are. First, in regard to lavatories, the regulation would require washing accommodation to the extent of at least one basin for every five workpeople. Soap and nail-brushes to be provided and properly looked after. Sufficient clean towels to be provided every day. Secondly, a mess-room is necessary so as to make it impossible for the workers to have meals in a place where they come into contact with lead. Cloak-rooms to be arranged so that it should be quite certain that the men's outer clothes do not come into contact with lead. Overalls to be provided at the employer's expense, and washed at his expense. Washable impervious floors to be introduced, so that they may be swilled down regularly every day?—Does that mean to say that all present carriage manufactories would have to be rebuilt?

7842. The floors would have to be relaid?—That is rather an expensive amusement. It would not affect me so much, because it happens that my floors are already impervious.

7843. Then a periodical medical examination to be made of each lead worker at the cost of the employer, together with payment of compensation whenever a man is withdrawn from work in lead. Efficient exhaust draught apparatus for the removal of dust to be installed wherever it is possible to apply it. Then you must also take into account the cost of setting up a system which will secure continuous observance of all these regulations, for you realise that under the Factory Acts the first duty is laid on the employer of securing the observance of the regulations?—Certainly.

7844. Taking all those points into consideration, and having in view the fact that we must introduce some remedies for the evil which undoubtedly exists, do you still consider that it would be better to regulate the industry by these special rules, or would you, as an employer, rather see the use of lead prohibited?—I would rather see the use of lead prohibited. If you are satisfied with the use of lead by the Daimler Company, which is a sulphate of lead,\* we will use the same as they do. I should like to be satisfied that that would be so, and that we should get the same results.

7845. Do you speak for yourself or for any number of employers?—I am only speaking for myself to-day. Other people do not interest me in the least. Of course, it would be interesting to us to know if you are willing to accept sulphate of lead. You have been speaking seriously about use or non-use of white lead by the Daimler Company, and you have based many questions on it, but the material they use, I am informed—of course I may be informed wrongly—is sulphate of lead.

7846. We should not accept sulphate of lead as a substitute?—Then all the questions you have put about the Daimler Motor Company would not really be fair, would they?

7847. The Daimler Company have sent us the formula they use, and the name of the people they buy it from. We have sent to the people they buy it from, and we have got an assurance from them that there is no lead in it whatsoever?—But you would not accept their assurance; you would have it properly analysed yourself, I take it.

7848. (Dr. Collis.) Lead is pretty easy to trace, is it not?—Yes.

7849. They would hardly make a false statement on that point?—I do not suggest that they would, but it would have been rather interesting to us to know if that material is accepted.

7850. (Chairman.) Let me clear the ground by putting this one further question. If it is proved to us that the Daimler formula contains no lead, are you prepared to give that a considerable trial?—Certainly. I should have done that without knowing anything about this inquiry, if that were so.

7851. Notwithstanding that you have had a few motor cars to re-paint because the customers have not

been satisfied?—There may have been other reasons why they sent it to me besides the painting.

7852. I thought you were rather belittling the formula?—I hate to be finding fault with other people's work, but there is a kind of feeling that the Daimler motor car work is not so good.

7853. I thought you were rather belittling the formula because some Daimler cars were sent to you to re-paint?—I do not wish to convey that.

7854. You certainly spoke in a tone of disparagement of the Daimler formula?—No, I do not wish to do that. I say that the use of white lead, as we employ it at the present time, gives a better result than theirs, and they are not using it. If their customers are satisfied with the result of their work, there is no reason why we should grumble at their work.

7855. You went on to say that some of the customers sent their cars to you to re-paint?—Yes, but I contend that the non-use of white lead does not, and cannot give so good a finish as the use of white lead. Anyone who has seen the white lead in filling up the grain of the wood, must admit that. If the use of white lead is prohibited, the finish of the panels probably will not be so good in the future, and the public will know it, and that will be given as a straightforward reason. May I refer to a special filler. It is absolutely non-poisonous. It is made from the finest quality specially selected oxide of zinc, tinted with carbon and ground in a special varnish medium. As an employer who looks after his men, I shall immediately obtain some, and have a carriage done with it, and if I am satisfied with the result, I shall probably dispense with the use of white lead altogether—even without your having asked me these questions.

7856. (Lord Henry Bentinck.) I suppose you will allow that if your works were old-fashioned and low and badly ventilated, there would be a danger from lead poisoning in the work you carry on in your works?—If it can be proved that there is a certain amount of poisonous fumes.

7857. It is dust, is it not?—Very little dust.

7858. Even in low rooms badly ventilated?—We do very little sand-paperying business.

7859. But there must be dust from the dry paint on clothes and hands and so on?—I do not think so.

7860. Then why are your rooms well ventilated?—They are ventilated for the sake of health or fresh air. I have never taken the matter of poisonous fumes into consideration until this Committee was appointed. I never considered it.

7861. Are your men insured under the Workmen's Compensation Act?—Yes.

7862. And do you pay as low a premium as anybody, or do you pay a higher premium?—I really do not know what premium is paid. I may mention that when the Employers Liability Act was passed, nearly all the carriage-builders combined together, and by that combination they got a special rate.

7863. Then you might get better terms than other coach-builders?—No. Quite a large number combined together, and by taking a large number of workmen the insurance company gave us a preferential rate. That is how it was done.

7864. But the rate which you pay as coach-builders, I believe, is higher than most people's?—That is so.

7865. That is an acknowledgment that your trade is a dangerous one, is it not?—That is only because the insurance company insist on it. If they will not do it for less, we must pay it.

7866. That is because they cannot afford to do it for less?—I should not think cases of sickness occur once a year in my factory.

7867. But you are paying a higher rate of premium than other manufacturers are paying because your trade is not a very healthy one?—That is an assertion that it is not a healthy one.

7868. I think that shows it, does it not, if you are paying a higher rate?—It may be so, but we do not find it in our works.

7869. (Chairman.) Out of 500 potteries there are about 350 which never had a case of lead poisoning at

\* Shown on analysis to be a leadless paint. (See 7777 above.)

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all. The corollary is that the same thing exists in your trade, but it does not say that there is not a very great amount of lead poisoning in the trade?—Then I think you are quite justified in trying to stop it, for the benefit of the workmen.

7870. (*Lord Henry Bentinck*.) There is only one more question I want to ask you, and that is about foreign competition. I suppose your chief competitors are the French coach-builders, are they not?—No, Belgian now. The French used to be, but it is Belgian now.

7871. In France the use of white lead will be prohibited in a year's time or two years' time?—It will be. I think the Belgian trade has increased very materially. A great many carriages come over from Belgium now. I was sent over to Brussels last year to act as a juror in the carriage-building industry, and they are sending me over to Turin this year.

7872. With regard to these Daimler cars that were sent to you to be done, were they sent, do you think, chiefly because the paint had proved unsatisfactory, or was it for other incidental repairs?—I should not like to assert that it was entirely on account of that, but when we do have the carriages we notice it.

7873. The owner probably takes the opportunity of having the carriage painted while it is in your hands for other repairs?—Yes. I do not say it came to us for that.

7874. There may have been a door wrong, or anything like that?—Yes. I should not like to make an assertion like that without being able to prove it.

7875. Very often owners take the opportunity of having their carriage re-painted when it is not absolutely necessary, because it is in your hands for repairs, do they not?—Yes, but having the carriage, we should look into it, and say, "Why is the paint gone here and not there?" and we should take it off and we should say, "There is no white lead here."

7876. The Daimler Company are on the whole a careful firm, they would not adopt any really reckless experiment merely for the sake of trying an experiment, would they?—No.

7877. (*Dr. Collis*.) I think you said you were uncertain as to the amounts that you were paying for insurance of the workpeople?—I have no figures in my mind of what we are paying at all.

7878. Then you cannot tell me whether the insurance paid by the combine of which you are a member has risen since the middle of 1907?—I am not aware that it has.

7879. You do not know whether it has or whether it has not?—No, I am not aware that it has.

7880. Have you had experience at all of the painting of motor car bodies made with Terno plates?—I have never heard of them.

7881. They are largely in use in the trade, are they not?—I do not know the term at all.

7882. It is a plate which is covered with lead and tin?—It is a kind of steel, is it not? They call them galvanized steel panels, I think. We beat them out and we use them instead of aluminium sometimes.

7883. They are coated with lead and tin, about 80 per cent. of lead to 20 per cent. of tin. What material do you use for covering those surfaces?—I believe there is some liquid material put on it to prevent rust coming through, and then we fill it up with ordinary filling, the same as we do wood panels.

7884. With lead paint?—Yes.

7885. I asked the question particularly, because I have been informed that the lead paint will not stick on it and cannot be used on it?—Possibly that is so, unless it is prepared with a certain liquid material, which we put on because the rust comes through, and it scales off.

7886. I was informed at certain works that they did not use lead paint on it, not from the point of view of health, but simply because it all scaled off and it would not stick on Terno plates. They are very big motor people who told me that?—I was not aware of it, because I see the men doing it every day.

7887. I did not know whether your experience was the same?—No, I am sure the men fill up these panels to which you refer exactly the same as the wood panels,

but I do not think they require to use so much, because there is no grain to fill up.

7888. They were using lead paint on their wood-work, but they informed me that if they put lead paint on the metal the whole came off, and consequently they could not use it?—That is not my experience. I will carefully go into that matter and see, but I am quite sure that they use the same filling in our works.

7889. It may be an isolated experience?—It depends what result you want to get.

7890. You mentioned the fact that you always followed the instructions of the factory inspector in all that he asked?—As near as possible, of course, to his satisfaction.

7891. You are aware, of course, that the factory inspector cannot go any further than the Factory Act?—Of course; but if he has to ask more he will get more, of course.

7892. But he cannot ask more until regulations are established by which he may ask more?—Yes, and then we shall do our best to carry out his wishes.

7893. I only wish to point out that in falling in with the requirements of the factory inspector under the Factory Act, it does not mean of necessity that every precaution is taken in the trade to prevent danger, because the Act has not yet made any special regulations for the trade?—We always carry out the instructions of the factory inspector, and if he has further instructions we shall do our best to carry out those.

7894. I only want to call your attention to the fact that there are no special regulations made for the trade under the Act at present?—Quite so; I appreciate that.

7895. On the question of the health of your own men, have you studied much the amount of sickness that occurs among the workpeople?—No, I have not.

7896. So that if only one man is off a year, as may occur with you, you are unaware whether that is 100 per cent. more than other occupations or 50 per cent. less?—I cannot answer that question at all. I shall be happy to obtain the information for you.

7897. The point which you have been rather emphatic upon is that no illness has been occurring among your men. Illness among a group of men is only a comparative term after all, is it not, compared with what they ought to have?—If there was any serious illness of any sort, my attention would be immediately called to it.

7898. If it was a glaring outbreak of plague, it would naturally impress itself on you?—I do not mean that. I mean if, for instance, it was a case of every week or anything of that sort, I should certainly know it, because there would be a claim on the insurance company, would not there?

7899. No, not unless it was a lead poisoning case?—But the insurance of the workmen is against all classes of illness, is it not?

7900. No, it is for accidents and lead poisoning. You made rather a point in your evidence of the healthiness of your workpeople, and therefore I cannot help making, in opposition, the point that you do not know anything whatever about it?—I say that I have no personal information. At all events my attention has not been called to it.

7901. Consequently that part of your evidence—chiefly really has no bearing upon the subject with which we are dealing?—I grant that.

7902. As regards the sand-papery of motor cars, you stated that you thought that after all there was not very much dust?—There is very little sand-papery done.

7903. There is some, is there not?—Very little indeed, to what there used to be.

7904. Do you ever sand-paper steel wings?—Steel wings are filled up with a filling and then rubbed down with pumice-stone wet. There is no necessity to use glass-paper on them.

7905. It is not used, for instance, after one coat of lead colour?—They keep on filling up. There is no necessity to glass-paper them.

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7906. They are not done?—I do not think so. I cannot say they are never done. It is the use of glass-paper you are speaking of to create dust, is it not.

7907. Yes?—There is very much less done now than there was five or six years ago.

7908. But it is used, is it not?—It may be in other factories; I cannot say.

7909. Do you not use any dry glass-papering at all?—Not on the wings and the metal works.

7910. On any part of the car?—The men use the glass-paper when they are cleaning up the panels before they are painted, certainly, but no lead has been put on to the carriages then.

7911. Do they ever do any after the lead has been put on?—I believe not.

7912. Tests have been carried out in actual practice where it has been done, so I should have liked you to tell me of a process where it was used?—As far as I know, it is only the filling up, and then the rubbing down with pumice-stone and water.

7913. For instance, this test was made: "Sand-paper stopping process: after one coat of lead colour and stopping, on steel panels of a motor body"?—That is not our practice.

7914. "Sand-paper stopping process: bonnet boards, after one coat of lead colour and sand-paper stopping." Is that not your practice?—No.

7915. "Door of motor body: after one coat of lead colour and quick drying, sand-paper stopping, urgent work"?—I mean to say that after the first coat of paint has been put on a panel, and there is a little rise in a joint, I dare say the men would take care just to rub that joint down, but that is not going all over the panel. I do not say that glass-paper is never used after a first coat of lead paint at all. That would be a ridiculous assertion to make. Just rubbing off a joint or anything of that sort might take place. A man might go round the body and rub little tiny places like that with glass-paper.

7916. Do you think that would give off any dust containing lead?—The thing is quite too trivial. It is quite a little thing, like rubbing your finger like that (*illustrating*). It is not like a man taking a great piece of glass-paper and rubbing a big panel down to create dust.

7917. Would he be doing that for long?—The whole carriage would not take him more than a quarter of an hour, I should think.

7918. Would his neighbours in the same workshop be doing that too?—I do not know that they would.

7919. How often would he be likely to be doing that in a day?—I cannot answer the question. It might be done a dozen times a day, and it might not be done another day at all.

7920. Would there be more than one vehicle in a shop which might be so treated in a day?—Yes, very likely.

7921. So that the combined amount of rubbing down might come to a certain amount in the shop, with all the men at work. This dust when it gets access to the air does not fall to the ground?—If you could see a factory like mine, these questions might be different.

7922. I quite agree with you that factories differ very much, but still we know, from the analyses that have been carried out, that those processes which are only carried on for a short period, during that short period give off dust which contains a very high proportion of lead; and that if it has been carried on for short periods, even, by several men in the same workshop, you would get an amount of lead dust in the air which is not going to be got out very quickly, and it is those small amounts constantly inhaled that do the damage?—Yes. I can only speak for my own factory, of course.

7923. From a medical point of view, one looks upon the trouble from lead when it is not causing absolute lead poisoning, perhaps, as more dangerous, inasmuch as it does not shout out about the damage which it is causing, whereas acute cases you cannot miss. The men who die of Bright's disease and the men who die of consumption in the lead trades are far more

numerous, when you take the number of those that are diseased in the ordinary population, than those who die of lead poisoning?—Then it is all put down to lead poisoning.

7924. I am only stating that in the lead-trade you have a proportion dying of consumption in excess of what you find in other trades, and that with regard to Bright's disease, which lead particularly causes, which is an affection of the kidneys, there again you have a proportion in excess of that for the ordinary population; therefore it follows that we should ascribe it to the influence of lead, wherever it is. These slow and insidious forms of lead poisoning are the matters on which we have to try and concentrate our attention?—May I suggest that the evil is somewhat magnified.

7925. Have you studied it?—I see what goes on in my own works.

7926. But you have already allowed that you know absolutely nothing about your own works in that respect?—That is rather a broad assertion.

7927. You have not compared it with the health of people in other occupations?—But I hear of very little illness in my factory at all. If I had known I should be asked that question, I should have given you the exact statistics for the last five years.

7928. Have you kept the exact statistics for the last five years?—Yes, I do not think there would be any difficulty in obtaining the figures.

7929. And a record of the age of each individual?—Certainly. There would be no difficulty in getting the age of the individual.

7930. It would be useless, without the age of the individual, because the amount of time lost through illness varies according to the age?—But you must not put every case of illness down to lead poisoning.

7931. I do not, but you can only compare the illness in one trade with the illness in another trade to find out where you are?—Of course that is the object of your Committee.

7932. Yes, to try and get such information, and we are finding very great difficulty in obtaining such information, because nobody seems to have paid any attention to the question?—I am sure I shall be only too happy to give you any information which lies in my power. If I had known, I would have had the information prepared, and I shall be happy to have the information prepared now if it will be of any use to you.

7933. The point is this, that you, in your evidence-in-chief, gave the distinct impression that you were giving very definite evidence upon the health of your workpeople. I am not in any way prepared to say for or against the statement, but I am bound to accentuate the point that the data on which that statement is made are incomplete?—Quite so; I may have appeared more emphatic than I should have been.

7934. (*Mr. Fell.*) When you questioned your 60 painters and rubbers-down about this white lead question, did you question any of your body-makers?—No, I did not ask the body-makers.

7935. Do you know that they are as liable to get white lead poisoning as the painters?—I do not see why they should, myself.

7936. They handle white lead in the jointing, and that sort of thing?—Yes, they do, to a certain extent.

7937. So they may suffer from lead poisoning?—Possibly, because they use the white lead in a more pure state than when it is mixed up for the painters, and that would go against them.

7938. Do you provide any washing accommodation for the body-makers?—Yes, in their department.

7939. For all men working in white lead?—Yes, certainly.

7940. (*Mr. Mason.*) Do you think that the evidence of the Daimler Company would be sufficient to justify this Committee prohibiting the use of lead?—I should say it would not be fair. They are only one of many other firms who are doing the business. I do not think it would be at all fair. I think we ought to have the experience of other firms besides that one firm. I think it was rather a broad statement. I do not think it could quite be justified.

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7941. (*Mr. Kinggate.*) I am very pleased with regard to the evidence as to the care you exercise with regard to the health of your workmen. With regard to the Daimler cars, of course, you will admit that sometimes cars are painted hurriedly, and, consequently, not so liable to stand. That would occur with any firm?—Yes.

7942. At certain times that would be so?—Yes.

7943. Does the finish of a car depend upon lead? You have stated that you thought you could not get the finish on a car if lead was prohibited?—Unless some satisfactory substitute is found.

7944. Do you think the finish depends upon the use of lead? Its durability might, but does the finish depend upon the use of lead?—The finish must depend upon the durability of the groundwork which is put on the panels before you get the finish. Unless the primary coats that are put on the wood panel are good, the finish never can be good.

7945. But the use of lead as priming, first of all, cannot affect the finish?—It does materially affect the finish, and if I see a car that is finished, I can always tell whether that has been properly started on in the painting, and if it has not had the foundation of filling the result can never be good.

7946. I agree with you with regard to its durability?—I am not speaking of durability at all. I am speaking of finish. By looking at a panel I can tell whether it has been hurried in its earlier coats of priming.

7947. But supposing the grain is filled up from some other source, apart from lead altogether, so that there is no suction, and that the coats of leadless filling that have been placed upon it have been rubbed down, and then the proper coats of colour placed upon it, and then the due number of coats of varnish, the appearance of that car is quite equal to if it had lead upon it—in its actual finish. I am not contending that it might possibly not be so durable, but you made a special point that you would not be able to get the finish without lead?—Without lead, unless some equally satisfactory substitute can be found.

7948. Referring again to the Daimler Company, their method of filling up their wood panels has not been with sulphate of lead or any substance of that character at all. Lead has only been used in very small quantities when it has been used for painting the thing white. They only use zinc now. I do not think they use sulphate of lead at all. The filling up of the panels has been simply done with varnish and japan, so as to entirely stop the suction. You, I understand, to stop the suction in the panel, use priming coats of lead?—Yes.

7949. And they find that it is equally as good as lead for that?—That is their assertion.

7950. The witness who told us is a thoroughly practical man?—That is the assertion of one firm only.

7951. That is the assertion of a practical man with regard to that, that for two years they have stood?—That is the assertion.

7952. With regard to your workmen, Mr. Fell asked you the question with regard to whether the body or carriage makers were asked as to the number of cases of lead poisoning?—No, I did not ask any others than those employed in the painting shops.

7953. You quite understand that in the old carriage-making days the carriage-maker was subject to more lead than any other process. The whole of his work was always put together with lead and his plates fixed with lead?—Are you speaking of a carriage body-maker?

7954. No, of the carriage-maker?—Yes, that is quite right. There is lead put in between the springs, and all the bolts are put in with lead, and the clips and everything else, but there is much less used now.

7955. Apart from that, the body was generally taken into the carriage loft to be hung, and at the same time as he was hanging the body the painter was working on it, doing the priming coat?—Yes.

7956. So that he was subject to more lead than the painter was?—Yes, you are perfectly correct.

7957. The carriage-makers are practically a small body of men, but probably a larger number of them suffered from lead than the painters?—Yes.

7958. And the air was impregnated also with fumes?—Possibly.

7959. With regard to sand-papery, you must, I suppose, sand-paper your wheels between the different coats?—Yes. I dare say the spokes and wooden wheels would have to be, but you must also bear in mind that wire wheels are coming very much into use just now.

7960. I am only speaking, of course, with regard to wood wheels?—Yes, the spokes would be rubbed down with glass-paper between each coat.

7961. With regard to the chassis, there is also a good deal of stopping on the chassis which is rubbed down with sand-paper. There would be a considerable amount of sand-papery in the chassis shop?—We use a kind of stopping just to fill up the surface, and then we put the filling on it and rub down with pumice-stone and water.

7962. Do you rub the chassis down?—Yes.

7963. That is not usual, is it?—It is not usual, but it gives a much better result, and I always have it done that way.

7964. I am very glad to hear it, because I know in most shops there is a great amount of sand-papery done?—Yes, and I follow exactly the same method of filling up the chassis part as I do the body part, but, as you quite rightly remark, the spokes of the wheel are probably glass-papered.

7965. With regard to men being off ill, perhaps you have not been aware, prior to the statements you have heard to-day, of the very subtle influence of lead poisoning. It is quite possible for a man to be off a day or two and perhaps himself not know the cause?—Probably.

7966. Perhaps he has been in the habit of feeling very queer and taking a dose of medicine to put himself right in a day or two?—Everything is put down to lead, of course.

7967. I am speaking from many years' experience in the workshop, and I have known many cases of this character, where men have been off simply for a day or two. They have felt ill, and they have said, "I must have a dose of salts," or something of that sort. Many large firms—railway companies especially to-day supply a drink to the men, and so do some of the coach-making firms?—I have never heard of that.

7968. I know one big shop where there is a specially prepared drink for the men. That is, of course, to ward off the evil effects of the lead. So that some of your men may have been off from lead, and yet you did not know that they were suffering from lead?—I have never heard of that drink, but it is interesting to hear of it.

7969. I do not think your workmen have the fear, but there is a fear, we know, amongst workmen, of attributing their illness to lead for the fear of being discharged on account of the employer's liability under the Workmen's Compensation Act?—I have never heard of that.

7970. You may be aware that in one year a man may be working in your shop and the next year in a tramway works or a railway works?—Yes.

7971. So that we have to take the whole industry?—Yes.

7972. From the workman's point of view, we are all engaged in the same industry?—Yes.

7973. It is quite possible that a man to-day may be working in your shop, and the next day in the corporation shop, and in a week or two for a railway company?—Yes.

7974. So that we have to consider the whole trade?—Yes. It might happen that he might have worked in a tramway or railway carriage works, and have become impregnated with lead and come to us, and we should bear the blame of it.

7975. (*Mr. Robins.*) There have been remarks made before this Committee as to the carelessness of the men. I think you will bear me out, with your wide experience, that the men of to-day are more intelligent and cleaner, and more sober in their habits than they were 15 years ago?—Yes. I am rather inclined to look after the men and say to a man: "Are you going home?" He says: "Yes." I say: "Do not you think

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"it would be better to wash your hands before you go?" He says: "I did not think of it." If a man does it once he does it another time, but you cannot force a man to wash his hands.

7976. I believe from your evidence you have 60 men employed in your paint shops?—Yes.

7977. What would be the average term of employment of those men; or is it an ever-changing department?—It is changing constantly. Sometimes there are more than others.

7978. So that if men were ill you would have little knowledge of it. Perhaps they are with you two or three months, I suppose?—But the men change themselves and they go off. We do not like to change the men if we can possibly avoid it. We do not dismiss the men, but there are many men who are birds of passage.

7979. With regard to the sand-papery, the point you emphasise in that connection is that there is very little sand-papery done. I take it from your evidence, with all respect, that you know very little about the paint shop, and that you leave that practically to your manager. I think, perhaps, if you were to inquire into the number of quires of sand-paper that were used in the paint shop with regard to painting, you would find it a little surprising. With regard to sand-papery mudguards, from my experience as a painter, there are very rare exceptions up and down the country, where mudguards are filled up and rubbed down, and I am glad to think that it is so with regard to your firm?—I have stated that I fill up the mudguards.

7980. From the very position and shape of the mudguards, in some cases it is impossible to do it, and then there must be a priming coat, and so on. With regard to the use of hot water, you said in your evidence that you did not think the use of hot water necessary for washing. I may have made a mistake, and I am open to correction?—I do not say it is not necessary.

7981. Are you aware that the paint of to-day is more or less of a quick-drying character, and that hot water is more essential than anything to get the paint off the hands. It is far quicker in drying qualities than it was years ago?—That is so.

7982. It is less of an oily character, and, therefore, hot water is very essential to get it off the hands. Should you consider that painting is a healthy occupation?—I do not think that painting is altogether the healthiest of occupations. I should say it is most unhealthy, even in the carriage-building industry. It is less healthy than in any other branch.

The witness withdrew.

Mr. WILLIAM LAWTON GOODMAN examined.

7995. (Chairman.) You are one of the witnesses selected to give evidence on behalf of the Society of Motor Manufacturers and Traders?—I am.

7996. Are you a carriage and motor manufacturer?—No, a motor body builder, and also a horse-drawn carriage manufacturer.

7997. Is your principal business in the motor body building?—Yes, largely so. That is our principal business.

7998. What length of experience have you had personally?—From my apprenticeship. I have been an apprentice, a journeyman, a foreman and an employer the whole of my life.

7999. How many men do you employ on work in which they come into contact with lead?—I could not give you the absolute figures, because in the body-building department the lead may be used probably for five minutes in three months by the body maker, but the number of men we employ all round probably average about 600.

8000. Can you tell us how many painters there are in that 600?—I should say probably the painters, the painters' labourers, and the men handling paint would be about 120.

7983. I take it you would consider the paint shop an unhealthy place to be in?—I do not say that my paint shop is an unhealthy place to be in at all.

7984. But still it is an unhealthy occupation?—There are many unhealthy occupations.

7985. Painting is an unhealthy occupation, but the paint shops are healthy. Is that what you say?—No, I do not say that. If it is an unhealthy occupation, the paint shop cannot be entirely healthy—that stands to reason.

7986. What would you attribute the unhealthiness of the paint shop to?—I should say it is from the odour of the paint used. There is a certain amount of odour from all paints—not necessarily from lead. You know that there is some odour from all paints.

7987. Then you would not consider that it was primarily from white lead?—No.

7988. I suppose you are aware that a large percentage of other colours contain a large percentage of lead?—Yes, I believe so.

7989. Then the primary cause you would consider was white lead, taking it all round, with all colours?—Everybody knows, of course, that many paints have white lead in them, and, therefore, probably the odour from the paints consists of a certain amount of odour from the white lead.

7990. Then you would consider that using white lead was unhealthy?—There is an unhealthiness in it. Everyone knows that. That is why we are here to-day.

7991. White lead is unhealthy?—Certainly.

7992. Then I take it that, if substitutes can be found, white lead should be prohibited?—We hope they will be found.

7993. I can speak from my practical experience. I have painted two carriages, and I say that they can be painted without white lead whatever, irrespective of the Daimler Company. I speak now as a practical painter. I have more than 30 years' experience. We have it from your evidence clearly that you consider that the painter's is an unhealthy occupation, that the paint shop is an unhealthy place, and that the cause of the unhealthiness of the painting is the white lead. After that, I should think you would be prepared to agree to use some substitutes for lead to minimise the danger with regard to painting?—I have said so, some time ago. It naturally stands to reason. Every employer would be willing to do the same thing for the benefit of his workmen.

7994. As a painter I am gratified to hear that, and I have had personal experience of the danger of it myself?—I certainly think it is the duty of everybody to do all he possibly can to protect his workmen.

8001. And a few of the others might be handling paint in the building?—Yes, they all would more or less, but Mr. Kinggate, being a body builder, knows the amount that is used and when it is used.

8002. But the whole of the 600 men might handle it?—No, the trimmers or the upholsterers would not be using it much.

8003. How many of the 600 do you think would come into contact with lead?—I could not give you the actual figures, but I should say quite another 150.

8004. How many cases of lead poisoning have you known?—I have not known of any.

8005. Not in your works?—No.

8006. Do you know that in the coach-building industry, in all branches, there have been 767 cases of lead poisoning recorded by the Home Office in the last 11 years?—I hear that has been stated, but we have never had any absolute proof whether these lead poisoning cases have really arisen in coach-makers' shops, because, as a set-off against that, we have taken a census of the coach-builders of the country, and we have no cases at all. I am rather inclined to think that those figures have been arrived at by including the coach painters who are employed in other trades

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than that of coach-building. On a former occasion, when we visited here, we challenged the statement, and it was volunteered to us on that occasion that it was made up of 322 in the railway employ, 42 in the tramways, 116 in the motor trade, and 44 in the miscellaneous, which included bird-cage painting and bedstead painting and a variety of other trades. As we are practically here on trial for manslaughter, having been charged with all these things, it is only right that we should really know how these cases are made up.

8007. (Chairman.) In the carriage building the number of cases of lead poisoning was 116?—During the last 11 years? I could not say with any accuracy at all. My association applied to every member of their institute, and they have received a paper signed by each, and the general census has resulted in no cases being reported to us. I cannot tell you the exact period, but as this circular is a printed one, and the questions are printed, they will demonstrate themselves on production.

8008. Did you get a reply from every one of your members?—I could not really say.

8009. As you want us to make further investigations into the Home Office figures, will you send to the Committee the replies you received from your members, and also a full list of the members that belong to your association?—Yes.

8010. Have you, as a society, taken any steps to test the merits of the different substitutes on the market?—Yes, quite a number of our members have already done so, one firm in particular, the Daimler Company, do not use white lead at all; they use some substitute.

8011. Have you instituted any inquiry as to the precautions necessary to combat the evil which exists in many branches of your industry?—We have fulfilled the obligation placed upon us by the factory inspectors.

8012. The regulations in force under the Factory Act to-day do not cover the whole of the evils which exist in the industry. I asked you whether you have taken any steps to combat the evils which exist in addition to those which are covered by the Factory Act?—My reply to that is that they are non-existing so far as my experience is concerned.

8013. Have you tried substitutes for white lead in your painting works?—No, we have not. Some of our friends have done so.

8014. I suppose you will agree that, if a substitute could be found that would be in every way as good as white lead, the use of white lead should be prohibited?—Undoubtedly.

8015. Do you know that for the past six years the Midland Railway Company have used no lead in their carriage and waggon works?—I attribute no importance to that at all, for the simple reason that the railway companies and tramway companies have only one customer to work for, and if it is not all right they simply do it over again, and they can afford to, whereas we, who are working for thousands of customers, must do it off our own bat and take the responsibility.

8016. You are aware that white lead is no longer in use at the Daimler Motor Car Works in Coventry?—I am.

8017. Do you hold that white lead is the most perfect substance that can be used?—I do.

8018. How does your work compare with the Daimler Company's motor bodies?—As regards paint?

8019. For the whole thing?—Speaking from a practical standpoint, taking the general parcel, I should say the difference would be between a taxicab and a C spring barouche in the park.

8020. But they are one of the largest firms in the industry, are they not?—Numerically yes.

8021. And they turn out work of the highest finish, do they not?—My answer to that is: query.

8022. The buyers of Daimler cars are of about the same class as the customers of your own or other leading coach body firms?—Much about the same.

8023. Would they not demand the same finish from the Daimler Company as from other firms?—I do not know. I should say they would demand it, but I should say they did not get it, most emphatically.

8024. The witness representing the Daimler Company told us that they are perfectly satisfied with the substitute they are using for all purposes for which white lead is commonly used in coach-building works. Are you surprised to hear that?—I am not surprised.

8025. Why?—The reason I am not surprised is that the Daimler Company's business is divided into two classes. First of all, there is the coach building, which is organised to make specific bodies in-series for chassis with as great expedition as possible, so as to enable their engineering works, with no delay ensuing, to place their goods upon the market, to enable them to get the quickest turnover on their money, selling, as they do, a complete car. Then there is the buyer who frequently purchases from an engineering firm a chassis, and thereupon sends it to some first class coach-builder to construct a carriage upon that chassis, giving him a long period of time to produce that body, in many cases four or five months. Hence the difference in the production of the work.

8026. The Daimler Company say they have used no white lead for two years, and they have had no complaints from their customers. It does not seem to me to matter very much whether the body is sent at one time or another. We have before us the fact that the Daimler Company have been using no white lead for two years and have had no complaints from customers?—The answer to that is, because the Daimler Company are manufacturers, and when they sell their car they very rarely see it back again at their works. I am correct, I believe, in saying that in fifteen-sixteenths of their business the repairing and repainting is done in other than the Daimler shops.

8027. But they say they have had no complaints from their customers. Surely if the material was ineffective they would have had some sort of complaint, and their business must have been injured?—On the contrary, it is just the ratio of degree of workmanship. I have had the Daimler painting under observation for the past three or four years, and in my opinion it is less durable than any other motor bodies.

8028. You are a competitor. I am speaking now of the customer. The customer, according to the Daimler Company's evidence, says that he is perfectly satisfied with the car as it is turned out, both with regard to its finish and its durability?—My answer to that is that it does not return to be done up, but it goes to a coach-maker's.

8029. But he would talk to people and find out that the necessity of having the car repainted was less with other firms?—So he does.

8030. But the business of the Daimler Company is just as prosperous, is it not?—Why does the buyer himself buy the motor from the Daimler Company and send the chassis to some coach-maker to build the body? Because he gets a better job.

8031. Do I understand you to say that it is invariably the case that the Daimler Company do not do the bodies?—No, in a general sense the Daimler Company build their bodies.

8032. How would you account for the fact that the Daimler cars, when turned out complete, should satisfy so many of the Daimler customers, if there is any defect either in the finish or durability?—I account for it in this way, that when a new car is finished the external appearance of it to the uninitiated might easily pass muster, and consequently the customer might express his satisfaction, and become the purchaser of it in that particular case.

8033. Do you not think that good work needs no bush, and that if bad work is turned out by any firm it is soon found out by the public?—I am not talking about the execution of the workmanship. I am talking about the durability.

8034. Not the finish?—Not the finish.

8035. Do I understand you to say that the finish is just as good?—Yes.

8036. It is only the durability you are speaking of?—Yes.

8037. What evidence have you to give us, of your knowledge, that the durability is not as good as those cars painted with lead?—The cars running on the streets.

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8038. How do you know how long they have been painted?—If you take the genesis of the car from 1908 or 1907, and so on, the body would not be built before the car was made in the general sense. You can give them the full length of time, and take 50 or 60 or 100 of them which you can find running about London, and investigate the conditions, and take 50 or 60 or 100 of any other makes with chassis of the same period.

8039. I understand that you base your statement on what you see running in the streets, and set it against the opinion of the customers who have bought and paid for the cars?—Yes, who may be quite delighted with them, notwithstanding they have got a bad job.

8040. Do you contend that the danger of lead painting can be practically eliminated by regulating the various processes, that is to say, something to carry off the dust, and so on?—In my experience it is non-existent.

8041. Are you prepared to answer questions regarding the various processes in detail?—Quite.

8042. First, with regard to the body-maker; he uses jointing paste in putting together the different portions of the woodwork, does he not?—Yes.

8043. What material do you use for jointing paste?—White lead.

8044. Where a lead jointing paste is used, is there no danger attending it?—None whatever, except if a man has cut his finger and gets some in it, then he gets poisoned.

8045. In making up the paste, does the worker use dry lead compounds?—No, wet, mixed with oil.

8046. Then he can hardly avoid the lead paste getting on his hands and clothing?—Yes, he can avoid it.

8047. How?—By keeping his pot clean and his brush clean, but as a rule a lot of body-makers get the white lead pot smothered up with white lead, as much outside as inside, and the brush, up to within close to the top of it, smothered up with white lead.

8048. Is that an element of danger?—An element of carelessness on the part of the worker.

8049. Is that, in fact, an element of danger?—None whatever.

8050. But if the paint gets on the brush and it gets on to his hands, he may put it in his mouth inadvertently, may he not?—I can only give you my own experience of 35 years.

8051. I am not speaking about whether it is careless or not. Assuming that it is careless, and that the man gets paint on his hands and rubs it on his clothing, is not that an element of danger?—No, I should say not.

8052. Do you agree that the use of white lead is an element of danger?—The use of lead, in my experience, is not an element of danger.

8053. I am speaking of the lead which you say, by the carelessness of the man, gets on to his hands and then gets on to his clothes, and I ask you whether that in itself is not an element of danger?—If I must answer that question, I should say certainly not, from my experience.

8054. Do you say that he might not inadvertently put his fingers in his mouth and get some of the lead off?—I should say again it is not in any way dangerous, because he is intelligent enough not to do any such foolish thing.

8055. I am not speaking about that. I am speaking about the carelessness of a man who inadvertently puts his lead stained fingers into his mouth. You say there is no element of danger there?—I am not going to say that if a man eats lead it is not dangerous, because I suppose it is poisonous.

8056. Then you do think that, with a careless man, that might be an element of danger?—Yes, I suppose it would be very dangerous if he ate lead.

8057. Supposing the lead dust gets on to his clothes and then into the air and he breathes it, do you think that is dangerous?—Do you mean the dust of the white lead?

8058. Yes?—The white lead pot used by the body-maker will perhaps have 5 to 7 pounds of white lead at the outside in it, and it is in a liquid state.

8059. I am speaking of the body-maker. If he rubs his lead stained hands on his clothing, and it dries there, and dust is generated, is not that an element of danger?—I should say certainly not.

8060. Why is jointing paste used?—To protect the joints made by the workman and cover up the joints from attacks of wet.

8061. Are there not a number of leadless jointing pastes in use?—I could not tell you.

8062. The carriage-maker or body-fitter attaches the iron work to the wood, does he not?—Yes. I take it this is the under-carriage of a horse-drawn carriage you are speaking of now?

8063. Yes. He uses lead in this operation in the same way as the body-maker, does he not?—To some extent.

8064. Is he likely to get that on to his hands too?—No.

8065. Why?—Because the old-time coach-builder put white lead on to plates and on to compass beds, and then put it on to bolts, and he was splashing about with it, but that was done away with 20 years ago, because it used to exude and show the white edges, with the result that the beds are painted and are allowed to get dry and then put together. It is a better job. If you are talking about 25 years ago, then he was splashing white lead about all over the place.

8066. But is he not just as liable to get it on to his hands as the body-maker?—Yes, I should say about equally the same. I should like to say in answer to that question, that that type of business is eliminated by the motor, and so far as the workman is himself concerned it is very small indeed. That branch of the business has been killed by motor cars.

8067. But where the work is still in existence, the man runs the same risk if it gets on his hands as he does in the other?—Yes.

8068. When the carriage is ready for painting, is it first given priming coats?—Yes.

8069. How many coats?—Four coats.

8070. Does the priming you use contain lead?—It is a lead colour.

8071. Is the work sand-papered between successive priming coats?—No, not after the first coat.

8072. Between which coats is it sand-papered?—The only process of sand-papering on the body is anterior to its getting any paint at all.

8073. But after the paint is on, is there no sand-papering?—Sometimes, if the filling has been put on course.

8074. Can you dispense entirely with sand-papering between priming coats?—Yes, undoubtedly, by using a fine Grafton paint.

8075. Does not that create dust?—No. The filling as supplied by —'s is in various strengths, that is to say, some is like flower pumice, and some is very coarse. If you mix up the coarse filling you get a lot of nibs or lumps on it, and they have to be sand-papered down before they can get the other coats on.

8076. Tell me what proportion of this particular work is sand-papered down?—With regard to the body, none of it at all—not after it has passed from the body-maker.

8077. I am still talking of priming. You tell me that there is no sand-papering between the priming coats?—That is right.

8078. Is there any part of this particular operation where there is any dust created in priming?—No, provided you do no sand-papering, certainly there is no dust.

8079. But is there any other operation similar to sand-papering—any other material used which generates dust to any degree?—If the body has been standing, and you want to make a good job of the painting, you do the filling and you come to the painting in three or four days.

8080. I am coming to the filling in a moment, but I am speaking about sand-papering or anything similar to that at this particular stage of the operation?—This is after it has left the body room and had a coat of colour?

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8081. Yes?—No, no dust whatever, only what there is in the shop, and that would be dusted off with a duster.

8082. Is it the general practice in coach painting to sand-paper between the various priming coats in other shops?—No—on under-carriages, yes.

8083. But not on bodies?—Not on motors.

8084. Could sand-papering of priming coats be prohibited altogether? Could we lay down a special rule that no sand-paper whatsoever is to be used for priming coats on bodies?—Absolutely, up to the wet rubbing down. You would clean it up before you put the lead colour on.

8085. The body next receives a number of coats of filling, does it not?—Yes.

8086. Do you use a leadless filling?—No, we use a Grafton paint.

8087. That is lead, is it not?—Yes.

8088. Why is lead frequently added to the filling material?—The lead is put into the filling material to give it greater body.

8089. The filling is not rubbed down, between successive coats, is it?—No.

8090. Now with regard to stopping: What stopping do you use on coach bodies?—None at all.

8091. Is it the practice to use hard stopping made from dry white lead and gold size?—No.

8092. Does your answer apply to all coach bodies?—Motor body building you are speaking of now in particular, are you not.

8093. Yes: Does your answer apply to ordinary carriage bodies?—To the bodies, yes.

8094. In regard to carriage bodies, in the process of mixing, there must be danger arising from handling the dry lead powder?—Yes, when you are making the stopping, but the stopping is a process of painting which is not used. Stopping is made of dry white lead and gold size and put on with a putty knife and then sand-papered off. That is the dry process, but it is not employed.

8095. When it is applied to cheap work, or to quick work, as you have told us, there is a distinct danger in it. What safeguards would you suggest should be introduced to protect the worker against this danger?—I do not use it, and I do not think any other coach builder or motor builder uses it at all. It is chiefly used in cab shops, which are generally small places. The only way you can get rid of it is to have a fan or something to drive off the dust that is created, because you have clouds of dust from it if you have a lot of it.

8096. Would you agree to the prohibition of anything like stopping?—I should. I think it is very dangerous.

8097. Now with regard to rubbing down. After the filling has been applied, is the whole surface rubbed down?—Yes, it is.

8098. Is this done with pumice stone and water?—Yes.

8099. In every case?—In all cases, excepting where one has to do one of those quick, cheap jobs, such as with sand-paper stopping, which I will not do—I will not have it.

8100. There are some firms that have to do these quick, cheap jobs?—Yes, they do.

8101. In that case there would be an element of danger?—Yes, there would undoubtedly.

8102. Have you nothing to suggest to mitigate that danger?—Only exhaust fans to take the dust away.

8103. Is that practicable?—It depends entirely on the place. As a rule it is generally done in a little place, the size of this room. Somebody up in a back shed is generally doing that work.

8104. The carriage under-work is generally sand-papered, is it not?—Yes, always.

8105. And the wheels?—Yes.

8106. This sand-papering gives rise to a great deal of dust, does it not?—Yes.

8107. Does this dust not contain a large proportion of lead?—Yes.

8108. A considerable amount of hard stopping is used on wooden and artillery wheels, is it not?—No, there is some used, but not a lot of it.

8109. A certain amount?—Yes, I agree.

8110. And on the wood-work of the under part of the carriage?—Yes.

8111. The sand-papering of such surfaces must create considerable dust?—It does.

8112. And there is lead in the dust?—Yes.

8113. How is this risk to be overcome?—By having proper workshops.

8114. Proper workshops with exhaust fans?—I do not think you want exhaust fans. General ventilation will do.

8115. In the earthenware and china industry in which investigation was recently made, the Committee, comprising both employers and workpeople, agreed that exhaust ventilation should be applied adjacent to every piece of work where dust was likely to be generated, and I presume that the Home Office would require similar precautions to be adopted in your industry. I ask you whether it would be possible to apply such exhaust apparatus to your trade?—No, I think not.

8116. How long does this operation of sand-papering wheels and carriage under-work take? What proportion of a man's time, generally speaking, if he is engaged on motor-car building?—Motors in many instances have wire wheels and not wooden wheels, and the only sand-papering on a motor car is on the wooden wheels. In some shops the chassis wheels are sand-paper stopped, and in others they make a good job of them and fill them up.

8117. You told me that there is a considerable amount of dust generated from this process?—Yes.

8118. What I want to ask you is, how are we to get over that evil?—You cannot get over the evil and prevent the dust. The dust is bound to arise from the process.

8119. And it is very heavily impregnated with lead?—It is really sand-papering the lead.

8120. It must be a serious source of danger?—No, because the time that will be occupied over that job on a set of wheels would be two hours.

8121. Two hours a days?—Yes, on a complete set of wheels.

8122. Do you mean to say by that, that he would only take this dangerous dust in small doses?—That is all.

8123. But you know that this evil has a cumulative effect, and if you take it in small doses it is only a question of time before it begins to act?—My suggestion as an alternative to that is to box off a portion of the factory where that process must be done in, and done in alone, and ventilation could be admitted into it to suit the requirements of your Factory Inspector.

8124. Could you introduce such exhaust ventilation as a matter of certainty to carry off the dust from the worker?—You would have to have a fan up against him, to blow it away—and the man as well, I should think.

8125. You do not think that is practicable?—No.

8126. Could the process of sand-papering be prohibited altogether?—It could be, but it would not make as good a job, because you could not stop up the holes and bumps that the wheel-makers leave. In these oak spokes, coming off the lathe as they do, there are holes and bumps.

8127. Is your conclusion, with regard to this particular operation, that there is an evil, but that there is no remedy for it?—That is the remedy I suggest, that a portion of the works is set apart.

8128. But you only confine the man to a small area of the evil?—That is much better than impregnating the whole body. Supposing you have 500 men in the works, and this one is doing that one process, if you go in for legislation, you do not want to say you must legislate for the 500, but legislate for this one, and make provision.

8129. But you say, so far as you can tell us, you can make no provisions for carrying away the dust directly from this man?—No, I cannot.

8130. Now with regard to the roofs: Do you finish the roofs of your close cars with canvas or moleskin?—Yes, we cover the exterior of them with moleskin.



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8131. How is that bedded?—It is put on in some instances by dextrin, and in other instances by liquid glue.

8132. Is it not usual to bed the canvas in white lead?—No.

8133. Have you heard of it being done?—Yes, 25 years ago.

8134. Where it is done, could it be prohibited altogether?—In practice it is never employed to-day.

8135. It could be prohibited, then?—Certainly.

8136. Now I will ask you a few questions about the precautions which must be taken where lead is used. Do you attach importance to cleanliness on the part of the men?—Undoubtedly.

8137. Do you provide washing accommodation?—We do.

8138. What proportion of basins to the number of men employed?—The only answer I can give you is that the requirements of the local factory inspector are fulfilled.

8139. There is no regulation?—Yes, there is a regulation.

8140. Only that water for washing shall be provided, but there are no regulations as to it?—We are willing to supply it to a man if he wants it, and if he will use it.

8141. That is not the question. What are you prepared to do?—We are prepared to provide whatever is necessary for the cleanliness of the men.

8142. Hot water as well as cold water?—Yes.

8143. Are clean towels supplied regularly every day?—Yes, with nails on them to nail them down.

8144. And nail-brushes and soap?—Yes; we have them chained up.

8145. Is time allowed to the men for washing before leaving off work, and before meals?—Yes.

8146. How long?—Ten minutes.

8147. Out of the employer's time?—Yes.

8148. Is a room provided for the men to take their food?—Yes, which they will not use.

8149. Is this room kept clean, and equipped with suitable seats and tables, and properly warmed in winter?—Yes.

8150. Where do they have their meals if they do not use the mess-room?—They have their meals on the bench by the side of their job, or on their tool box.

8151. In close contact with the lead dust?—At the side of it. To give an illustration, I have had to issue an order that I must close the works during the meal hours. Although I have a dining-room, and everything provided, and a gas cooker and all that kind of thing, they will not use it. They sit by the side of their job, and in the paint room they are absolutely sitting by the stone that the colours are ground on—sitting on the brackets of the gig, taking their food, although the dining-room is there provided for them, and empty. I have to lock the works up and say, "You are either going to use this dining-room or going outside."

8152. Of course, it is against the law to-day to allow them to eat their meals close to their work. You are breaking the law to-day?—We cannot help it.

8153. Do you provide overalls for your men?—No.

8154. Do you think it necessary?—No.

8155. Is there not a tendency, if they have not overalls, for the dust to get on to their clothes?—They have to buy them. They get paid enough wages to buy their own overalls.

8156. In other industries it has been enacted that men are to wear overalls?—I should make painters wear them too, if I had to deal with it.

8157. In other industries they are provided at the expense of the employer, and washed by the employer. Would you agree to that?—I would not. You might as well ask us to wash the body-makers' aprons.

8158. Have you impervious washable floors in your painting shops?—They are concrete, but I wish they had been wood.

8159. So they can be cleaned down very easily by swilling?—Not so much dust arises from it.

8160. You can swill it down very much easier with impervious floors, can you not?—You cannot make

good painting except on wooden floors. I would like to make a point of that, because I am going to build a new paint room.

8161. Do you clean your floors wet?—Yes.

8162. Suppose you had wooden floors, would you still have them cleaned wet?—I would.

8163. Would it not be rather uncomfortable for the men to have to stand on them afterwards, while they were wet?—I should have them cleaned once a week.

8164. What are the usual hours worked by your painters per week?—53 hours a week.

8165. Do they frequently work overtime?—Yes.

8166. What is the aggregate amount of time they put in now, including the overtime?—The average is, I should think, about 40 hours per week.

8167. What is the maximum number of hours they work?—I should say they are working now in some shops—it all depends on the shops—65 hours a week.

8168. Would you welcome a strict limitation of the hours of employment, say, not to exceed 48 hours per week?—I should not.

8169. I may remind you that this has been recommended by the Potteries Committee—both employers and employees. You would not agree to that?—That is impossible, for this reason, that in coach painting, or motor painting, the body-maker, perhaps, has, at 5 o'clock, got the body ready for a coat of paint, and it takes the painter two or three hours to paint it, and the man has to go on with the job. You save a day on that. It is different in potteries, where you are turning out tea cups.

8170. Do you have a periodical medical examination of your workers?—No.

8171. Do you know that in other industries where lead is used, the Home Office insists on a monthly, or even weekly examination by the certifying surgeon, at the employer's expense?—My suggestion is that, if every workman is examined by the doctor before you engage him, if you are using lead, the result will be that you will throw your workmen into the streets. People will not engage them. That will be the result of it, because they are probably a lot more susceptible to the collection of lead poisoning, not due to the employer probably, but probably due to physical disabilities, possibly through their constitution, and possibly through their own manufacturing during their lifetime. Consequently we must have them examined when we engage them, which will be bad for the worker.

8172. Would you agree to have a periodical medical examination of your workers during the time they are at work?—No, I should certainly not agree to it.

8173. This is in vogue to-day in the majority of other lead industries?—I would like to qualify it in this way, that I am dealing with this question of lead as relating to every coach-maker who is employed in a coach-maker's shop, not the coach-painters only, because lead is used in every nook and corner, with a touch on the bolt head here and that kind of thing, and although there is only half a pint used in a great big room during the day, if a man moves from one portion of the shop to the other portion, the other men, according to what I have heard to-day, come under the scope of that operation. That is why I say I am not agreeable that the men should be examined by the doctor at the employer's expense, and in the employer's time. It is a different thing with the painter.

8174. Do you agree to that, in regard to the painters in your industry, there should be a periodical medical examination of the workers at the employers' expense?—I do.

8175. Then in regard to the other workers who handle lead, but in less quantities than the painters, would you agree to a periodical medical examination of them?—No. They might overcome that by sending a painter to paint the joints, and leave the other men right out of it.

8176. Would you agree that those workers who handle small quantities of lead to-day should be prohibited from using it?—From using it altogether—yes—I should quite agree to that.

8177. So that those particular men would not come under the category of employment in dangerous

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processes?—I should recommend it very largely, that the body-makers should be excluded—that motor body builders and carriage builders, and all other branches of the motor or carriage building trade should be excluded from using lead in any form, the lead to be only applied by the painters, and their labourers?

8178. Would you agree that the men so excluded should not be in the same shop as those using lead?—That is impossible—absolutely.

8179. I suppose you have realised by this time the very great expense which the industry would have to bear in connection with such stringent regulations?—I have.

8180. There seem to be only two ways of mitigating the evils which we have had before us in your industry. The first is to prohibit the use of lead altogether; the second is to introduce a code of regulations which will bring this industry, in regard to care for the workpeople, up to the standard of all other large industries where the use of lead is permitted?—I entirely concur with that.

8181. I will just give you an indication of what those special regulations would be. First in regard to lavatories. The regulation would require washing accommodation to the extent of at least one basin for every five workpeople; soap and nail-brushes to be provided and properly looked after; sufficient clean towels to be provided every day. Then a mess-room to be provided so as to make it impossible for the workers to have meals in a place where they come into contact with lead?—You could not apply that to small coach-makers' shops, because you cannot afford a mess-room. That applies to a lot of people like myself.

8182. What do you suggest as an alternative?—Insisting on the men going out to their meals. That is all that could be done.

8183. Is it possible to provide a mess-room generally?—Yes, in all the large works, but in the small works it would be impossible.

8184. In that case you suggest that the workshops should be closed, and that the men should have to go out, and have their meals outside?—Yes.

8185. The next thing is: cloak-rooms to be arranged so that it should be quite certain that the men's outdoor clothes do not come into contact with lead?—We cannot do that. We tried that. What happens is, that in a coach-builder's works you have a great variety of different classes and conditions of men; and you have all their coats in one place, and the numbers up for them, and they must leave their coats in those particular places. The result is that the body-maker says: "I am not going to conform to this arrangement; my coat will come into contact with other coats, and it might get dirty; I am going to take it upstairs."

8186. Cloak-rooms to be arranged so that it should be quite certain that the painters' outdoor clothes do not come into contact with lead?—I agree to that.

8187. The next thing is: overalls to be provided at the employer's expense, and washed at his expense?—No, certainly not—not on any account.

8188. Washable-impervious floors to be introduced so that they may be swilled down regularly every day?—It is too much expense, it could not be done—and they must be wooden floors for paint rooms.

8189. That is putting the clock back?—No, it is the experience that we have got. We have passed your time-piece, and we are going back to the wood now, and getting a better job.

8190. It has been proved beyond question that wooden floors suck up the dust. You cannot thoroughly clean a wooden floor by the wet process; it is impossible. If you put a hose on the floor, or if it is done with a brush, you do not get all the stuff away; it dries up, and then it is kicked up again when it is dry?—But you cannot get away from the fact that we know that the best varnishing is done on a wooden floor, better than on the other floor.

8191. Then a periodical medical examination to be made of each lead worker at the cost of the employer?—We agree to that—each worker in the paint room.

8192. Together with payment of compensation whenever a man is withdrawn from work in lead?—We already have to do that now.

8193. You have to do it if he were certified as having contracted lead poisoning, but in the potteries it has been enacted, and the employers have agreed, that if a man is suspended by a certifying surgeon because he thinks he is very near an attack of lead poisoning, then the employer has to keep him going a bit?—That would result in a tremendous lot of malingering, particularly when trade is a bit quiet.

8194. It is the doctor who decides, not the man?—No, I do not agree to that at all; in or out; let us have a case or none.

8195. Then: efficient exhaust draught apparatus for the removal of dust to be installed wherever it is possible to apply it?—I agree with that, to keep the place clean. Where you have got dirt you have got waste.

8196. You must also take into account the cost of setting up a system which will secure continuous observance of all these regulations, for you realise that under the Factory Acts the first duty is laid on the employer of securing the observance of the regulations?—I tell you distinctly that the manufacturer may provide all you require, and you may make your regulations, but in practice, my experience of 35 years, in handling thousands of men, is, that there are, amongst them, men that will not conform to the regulations, and you must make it penal.

8197. There are regulations under the Factory Acts existing to-day which you do not carry out. I only want you to understand that with regard to any new code of regulations, the employer will be responsible for securing the observance of the regulations?—I entirely disagree. Any new regulations that are brought into force for this must be carried out at the instance of the factory inspector, who will be solely responsible. He must see that they are carried out, and not the employer, because the employer fails to do it, or his foreman fails to do it, and nothing will reach it or touch the spot except the Government themselves.

8198. Let me point out to you that it is a question of the proper interpretation of the existing Act of Parliament—that the employer shall see to the observance of the requirements?—It is manifestly unfair.

8199. Then you must get it repealed?—The position is, as far as you are concerned, if you frame regulations for the general safety and welfare of the masses, you should say to us: "You have conformed with all our requirements because you have placed a man in charge and told him to see that the men under him do those various things, and he has assured you that they have done it."

8200. Then you have done all that you are asked to do?—But what is the result. What you want to do is to alter the conditions. The conditions are the same although we are put to all that expense.

8201. If you are allowed to use lead in the future, you will have applied the same sort of regulations as exist in other lead industries. To-day you have only the general Factory Act, which you have broken already?—We always break it every day. It is not the rank and file, it is the submerged that cause all this trouble. As an employer, with four or five different places, I entirely disagree with any arrangements or any obligation that is to be placed upon the employer to see that the workman fulfils his side of the obligations to the State. You say to the employer: "Provide so-and-so, and so-and-so." He does it; he give the men time to do it in, and if the man fails to fulfil that obligation which he owes to the nation, then the nation should say: "Account to me," and not go to the employer and say: "Come this way, Mr. Employer, that man over there has been too lazy to wash, and you must go to gaol, Mr. Employer."

8202. You have conformed with your part of the law if you have provided the accommodation which the Factory Act insists upon. If the man refuses to obey that law, then he is the responsible person, and he can be prosecuted, and not the employer. The law cuts both ways. If you find any workman who has refused to conform to all the regulations of the Factory Act, the factory inspector can prosecute him; and, *vice versa*, if you refuse to conform, the workman can inform the factory inspector and you can be

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prosecuted?—The question is, what are the results obtained from it, and my contention is that whatever you put down there as regards the provisions, you have got to have your factory inspector behind it to see that it is carried out.

8203. You would want a factory inspector in every factory. You would want about 20,000 factory inspectors, and at present there are 200?—I do not think that matters, does it.

8204. Taking all those points into consideration, and having in view the fact that we must introduce some remedies for the evil which undoubtedly exists, do you still consider that it would be better to regulate the industry by these special rules, or would you, as an employer, rather see the use of lead prohibited?—The answer to that is, that the policy that you have outlined is a destructive policy without any constructive policy in return. We know from experience that lead has been the foundation of our good work, and if you are going to legislate to prevent its use you will place us in an unfair position with our competitors from France, Belgium, and America, who will undoubtedly, from our 35 years' experience, produce more lasting work by using lead than any of the substitutes, or the substitute which we have had under observation as used by the Daimler Company, the result of which will be that the manufacturer and the workman would alike lose business.

8205. But you realise, do you not, that this Committee has been called together to find some solution for the evils which the Home Office have found to exist. What I ask you is this: Would you prefer that the industry should have special rules introduced to protect the workpeople, such as I have foreshadowed, or would you prefer the abolition of lead?—I should prefer the abolition of lead, provided you can prove to us that we have got an alternative non-poisonous paint, which can be used to produce the same work.

8206. That is not an answer to my question. The question I asked you was this. The evils exist, and there are two alternatives. One is to prohibit lead, and the other is to have regulations. I ask you which you would prefer to have?—Regulations, undoubtedly.

8207. (*Dr. Collis*.) You have spoken of white lead as being the most perfect substance you know of to-day for use as a paint. How do you define white lead?—I am not a chemist, and I know nothing about its chemical attributes. My experience of white lead is based on my business knowledge, and the use of it for the period of my lifetime, and upon the durability of the work that has been produced on its foundation.

8208. But it is important for us to be able to know what exact substance has been referred to. Are you referring to process white lead, stack white lead, chamber white lead, or basic sulphate white lead?—What I am referring to is wet white lead.

8209. I have given you four forms of it?—I can answer to none of these, because I am not a chemist. If you want an analytical examination of the lead we use we should be pleased to provide you with it. I can only tell you that pure white lead, as sold by —, has formed the basis of my paint.

8210. You use — white lead?—Yes.

8211. — is stack—the old Dutch process. Then would you be prepared, for instance, to cut out the other three?—I do not know of any—only pure white lead as I use it.

8212. Those are pure white leads that I have mentioned to you?—I am afraid I should be a very poor witness to give you any information with reference to the scientific or the chemical properties of white lead. I can only tell you that the white lead that I use is what is called pure white lead, supplied to me by —.

8213. But there are other white leads besides —, and they are pure white lead, within the definition in the trade. I want to know exactly what it is you want, and what it is you are prepared to admit?—I do not profess to have any chemical knowledge of the matter at all. What I do profess to tell you is, that in my 35 years' experience the article which is sold commercially as pure white lead by — is, in

my opinion, the best form of paint to withstand the attacks of the elements. As regards whether it answers any of those four names, chemically, I do not know.

8214. What is your experience of the other articles, since you have not used those others—what is your position in saying that is better than the others?—I know nothing whatever about that.

8215. Is it not a rather bold statement to say that one article is better than others when you have not used them?—No, I am speaking of pure white lead now.

8216. I am also speaking of pure white lead?—I am afraid we are running at a tangent, because those various leads which you are speaking about may be all understandable to you, but to me they amount to nothing, because my lack of education as regards the product is one that I must deplore; but so far as my commercial knowledge goes, I can only say, as I told you before, that I am using a white lead which is sold to me as pure white lead.

8217. But you have made the statement that this is the most perfect substance on the market. What I want to get from you is, what is your experience of it being more perfect than others, if you have not used those others?—My experience is, by comparing it with non-poisonous leads—it may be some of those names which you speak of—which are used by some of my friends and competitors in the business.

8218. Do you mean non-poisonous paint?—The Daimler people call it non-poisonous lead. I have not tried that.

8219. The point I want to get from you is, the extent to which you yourself have made experiments with any other paint than — paint, which seems to be the one which you prefer?—I have used other people's white lead.

8220. I want to know how far you have used paints not containing lead, and whether your experience of the others not being valuable is merely based upon what you have seen of other people's work?—From observation.

8221. Not from any experience of your own?—None whatever.

8222. Now, on the question of the health of your workpeople: do your men stay with you always, or do they come and go?—Some of them stay with us always, and some come and go. I think, taking it as a shop, our men have stayed with us longer than in any other shops in the kingdom.

8223. What is the longest period that any man you have with you has stayed with you now?—I should think about 25 or 30 years.

8224. Have you many men who have been with you as long as that?—I daresay we have 100 or 120 men who have been with us 14 years on the average—some longer.

8225. I suppose a man's working period of life commences about the age of 20?—Yes.

8226. How long do you expect a working man to live?—I have no idea of mortality tables. I am not in the insurance world at all. I can only tell you that I have apprentices with me who are now foremen, and charge hands, who have been with me all their life. They have been with me from boys to old men, and they are still with me. They are part of my family, and they will probably be with me till they die.

8227. How old are they?—55 and 60, and so on.

8228. Do you expect them to die soon?—I hope not; they have just got their experience now.

8229. This is the point I want to get from you; when do you think they should die? We find the average length of life in various employments varies?—Yes, but a coach-builder is under cover, and it depends entirely on the shop he is working in, and the conditions. If a man is in a constant job, and has a decent shop to work in, as he has in a good number of shops in the country, and his home is set up, that man has a fairly happy, peaceable, long life; but if he is moving round the country on the tramp it is different.

8230. I want to get from you what you consider is a long life?—You are asking me a question which is

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quite outside the scope of my observations. You are asking me to focus the mortality tables of the working classes.

8231. That is a very important part of this inquiry. Have you any knowledge of it?—No. We can give you an idea of it if Mr. Kinggate will turn up the United Kingdom Society's pension list.

8232. We have got that, but we want it from you. You have made some statements with regard to the health of the workpeople, and your experience may be a very different one to that. You have given 35 years as a long period of employment. I have just had reason to make some inquiries in Nottingham in the lace trade, and I find on an average that is rather short; 50 to 60 years of employment is quite frequent?—That is quite a different business; it is not analogous at all to this question, because the painting side of the business is one of the most transitory sides of the carriage building business, because there is the flotsam and jetsam, and the ser on business.

8233. I asked you that point to start with, whether any of them came and stayed with you?—They do.

8234. Then you ought to have many of them who have been employed 50 or 60 years?—I do not think so, because we made the business ourselves, and we have not got to those ripe years ourselves.

8235. On this question of the health of your workpeople, have you studied the question at all, as to the amount of time they have lost for anything whatever? I am not referring to illnesses certified as lead, but time lost for illnesses?—No, I could not tell you the time lost for illnesses. It is not of very great moment, and it cuts no particular figure compared to the time that is voluntarily lost for pleasure and enjoyment. I am speaking now of Lancashire, where some of the men will lose a week-end or three days to go to a football match.

8236. But you do not, in fact, keep any statistics of the reasons why your men are away from work?—No. If they are away from work too much, we say good-bye to them.

8237. It might be that they were staying away not for football matches, but it might be that they were suffering from recurrent headaches and general feeling of malaise, which kept them from work, and they stopped away from work too much, and you let them go. Would not that be so?—I should say certainly not.

8238. Why not? How would you know the difference between the two?—If a man is suffering from a very violent bilious attack or malaise, or all those headaches and different things, it arises from a very heavy Saturday night in a good number of cases, because most of the time that is lost is on a Monday, when the man has had time to rest.

8239. May I quote the Registrar-General: "Coachmakers are but little addicted to alcohol"?—I agree.

8240. Then we will leave that on one side. I think that is an absurd and perfectly unjustifiable attack on the working man?—You have not had experience of the painter's labourer, and that is the man who comes under this inquiry.

8241. In other words, I take it you have not studied the health of your workpeople closely?—Very.

8242. Will you state in what way?—When a man is ill I get to know about it, and I look into the matter, and I help him if I can. I have no cases of any moment brought under my notice from breakdown of health except in cases of accidents.

8243. But have you kept statistics? The loose statements that we have received from witnesses with regard to the health of their workpeople have been rather astonishing, inasmuch as they have not studied the question, because they have not kept the figures?—Everyone keeps the figures, for the simple reason that you keep a man's record of his time that he works, and there is the wages book there to show the time he works.

8244. But the reason why he is away is not kept on record?—No.

8245. You are no exception to the other trades. Are you, therefore, in any position to make a statement

about the health of your workpeople?—If the absence of the workpeople is to be the standard on which you reckon their illness or health, I say we are in a position, because our wages book shows the time that the men work; and the average time of the man who is in constant employment, or an itinerant labourer, even if he is only there a portion of the time, is a pretty full week; but there are lapses, and you can see that in the books.

8246. Let us take the point now as regards illnesses caused by lead. Are you aware that lead affects the kidneys?—No, I have no idea of what effect lead has on the human anatomy. I am not a doctor. I am afraid, as a manufacturer, with 35 years' use of lead, commercially and practically, it would be impossible for me to epitomise what effect that has on the human frame.

8247. Not having had information, it seems rather bold to inform the Committee, as you have done, that various processes are harmless?—We can only base that calculation upon lifetime experience.

8248. And your lifetime experience has not been a study of the health of the workpeople?—But they are with us still.

8249. It only runs to 35 years?—That we consider quite a long time.

8250. That is curious, because in other trades it is not a long time?—Do you suggest that 35 years is not a long service for any workman with any firm?

8251. I do not consider it very long. In other trades—and my experience is very fair now—I have examined thousands of workpeople, and asked them the length of time of their employment. Taking one that I was at only at the beginning of this week, 45 and 50 and up to 60 years was not unusual?—I quite agree, but in a trade like the carriage building trade, of which I have the most immediate knowledge, I suggest to you that 35 years is a very long service.

8252. I perfectly accept your statement, and therefore I say there must be something in the nature of considerable ill-health among the workers if 35 years is a long service?—No, the men move about more in the motor and carriage trade than they do with a lace machine, because they take their tools in a box, but they cannot take a lace machine about with them from one factory to another. The coachbuilder moves from London to Birmingham, and right about, but the lace people do not. I should say that my experience of coachmakers is that they generally live to about 60 or 70. That is the average life of coachmakers. We have some of our old pensioners who are over that.

8253. You drew a distinction between the work of 20 years ago and the work of to-day, did you not, in the carriage making? Would you allow that the Registrar-General's class: "coach, carriage, and railway coachmakers," in any way represents the class with which we are now dealing? For instance, how many people would you estimate to be employed 10 years, or 20 years ago, before the motor industry came in, in coach and carriage building?—I have not the remotest idea. I am a small manufacturer. I do not know what the railway companies keep.

8254. Do you think it is probable, taking it from its name, "coach, carriage, and railway coachmaker," that the people included under that head would be exposed to any risks that the men would be exposed to in the class that we are now dealing with?—The painting.

8255. Yes?—No. I should say that it is a trade without any dangerous risk in it.

8256. Referring particularly to lead poisoning, you think that they represent what we are dealing with: the coach and carriage painter?—Yes.

8257. It will interest you to know that the mortality from lead poisoning was exactly the same as in the previous 10 years, while there had been a considerable fall in mortality from other diseases. My point is, that the general condition of health, due to rise of wages and better food, shows a distinct improvement in health, but lead poisoning has stayed at exactly the same figure during the two periods?—Yes.

8258. You were telling us that you made a great point of it that 20 years ago there was a great deal

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more lead being thrown about and likely to cause more trouble?—Yes.

8259. Then how do you make your statement coincide with the Registrar-General's statement?—Because my statement referred to coachmakers' shops, and I did not include, neither have I any knowledge of, the grouped trades which you have down there.

8260. I asked you if you allowed the group as representative, and you said distinctly, yes?—Coachmakers' shops is what I am dealing with.

8261. You also suggested that if a medical examination was instituted, the result would be to throw many men into the street?—Undoubtedly.

8262. On what do you base that statement?—On the fact that there are a tremendous number of painter's labourers who use lead.

8263. Let me suggest to you that this medical examination is insisted on in the white lead trade, where there is a great deal of casual labour. There is probably more casual labour in the white lead trade, where those regulations are in force, than any other trade. Casual labour occurs, not so much in the pottery trade, where there is medical examination, but it also exists in the tinning, in the manufacture of paints, and several of the other trades. Your statement that men would be thrown out on to the streets has never been found to be justified by our previous experience, when the medical examination was installed. I allow that it is a point that we have been told is going to occur?—And it will occur undoubtedly.

8264. It has not occurred before?—It has occurred in lots of industries.

8265. It has not occurred to my knowledge?—I do not know about the trades you are speaking of, but you have to put yourself in a commercial position in looking at this thing, as well as a humanitarian position. If you are going to have your men examined, you will have to examine the men who have been with you, and the itinerant labourer and the casual labourers who have come to your place and have been there one month, laden with lead—if we are to carry out the theory that lead is poisonous. They start with you one month and they develop this, and the responsibility rests with you. The employer will naturally say: "You must be medically examined before I take you. You must be medically fit." Consequently they will say: "You can do your work all right, Tommy, but we are sorry you cannot pass the doctor"—and Tommy is in the street, and Tommy will be in the street.

8266. I am only giving this as a fact: that it has not occurred before?—My answer is, that, from my own commercial knowledge, that is what I anticipate the result will be in practice—and it has been the practice in other trades.

8267. Can you tell me a single trade in which this has occurred? You may be able to find one or two isolated men, but can you tell me any trade where this has happened in your experience? I cannot tell you of a trade, but I can give you a parallel case, and to-night I can go and show you the case if necessary. When they brought the Employers' Liability Act in, the result was that old servants, in consequence of the risks that ensued, got dismissed from the large public companies in England, and they are in the streets to-day, and they are replaced by younger men.

8268. That had nothing to do with the medical examination of the men's health, had it?—It applied to the chemical trade and others, and so it will be in this trade.

8269. Medical examinations have been welcomed by the employers in other trades, because it has lessened their liability?—I agree.

8270. They found themselves distinctly strengthened by the medical examination being instituted, but as regards the medical side of the question, and the medical men refusing men on account of their ill health; I ask you which trade it has occurred in. I suggest that you are raising for yourself a bogey there which has no existence?—I have answered you that I am entirely in favour of having those men in the painting shop medically examined, and I am quite agreeable that they should be in every way. If we are to be held

responsible for the health of these men, and for the medical examination, it would naturally follow that before we embarked upon any new set of regulations we would have our men examined, and those who had been with us for years would certainly go on with us; but with regard to the men who had just come to us a month ago from some other company, the doctor would say: "This is a very likely case, in consequence of his having had rheumatic fever, or being half-fed or something of that sort, to get lead poisoning." We should say: "We are very sorry, Tommy, but we cannot take you"—because I should consider if I took him I should have to support him.

8271. Do you not think that that would be better for Tommy?—No.

8272. Why not? Tommy would be better off in a trade where he could not get lead poisoning?—No, Tommy would be in the Salvation Army shelter at night.

8273. Your attention has been considerably drawn during your examination in chief to the danger incurred from dust. Have you considered at all the possibility of danger arising from fumes given off by lead—the smell of lead paint?—I have not given the matter any consideration, except from the experience I have had of the number of painters I have had through my hands, and their absolute immunity from illness.

8274. I think we have dealt with that already, and shown that you have no real knowledge on that point?—None whatever.

8275. You can hardly keep on making that statement again and again?—It is a very hard nut to crack, when you have had the men so many years. Whatever science may teach, we can produce the men.

8276. What you want to produce is the exact number of men you have employed, and of whom these are the survivors. It would be rather difficult, because you cannot tell what has happened to those who have left your employment?—We can dig them up. We have the records of them.

8277. (Mr. Fall.) One or two questions about the substitutes. You say that your experience of substitutes is simply limited to seeing certain cars in the streets?—Yes.

8278. You have not tried the substitutes yourself?—No, but I am in close touch with other coachbuilders who have used, and do use these things.

8279. Can you tell the Committee the general effect of using these substitutes on vehicles?—The only case that I have had under my own observation is that of one company, who is the largest user of the substitute. From my experience and my observation of a number of cars in various parts of the country two years old—they can be no older in consequence of the chassis on which they are mounted—and a number of other cars and bodies made by people all over the country, that one, as a parcel, is certainly very much worse in the painting than any other car from any other coach building shops.

8280. There are several motor-car companies using French bodies?—Yes.

8281. Do not some of those companies get their bodies painted abroad?—Yes.

8282. And are they not to a large extent painted with substitutes and not white lead?—I asked about that. Most of the French motor-car bodies are painted with white lead to-day.

8283. Does not the condition of the car which you see in the street depend to a very great extent on the varnishing?—Not in any way as regards durability.

8284. Do you not think it appears to be better, if it is more frequently renovated?—Undoubtedly.

8285. So that, seeing a thing casually in the street, unless you knew when it was varnished last, you would not know what the real state was?—I agree.

8286. So that, unless you get it actually under observation, you cannot tell what the life is?—No, you cannot make a positive statement and say that this one was done with lead, and this one with non-poisonous paint, and they have run so many miles, and so on. I do not know that; I am only speaking collectively.

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8287. Would you be prepared to paint some cars with substitutes?—No, I am afraid I would not, because I could not afford to experiment on my customers. I would not mind doing one of my own, but I have not one. I have a number of customers, and if a thing was painted white, and it went black, I should have to do it over again.

8288. Do you know that the Midland Railway Company have been using substitutes?—Yes; I understand so. I do not attribute any importance to any railway company or any tramway company using it at all, because they can experiment with the money of large corporations, whereas we are small builders, with all our money on the table, running our business to get a living, with hundreds of customers in different part of the country, and we have to please the lot of them. If the thing is not a success with a large corporation, then they do it again.

8289. But you know the margin in a public corporation is a very small one sometimes, and you have to save everything you can?—We have not found that with the London and North Western Railway Company and the London County Council.

8290. The Committee would like, I am sure, to have some evidence to show that at any rate the manufacturers have tried some substitute. It is not sufficient for you to simply say that lead is the only thing that can be used, and not attempt to try a substitute?—That is quite sufficient for me, because my experience is this: that I have produced very fine work with lead, I have given my customers satisfaction, and I know that the longevity of the work is there. I am not prepared to gamble or experiment with my customers or my profits by trying anything else, for the reason that my workmen's health during that period has been satisfactory.

8291. (*Dr. Collis.*) You have already allowed that you know nothing about that?—No, I beg to differ with you. I think I have told you pretty conclusively that, so far as the workmen are concerned, the fact of their non-absence from their work is proof of their general good health.

8292. (*Mr. Fell.*) If it can be proved to you that a substitute could be used, would you adopt it?—If it can be proved to me that a substitute is as good as white lead, certainly I would adopt it. I will use it if it is worse, if you decide that I must.

8293. (*Mr. Mason.*) You were suggesting just now that you might paint wheels in a certain shop, apart from the general shop?—Yes.

8294. If the wheels, being painted on a horse, were taken to one spot, would it not be possible to apply a process of exhaust ventilation in doing those wheels?—Why I said "make it a portion of one shop," was so that the Act would apply to that one particular man rather than to the 500 who surround him.

8295. Do you think it would be a success?—I am afraid I am not sufficient of an engineer to say what kind of appliances they could find to-day. I think proper ventilation would get rid of a good deal of it.

8296. (*Mr. Kinggate.*) In the early part of your evidence, you have inferred there is no danger at all in the private coach-making trade in the use of lead?—Yes.

8297. With regard to these 116 cases that we know of that are reported, you are aware, of course, that they have to come through the certifying surgeon—definite cases of lead. Do you know that there are hundreds of cases that are never reported at all?—I do not think there are—not lead poisoning.

8298. Take three London shops. In one of the largest London shops I know perfectly well that there were, in the wood loft alone, a dozen men who were suffering periodically from white lead poisoning. It came out mainly in cancer?—Yes.

8299. In another shop in which I worked for a great many years amongst the wood workers, out of about 30 men employed, there were five men that were periodically suffering from lead poisoning, and men that were very careful men too. Perhaps you are not aware of that?—How many years ago is that?

8300. I have only been away from the trade now about eight years. It was in the latter part of my

time?—Do you consider that those cases are only eight years old, and that it is only eight years ago that this happened, or 28 years ago.

8301. Some of them were 20 years ago, and more than that?—The answer to that would be the statistics that you have got.

8302. None of those cases had been reported?—That is quite right.

8303. We have had, in my own organisation, within the last two years, in the coach-building trade, five deaths from lead poisoning besides the other cases. Do you know that it is very possible that a number of your men may have been off ill and not been aware that it was from lead poisoning?—Quite so.

8304. Do you know that many men are away for a short period, and that they periodically dose themselves with medicine for the purpose of keeping themselves at work?—Yes, but I have no knowledge of their taking physic to keep themselves at work.

8305. So that your statement that you have no cases of lead poisoning, if it came to be analysed, might prove to be that you had a large number?—That is supposition.

8306. You have no figures to prove the cause of the illness?—No, but I have the time sheets and the men's records, and the hours that they put in.

8307. Just so, but the men may be off only for a day or two. You have no figures to give to this Committee, and no statement to give, as to the reason why a man might have been off from your works for two or three days?—No. Do you suggest, as secretary of the men's society, that I should say to my men: "Where were you yesterday, what were you away for?" so that I can tabulate it in a book?

8308. You have not done it in the past, and it is not a question of what you are going to do in the future. You have not done it in the past, and therefore any statement you make is not to be relied upon that you have had no cases of lead poisoning. That is the point I wish to get at, because I know from my experience that there are a very large number of these kind of cases that are never reported at all, and that very grave danger exists with regard to the workers in our industry. You say practically there is no danger at all to the body-maker. You know that, in using white lead in putting on the edge plates and the various plates, he is bound to get his hands covered with lead very frequently; he cannot avoid it. There is a possibility then, as the Chairman said, of putting his fingers to his mouth for various reasons, and so it gets into his system, so there must be some danger?—None whatever.

8309. That is your opinion?—Absolutely.

8310. Then how would you account for body-makers suffering from lead poisoning?—I have never had a case of lead poisoning.

8311. Not to your knowledge?—No.

8312. With regard to carriage-making, of course, I agree with you that there is very little carriage-making now, but there may be in the future a reversion to the horse carriage?—I hope so.

8313. I was rather astonished, as a practical man, at your statement with regard to putting together the carriage. To say that the plate was painted and allowed to get dry and then put together, seemed to me an astounding statement, and I was surprised at your making it. What was the object of your putting on white lead?—It is certainly a better job to do it in the way I suggest, because it does not exude afterwards, and you get the lead into the grain of the timber. If you took a transom plate off you would find the white lead bedded down, and you find the water gets in. In consequence of that, we say we will paint these things before we put them together, and it makes a better job, because in the old days they used to slabber themselves all over with white lead. That does not exist any longer in the carriage-making of to-day.

8314. Then, from your statement, lead is practically useless for this purpose, because as soon as the water gets to it it gets rusty?—No.

8315. You just said that that is why they have done away with lead; that you find, where the lead has been used along those edges, it has got rusty?—On the

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contrary, what I said was, the bed plates were painted with lead colour, and not white lead. The lead colour was allowed to get dry, and two or three coats put upon those beds before the plate was put upon the top of it, and that process gave greater life to those compass beds than the old process of putting them together with a splash of white lead on the plate and one on the bed. I say that that is a better job, and that is the up-to-date process of making under-carriages.

8316. It is an exceedingly strong statement to make. You were speaking of a case to me a little while ago with regard to an old barouche which you had to knock to pieces, and you said that when you had taken the bolts out you had to hammer the plates on account of the casing properties?—Yes.

8317. With a light frame you want something easing for that, or it would spring away?—I am speaking of carriage-making. In carriage-making you have four bolts in that length. There is no springing away if the smith knows what he is doing, and puts the bottom plate on it.

8318. Take from the end of the transom to the spring; in many light carriages you have a distance there in which your bed is not more than three-quarters of an inch thick?—That is right.

8319. And that is where you require lead, if you require it at all?—Yes.

8320. To thoroughly fix it?—Yes. What you require in that case is a good solid smith, with a good lump of iron, with a good bottom bed-plate.

8321. And as regards the stronger bed-plate there is more liability for the bed to get away from it?—Yes.

8322. I am speaking of a practical carriage-maker?—So am I.

8323. You made a statement with regard to there being no hard stopping in motors to-day. That is rather a strong statement to make, is it not?—No.

8324. Do you find that in many cases there is more hard stopping used now than there was in the coach-painting trade?—No.

8325. There are holes to be stopped up?—Where are they?

8326. The inequalities of the panels?—But the panels are filled up and the mouldings are aluminium mouldings, and they are put on with screws, which are countersunk and filed off level and the nicks filled in.

8327. That is not in all cases, is it? There are plenty of wood mouldings and plenty of wood panels still, are there not?—You are asking me what I do.

8328. You may be adopting a different method to what other builders are doing, but you know perfectly well they still use wood panels in many cases?—Yes, and I think I shall possibly go back to wood panels. If I did I should not use stopping, because I should glue my panels, and I should put them on with copper panel pins, and I should fill them up. I should put no stopping in them, because I should not allow body-makers' work to pass with bad joints that you could throw your hat in.

8329. With regard to the use of lead in body-making, you have been speaking of the French coach-makers. Is it a fact that they do not use any lead in the construction of the bodies, but it is all glue?—In France?

8330. Yes?—No, I think they use glue in France and America.

8331. The body-maker does not use lead at all?—No.

8332. In my experience it is all glue in those countries?—Yes.

8333. There is another point with regard to that. If it is possible, as you say it is, and it is done to-day, to put the canvas on the roof with glue, instead of the old plan with white lead or japan, that is for the purpose of keeping the wet away, is it not?—Yes.

8334. We have been told here by most of the witnesses that, with regard to jointing, the object of it is to keep the wet away?—Yes.

8335. If the use of glue upon the roof of a carriage will keep the wet out, surely the use of glue in jointing would be equally as efficacious as the white lead would be, seeing that there is no possibility of the water getting to the joint like there is to the roof?—Glue, as

you know from your own experience, suffers from the humidity of the atmosphere. All American carriages are made of white wood with corner blocks fitted together. When they are put into the atmosphere, here in this climate with the rain, where do they go? Then with regard to the French makers, there is a firm sending 300 bodies into London.

8336. He is not a Frenchman; he is a Belgian?—He is using a lot of glue. What happens? Those things come to London with a beautiful surface on them, but what happens? You can walk through the mitres at the corners of the pillars, and also through the wooden mouldings.

8337. But that cannot be from the fault of the glue. It must be the fault of the timber?—You get a screw head, on the principle of putting in a screw, and then putting a wooden dowel, and levelling it off with the end grain. What happens? Up comes the end grain, and there it stands right out. Glue in coach-making is no good at all; that is my view of it, because it will not stand the humidity of the atmosphere. Then with regard to covering the roof, we use dextrine for covering the roof, and you must not lose sight of the fact that the roofs of the carriages, when they were put on with japan and white lead, were generally jointed in about three pieces. Now they use three-ply American wood, cut to the full length of the roof, and there is no joint in it at all.

8338. That is not my point at all?—Even then, if you look at the top of the brougham, looking down the street, you would find the ridges of the joints.

8339. In those cases they were not put on with white lead?—Japan and size. We used to put a good wet hide on them.

8340. There has been a lot of talk about foreign competition. If the evils are so great with the use of glue, then, of course, we have nothing to fear from foreign competition?—The best illustration of that is to come up with me and see it on my car now. If you will come up to Warwick Wright's, you can see the roofs of bodies made in Belgium.

8341. You are contending that there is very little to be feared from the evil of the use of white lead. You are suggesting that you are going to look your men out from having their meals in the shop on account of the danger attending the use of lead?—Nothing of the kind. I am looking the men out of the shop for their meals on account of the bits of bread and paper, and everything that is rolling about, and I contend that where you have dirt you have waste.

8342. That is hardly the reply that you gave to the Chairman with regard to the factory regulations. You said you should look the men out of the shop, thereby showing that you recognise the danger?—Not in any way. I wish it to be quite understood that in looking my men out of the workshop, and sending them to the dining-room, it is not that I fear any danger from it, but it is with a view to having my shop cleaner, and not having bits of bread, and bits of paper all over the place. It is not a question of danger to health at all.

8343. With regard to the discharge of men suffering from lead poisoning, is not that also, at the present time, the cause of many cases not being reported for lead poisoning. We recognise that your statement is quite correct, that if you were employing a man and he was suffering from white lead poisoning, you would not employ him?—That is right.

8344. There is also this that has to be considered, that there are many cases of white lead poisoning in which the man refuses to report the case, and, in fact, even goes so far as to ask the doctor not to say that it is white lead poisoning—to say that he is suffering from Bright's disease, but not the cause of it—for fear of being discharged?—Not at all; that does not exist at all. If I have got a chap suffering with lead poisoning, the first thing I do is to try and get him right.

8345. I am following up your remarks about the evil effects which you think would come upon the workmen from medical examination. I will put it in this way, that there are a large number of cases, generally, not reported, from the fact of the fear of the man being discharged from his employment, on account of suffering from lead poisoning, and the liability attaching to

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the employer for compensation?—Of course, you have had a more general knowledge of that than I have. I should rather think not. I should rather think that the organisation which you are at the head of would see to it, that if you have a case of lead poisoning you would very soon put it on to the counter to the employer. You ought to do so. You would say: "Here is a case of our member, John Jones, suffering from lead poisoning in your employ. What are you going to do for him?" That is your duty.

8346. But you must remember that the man has, in the first place, to go to the doctor, and he may fear his discharge?—Yes.

8347. We may take his case up, and he may get the benefit of the compensation, but that would not make up for the loss of employment?—That could be easily overcome by the Home Office issuing instructions to the doctor that it is a penal offence if the doctor does not report it as lead poisoning the same as in scarlet fever, and so on.

8348. I notice you made a point with regard to some experience by the North-Western Railway Company, which you seem to place some weight upon. It is a most remarkable thing that you do not place any weight at all on the fact that the Midland Company do not use lead at all?—I know very little about the work in railway shops, but it came to my knowledge, through one of the directors of the North-Western Railway Company, that a train had been painted with other than white lead, with the result therefrom that it discoloured and had to be done again. I wanted to illustrate to the chairman that that was a mere bagatelle to a firm like the North-Western Railway Company, but to me it would very likely have meant my being sold up, if a railway train had to be painted over again. I cannot afford to make those experiments. With regard to these gentlemen who have big corporations behind them, let them experiment by all means, and if it is a success I shall be very pleased to benefit by the experience of the money they have already paid for it.

8349. According to the evidence we have had here, there seems to be no substitute, as far as we know, used for lead in the ordinary preparation of a body. Take a wood body now, for instance, with wood panels. The object of the lead, first of all, is to stop the suction of the wood, to fill up the grain, is it not?—Yes.

8350. Again, after the body has been filled up and rubbed down, it is to stop the suction or the porousness of the filling up?—Yes.

8351. The thing that has been used in the Daimler car is not a substitute at all; it is an old thing. Do you know what it is?—No.

8352. It is simply a mixture of varnish and japan—generally the waste that you have from the stone—and that effectively stops the suction. The man who is head painter there is one of the most experienced painters in this country, and he is a very old member of our society. He is the foreman of the painting department?—What is his process. When he has got the thing rubbed down, does he give it a thin coat of japan and varnish?

8353. Yes?—That is entirely his own invention.

8354. Yes, you must know that the more recent productions of the Daimler Company have been of a better character than they used to be?—A long way.

8355. A great improvement?—Yes. I attribute that to using iron panels instead of wood. It is very much better painting.

8356. Then, again, with regard to the standing of the paint, of course many of their things have to be rushed through very quickly. Other firms may do the same. You have not tried any substitute, have you?—No.

8357. If the evidence is forthcoming from this inquiry, and the evidence is conclusive, that a substitute can be found to take the place of lead, you are perfectly prepared to fall in, and use that substitute, are you not?—Undoubtedly. I want you to rightly understand that the health of my workpeople is my first consideration, because my profit must come from

them, and I do not want to use any of these poisonous things as long as I can make a good job.

8358. (Chairman.) But you have told us you do not believe in the dangerous character of the employment, I think?—You are illustrating the dangers as you allege they exist; but I do not believe they do. In the wisdom of counsel such as this, if it is proved in the aggregate that it does exist, and that there should be legislation for it, you must give us something else, and we will give it a trial.

8359. (Mr. Kinggate.) You do not know the insidious nature of the evil, do you?—I know if you cut your finger and dip it in the paint pot, you will get it poisoned.

8360. The evidence has been that a man was dipping in the white lead glaze with a cut finger, and he said it was the finest thing to heal it?—I have seen cases like that.

8361. (Mr. Robins.) I believe you said in your evidence that white lead was not dangerous?—I will qualify it. I admit that white lead, so far as my experience is concerned, has not proved itself dangerous in motor-car painting.

8362. Still, you consider that it is quite necessary that a portion of the shop should be apportioned off to sand-paper the white lead that is on the wheels?—No, I do not consider it necessary at all, but in view of your wishing to legislate for it, rather than that you should legislate for 500 men in a shop, and make your rules applicable to those, you should take off a portion of the shop and legislate for the one, and we should conform to whatever regulation you see fit to impose for the health of that workman.

8363. Do you think that that could be done in very small works?—No, they might use sand-paper stopping all over the body, and everything.

8364. Do you consider that sand-paper stopping is dangerous to health?—It must be. Any dust is.

8365. And you consider that white lead is not dangerous?—I am giving you my experience.

8366. (Chairman.) You say it is dangerous, but not in your works?—Yes.

8367. (Mr. Robins.) In giving the first part of your evidence, with regard to cases of lead poisoning, you mentioned that you were receiving the credit, in the coach-painting trade, of lead poisoning, while many other industries were really the cause of it?—Yes.

8368. One instance you gave was that coach-painters were painting bird cages?—Yes.

8369. Would it surprise you to know that a bird cage painted with white lead would be very dangerous to the bird, and that in bird-cage painting enamel made from zinc white is used?—I must express my ignorance of bird-cage painting, but I know of safe painting and lift painting. A firm of lift makers, when they have, as they do sometimes, a job to take to the International Show, like the Turin Show, they send for a coach painter to paint that lift, which in the ordinary course would just get a coat of paint from one of the works' staff. They finish it up with stopping, and sand-paper it down. In the ordinary course, the man who does that is employed in the coach-painter's shop, whereas he is really a lift painter.

8370. Do you consider that the use of stopping and sand-papering down is likely to give that man lead poisoning?—No. If you have a little room about the size of this table, and they are using it all day long, that is different.

8371. You still hold that to carry on this operation there must be a special ventilator to carry it off, so that it is not dangerous to the man who is doing it?—Yes, I do.

8372. He must have that ventilation, and without that ventilation it is highly dangerous?—I agree with that, such as it is.

8373. Yet in the first part of your evidence you said that white lead is not dangerous at all?—I do say so now.

8374. How do you reconcile those two statements together?—I will give you a very overt explanation of it. I have a shop that is 300 feet long and 90 feet wide, and I am painting in it. You have, or someone



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else has a shop the size of this room, where they are painting a motor body, and that is the full size of their painting room. I can take you to lots of places in London where they are doing it. In this corner there is a man sand-papering the wheels with sand-paper stopping, and over there is a man with a putty knife laying it on with sand-paper stopping, quite a different process. In that small place the conditions are quite different. That is why, when I tell you that white lead is not dangerous, I say that from my experience in my own particular works—and that is all I am speaking about—from the experience I have had of the number of people in the coach-painting trade, I have never found white lead to be of any danger to my workmen.

8375. (*Chairman.*) Do you not mean by that that they get smaller doses of the poison?—No.

8376. Is not that the inference? You admit that there is a certain amount of dust?—Yes.

8377. So that in your place the men get a certain amount, but in smaller quantities?—Yes.

8378. (*Mr. Robins.*) On that point I must say from my own practical knowledge that since the motor industry has been started, better shops have been made, and better ventilation introduced, but at the same time you must be prepared to bear me out that, in 75 per cent. of the places where the coach building is carried on, it is highly dangerous. They are different to the motor shops as a rule, which are better ventilated, but still that does not say that this question of white lead and the sand-papering is not dangerous. You have to take these precautions of ventilation in order to remove the danger, but the danger exists; or else why would you use these things?—To give you an illustration, on a beautiful summer's day, on a country road, when the dust is blowing up in clouds, when you have got the atmosphere of the fields round about you, you get the same volume of dust, but in a room like this you would be smothered.

8379. But all the way you went along in the country the people would not be raising dust from dry white lead. Would you consider that coach painting was a healthy occupation?—No, I should not.

8380. And would you think a paint shop was a healthy place?—Give me a description of your idea of a paint shop.

8381. An ordinary paint shop. Should you consider it a healthy place?—I should, according to my view of a paint shop. I can take you to some places very unhealthy.

8382. What would you consider was the cause of the unhealthiness of those shops?—What I wish to convey is that paint shops are as varied as private houses. You can either have a hovel down a back street or you can have Buckingham Palace. There is very much variety in the various paint shops in the country. If you say a painter's shop is a dangerous place, how about those poor chaps that are selling paint over the counter in these small shops throughout London?

8383. I do not think that has anything to do with this inquiry at all?—I am giving you an analogy.

8384. (*Chairman.*) Would you not say that you would have to legislate for the average place?—You are going to legislate people out of business.

8385. Would you not have to legislate for the places that are not so well equipped as your own?—In my opinion, if I were dealing with this question, I should classify them, and I should say, under various conditions you may do so and so, but under other conditions we will only permit you to do so and so. I think that is a practical way of putting it.

8386. (*Mr. Robins.*) Seeing that the condition of the painter is unhealthy, and that the conditions under which the men work in your paint shop are far healthier, but that you consider that the workshops generally are not so healthy, what would you consider was the cause of this unhealthiness among the painters? You say that the painter's occupation is an unhealthy one?—Yes, and I qualify that by saying, compared to any other branches of the coach-building trade. I do not say that it is a dangerous occupation, but I say that it is much more unhealthy than that of the body-maker or the carriage-maker or the smith.

8387. What I ask you is, what is it that makes it unhealthy?—I want you to understand that in my definition of the painter's occupation, my comparison is that the coach-painter's occupation is unhealthy compared with his confrères in the other branches of the trade, but if you are speaking of coach painting as a trade in England to-day, compared with other trades, I say that it is not unhealthy. I can find you much more unhealthy trades. It is not an unhealthy trade, but it is unhealthy compared with the body-making or the smithing or any other part of the trade.

8388. What is the cause of the unhealthiness?—It does not exist.

8389. Yet you say it is an unhealthy occupation?—Unhealthy compared with the others.

8390. (*Chairman.*) What makes the difference in the health of the two sets of men. One is not so healthy as the other. What makes it less healthy for the painters than for the rest of the men?—From my observation of the physique of the men myself, I have not noticed any difference between them at all, but I have said that my opinion of the coach-painting trade is that it is the most unhealthy branch of it.

8391. Why is it more unhealthy than the other branches?—It is very largely due to the fact that coach painters are running about from one shop to another, visiting the factories, particularly the small factories, where they are very uncleanly and very small, and very dirty, and the men do not keep themselves clean.

8392. But what is the cause of the unhealthiness? Is it the lead?—No, because my experience during all this period is that I have had no cases of lead-poisoning.

8393. You have admitted that certain sections of the men work under unhealthy conditions?—No, my comparison to our friend here was that, in the coach-building trade, I should consider the most unhealthy branch of the trade is the coach painting.

8394. (*Mr. Robins.*) What is the cause of that?—It is due very largely to the fact that it is a very migratory trade, and the conditions under which they work in a great number of places are absolutely unsuitable for them to pursue their trade in. What I wish to infer is this, that the coach painter's occupation is not so healthy as the other branches of the carriage trade, and it is due very largely to the fact that his occupation is very migratory, and it is the result of him working in small shops particularly, which are quite unfit for the carrying out of coach painting, except to the damage of his health.

8395. (*Dr. Collis.*) I should like to ask whether you would modify your opinion as to the cause of the unhealthiness of this section of the trade in any way, if you know that these people have an average age at death about nine or ten years younger than in the other branches of the trade to which you have referred, and that this average age at death is lowered by the diseases which we know lead specially causes?—No, I was not aware of that.

8396. Would it cause you to modify the opinion you have just expressed as to the cause of the unhealthiness?—No.

8397. It would not cause you to modify your opinion if you had that in figures?—I am afraid it would not.

8398. (*Mr. Robins.*) You have said that it was mainly with regard to the migratory character of the men, and working in little shops?—Yes.

8399. If white lead is not dangerous, it is not dangerous in small confined spaces any more than it is in a large space. If it is dangerous in a small place, certainly it is equally as dangerous in a large place. Even if preventive measures are used, still there is the danger, because preventive measures are used. You would not want to use preventive measures if there was no danger?—You hardly followed my assertion. We were speaking of sand-paper stopping, which is a process with dry white lead. I have agreed that when it is used it should be used in a place enclosed with an apparatus for the withdrawal of the dust that arises therefrom.

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Mr. WILLIAM LAWTON GOODMAN.

[Continued.]

8400. (*Chairman.*) Why do you want the dust removed if it is not dangerous?—I have admitted that it is, all along.

8401. (*Mr. Robins.*) You would consider that dry white lead is highly dangerous?—In a small room, yes.

8402. It would be equally as dangerous in a large room?—I disagree.

8403. If you got enough of it?—No, you would get the same particles floating over a much greater area.

8404. But you would only have lessened the danger, you would not have removed it?—Yes, you would have removed it altogether, because the particles would be so small, in a large area, that they would not have any effect.

8405. (*Dr. Collis.*) What scientific evidence have you for this statement?—I have no scientific evidence at all. I have the practical experience of a lifetime.

8406. (*Mr. Robins.*) You still hold that dry white lead is dangerous. Do you hold that opinion?—No.

8407. Then I gather from you that all leads are not dangerous?—I am afraid that your cross-examination is rather begging the question. What we are speaking of is sand-paper stopping, its application, and its uses. I suggest that in large works, if sand-paper stopping is to be used, rather than that the employer should be mulcted in legislation for 500 men, when only two men are using it, we should take off a corrier of the place, conform to the regulations that you may request of us, to carry off the dust, and consequently deal with those two people. That is what I suggest.

8408. You are suggesting remedies, but with regard to my question, it is this, do you consider that the use of dry white lead is dangerous in sand-papering?—Yes, in a small room.

8409. Why do you consider it is dangerous?—Because wherever you have dust you must have a certain amount of sediment rolling about the room, which is unhealthy to anybody.

8410. But we do not have these awful effects from dust on the street that we do from sand-papering of white lead?—I think we have.

8411. I have had experience. I have painted two carriages recently without any lead whatever, one in white colours and one in dark colours, and they have been perfectly satisfactory to the firm?—They have not been out on the road any time, have they? They have not been in use?

8412. No, but at the same time, to all appearances, they are quite as good, and from my experience as a painter, the wearing properties I consider will be superior?—That is what we want. We have no brief for white lead; the durability of our work is what we have a brief for.

8413. I consider as a painter that we want to lessen these dangers. At the same time, I am speaking from a point of view with as much pride in the production of painting as you would speak as an employer with regard to the production of a carriage, and I take it that that is the common opinion of the coach-painter to-day. I say this also, that the average painter to-day is more intelligent, is more sober, and is more cleanly than he was 15 years ago?—Undoubtedly; he is quite another man.

8414. I am glad to have that admission?—Yes, a better man altogether.

8415. You say that a great number of cases that we have of lead poisoning are to be attributed to the dirty, or even drunken habits of the men, or to their lack of intelligence, and yet you find, as you have admitted, that the man to-day is more intelligent, is cleaner, and is a better man altogether than he was 15 years ago. Notwithstanding that, this last three or four years, cases of lead poisoning have not diminished?—Yes, but of course that, again, is a statement that you gentlemen have made. All we can do is to say that we have investigated the matter so far as we are concerned, and we do not find it arising.

8416. I am taking this from the Home Office reports?—What I suggest is, that in fairness to us you should say: "There are the cases, and there are the shops; we have made this statement; disprove it; that is our case"; but what you do say is: "There are coach-painting cases; so far as you are concerned, we tell you they exist in coach-building shops."

The witness withdrew.

## ELEVENTH DAY.

Wednesday, 31st May 1911.

### PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. F. G. RICE.  
Mr. W. G. SUTHERLAND.

Mr. A. GARDNER.  
Mr. J. PARSONAGE.

E. A. R. WEBNER (*Acting Secretary.*)

Mr. JAMES SAMUEL HOLLIDAY examined.

8417. (*Chairman.*) Do you attend to-day as a representative of the Institute of Builders?—Yes.

8418. What is the nature of your business, and where is it carried on?—I am chairman and managing director of Holliday and Greenwood, Limited, contractors. I may say that we built the Victoria and Albert Museum, under Sir Aston Webb.

8419. Whereabouts is your business carried on?—Loughborough Park, Brixton.

8420. How long have you been concerned with house-painting work?—About 36 years.

8421. What is the average yearly number of painters employed by your firm?—Sixty.

8422. Have you known any cases of lead poisoning, or painter's colic?—No.

8423. You will probably not be surprised to hear that such a good record is not unusual; in some of

the pottery works there are a large number who are quite immune from lead poisoning. The trouble is that even some of the best works are not altogether immune, and moreover a works that has been free from lead poisoning for many years will sometimes have a succession of several cases quite unexpectedly?—Yes.

8424. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act of 1906?—I take it that the Employers' Liability covers that. We insure against liability on the general policy.

8425. Has the premium advanced in recent years?—Yes.

8426. How much?—I think we are paying 2s. 6d. in the 100l. this year more than last.

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Mr. JAMES SAMUEL HOLLIDAY.

[Continued.]

8427. What did you pay last year?—We are paying 17s. 6d., I think.

8428. That means at least 15 per cent. more?—Yes. We have always insured in the non-tariff offices. I believe the tariff offices are about 25s.

8429. (Dr. Collis.) You are paying 17s. 6d. now, and you were paying—what?—15s.

8430. (Mr. Sutherland.) That is an all-over rate?—Yes.

8431. (Chairman.) Has that increase taken place in consequence of the dangers of the lead in the industry?—Not to my knowledge. It has never been put forward.

8432. Why did they raise the rate?—Because of the extra number of claims for accidents, and various causes, but we have never had it put forward by the insurance companies that any increase has been made on account of lead poisoning or the dangers of lead poisoning. We employ only about 60 to 100 painters—sometimes more and sometimes less, but I put it at the average of 60, and we have at times of pressure employed about 800 men, so that the painting in our business is quite a minor part of the work.

8433. You pay a flat rate for all your men?—Yes.

8434. So that you could not answer as to whether the dangers of lead are taken into consideration by the insurance companies?—The insurance companies have never put forward to us that the increase has been caused by any suggestion of lead poisoning.

8435. (Mr. Sutherland.) What company is it you are insured with?—I rather think it is the Northern Equitable. It is one of the Scotch offices.

8436. (Chairman.) Have you known men who have broken down temporarily on account of lead absorption?—We have never had a case, from my inquiries in the firm.

8437. Have your men had occasional days of sickness due to lead?—We have never had any notice of it.

8438. Do you have a periodical medical examination of your men?—No.

8439. Then it is possible that some of them may be suffering from the slower and more insidious forms of lead poisoning?—It may have been, but we have never heard of it.

8440. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—I should say so, but I am not in a position to answer that question.

8441. You take a prominent part in the work of the Institute of Builders?—I am the President.

8442. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—Since this invitation to give evidence has come from the Home Office.

8443. But not before?—Not before.

8444. Did you never take any steps to discover how much illness there was among the men in your trade?—As Holliday and Greenwood, do you mean?

8445. As an institute?—I do not know that we have.

8446. You must have heard of the prevalence of lead poisoning among the men who handle lead paints?—I have heard that there is such a thing as lead poisoning among painters.

8447. Did your association never attempt to collect statistics concerning the number of days' absence from ill-health among painters as compared with workers not in contact with lead?—I believe Mr. Shepherd, who is past president, and I think Mr. Rice, gave evidence some years ago on this, but I cannot answer for what the institute did before I joined. I have only been in the institute four or five years.

8448. During the last four or five years, have the institute collectively taken any steps to combat the known evil?—Not to my knowledge.

8449. Did your association ever consider the advisability of having a medical examination made of the persons employed?—Not to my knowledge.

8450. Would this not have been the best way to discover the proportion of painters showing symptoms of lead impregnation?—Yes.

8451. Has your association ever taken any collective measures to discover a substitute for white lead in paints?—Not to my knowledge.

8452. Have you employed a chemist to make scientific investigations of the chemical properties of different pigments and vehicles?—Not to my knowledge.

8453. There are a number of substitutes offered on the market, the makers of which claim that they will successfully replace white lead?—Yes, I believe so.

8454. Has your association carried out any practical tests with these?—Not to my knowledge.

8455. We have been told that the extent of the danger of lead poisoning to which house painters are exposed is not fully realised by many master house painters?—Perhaps not.

8456. Have you ever had the figures published by the Board of Trade brought before your notice?—I think I have read them lately, but not previous to my being invited to give evidence here.

8457. Then you have not realised the magnitude of this lead poisoning evil?—I have not.

8458. Are you cognizant of the number of deaths and the attack rate?—I have read some figures at which I was astonished.

8459. I am sure you will agree with me that all this sickness and death is very deplorable?—Certainly.

8460. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I believe so.

8461. And that the use of white lead has been prohibited to an appreciable extent abroad?—I believe it has in some countries.

8462. And that in other countries the work of painting has been strictly regulated where the use of white lead is still allowed?—I believe so.

8463. Do you not think it regrettable that this country should be behind other nations in this respect?—I do.

8464. A great many small dangers attend the use of lead. For instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—I do, certainly.

8465. Then you consider lavatory accommodation essential?—Washing accommodation, yes.

8466. Including the supply of hot water for washing?—We do not supply hot water.

8467. Is it not obvious that, if a man can get hot water, it is very much better to use to get the paint off the hands, especially in the winter?—Yes, I should say so.

8468. Is it generally practicable for the men to have hot water to wash in?—No.

8469. Do your painters wear overalls?—Yes.

8470. Do you supply these?—No.

8471. Would you object to a rule that overalls are to be provided and maintained by the employer, as is prescribed in other lead industries?—Yes, but if it is the general custom we should fall in certainly.

8472. How often are the overalls washed?—I think that depends upon the habits of the painter to a certain extent. I should say weekly or fortnightly. Some men are not clean, and they might go for a month, but I should say a week or a fortnight.

8473. Would you be prepared to arrange for the overalls to be washed at your expense, as is done in other industries where lead is used, at least once a week?—No. I think a man ought to keep his own overalls clean.

8474. Would you be prepared, if required, to arrange for the overalls to be washed at your expense, as is done in other industries where lead is used?—I should give the same answer that I gave to the other question—but we should be prepared to do whatever, in the general view, was the best way of obviating this trouble. I have never thought about the question, to tell you the truth.

8475. Where can the overalls be kept from day to day when the man is working continuously on one job?—They are generally kept in a room set apart for the painters.

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Mr. JAMES SAMUEL HOLLIDAY.

[Continued.]

8476. Can you always provide a separate room for the painter to leave his overalls?—Painters go into a building when it is very nearly completed, and there would be no difficulty.

8477. I quite understand there would be no difficulty in some cases, but could you lay down as an absolute rule that a room could always be provided for the workman to keep his overalls in?—I should think it would be rather difficult to always provide it.

8478. Can you always provide a place for the painter to hang up his coat where there will be no risk of dust falling upon it?—I should say, no. It is impossible I should say.

8479. Now, about the men having their meals. Do you advocate a rule regarding meal rooms, so that no man shall eat his food in a place where paint is being handled?—Certainly.

8480. That is the law now in factories where lead industries are carried on?—Yes.

8481. Can you always provide a place, quite free from risk of contamination, where the painter may leave his food during his working hours?—Certainly.

8482. Can a place always be found for them to have their meals in?—Yes, except in the case of a private house being decorated, or that sort of thing.

8483. Is it always practicable for a man to be able to eat his food in a place where there is no possibility of it getting into contact with lead dust?—It is rather difficult to give a decided answer in that way, because, supposing a house was being rubbed down, whatever part of the house it was, there might be dust flying about, and, therefore, there would be dust all over the place, but I may say that we make it a rule that no man is to take his food in a place where paint is kept and made up.

8484. That is not the point. Do you make it a rule that a man is not to take his food where work is being performed?—No.

8485. From your answer to my question I take it it is almost impossible for a man to have his meals during his job, unless he goes outside, without coming into contact with some lead dust?—I qualify that by saying, in new buildings, and certainly in large buildings, you can set apart places. Nearly always our mess-room is outside.

8486. But there would be a considerable amount of cases where men would not have that opportunity?—With us?

8487. In the general painting business?—We are contractors, and, as I said at the start, the painting in our business is a very small portion of it, and, of course, the painters go into the mess-room with the other men.

8488. From your knowledge of the trade, do you think it is very probable that it would be very difficult to lay down a hard-and-fast rule that under no circumstances is any workman to have his food in a place where work is being performed?—Where lead is being made up, or anything of that sort, certainly. Where he can get lead poisoning; I should say; yes, it is quite right that a man should not take his meals there.

8489. But I asked you whether it is possible to avoid a man having his meals sometimes in rooms where he can contract lead poisoning?—Generally, certainly.

8490. But there are cases where he could not?—Yes. As I said with regard to house painting, I think if a house was being rubbed down the dust would fly all over the house, and, therefore, he would have to have it outside.

8491. As regards the dry rubbing down with sand-paper, I understand this process is indispensable?—We have always been led to understand so in the trade. To get a good surface for the next coat you must rub down the previous one.

8492. Where dry rubbing down is indispensable, how can you prevent the worker from breathing the lead dust?—I do not see how you can prevent it, unless he has a respirator over his mouth.

8493. Can you use an exhaust draught to remove the dust?—Not in our trade.

8494. The next process I wish to ask you about is the painting of ceilings having moulded or relief

designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

8495. This gives rise to splashes which must frequently fall even on the face of the worker?—Yes.

8496. How can you deal with the spray which arises in this operation?—I hope you will not think that some of my answers are rather qualified when I tell you that we very seldom use white lead on ceilings at all, and I have not much experience. I should say that in 50 out of 100 ceilings it is done with distemper.

8497. When it is done with lead, how are you going to remove the danger of splashes falling on the men in the operation of their work?—Of course there is more likelihood of splashes coming on a painter when he is doing a horizontal ceiling than when he is doing vertical work.

8498. Then I understand there is no remedy?—As far as I know.

8499. Could you prohibit lead for such work?—Of course it is not for us; we do not say what is to be used; but I do not think it would be a very bad thing if Duresco was generally used, or some such thing. We always, or practically always, use it on ceilings.

8500. (Mr. Sutherland.) A washable distemper?—Yes, like Duresco, and so on.

8501. (Chairman.) I suppose your observations which apply in regard to the difficulty of removing the dangers in painting ceilings apply equally to stippling, do they not?—I should say there was not so much likelihood with stippling a vertical place as with a horizontal place.

8502. I am speaking of stippling ceilings. There is a certain amount of splashing in the operation of stippling. Can you suggest any way of averting that?—No.

8503. Do you have old paint burnt off with a spirit or charcoal burner?—I have made inquiries, and I find we generally burn it off with a liquid now. We do not use the burning-off lamp.

8504. Are there any fumes coming from that?—I cannot say; I do not know what it is made of.

8505. But if the process of burning off is still adopted, how are you going to prevent the men breathing the fumes?—If there are fumes they must inhale them, of course.

8506. It appears from your evidence that there are certain indispensable processes in carrying out which the painter must necessarily inhale some dust and some spray or fumes containing lead. How can these dangers be met?—I do not know.

8507. Is there any possible way of removing these dangers unless you prohibit the use of lead?—I should say it is impossible, when a painter is rubbing down dry, to prevent some of the dust getting into his mouth, of course. It is natural that with some of it flying about in the air he would breathe it.

8508. Do you think that we could remove these dangers that we have gone through in these questions unless we prohibit the use of lead?—No, I do not think you can.

8509. Various witnesses have told us about non-poisonous substitutes for lead. Have you had any personal experience of such substitutes?—We use zinc white a good deal.

8510. What results did you obtain from zinc white?—It is a very good paint.

8511. Is it as good as white lead?—Not in every way. It is not so dense, and it has not such preservative power. I do not think there is anything that has so preservative a power as white lead, especially for outside work.

8512. The Office of Works, among other people, have succeeded in obtaining efficient non-lead paints. I suppose you would agree that, if an efficient substitute could be found, the use of lead should be prohibited?—Certainly.

8513. The Office of Works have told us that for the last four years they have given up the use of lead altogether?—I did not know that.

8514. Do you not think, if the Office of Works can do without lead, that we should be justified in saying that other people should do without it?—They did not

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Mr. JAMES SAMUEL HOLLIDAY.

[Continued.]

do without it on our job. That was a 300l. job at the Victoria and Albert Museum. Most of it was polished work, but all the outside work was painted.

8515. When did you do it?—We handed it over to King Edward two years ago.

8516. When did you begin on that work?—We were there nearly seven years, but of course the paint was not done till the last.

8517. When did you begin the painting?—Perhaps a year before we finished.

8518. That is three or four years ago?—Yes.

8519. The Office of Works were then only experimenting, but they inform us that their formula has been in operation now four years, and their formula contains no lead?—I was not aware of that.

8520. And they find it entirely satisfactory?—I have no knowledge.

8521. Do you not think that with that evidence before us we should be justified in saying that, if the Office of Works can use non-lead paints, other people should be made to do the same?—I do not know that I would go so far as that, I should like to say that if I thought it was conclusively proved—if I may put it in that way—it might be a different thing.

8522. What are the usual hours worked by your painters per week?—It is about 52 hours, I think.

8523. Would you agree to a limitation of the hours of employment, say, to 48 hours per week?—For painters only?

8524. No?—It is rather upsetting the works. I do not think I should like to say yes off-hand to that.

8525. Then you would not agree to a strict limitation of hours of employment, say, to 48 hours per week?—I could not agree to that—not on my own account.

8526. You expressed astonishment just now at the figures showing the number of painters who suffer from lead poisoning. You employ 60 painters?—Yes.

8527. The workers' representatives here are able to speak for some 19,000 painters?—Yes.

8528. You would not be surprised to hear, then, that they have known of a very large number of cases?—It is a surprise to me. I was not aware of it until this question came up.

8529. And much suffering in connection with minor attacks of lead poisoning, such as Bright's disease and phthisis, and so on, which are never reported to the Home Office at all?—Yes. I may tell you that I have been at home unwell with shingles in the head, and I asked my doctor, and he said: "I have had a good many cases of lead poisoning." I said: "You surprise me." It is a surprise to me.

8530. When one is sitting here one is rather surprised that the employers have not taken any collective notice of it?—We have not been aware of it.

8531. You do not have a periodical medical examination of your workers, do you?—No.

8532. Do you know that in other industries where lead is used the Home Office insists on a monthly or even weekly examination by the certifying surgeon?—I did not know it.

8533. I have told you that lead poisoning frequently undermines the health without immediately developing acute symptoms?—Yes.

8534. To bring this industry into line with others where lead is used, each painter would have to carry a health register. I mention a health register, as it would be impossible, as the custom obtains in factories, to have the men examined collectively?—Yes.

8535. So it would mean that individual men would have to be examined at odd times and receive a register which they would carry about with them. They would have to see the appointed surgeon at least once a month, and the employers would have to pay the fee for the medical examination. Would you agree to that?—I cannot answer that individually. I would like to talk to my partners about it.

8536. If a certain painter's health were found to be unsatisfactory, the surgeon would suspend him; that is to say, that man would not be allowed to work with lead; say, for a fortnight or a month, and the employer would have to find him other work or compensate him during that time. Would you agree to that?—No.

8537. Do you realise that if the free use of lead is allowed to continue the Home Office will have to insist on the rigid observance of all special rules introduced, in the same way as in other industries where the workers handle lead?—Yes.

8538. And do you realise that the hours of labour might have to be reduced, as has been done in other dangerous trades?—Yes.

8539. This would involve an extremely complicated and elaborate code of regulations?—Yes.

8540. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess-rooms, washing accommodation—and washing accommodation would mean a compulsory supply of hot water, nail-brushes, and soap, a proper supply of clean towels—and some sort of arrangement for the avoidance of dust, the limitation of hours, and all other such matters?—I could not agree to that. I would sooner do without lead.

8541. (*Dr. Collis.*) Of course I am aware it is not the custom for employers to study closely the health of the workers. For instance, could you tell me, in the course of your experience, whether many of the people you have had in your employ have died of consumption?—We hear sometimes what the men die of. Unfortunately we had one last week who committed suicide. He was a man who had been with us for 30 years. It was a very sad case. We do hear generally.

8542. If the question had been asked you in your examination-in-chief as to whether many of the men in the course of your experience had died of consumption, what would have been your reply?—I think I should have said I had heard of some cases. Ours is a migratory business.

8543. I understand that quite; but could you quote me straight off an instance of a man who had died of consumption?—Not just at the moment I cannot.

8544. Yet I dare say you are aware that one out of every ten of the general population who die, die of consumption?—I did not know that.

8545. So the fact that you are unaware that any of your workmen may have been suffering from lead poisoning, which even in the trades which suffer most from lead poisoning never reaches such a high mortality as that of the general population which suffers from consumption, can be no matter of surprise? If you are unable to quote off-hand a death from consumption, which produces a death-rate of one in ten of the general population, which is a rate which is a great deal higher than that which lead poisoning produces in any trade, it is not a matter of surprise, if you have not been paying special attention to it, that you have not any knowledge that the men may be affected by lead in your employ?—I will tell you what I did. I saw our general foreman of painters, who has been with us 36 years. I had him in last week and questioned him very carefully. I said to him: "Do you know, or have you heard of any cases of your men being away?" I should have thought the general foreman would know what his men were away for if they were suffering from any complaint. I can only give you what evidence I gathered myself.

8546. I am only trying to bring to your mind that an evil like consumption, which, we know, is the white man's scourge, has passed without your knowledge, and, therefore, lead poisoning, which is a much less evil, would pass?—I am certain if any of our men were away from lead poisoning we should know it.

8547. But the point is that if the one could pass without your knowledge so could the other, even though it was present?—Generally, you mean?

8548. Yes?—I thought you meant the men in my firm.

8549. The men in your firm. If you have no knowledge when they have been away from consumption, you would not have a knowledge of whether they were away from lead poisoning?—I suppose, as a matter of fact, so few men die in our firm. I do not know whether it is that or not.

8550. How many men do you employ altogether?—At the present time we will say we have got about 500 or 600.

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8551. And about 60 only of those are painters?—I daresay we have a hundred now; but I am giving you an average.

8552. About one in seven is a painter?—Yes.

8553. For that one in seven the insurance has gone up from 15s. to 17s. 6d.?—Yes. We have had one or two rather heavy accidents, and I think it has gone up on account of that.

8554. You mentioned that you are now using a liquid to burn off the paint?—So our foreman tells me. I called him in the other day and asked him this question of burning off with a lamp.

8555. Is it acid which is used, or something of that sort?—Yes, some kind of acid that they put on, and I take it that it really burns it, and has the same effect.

8556. You have not seen it in use?—I have not noticed it. The fact is that we do mostly large new contracts, and we do not do much burning off.

8557. One question about ceilings; I understand at present the water paints or non-lead paints are used extensively on ceilings?—With us. I can only speak from my own experience.

8558. Will you give me the difference between the ceilings and wall paintings generally that calls for this special form of paint to be used on ceilings rather than on other parts of the work?—We generally use, as I said, Duresco, or some other such liquid on the ceilings.

8559. Why, if it is suitable for ceilings, is it unsuitable for other parts of work?—There is not so much wear on the ceilings as there is on the walls, is there? It is very often used on the walls, too. Architects like flatted walls.

8560. If the architect is not the person to please, and if it is a case of the finish of the work, is there any reason for not using these other paints?—Duresco is not so durable as paint. It is all right on the ceiling, but it would not do on the wall.

8561. Do you mean because of the rubbing against it?—I mean to say it has not got the same body. It is simply a water colour.

8562. (Mr. Parsonage.) It will wash?—Yes, but it will not stand scrubbing. It will wash with what we call a very superficial kind of washing.

8563. (Mr. Sutherland.) It is not like a glossed paint?—No.

8564. (Dr. Collis.) If you are not wanting a glossy paint, but if you are wanting a similar kind of surface on your wall as you have on your ceiling, is there any reason for not using these water paints on the wall?—No, I should not think so.

8565. So that there is a possibility of getting an alteration in the form of paint without anything lost, really?—Yes, the only thing is that the public would have to have it done once in two years instead of once in four years, perhaps, that is all.

8566. What is the difference in the original cost of the paint?—There is a difference in the original cost, but I cannot tell you what it is. It is cheaper, I know.

8567. One always looks upon the rewashing of a ceiling as a small thing in the spring cleaning?—Yes.

8568. But if you have to have anything painted, directly you mention the word "painting," the individual who has to do it presents you with a very long contract?—But the expensive part of white-washing the ceiling is the cleaning off the old white-wash.

8569. I am only considering whether if this Duresco, and these water paint can be used more extensively in the other parts of the building, the public would be suffering much more in the way of expense?—That is a question which wants considering. If you paint a wall well, and flat it and paint it well with several coats, it will last for many, many years, and you can always wash it and sponge it down, but you cannot do that with any of these substitutes in the shape of Duresco. If you get any marks or anything on it you can wash them off if it is painted well. It will stand any amount of washing and rubbing, and almost scrubbing.

8570. It is difficult for you to give an estimate of the expense of the two methods?—Yes, I think I would rather not. I do not go into these little matters in my firm.

8571. (Mr. Parsonage.) With regard to your firm you do not take any ordinary painting jobs only; it is buildings?—We do. We have a branch at Kensington that is managed by my son, close to the Museum.

8572. Is that recently?—Yes, this last four years.

8573. On this very large job which you did on the Victoria and Albert Museum, with regard to the men washing their hands, and so on here, there was no time allowed for the painters to wash their hands, was there?—No.

8574. And no towels provided for them to wipe their hands with?—I think they generally wipe their hands on their aprons, and so on.

8575. There was nothing of that sort provided, was there?—We only provided soap and water.

8576. (Mr. Sutherland.) With reference to the limitation of hours, it would be difficult to curtail the painters and retain the others at the same hours, would it not?—Yes, impossible—impracticable I call it.

8577. It would be difficult to separate the one from the other?—It is impossible, I think. It would necessitate timekeepers for each trade.

8578. In reference to the health examination which the Chairman has spoken about, do you not think that would operate against the men?—I do not think the men would have it.

8579. Do you not think it would operate against the men? If a man had an indifferent record, would the employer take him on?—I should think not, certainly.

8580. Do you think it is impossible or impracticable?—Yes.

8581. Now, in reference to the experiment of the Office of Works. Do you think that an experience of four years is sufficient to change the usage of a trade and a material that has stood the test of competition against all competitors for 100 years?—No, I do not think it is.

8582. When you consider that, after all, the Office of Works has applied this on a limited range of buildings, and in a comparatively limited area, do you think it is sufficient to institute such a great change?—I hardly think it is.

8583. Before such a great change was made as the prohibition of white lead, do you not think this Committee, or some committee appointed by it, representing the architects, the builders, and the master painters, with chemical advisers, should institute a series of tests much more searching and much more to the point than those instituted by the Office of Works, with a view to giving us a satisfactory alternative?—I think that is a suggestion I should have made myself.

8584. My own association is prepared to contribute to that: do you think your institute would be prepared to contribute to that?—Yes, I do, and I think I can answer that the London Master Builders' Association, of which I am senior President, would as well. I cannot say, but I should think they would be prepared to.

8585. What did you use on the Victoria and Albert Museum?—The whole of the joiner's work there was teak, which was either polished and oiled, inside and outside, the sashes; and the whole of the outside of the roofs in teak, but those were painted. Of course it is an enormous area—I mean the wood-work of the roofs.

8586. What were they painted with?—White lead. They had three or four coats of white lead, and then I think they were finished with —'s paint, to the best of my recollection, but they had a foundation of lead.

8587. On the specification of the Office of Works?—No, Sir Aston Webb's specification.

8588. And finished with —'s paint on the lead foundation?—Yes, to the best of my recollection.

8589. Practically, —'s paint is the paint of the Office of Works, is it not?—Yes, I think it is. I think that most of the work is finished with —'s paint.

8590. You are not a practical painter yourself; you have only general supervising knowledge of it?—I cannot say that I have not done any painting in my early days, when I was about 17 or 18, but although

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I profess to have a practical knowledge of painting, I cannot say that I occasionally use the brush now.

8591. (*Mr. Rice.*) You are the President of the Institute of Builders?—Yes.

8592. That institute has been engaged at different times in works of education?—Yes.

8593. I think, as a matter of fact, they have not dealt with lead poisoning?—That is what I told the Chairman—since I have been in it—although I think Mr. Shephard gave evidence that they did some time ago, but I have no recollection of dealing with lead poisoning.

8594. But the institute deals with other matters of education?—Certainly.

8595. Had lead poisoning been brought before them so prominently years ago as it is now, no doubt it would have had consideration from them?—Yes.

8596. I take it from your replies to Mr. Sutherland that the institute would be quite willing to assist in any investigation as to a substitute for white lead?—I am sure of it.

8597. I think you, as an individual, and probably knowing the feelings of some of the other members of the institute, hold no brief for the retention of white lead?—Not at all.

8598. Provided there was an efficient substitute found, you would be quite willing to agree to the prohibition of white lead?—Certainly.

8599. (*Chairman.*) In regard to these experiments that it is suggested should be made by a joint committee representing the various builders' associations, and the architects and engineers, what period do you consider would be a reasonable one for those experiments to extend over?—I think that would have to be guided by experience, as they went along.

8600. You have admitted that there are certain operations in the painting trade which involves a risk of men absorbing lead dust?—Certainly.

8601. What would you suggest should be done in the interval between the deliberations of this suggested committee and now?—I should have thought it was hardly necessary to make any stringent rules for that period.

8602. But you have admitted that there are evils obtaining, and the Home Office have statistics which show that the effects of the lead are very deplorable. You surely would not expect the Committee to let the existing conditions prevail while you are searching about for a substitute for lead?—But it would not take such a wonderful time, I should think.

8603. I asked you what you considered would be a reasonable time to allow the committee to make the experiments?—I have no experience in the time that chemists would want to take in testing and that sort of thing.

8604. Then I come back to the other question. What is to be done for these men while you are searching about for the substitute for lead paint?—I have no suggestion to make.

8605. Knowing the conditions to be deplorable, as is illustrated by the Home Office figures, would you consider it right that the men should be allowed to go on suffering as they are, without anything being done while the committee are experimenting?—I think everything should be done to look after the men's interests, as far as possible, certainly.

The witness withdrew.

Mr. ARNOLD PHILIP (*Admiralty Chemist*) examined.

8617. (*Chairman.*) Have you been instructed by the Admiralty to attend here to-day to give evidence regarding the use of paints in the British Navy?—Yes.

8618. Are you the Admiralty Chemist?—I am.

8619. I understand that you act as chemist for the Admiralty generally, although at present you are stationed at His Majesty's Dockyard, Portsmouth?—That is so.

8620. And in the course of your duties as Admiralty Chemist, I understand that you examine the material supplied to the painting department?—Yes.

8606. Then you have told us that there are some portions of the men's work where it is impossible to obviate the dangers that ensue?—I do not think I have admitted that it is impossible to do without it.

8607. You say it is impossible to obviate the dangers because it is impracticable. For instance, take the scraping down of walls. You told us it would be impracticable to have exhaust apparatus to remove that dust?—Certainly.

8608. You have also told us that the danger must remain?—If you ask me to put it in that way, I can only speak from my own experience, which is that, as far as my own experience has gone, I do not think that the effects of lead poisoning from painting in the building trade is such that the time a committee would take to endeavour to find out something else and to carry on tests is sufficient to make stringent alterations.

8609. Then I ask you again, what period do you think would be a reasonable one to allow for these experiments to be made?—I should think 12 months or 2 years, or something of that sort—12 months, I should have thought.

8610. I want you to give us your idea of what should be the time allowed for the investigations?—Of course, whatever I say is a matter of opinion. I cannot feel that I have any weight behind it, because, as I say, you cannot tell how long a chemist is going to take in making experiments.

8611. Then I come back to this. What is to be done to relieve the men from the dangers they come into contact with?—I cannot say.

8612. Would you leave the men in the deplorable condition they are in to-day?—As far as my experience goes, yes. As I say, I have had an experience of immunity from this trouble.

8613. I ask you to remember, not your own experience, but the figures which the Home Office have put before you, showing that the condition of the men is a very deplorable one. I want to ask you whether, in view of those figures, you would think this Committee were justified in allowing those conditions to remain as they are, while you are to have an unlimited time to experiment and try and find a substitute for lead?—I do not think that unlimited time should be given to the committee.

8614. I want to get from you what you consider would be the proper time?—I am afraid I cannot give you that. I am not in a position to say, not being an expert.

8615. How long do you think the men ought to be allowed to go on undergoing the risks which obtain to-day in the industry?—It is rather a difficult thing to say. I cannot answer that.

8616. Would you think it right that they should be allowed to go on for two years without any improvement in their conditions?—It is a question I do not like to answer, because it is suggesting that I am giving an opinion that these poor men are in that condition; I think every possible effort should be taken as soon as possible, with instructions to the committee that no time is to be lost, so that these men's interests can be looked after, and investigations made, and experiments made, so that the danger can be put a stop to as soon as possible. That is as far as I am prepared to go.

8621. And you also advise the Admiralty on technical points connected with paints?—That is so.

8622. The Admiralty have no doubt had before them for many years the dangers arising from the use of lead paints?—Yes, the Admiralty have, for instance, objected to the use of sprayers for painting, on account of its being prejudicial to health. They have also given general instructions that no mediums or driers detrimental to health shall be used in paint material, and they have been introducing machinery for the mixing of paint at the dockyards, which used to be

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done by hand. It is gradually being turned over to machine-mixing.

8623. What has been done in the way of finding substitutes for lead paints?—Red oxide of iron has replaced red lead on double bottoms for a considerable period, and the iron casings of boilers are now coated with red oxide paint instead of red lead. Zinc white paints have also been introduced, partly as a substitute for white lead in the interior spaces, and quite recently zinc white enamels have been used inside the cabins in place of white lead paints.

8624. First, with regard to your red oxide paint, will you tell us what materials it contains?—Red oxide of iron paint consists of red oxide of iron with a proportion of lead driers and boiled linseed oil.

8625. How much lead is introduced in that paint in the form of driers?—The present mixture contains under 1 per cent. in the form of lead oxide, as far as I can make out.

8626. Has the use of zinc white in the Navy increased during recent years?—Yes, quite recently.

8627. What led you originally to make use of zinc paints?—Zinc paints have been used for a considerable time. Overhead surfaces have been painted with zinc white for a long time. Where not exposed to weather, inside decks, a mixture of zinc white and white lead has been used for some time.

8628. (Lord Henry Bentinck.) You do admit some white lead then?—Yes.

8629. (Chairman.) What proportion of white lead do you use in the paint you have just illustrated to us?—I am afraid I cannot tell you the exact proportions. I know the proportions of zinc oxide to lead oxide on the total paint used in the Service, but that would include outside. The exact proportion we use, in enclosed deck spaces, of white lead and zinc white, I am afraid I do not know as a separate figure, but that mixture has been used for a very long time.

8630. What led you originally to make use of zinc paints for the inside of cabins?—Originally, zinc mixed with lead and zinc by itself was used, and has been used for many years, because first of all it was not exposed to the weather, and under those conditions it was considered that zinc white could be used, and for another thing it kept its colour better. I should like, if I may, to state it in this way, the use of zinc has been brought about by two steps. Zinc white mixed with lead as a paint has been used for quite a long time. I do not know how long—before I joined the Service.

8631. How long ago is that?—I have been in the Service ten years, and it was considerably before that, undoubtedly; but recently a further step has been made in painting the insides of cabins with enamels. These enamels are made entirely, as far as I am aware, with zinc white.

8632. Do you find them wear as well as lead paints?—They wear a great deal better, not necessarily because of the paint material, the white, but because the gum resin in the enamel preserves its surface very much better.

8633. Do I understand it preserves its surface with zinc paints better than it does with lead paints?—No, I cannot say that.

8634. Then what do you mean by saying that it is preserved better with enamel?—I mean that an enamelled surface, whatever colouring material the enamel used is made up with, will stand the wear, and look better, and it can be washed and rubbed in better condition, and will last very much better than an oil paint, but I understand that manufacturers find that a zinc white made up into an enamel is a much more satisfactory material than lead. In fact, so far as I understand, many manufacturers do not even like any lead in the flatting underneath. They object to it. Lead flatting has been used underneath the mixtures of zinc white, and some manufacturers have asked that we will do away altogether with white lead for the purpose, and use zinc only.

8635. (Mr. Parsonage.) That is for the finishing coat on the iron, is it not?—It is used on the iron work, first of all, and then over that there are two coats of enamel.

8636. (Chairman.) Does it retain its colour?—As far as I am aware, the zinc white enamels retain their colour excellently, except that if they are covered over, in the dark they change to yellow slightly. That is the only thing I have heard against the use of white enamels.

8637. Are you at liberty to give us the Admiralty figures showing the proportion of zinc used in recent years?—Yes. The figures that have been given are as follows. Up to the recent use of enamel paints, the proportion of the zinc allowances made for battleship painting was 33 per cent. of the total white paint, that is to say, if you add together the zinc white and the lead white issued, 33 per cent. of that total is zinc white. Since the introduction of the enamel paints, which are, as far as I am aware, entirely zinc oxide paints, and contain no lead, the percentage has risen something to the order of 60 per cent. of the total; that is to say, at the present time, a battleship's allowance of zinc white is something of the order of 60 per cent. of the total sum of the zinc white and lead oxide issued.

8638. (Mr. Sutherland.) Does that include the outside painting?—It includes it all.

8639. For the hull, and everything?—Yes.

8640. (Chairman.) Do these figures include pure zinc flattings?—They do not include pure zinc flattings, and, as I stated just now, recently some of the manufacturers of these zinc whites have been asking the Admiralty to employ pure zinc flattings. If these pure zinc flattings are employed in the future, it will increase still further the proportion of zinc white used.

8641. Have the Admiralty sought to use zinc paints instead of white lead from humanitarian reasons?—In my opinion not. That has not been the primary point of view from which the use of paints in the Service were regarded. It was a question of efficiency and of cost. I should like to add to what I have said in answer to a previous question, that the consideration of health has always been in the mind of the Admiralty, but it has not been from that point of view that the decisions have been arrived at.

8642. To what, then, is the increasing use of zinc white to be ascribed?—Officers have in the past not infrequently considered it necessary to supplement the Service allowances, and paint with further material privately purchased, and their experience thus gained has been in favour of an enamel rather than an oil paint for internal cabin work. Even though the prime cost of such enamels was necessarily greater than that of oil paints, in the end the use of these materials was actually found to be economical.

8643. Do I understand you to mean that there are occasions when the officers have had to supplement the work of painting?—That is so.

8644. Out of their own pockets?—Yes.

8645. Why do they do that?—I believe, as a matter of fact, that that is undoubtedly so.

8646. Do you know why it is? Is it a system that prevails generally in the Navy?—I should rather prefer not to express opinions on that.

8647. In what way do you mean that the higher priced paints were more economical?—It has been found that, although they are more expensive, the enamels are much more durable, and they retain a good gloss for a long time without repainting. Therefore it has been found more economical to use these paints instead of using white lead paints and repainting more frequently. Enamels simply want wiping with a damp cloth, and the occasional use of perhaps a little pumice stone powder, but they should not be washed in the ordinary way. I understand they are perfectly satisfactory for outside work.

8648. Have you used zinc paints for outside work?—Not in my own experience. I believe they have been experimentally used by the Admiralty in the tropics, but that was more than 10 years ago—before my time.

8649. Then your experience of zinc paints has been confined to interiors?—That is so.

8650. And that experience has been entirely favourable to zinc enamels?—Yes, quite satisfactory, as far as I am aware.

8651. How do you account for the widespread belief that lead paints are the best?—In my opinion, the use



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of lead paint has a much longer history attached to it than the use of zinc paints. The zinc paints are comparatively modern. The use of paint material is an art, and its manufacture is an art. I think that it is always the case that a workman using a paint will be somewhat prejudiced in favour of a material which he has been accustomed to use, and to which there is an enormous history attached. Zinc white and other lead substitutes have not that history attached to them, and there is not that experience either in manufacture or in use.

8652. The exterior painting in the Navy is almost entirely on metal?—That is so.

8653. What material do you use for this exterior painting?—White lead with a lamp-black staining.

8654. What colour are your ships painted outside?—Grey.

8655. How long has this colour been used?—Eight or nine years.

8656. How often are the ships painted outside?—I believe that the Service allowance is about eight coatings per annum, but the amount which is actually used depends upon several conditions, that is to say, on inspections, on stormy weather, and on service on manœuvres, &c., and so forth.

8657. If you repaint as often as that, is the durability of the paint an important factor?—No, I do not think the durability of outside paint is a very great factor, because the outside paint does not weather off; it is not destroyed by weather conditions, but it is knocked off, and after some of the paint is damaged the whole ship has to be repainted outside.

8658. Have you painted any of the outsides of ships with non-lead paints?—Not to my knowledge, although I believe some experimental paintings have been made in the tropics, as I said previously.

8659. Are you aware that the Dutch White Lead Commission made extensive experiments with the use of zinc on their vessel, the "Argus"?—No, I am not aware of that.

8660. I will read you the report of the experiments made on that vessel: "After the expiration of four years, the Commission are able to state that the zinc white paint has been all the time in a somewhat better condition than the white lead paint. This favourable result was so marked after a couple of years, that the Admiralty started using the zinc white paint employed by the White Lead Commission elsewhere also, and on large surfaces, and the results obtained therewith, according to official communications to the Commission, are again extremely favourable, and in favour of zinc white."—Yes; no doubt that means both financially and otherwise.

8661. Yes?—That is a very interesting experiment on a big scale.

8662. Do you not think that the Admiralty should institute experiments to a similar end?—I should like to make a remark on that, but generally speaking I should not like to answer the question directly, because I feel that it is a question that probably would be better referred to the Board of Admiralty. I should like to say that the use of paint material by the Admiralty is entirely governed by the importance, as far as I am aware, of three conditions. First, rendering the ships as little visible, under ordinary conditions, as is possible. Secondly, preserving the material of the hulls in as satisfactory a manner as possible against weather damage. Thirdly, preserving a satisfactory appearance. To this one may add, fourthly, seeking these three conditions at the lowest ultimate cost in material and labour considered in its widest sense; and it is considered that the use of any paint material which could be shown to improve a paint in any of these uses would be very favourably considered. That is my opinion.

8663. (Lord Henry Bentinck.) You issue, apparently, the two classes of paint, and yet you have no data as to how much zinc white is contained in the paints which do contain zinc white?—It is not in this list.

8664. It is rather an important point, is it not, because if your zinc white paints contain a certain amount of lead it is important to know that?—When I say that I believe zinc white enamels do not contain

any lead, that is my own belief, but they are bought as proprietary articles, and we do not buy the materials and mix them and make them ourselves, therefore we do not know, except by analysis, what they contain.

8665. Then you have very little to tell us as to the possibility of employing leadless paint on the outside of ships, have you?—No, nothing at all. It has not been done.

8666. You have formed no opinion yourself?—Yes, I have an opinion. I think, seeing that paints used for the sides of ships do not wear out, but are knocked out, even comparatively cheap paints, containing, for instance, baryta white, might be found to be equally serviceable.

8667. How do you mean knocked out—knocked out by the force of the waves?—With tenders coming alongside, and with weighing the anchor, and so on.

8668. (Chairman.) Do I understand you to mean, not wear and tear, but accidental damage?—It is really wear and tear, it is not accidental damage. Tenders constantly come up alongside, and so on, and if a ship is out on manœuvres she will probably have a good many more tenders than if she happened to be in reserve, for instance, when she would have comparatively few tenders coming alongside.

8669. (Lord Henry Bentinck.) Then if zinc white were used, you do not contemplate that it would be necessary to allow more coats of paint a year, do you?—Of course that is a matter of experience. We have had a long experience of lead paints for outside work, but I believe that some ships in the mercantile marine use cheaper paints for outside.

8670. What do you mean by cheaper paints?—A cheaper paint, for instance, would be a grey paint made with baryta white, instead of lead and zinc oxide, and lamp-black. For instance, instead of using the ordinary lead paint, supposing you used a quarter of the zinc oxide now used and made it up with baryta, that would make up a cheaper paint. My own opinion is that it is a paint which would probably not last so long if it were exposed to the weather, but the fact of the matter is that external paint is not destroyed by the weather on battleships, but it is destroyed by mechanical action.

8671. It seems to me to be an extravagant estimate to allow for eight coats of paint a year?—It certainly sounds rather a big allowance, but it is based upon actual use and experience, and it is necessary to do so; but that allowance sometimes is not used, and sometimes more is required, and then the amount is made up by external purchases.

8672. Do your men suffer from lead poisoning at all?—Not that I am aware of, but the facts as to lead poisoning, in my opinion, would really come more before the cognizance of the Home Office than myself. I think all cases of lead poisoning are reported to the Home Office under the Home Office Regulations.

8673. (Dr. Collis.) Does the question of the weight of the paint come to be of importance in the Navy?—I think it is of importance. It is a question that is always under consideration by the Admiralty undoubtedly.

8674. So that the substitute, being a lighter paint than lead paint, might lead to a war vessel carrying some tons less paint?—I should not like to commit myself to how many tons, or what the weight was.

8675. But it might be a consideration?—The paint weight is a consideration undoubtedly. If we were to use such paints, for instance, as these enamel paints, which are now being used for cabin work; as it is contemplated that the renewal of that paint would be much less frequent than the renewal of lead paints, it will be carrying a smaller amount of paint material undoubtedly, and that means not only a saving in weight, but, perhaps, what is more important, in stowage accommodation.

8676. (Mr. Sutherland.) Why do the Admiralty restrict the use of zinc paints to interior surfaces?—There again I believe that the use of zinc paint being restricted to internal surfaces is that there is no real experience as to its weathering properties. My own opinion, without actually having carried out experiments, would have been to say off-hand that I do not fancy zinc paint will weather so well as a similar

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paint made up with oxide of lead—but I do not think sufficient experience exists with regard to it.

8677. (*Chairman.*) Would the experience of the Dutch Commission influence your opinion at all? I have not had the opportunity of considering it. If I had to pronounce an opinion I should like to ask a very great number of questions about it, as to the covering power of the paint used, and the labour used in putting it on, and I should like to have the opportunity of going into the question in very great detail. But undoubtedly, if such an examination showed that there was a saving in cost, such an experiment would, I should imagine, be a considerable inducement to the Admiralty to carry out similar practical tests.

8678. (*Mr. Sutherland.*) Would you regard efficiency as the first qualification for a paint for outside work—effective preservation?—I think that the first consideration would be its tactical value in rendering the ship invisible.

8679. That is only a question of colour, not a question of pigment at all?—That is only a question of colour. Then the next important point would undoubtedly be the preservation of the hull.

8680. That comes in your three steps, does it not?—That is so.

8681. (*Mr. Sutherland.*) You have never really applied it as a test outside to examine it, have you?—To my knowledge, zinc paints for outside work have not been used in the Navy.

8682. (*Chairman.*) With the exception of the experiments in the tropics?—There was an experiment, before my time in the Service, in the tropics.

8683. You told us that the ships in the tropics were painted outside with zinc white paints?—I believe experimental paintings have been made, but those were made before the period during which I have been in the Service of the Admiralty.

8684. (*Mr. Sutherland.*) Before the use of white lead was prohibited, you would consider it very important in the interests of the Navy that sufficient tests should be made if any other material or paint was substituted?—Yes, with regard to paint materials generally, whether they are compositions for ships' bottoms, or whatever they are, I have always said that really practical tests on a small scale should be made tentatively before making further experimental tests.

8685. As against chemical tests?—I do not believe in chemical tests, merely.

8686. In reference to the enamels, you could not call the enamels that you use "paints" in the ordinary sense of the word?—That is so, in fact I always prefer to call them simply enamels, and not enamel paints, because those latter are varnishes mixed with paints.

8687. They are very expensive, are they not?—They are very expensive, but I should like to qualify that by saying that that is only in the first cost of the material.

8688. The wearing is good?—The wearing is so good that the saving of labour and material becomes very important.

8689. We could not take into regard the use of enamels for our ordinary material—I am speaking now of house painting as well as ship painting?—That, of course, I could not say.

8690. The proportion of work that is painted without enamel to that which is painted with enamel is 90 to 10, I should say?—Yes?

8691. If not a less proportion of enamel work?—Yes?

8692. The Admiralty have not been moved in this matter by any considerations of the health of the employees other than prohibiting spraying machines?—Yes, there are one or two other points. I think I may say that they have undoubtedly always kept the health question in their mind, but the important thing is to keep the Navy efficient. They have taken several steps to secure health as against lead poisoning. For instance, although cheap, the Admiralty objected to spray painting, and, with regard to the inside of double bottoms, stopped the use of red oxide of lead.

8693. The supplementing by the officers of the painting is a matter of getting a more decorative surrounding, is it not?—I am rather disinclined to speak for the officers, if I may say so. It is a private

matter for the officer himself, and I should prefer not to say anything about it.

8694. Then it really does not bear either way on the question before this Committee?—I think not.

8695. Neither for nor against it?—I think not, so far as I am aware. The importance of it is this, that the actual use by the officers of enamel paints has called attention to the fact that they really are cheaper for internal work.

8696. In a prolonged service?—Yes, for a prolonged commission of two or three years.

8697. But that is only in the officers' quarters, and not the men's, is it not?—The proposals are that it is only intended for the cabins, but it is to be used also, I think, for grey enamel.

8698. For outside?—Not for the sides, but for work which is exposed to sight on deck.

8699. But protected at the top?—Yes.

8700. (*Lord Henry Bentinck.*) Not altogether protected?—The works outside are painted grey for invisibility, and, therefore, any paint work outside which may be visible must be grey, and not white. Therefore, these enamels have been proposed for use for deck work, on gun turrets, and so on, which are exposed to the weather.

8701. (*Mr. Sutherland.*) Would there not be a danger of a glint of white revealing itself with enamel paint?—There again I should not like to answer. That is a tactical question really.

8702. You have no actual figures as to the relative cost of the two paints in use by the Admiralty, have you?—No, I have not. I think I may say generally that the view is that the use of enamel paints for deck work—not the sides, but for deck work in grey paint and for cabin work in white paint—will be not at all more expensive.

8703. Excluding the enamel?—No, replacing oil paint by enamel paint will cost very little, if any, more, and perhaps there will be no increase in cost.

8704. By reason of the greater prolongation of the service?—Durability; and, of course, the question of labour is of very high importance in the value of paint. If you can do away with two or three paintings, one coat of enamel paint will actually come cheaper than several paintings of oil paints.

8705. (*Mr. Gardner.*) If you are thinking of using this grey enamel for the outside of gun turrets, and so on, why could it not be used for the top sides, which are just as much exposed to weather and the sea. I am referring to the grey top sides above the composition on the ship's bottom?—I should imagine, as I said before, that the tendency rather is to get something which is less expensive. Paint on the sides does not wear out. It is smashed out; it is damaged, and consequently the use of enamel for top sides would be a step in exactly the opposite direction to the one which I was just now mentioning had been considered by the Admiralty, of putting in a cheaper paint material—because it does not wear out, it is knocked out.

8706. But the life of oil paint on an ordinary merchant ship's top sides is anything from one to two years. Of course on His Majesty's ships they are coated three or four times a year, as apart from a merchant ship?—Yes.

8707. So that a zinc paint might do quite as well, and it is a question of experience, because enamel paint is purely a zinc paint made up with varnish?—Yes.

8708. Just as we also used to make up enamel paints with white lead?—I have not really any experience in the making up of enamel paints, but I understand the manufacturers now object to lead.

8709. That is for the grounding purposes?—Yes, but I think, as far as I am aware, the actual enamels themselves do not contain lead.

8710. Of course your experience has been dockyard experience?—Yes. I am stationed at Portsmouth, but as a matter of fact I am the only Admiralty Chemist. I am sole representative of my tribe, and I do all the advising work, and all the chemical work for the

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whole of the Admiralty in all the yards and buildings all over the country everywhere.

8711. With regard to the use of sprayers, was that prohibited only in the dockyard, or with contractors?—That I cannot say.

8712. Why did you object to the use of sprayers?—From the point of view of the health of the men. It was considered unhealthy.

8713. And from the point of view of the finish of the job, it not being a properly painted job when it was sprayed?—I saw the experiments carried out myself and the whole thing was stopped. As far as I recollect, I think it was stopped entirely from the point of view that a man who was using a sprayer got simply immersed in a vapour of lead particles, and it was considered absolutely unhealthy, and the Admiralty would not have anything to do with it.

8714. (Chairman.) If the Committee decided to prohibit the use of lead for the painting of the interior of ships, would the Admiralty raise any objection, do you think?—Would that refer to the ships in the Royal Navy or to merchant ships?

8715. To both?—I am afraid I am not in a position to answer that.

8716. But do I understand the interiors of all ships to-day are painted with non-lead paints?—No, that is not so, only parts. White lead paints, and white lead and zinc paints, are both used in the deck spaces—the mess-decks.

8717. Is there any particular object in doing that?—First of all, they must have white for the light, and for seeing that the place is clean, and, secondly, mere plain white lead I believe is found not to keep its colour so well as mixed white lead and zinc. As to why they have not gone over entirely to zinc white, I am not quite certain whether that is due to the fact that no experience exists as to the duration of zinc white by itself.

8718. How often is it painted in the deck-spaces?—I do not know; fairly frequently.

8719. Several times a year?—I think so.

8720. Who would be the best people for us to apply to to ask specifically whether the Admiralty would have any objection to the prohibition of the use of lead for the interior work of battleships and other ships?—It appears to me that it certainly could not come from myself. It would occur to me that your Committee itself should be able to apply directly to the Admiralty.

The witness withdrew.

Mr. GEORGE BEVAN MÖCKFORD examined.

8721. (Chairman.) Have you been instructed by the Admiralty to attend here to-day to give evidence regarding the use of paints in the British Navy?—Yes.

8722. Are you the foreman of painters at His Majesty's Dockyard at Portsmouth?—Yes.

8723. How long have you held that post?—Six months as foreman at Portsmouth, with a previous experience of 7½ years at Sheerness in a similar capacity.

8724. How many men are employed under you at Portsmouth?—320.

8725. Are they all connected with painting?—Every one.

8726. Have you, in the course of that experience, known cases of illness resulting from the use of lead paints?—Several cases.

8727. Then you have realised from your own experience that the use of lead constitutes a very decided danger?—Decidedly.

8728. Do you consider that the use of red lead, as well as white lead, involves serious danger?—Yes.

8729. In confined spaces more than in the open?—In confined spaces you will find the Admiralty have decided not to use it at all.

8730. Not to use lead paints?—Not to use lead paints.

8731. What steps have the Admiralty taken in view of the danger arising from the use of red lead?—In the case of confined spaces we have distinct instructions not to use it on any account. Those confined spaces include all double bottom apartments, fore-peaks and wing spaces, and, in the bunkers of all war vessels, oxide of iron paint is used exclusively.

8732. How long ago was this order given to abolish it?—About 15 years ago.

8733. What did they substitute for red lead?—Oxide of iron paint.

8734. With what medium is that used?—Boiled linseed oil.

8735. Does that give satisfactory results?—Generally we find very good results from it.

8736. What other changes have been made in the paint used in the Navy of recent years?—Oxide of zinc has been used very greatly in preference to white lead for the finishing coats.

8737. What is used for the other coats?—Our work being principally iron and steel, the priming coat is a mixture of red and white lead, the proportions being 55 lbs. of red lead to 24 lbs. of white lead, with the necessary thinnings.

8738. What do you consider the principal danger to which painters are exposed?—The inhalation of

lead dust arising from the rubbing down of surfaces, and possibly the inhalation of the smell of lead itself.

8739. Is there much dust in the process of rubbing down?—A considerable amount, and oftentimes almost imperceptible.

8740. In such small atoms that you can scarcely see it?—Exactly.

8741. How can that danger, in your opinion, be obviated?—By a greater and more extended use of zinc paint.

8742. Have you noted injurious effects arising otherwise than from the lead dust?—From what I have just explained—the smell of the paint in some cases. The men have complained very much, and have been dealt with accordingly.

8743. What is being used in the Navy in place of white lead?—Oxide of zinc.

8744. Is that confined to the interiors of the cabins and the like purposes?—Not entirely. We use it to a great extent in the living spaces where the men are, as well as in the officers' cabins.

8745. Does that apply to wood-work as well as metal surfaces in the interior parts of the ship?—Yes, except the priming coats.

8746. Is there much wood-work to deal with except in the Royal Yachts?—Not a great deal. Usually in the building of warships of all descriptions wood-work is put out of court, because of the danger of fire from shellfire, and so on, which would possibly cause combustion.

8747. Have any of the Royal Yachts been in the dockyard for repainting recently?—At present the "Victoria and Albert" is undergoing the process of redecoration for the Coronation Review.

8748. What paints are you using at present on the "Victoria and Albert"?—Practically zinc—all zinc.

8749. You say "Practically." Will you explain that?—I might possibly have used a little lead in some preparations where new wood-work has been put in. Apart from that, zinc is used exclusively.

8750. For both inside and outside?—The outside of the yacht is painted black, and in that case we use —'s preparations. We have no knowledge of the component parts of that. The final coat is —'s black enamel.

8751. Are the Committee to understand that the paint being used on the "Victoria and Albert" yacht for internal work is practically all zinc?—Yes. I must qualify that by stating that is so in the King's and Queen's apartments particularly, but the remainder of the work on the upper deck, and in the apartments used by the officers, enamel is used for a final coat, and the enamel, of course, is made with zinc.

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8752. What other parts of the Royal Yacht are painted with zinc paint exclusively?—Apart from the Royal apartments, there are the suites of rooms further aft. The Royal apartments occupy the amidships portion of the vessel, the other suites being aft, and the officers' quarters being forward of the Royal apartments.

8753. Is any lead used at all in the seamen's quarters, for instance?—Yes, but we in the dockyard have very little to do with that, except when granulated cork is applied in the first instance.

8754. Can you tell me what part of the Royal Yacht is painted with any part of lead?—The first painting in the seamen's quarters; but that has been done some time ago now. It is only refreshed now with a coat of zinc paint.

8755. But supposing you were to paint similar apartments to the seamen's quarters, would you use a lead priming coat?—Probably in the parts covered with granulated cork, a first coat of half lead and half zinc would be applied, to be finished finally with zinc.

8756. What objection would there be to the use of entirely zinc for such work?—The zinc oxide has not the covering power or body or capacity of the lead. Lead has always had a greater covering power.

8757. Do you say that from your own knowledge?—That is my experience.

8758. Have you tried any of the non-lead paints which are on the market now?—Only as supplied by the Admiralty. We have tried them for experiments only, but they have not been brought into actual use. We have never found the leadless paints to give such good results as the white lead.

8759. When did you make these experiments last?—From time to time, as ordered by the Admiralty. I can give you no specific date.

8760. But have you made them in the last few years?—As recently as 18 months ago.

8761. Do you know what the formula was that you used then?—That I could not state off-hand.

8762. Is there much work on the Royal Yachts which has to be sand-papered?—A considerable amount. The whole of the cabins have to be sand-papered down.

8763. And are there considerable surfaces to be stippled?—Yes, the stippling process of course is very fine work, and while that is in process there is always a very fine vapour of paint. The paint is first applied and then stippled.

8764. Do I understand that you can eliminate the risk from all this work by using only zinc paints?—I believe we can.

8765. But you cannot eliminate the risk without using zinc paints?—I think zinc is the cure for it.

8766. I understand that, in the Royal Dockyards, the painters are required to observe carefully certain precautions?—There are several regulations laid down by the Admiralty.

8767. What provision do you make for personal cleanliness?—Soap, towelling, nail-brushes; and the provision of hot and cold water is also made for them.

8768. Do you consider that the provision of hot and cold water is essential?—Very, especially in cold weather, because then the men have very great difficulty in removing the paint. Hot water is most essential, I should think.

8769. If you heard anyone state that the use of hot water was not essential, what would you think of that?—I should say that, on a very cold day, I should experience very great difficulty in removing the paint. A man's hands are sometimes so numbed with the cold that he has not the power to remove it except by hot water.

8770. Is time allowed for washing in the dockyards?—Yes, five minutes before noon bell ringing and five minutes before the afternoon bell ringing.

8771. Do you take any steps to ensure that they make use of the washing conveniences supplied?—The men have to proceed to the wash-house provided, and the men's tickets are held there by the chargeman, and they are not given to them until they have washed their hands, which means that the washing of their hands is under the supervision of the chargeman.

8772. Do you provide overalls for painters?—Yes, all men are supplied with overalls.

8773. By the Admiralty?—At the expense of the Admiralty.

8774. How often are they cleaned?—Approximately, once a fortnight.

8775. At whose expense?—The Admiralty's expense.

8776. Where are they washed?—A large washing laundry or house is supplied, and steam machinery is used.

8777. Then is no painter allowed to take his overall off the premises?—No, they are Government property, with the broad arrow on them.

8778. Do you have a periodical medical examination of your painters?—At Sheerness the men were examined regularly every Saturday morning, and at the Portsmouth Dockyard, where the numbers are great, the men are seen at convenient seasons by the surgeon of the dockyard. We send them in batches of 20.

8779. Have you noticed any difference in the amount of time lost for illness, even transitory, now as compared with, say, eight or ten years ago?—There is a great improvement.

8780. You have told us earlier in your evidence that you consider the abolition of lead the only way to remove the evils. Would it, in your opinion, be practicable to prohibit the use of lead?—I think it would, except in our priming coats on iron and steel surfaces.

8781. Both inside and outside?—For all purposes, except confined spaces, where we have no option in the matter. We are forced to use oxide of iron paints.

8782. Have you made any experiments yet on iron and steel surfaces with non-lead paints?—No, not on any large scale.

8783. Have you made anything which is worthy of being called a serious test?—No.

8784. Then why do you say that you cannot use non-lead paints for priming coats on iron and steel surfaces?—Only that we have observed the use of red and white lead mixed, and it has stood the test very satisfactorily on our warships.

8785. And you think that no other mixture would stand the test?—I would not go so far as that.

8786. How often is the painting done in these ships on the iron and steel surfaces?—On a new ship which is building, as soon as the shipwright and other people have finished, we commence scraping down the whole of the hull, freeing it from rust, and then we commence the application of red and white lead mixture followed by the other coats.

8787. But after the ship is once painted, how often is it repainted inside?—That depends very greatly on the result of the survey.

8788. What is the average period of repainting of a ship?—Three years.

8789. It is painted every three years?—Every three years inside.

8790. How often is it painted outside?—The outside hull is really done now by the ship's staff. It is done by the crew. They repeatedly repaint it. As the vessel gets shabby, so they repaint it.

8791. Have you any experience of the durability of zinc paints when exposed to the weather?—Yes, considerable. The zinc stands well as compared with white lead.

8792. Does it stand better than white lead?—Quite as well. Our surfaces are constantly washed by salt water.

8793. When you say that the ships are repainted inside every three years, do I understand that they are never painted more frequently than that?—Yes, it is generally painted on the survey in three years, but the officers' quarters are painted oftener, and so are the crews' spaces.

8794. How often would you say the insides of a ship are painted?—That is rather indefinite, because we have to take the ships in hand as sent to us by the Admiralty.

8795. Can you give me an average time? Are they painted every year, or more frequently than every year?—I will give you a case in point. If a ship is

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paid off, and is brought in to us, if the paint work in the officers' quarters is discoloured, or scraped off, or anything, we have to go right through them, and that may be every 18 months, but the officer may have had his cabin done quite recently. The same officer would not get his cabin done if he remained in the ship.

8796. I want you to give me the average time?—Once every two years would be a fair average.

8797. (*Lord Henry Bentinck.*) You have no cognizance, I suppose, of how many times the interior of the ships would be painted by the officers themselves?—No.

8798. It may be every two or three days, I suppose, as far as you know?—It would not be as often as that, of course, but they have an establishment allowance of stores, and that amount must last them, unless the officers of the ship choose to pay for it out of their own pocket.

8799. The last witness said that zinc white was not used on the mess-decks?—Yes, it is.

8800. Is it entirely used on the mess-decks?—No, I would not go so far as to say it is entirely used. The ship's establishment allowance may be a proportion of white lead and a proportion of zinc. If the ship's officers found they had not sufficient zinc to do an apartment out, they would naturally turn to the next paint which was at hand and use the lead.

8801. Are the men's mess-decks painted by their own staff as well as the officers' quarters?—Yes, more often than by the dockyard.

8802. And you do not know what they paint it with?—No, I do not.

8803. They may paint it with what they like?—Yes.

8804. You could not tell me whether they prefer zinc white to lead white, could you?—I know they prefer zinc white, for this reason—I do not know that they would study it from the health point of view, but because of the superior qualities of zinc in keeping its colour. It does not discolour like lead.

8805. I do not quite understand why you say that lead should be used in priming coats for iron and steel surfaces?—There is a greater adherence than in the coats of zinc. My personal impression is that for priming coats zinc is likely to chip.

8806. Your experience has shown you that?—Yes, although we have not carried out any big tests.

8807. That is for inside work?—Yes; but still we have never done it for testing purposes.

8808. You do not mean to say that you could not arrive at a satisfactory zinc white paint, do you?—I think that would be possible.

8809. But your present idea of it is that it chips?—Yes; I think that is the idea.

8810. (*Chairman.*) If this Committee decided to prohibit the use of lead for all interior painting of ships, would that be considered a hardship by you?—Not at all.

8811. (*Dr. Collis.*) As regards the care of the workpeople in the dockyard, the Government exerts considerable care in looking after the health of its workpeople, does it not?—That is so.

8812. There are medical examinations of the men once a week at Sheerness, and periodically elsewhere. Overalls are supplied and kept rigorously clean, and lavatories with hot water. Can you suggest any other possible precaution for the health of the workpeople besides those which are already adopted?—I think in some cases the Admiralty might grant us a longer time for the men. I can explain that by stating that some of the men are working on ships at a considerable distance from the lavatory, hence the hurry and scurry to pick up their tickets and get away to their dinners.

8813. Has there been any alteration in these precautions during the past ten years?—Only the supplying of hot water.

8814. Has that been more insisted upon recently than formerly?—Yes.

8815. When was there any special injunction on that point?—At Sheerness no hot water was supplied until I insisted on its supply.

8816. You insisted on it, personally?—Yes, and I was backed up by the surgeon of the dockyard.

8817. But there has been no special instruction by the Admiralty on the point to the yard as a whole?—No. I know, when I left Portsmouth to go to Sheerness, eight years ago, no hot water was supplied, but it has been since.

8818. Notwithstanding all the care which is exerted, cases of lead poisoning occur?—Undoubtedly. We have had several cases, and the men have been sent away from the Department—not punished or discharged, or anything of that sort, but sent away, and not allowed to use lead again. You asked me about precautions, and there is one other point. We issue twice a day, to every man employed with red and white lead, a wine-glassful of sulphuric acid orangeade, made up by the surgeon of the dockyard, and carried to the men at their work.

8819. (*Chairman.*) Do they drink it?—They do.

8820. (*Mr. Sutherland.*) Do you go round and see that they drink it?—No, I cannot do that.

8821. (*Chairman.*) How do you know they drink it?—Only by the bottles being brought back empty.

8822. Do they like it?—Some do, others do not.

8823. You say you think it is done for their good, and they help the authorities by drinking it?—I am convinced that they fully understand that this is a measure for the benefit of their health.

8824. (*Lord Henry Bentinck.*) But is the swallowing of sulphuric acid conducive to anybody's health?—I do not think I can answer that.

8825. (*Dr. Collis.*) The point I wanted to make was this, that notwithstanding every possible care that is taken in the Government dockyards in these ways to protect the workpeople, yet cases of lead poisoning occur?—Frequently.

8826. And, without interfering with the process carried on, it would not be possible to protect the men further?—I do not know of any other thing that could be done to eliminate it.

8827. It seems to me there has been a large substitution of other paint for lead paint in recent years?—Yes, as I have stated, zinc paint has been used.

8828. And that has been associated not only with what you have already stated of your personal knowledge of the improvement in the health, but it has also been associated with fewer cases being notified from the dockyard. Are you aware of that fact?—Yes.

8829. So that the sum of your experience in the use of paints is, that notwithstanding the strongest possible precautions to prevent lead poisoning it will occur, but that when you commence substituting other paints for lead, the number of cases of lead poisoning falls and the health improves?—It certainly does.

8830. (*Mr. Gardner.*) Do you find oxide of iron satisfactory in the double bottoms and the shell rooms, and the tanks and all those other places?—Not the shell rooms.

8831. In the tunnel, and all the rest of it?—Yes.

8832. Why do not you use it as a primer instead of the red lead?—There would be the covering property to commence with. Oxide of iron is quite a dark red paint, and then you have to study your covering power afterwards. You would require more coats, and it would be an expensive thing. Then again oxide of iron paint never dries so hard on a surface, as a preparation of red or white lead, with the result that in the coats following, the rubbing down process tears up or brings up the primer, and so you get a pink instead of a white coating, which of course you gradually get rid of at a great expense.

8833. In the mess-rooms do you use red lead only, or a mixture of white lead and red lead?—In the first case, on the iron and steel work, a mixture of 55 lbs. of red lead to 24 lbs. of white lead.

8834. Then your only objection to using iron oxide as a primer all through, on the steel work of the vessel, is the darkness of the colour as a grounding coat, and the fact that it does not dry quite so hard as the white lead does?—That is a very strong objection.

8835. Do you not think that could be obviated by taking more care in the mixing with oil—using special oil and special mixing?—The nature of oxide of iron

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[Continued.]

paint is always more or less to keep soft, and to skin up.

8836. Can you give me an idea why the Admiralty prohibit you from using lead in the double bottom, and in the ballast tanks, and allow outside contractors to use it?—I am not aware that that is the fact. I have no knowledge of contractors being allowed to use lead paints in confined spaces on Admiralty-built vessels.

8837. Do not you know that?—No, I do not know that. I have examined plenty of vessels that have come from the contractors' works, and found invariably that oxide of iron paint has been used. If a priming coat of lead was used, it was always coated finally by the oxide of iron.

8838. What deck work have you done with zinc?—The "Victoria and Albert" upper deck is done with zinc, and finished with zinc now.

8839. Have you done any battleships with zinc?—They are always finished in grey.

8840. But you can tint zinc?—Yes, but in that case we have an Admiralty shade board to work to. We usually have 73 lbs. of white lead and 8½ lbs. of black to form the grey, and that is used in board and out except on special parts which the Admiralty decide have to be finished in grey enamel. Then the preparation coat must have a proportion of zinc because of the bluish grey which follows with the zinc enamel, because as you know enamel, even when the black is used, produces a different greyish tint to what a lead does.

8841. But, if you find it satisfactory for deck-work as a white paint, do you not think you could get over

The witness withdrew.

Mr. FREDERICK HIGGS examined.

8852. (Chairman.) Do you attend to-day as a representative of the National Federation of Building Trades Employers of Great Britain and Ireland?—The federation asked me to come.

8853. What is the nature of your business, and where is it carried on?—I am a builder and contractor of the ordinary type carrying on business in London.

8854. How long have you been concerned with house painting work?—Ever since I began carrying on the building trade in 1880.

8855. What is the average yearly number of painters employed by your firm?—I have two businesses, one in London, contracting, and the other in the country, jobbing, at Cobham, in Surrey. Thirty-five is the average number we employ in London and 12 in the country.

8856. Are they all painters?—Painters.

8857. Have you known any cases of lead poisoning or painters' colic?—None that have ever come to my notice. I do not know of any in my business at all.

8858. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—All my liability is transferred to the insurance company.

8859. Has the premium in recent years been raised?—It has been raised. I expect you have the same evidence from everyone. The premium is going up.

8860. Is that in consequence of the dangerous nature of the trade?—I take it that it is because we have accidents, and that they have to pay more.

8861. Is the reason to be assigned to the danger of lead poisoning, do you think?—I cannot conceive that in my case, because I have never had a case.

8862. But the insurance people know that the use of lead is a dangerous element?—They may know that, but as far as I am concerned I have had no cases, and I think the insurance companies will tell you that they keep records of the particular cases. If I am covered to-day with one company, and next year I have to go to another company, that other company knows my record.

8863. Do you pay a flat rate for all your men?—Yes.

8864. Whether they are employed in lead or not?—Just the same.

the question of colour, and use it on top-sides?—Yes, we should do it at once if the Admiralty gave us instructions to do so.

8842. It is all a question of getting permission to do it?—Yes.

8843. And do you think it would stand quite as well?—I think so.

8844. (Chairman.) For the upper decks?—Yes.

8845. And for the outside painting of the battleships?—Yes, I think so.

8846. (Mr. Sutherland.) You have no experience of it?—No.

8847. (Lord Henry Bentinck.) For the hull as well as the upper deck?—Of course the outside of the hull gets a greater quantity of washing with salt water than the upper deck. The bluejackets spill the salt water over everything of course with their pails, but there is not so much gets on the upper deck as on the hull. There is very little fresh water that gets on the upper portion of a battleship.

8848. (Chairman.) I suppose the reason you have not painted the outside of battleships with leadless paints is because the Admiralty have not instructed you to do so?—Exactly.

8849. And you have made no tests because you have not been asked to?—We are not permitted to. We are very much bound by our instructions.

8850. In your experience you think there would be no objection to using the non-lead paint for the outside of battleships?—I see no objection to it.

8851. And for the hull—the whole of it?—Yes, the whole of it, in board and out

8865. I am pleased to hear that you have had no lead cases in your firm, but I am not surprised, because you may be aware that in the Potteries there are a large number of works which are quite immune from lead poisoning, whereas others have a good crop of cases every year?—It is most peculiar that both myself, and many other builders that I have talked to have had absolutely no experience of lead poisoning with painters.

8866. Have you known men who have broken down temporarily on account of lead troubles?—None which come under my notice. Of course you can understand perfectly well that, in employing a large number of men of various classes, one does not know personally in each case what is the matter.

8867. You have not an opportunity really of knowing, I suppose?—No, not unless you miss a man and say: "Why is not he here?"

8868. Have your men had occasional days of sickness?—I could not tell you; I should think most likely; most people have.

8869. And that may be due to lead, I suppose, as far as you know?—I could not tell you. I would not like to say so.

8870. Do you have a periodical medical examination of your men?—No, I have nothing of that sort.

8871. Then it is possible that some of them may be suffering from the slower and more insidious forms of lead poisoning?—I could not say yes or no to that.

8872. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—Yes, I have understood that.

8873. Do you take a prominent part in the work of the National Federation of Building Trades Employers of Great Britain and Ireland?—I am one of the junior officers, and that is the reason I have come here.

8874. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—Since this Committee has been sitting.

8875. Not before?—Not before.

8876. Did your association ever consider the advisability of having a medical examination made of persons employed?—I never heard of it.

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8877. This would be the best way to discover the proportion of painters showing symptoms of lead poisoning, would it not?—I daresay it would. If there was anything the matter with a man, he would go to the doctor to find out what it was.

8878. A medical examination would be the best way to discover whether any of the painters you employ showed symptoms of it?—I know of no better way.

8879. Has your association ever taken any collective measures to discover a substitute for white lead in paints?—Not since I have been connected with it.

8880. They have not employed a chemist to make scientific investigations?—No, not as yet.

8881. There are a number of substitutes offered on the market, the makers of which claim that they will successfully replace white lead. Have you ever heard of them?—I believe most of the patent paints that we know are supposed to be leadless, but I am no chemist, and I cannot tell you whether they are or not.

8882. Has your association carried out any practical tests with these?—No, not as far as I know.

8883. We have been told that the extent of the danger of lead poisoning to which house painters are exposed is not fully realised by many master house painters?—It would not be if it does not come under their notice.

8884. The amount of injury caused to workpeople is published every month in the Board of Trade returns. Have you seen those returns?—I confess that I get a Board of Trade journal once a month, I think it is, but I have not had time to peruse that regularly.

8885. The secretary of your association has not called the members' attention to the serious injury caused by lead amongst house painters?—No, I suppose he has not known of it.

8886. Do you know the number of definite deaths from lead poisoning in the last ten years?—I have no personal knowledge, but I have heard that it is rather large.

8887. It is 284?—I do not know what the total number of painters would be. Everything is a matter of relative proportion. If you say 284, I cannot controvert you.

8888. And that the death-rates from Bright's disease and nervous diseases and phthisis, due to work in lead, are very high?—It may or may not be, I cannot tell you, but I know this, that there are plenty of people besides painters who have phthisis, Bright's disease, and nervous debility.

8889. But do you know that the proportion of house painters affected by those diseases is very much higher than that of other workpeople?—No, I did not know that. Is it suggested that these diseases are part of the symptoms of lead poisoning, or that lead poisoning is an assistance to the production of such diseases?

8890. These diseases are sometimes caused by the absorption of lead. In other cases they are very much aggravated by the absorption of lead. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same 10 years?—I did not know that.

8891. And that these cases reported voluntarily are only a fraction of the whole?—That I cannot tell you. You are asking me about these points which have never come under my notice.

8892. I am bringing that forward because I want you to realise how very serious the evil is?—I think we are all beginning to realise that, because we understand that the Registrar-General's returns give certain facts which have never come under our notice before, or else we should have seen their gravity.

8893. I am sure you will agree with me that all this sickness and death is very deplorable?—Certainly.

8894. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I have heard so recently.

8895. That the use of white lead has been prohibited to an appreciable extent abroad?—I have heard that.

8896. And that the work of painting has been most strictly regulated in many countries where the use of white lead is still allowed?—That I have heard, but what the regulations are I do not know.

8897. Do you not think it regrettable that this country should be behind other nations in this respect?—It is a question of proportion, of course.

8898. But do you not think it regrettable that this country should be behind other nations in respect of protecting workpeople in regard to the dangers from this evil?—I think that Great Britain should act as a pioneer in most matters.

8899. We have found, in investigating other industries, that a great number of small dangers attend the use of lead. For instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—I should think that is clearly one preventative.

8900. Then you consider that washing accommodation is essential?—Yes, the men must wash their hands, of course, if they use lead.

8901. Including the supply of hot water for washing?—I do not know if hot water is better than cold. I have not adopted it.

8902. Take your own practical experience. Suppose on a winter's morning you had a good deal of paint on your hands, you would get it off easier with hot water, would you not?—I think I should try and use turpentine, or something of that sort.

8903. But supposing you had no turpentine about you?—Hot water would cleanse my hands better than cold water, certainly.

8904. Then, do you not think it is better for the men to use hot water?—Yes.

8905. But is it generally practicable for the men to have hot water to wash in?—It depends on the circumstances.

8906. Is it generally practicable? Can they generally get it?—On a building, yes. The buildings that I have to do are mostly new buildings, and in all buildings of a moderate size we provide a man to do the cooking. There is always hot water for boiling the tea at breakfast time, and generally at dinner time. It would be practicable in those cases.

8907. Do you think from your experience as a master house painter, that it is always practicable for the men to get hot water to wash in?—It would not always be practicable.

8908. Do your painters wear overalls?—They are generally in white—I suppose they do.

8909. Do you supply these?—No.

8910. Would you object to a rule that overalls are to be provided and maintained by the employer as is prescribed in other lead industries?—I should think it would be better for the men to provide their own overalls the same as a carpenter provides his own apron.

8911. But carpentering is not a dangerous trade?—Not in this sense.

8912. How often are the overalls washed?—Not being my overalls, I do not know.

8913. Do you insist on the men having clean overalls from time to time?—I do not make any such rule.

8914. Would you be prepared to arrange for the overalls to be washed at the expense of the employer, as is done in other industries where lead is used?—I should object to that. I think the men ought to wash their own overalls.

8915. It is insisted that lead workers in other trades shall not take overalls home to be washed owing to the danger that that involves?—I cannot tell you about the danger. That, I suppose, is where they get very dusty.

8916. They get dirty. The men wipe their hands on their overalls, and the paint dries, and then the lightest touch creates a regular puff, so that they inhale it, and that is one of the small dangers. Where can the overalls be kept from day to day when working continuously on one job?—They would be hanging up in the painters' shop as we call it.

8917. Now with regard to where the men have their meals. Do you advocate a rule insisting that

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no man shall eat his food in the place where lead paint is being handled?—I think it would be a wise rule under the circumstances that you speak of.

8918. Can you always provide that?—Generally on the job there would be the painters' shop, which would contain all those things, and the pegs, and there would be the mess-room, and the mess-room is where the men ought to mess, but they do not always do it there. They do not always mess together.

8919. Could you say from your own knowledge that a room could be always provided for the men to take their meals in where there is no work being performed?—There always is on jobs of any magnitude.

8920. But take a small job?—Painting out a house.

8921. Supposing you paint out a couple of rooms?—Then, probably, they would have their meals downstairs, in the kitchen or the scullery.

8922. But supposing they were not allowed there, where would they have them then?—They would have to go outside, I suppose.

8923. Is it not the practice, on some occasions, for the men to have the meals in the room in which they are working?—Probably it might be the case that they would have to.

8924. All these precautions, as well as others, are insisted on for the mitigation of lead poisoning risks in the Potteries. Would it not be exceedingly difficult to carry them out faithfully in connection with house painting operations?—I am afraid it would. It would not be difficult in the case of a large contract, but with the multitude of small things it would be exceedingly difficult.

8925. Now, with regard to the processes. First, as regards the dry rubbing down with sand-paper. I understand this process is indispensable?—I think so, to make proper work. With regard to that, since this thing has come up, I have been going round my works, and seeing them rubbing down, and I tell them they must either breathe through their nose or get a kind of respirator.

8926. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—Only by the method I have spoken of. A doctor would tell you whether it was any good to breathe through the nostrils under those circumstances, but that is what the nostrils are for, to take up the impurities, and probably the nostrils would do it better than a respirator.

8927. I suppose you could not use an exhaust draught to remove the dust?—Absolutely impossible.

8928. The amount of dust arising from this sand-papering is very considerable. We have been told that it covers his clothing as well as the floors and surrounding objects. How is it possible to save the workman from the very serious danger involved in breathing this dust?—Either to adopt some sort of respirator or to make him breathe through his nostrils.

8929. Have you ever known a respirator that is comfortable to wear?—Fortunately I have never had to wear one, and I cannot tell you.

8930. The next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Quite.

8931. This gives rise to splashes which must frequently fall even on the face of the worker?—I say the danger connected with that is far less than with the rubbing down, but still there might be some.

8932. But there is some danger in it?—A careless painter would splash. A careful man would splash much less.

8933. How can you deal with such splashes as arise in this operation?—I do not see very well how that can be dealt with. A man ought not to splash much.

8934. No, but you know what men are; they are not automatic machines?—I quite agree with that, but the painting of enriched cornices is really a small quantity as compared with the whole painting.

8935. I quite understand that, but I want to bring out all the small points that have to be considered?—The point which was in my mind was this; you should

not propose regulations to govern and perhaps harass the whole painting trade of the country for the sake of just a few exceptional cases.

8936. Not unless the few exceptional cases in the aggregate amount to an evil which we consider sufficiently serious to interfere with. Then with regard to stippling, the same point arises there?—I do not think there is much splashing in stippling. A dry brush is used.

8937. There is a little splashing from the painter to the stippler. Take a ceiling, a man paints a ceiling adjacent to the man who is stippling?—Yes.

8938. Sometimes a splash from the painter's brush gets on to the stippler?—Yes, it might, but I should think that that is a very remote case.

8939. But I saw an instance the other day where a man got a splash in his eye. He may get it on his lips, and a careless man may suck it in. I am only bringing out these small dangers?—Yes.

8940. He got it on his hands too, slightly. Do you have old paint burnt off with spirit or charcoal burners?—Spirit generally.

8941. How can you prevent a worker from inhaling fumes that arise in this process?—I should think it is rather impossible. It is not a very nice smell—fumes from burning paint. Naturally he would stand on the side away from that to which the fumes are being blown.

8942. He must inhale some of the fumes?—It is almost impossible to prevent it.

8943. It appears from your evidence, then, that there are certain indispensable processes, in carrying out which a painter must necessarily inhale some dust, spray, or fumes containing lead. How are these dangers to be met?—I have no remedy for those, not for the fumes at any rate.

8944. (Lord Henry Bentinck.) Not even breathing through the nose?—I am afraid that that would make it worse.

8945. (Chairman.) Various witnesses have told us about non-poisonous substitutes for lead. Have you any personal experience of such substitutes?—We have used a good many of these patent paints which they say are leadless.

8946. What results have you obtained from such paints?—In my view they are not good pigments. They do not cover well.

8947. What results did you obtain from zinc paint?—It makes a satisfactory finish, if you put enough coats on, from what I have seen of zinc white. I have not seen much of it. You want about twice as many coats as with lead, if zinc is the basis, they tell me.

8948. Is that your own personal experience?—I have seen it used.

8949. Have you employed these paints yourself for work that you have undertaken?—Yes. I have done a good deal of work for the Office of Works. The last I did for them was with a paint called —. I do not think that zinc makes such a solid paint.

8950. You contend that white lead is better than any other paint you have tried?—Yes, for pigmentary purposes.

8951. For what reason?—It covers better. It is a better pigment.

8952. What have you to say with regard to preservation and protective qualities?—I should think that it is better on that ground, but I could not tell you from my own knowledge.

8953. Your only point is that it is better with regard to its covering properties?—Yes, and lasting. You get a house painted with white lead and it lasts a long while. If painted with zinc paint you do not know how long it will last. You cannot compare.

8954. You mentioned the Office of Works just now. Would you be surprised to hear that they, and other people, have succeeded in obtaining an efficient non-lead paint?—I know that they require these paints. I have had to put them on, and they are satisfied that they are efficient. How long they are going to last I do not know.

8955. They have given their non-lead paints, now, four years' trial, and they have been here and have told us that they are eminently satisfactory?—Yes!



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8956. Would that cause you to alter your opinion about them?—Well, you see, the Office of Works and others make it their business to look into the lasting qualities of paint on houses, and that sort of thing. We have to do what we are told—put on white lead or put on —, or anything of the sort, and until we go back to it again we do not know how it has lasted. With regard to any property of our own we know.

8957. But it is a very striking fact that the Office of Works, after nine or ten years' experimenting, have at last found a leadless paint which from their point of view is highly satisfactory?—We should welcome anything of the sort.

8958. With regard to the hours of labour, what are the usual hours worked by your painters per week?—Fifty in the summer and 44 in the winter.

8959. Do they ever work overtime?—They do, if necessary arises.

8960. Would you agree to a strict limitation of the hours of employment to 48 per week?—That is a question of policy, I suppose. I am not restricted myself.

8961. The evidence we have received from the medical profession shows very clearly that the fewer hours the workman is employed in coming in contact with lead the better?—It may be. I have nothing to say against that.

8962. You have no periodical medical examination of your workers?—No.

8963. Do you know that in other industries where lead is used, the Home Office insists on a monthly or even weekly examination by the certifying surgeon?—I never heard of it.

8964. Do you know that lead poisoning frequently undermines the health without immediately developing acute symptoms?—I have heard so.

8965. To bring this industry into line with others where lead is used, each painter would have to carry a health register?—Yes.

8966. He would have to see the appointed surgeon at least once a month?—Yes.

8967. And the employer would have to pay the fee for the medical examination?—I have not heard of it.

8968. Would you have any objection to that?—I would sooner see white lead abolished than all these vexatious restrictions.

8969. (*Lord Henry Bentinck*.) You said that your men lost time through occasional days of sickness?—I said that sometimes they were off. I could not say whether it was through sickness or not.

8970. You do not inquire, when they go off, whether it is sickness, and if it is what the sickness is, do you?—No. You see the men do not come under my own personal supervision, so far as that goes. If I was the foreman on the job, and some of my men were away, I should want to know why they were away.

8971. You do not ask, "Is that man suffering from lead poisoning?" or "Is he suffering from Bright's disease?" or "Is he suffering from phthisis?" You do not make any inquiries?—No. I do not make inquiries.

8972. Your evidence as to the existence of lead poisoning is not very valuable, is it?—No. No cases have come before me, particularly since the Workmen's Compensation Act.

8973. Your men, for all you know, may be suffering from lead poisoning?—I could not say if that were so or not. You must not take it either way.

8974. (*Dr. Collis*.) You spoke of the possibility of the men wearing respirators. Is that a theoretical suggestion, or have you any practical knowledge whatever of the wearing of respirators by the British working man?—It is purely theoretical. It is only the last month or so that the idea has occurred to me in consequence of what I have heard of this Inquiry.

8975. Are you aware that seven or eight years ago there was a Committee of Inquiry into ventilation in factories, and the question of respirators came up very strongly there, and that the Committee stated that they only looked upon respirators as a very last resort when everything else failed?—I did not know that. I have not heard of it.

8976. For all the various forms of dust, quite apart from lead dust, and they came to that conclusion owing to the fact that no suitable respirator was yet invented, and that if you had got one you could not make people wear it?—I should think that that is very likely.

8977. So that, after all your suggestion probably would not be practical if it was attempted to be carried out?—The best respirator is the human nose. I know that perfectly well.

8978. (*Lord Henry Bentinck*.) But you cannot pass an Act of Parliament that everybody shall use his nose?—No.

8979. (*Mr. Sutherland*.) Your good opinion of white lead is founded on your experience?—Yes, such experience as I have been able to gain during thirty years of business as a master builder, painting being one of the sections of the trade I practise.

8980. And you know that white lead saponifies with the linseed oil and strengthens the linseed oil, and the linseed oil strengthens the product which comes from the white lead, and a protective film results?—Yes.

8981. In the case of zinc the oil simply holds the zinc, and does not amalgamate with it?—I see.

8982. So that when the oil perishes the zinc is exposed to the weather and also perishes?—I did not know that.

8983. That is really the difference between the two. What other substitutes have you had experience of—only proprietary paints?—Only proprietary paints.

8984. No Committee could really recommend that purely proprietary paints should be used in substitution for a basic article like white lead?—No, except so far as proprietary paints are leadless.

8985. From that point of view possibly, but a committee could not take it on itself to recommend particular articles?—No.

8986. It can only deal with broad substances?—I perfectly understand that.

8987. Do you know that for 40 years, at all events, certainly the last 40 years, paint manufacturers have been trying all they can to produce a paint that shall be a satisfactory substitute for white lead?—I should think very likely that is so.

8988. And that up to now nothing has been produced that is as good and as easily applied and as easily mixed as white lead paint?—Very likely not.

8989. And that, apart from its evil effects as a paint on the health of the workers, there is nothing to compare with it in value as a paint?—Nothing.

8990. (*Mr. Rice*.) You told us that you were covered by insurance in respect of your workmen. In arranging terms with the insurance company, did they ask any extra rate on account of the risk to painters?—None at all. The question of painters' risk has not come into my business as far as I know.

8991. You have had to make no claim on your insurance company in respect of any painters?—Not in respect of any painters at all.

8992. You say that you have an average employment of 35 men. I take it that most of those men are working on buildings?—Yes.

8993. And there they would have a mess-room provided in the usual way?—Yes; two thirds probably are employed on buildings.

8994. Two-thirds would be working under conditions whereby they would not have to have any meal whatever in the paint shop or room where they were working?—No.

8995. I take it that the number of ceilings that you deal with would be mostly distempered?—Mostly distempered. Painting ceilings is very rare. Sometimes I have ceilings painted once—when I line them—when they are very bad in order to keep them up.

8996. The conditions outlined by our Chairman are very seldom found?—Very seldom, indeed, as far as my experience goes. A West End business might have a different experience, might it not?

8997. With regard to the limiting of hours to 48; I think that in London the working hours are 50 per week?—Yes, in the summer.

8998. It would be very inconvenient to alter that to 48 for painters, would it not?—Yes.

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8999. It would mean starting at a different time or leaving off earlier?—Yes.

9000. (*Mr. Parsonage.*) With regard to the working hours in London, is it not a fact that in decorators' shops, apart from builders' shops, the painters work 10 hours per day?—I cannot answer any question about decorators. I do not know.

9001. That is so. The builders' shops work nine hours and decorating firms work 10 hours?—Nine is our time.

9002. With regard to washing hands, do you allow men time to wash their hands?—I think that they generally take it.

9003. They take it, but they must not let you catch them taking it, I suppose?—We should not object.

9004. Do you provide towels?—We do not provide towels.

9005. They have to find what they can for wiping their hands. They wipe them on their aprons generally?—Perhaps so; I cannot tell you, but I know that towels are not a part of my stock yet.

9006. You agree that the principal danger is the dry rubbing down?—I am not a chemist or a painter, but I should think that that is the case.

9007. That is my experience. You would agree with that?—Yes.

9008. Would you agree that, if dry rubbing down before the first coat of paint is applied was prohibited, that would considerably minimise the danger?—I do not know whether you would get the same results. You mean to say, if you get an absolutely smooth surface to start with, and you put half a dozen coats on would you get the result you wanted?

9009. What I mean is this. Years ago there was far more rubbing down with pumice stone and water on old paint than there is at the present time?—Yes.

9010. You agree with that?—Yes.

9011. In the West End of London now, unfortunately, the use of pumice stone has pretty nearly died out, and they use sand-paper before the first coat is applied?—That is in renewing paint?

9012. Yes. So that nearly all the rubbing down now is dry?—With sand-paper?

9013. Yes?—I daresay that is so.

9014. I wish to bring out the point that the use of pumice stone and water has very nearly died out altogether. Pumice stone and water could be used, you will admit, equally well or better than the dry rubbing on old paint before the first coat is applied?—I should think, quite as well.

9015. It would be better really, would it not?—Yes; you would get a better surface to start with.

9016. One of the principal causes of the evil is the introduction of what is entirely unnecessary, that is, the dry rubbing down before the first coat of paint is applied?—I could not speak to that, because I do not know the causes of the diseases. If they are more frequent among painters working on old houses being repainted than among those working on new work, then I should say your theory is correct, but I do not know if that is so.

9017. With regard to the principal causes of lead poisoning, dust arises far more from dry rubbing than from the wet process?—Undoubtedly. There would be hardly any dust or none with the wet process.

9018. And the wet process is the best for getting a good surface before the first coat of paint is applied?—Yes, but not with new work.

9019. On old work?—Yes.

9020. But why has pumice stone and water been discarded and the more dangerous process been adopted; can you give me an idea?—No. It is an interesting point. I must find that out.

9021. Is it not a question of cheapness and competition?—I could not tell you. They may have had something to do with it.

9022. (*Mr. Sutherland.*) Would you prefer prohibition for inside work rather than regulation?—Judging from the type of regulations that have been foreshadowed to me, I should say, most distinctly, yes.

9023. Prohibition?—Yes.

9024. (*Chairman.*) I understood you to say that you prefer prohibition altogether to regulation?—If I have to register myself as a worker in white lead, which I suppose I shall have to do, whether I use it inside or out, I shall be subjected to a thousand and one forms, letters, visits, and inspections of all sorts, which Heaven preserve us from! We have sufficient already.

The witness withdrew.

Mr. F. L. WALKER examined.

9025. (*Chairman.*) Do you attend here as a representative of the London Master Builders' Association?—Yes.

9026. What is the nature of your business and where is it carried on?—I am in charge of the decorating department of Messrs. Janies Shoobred and Co., Tottenham Court Road.

9027. For how long have you been concerned in house-painting work?—For about 25 years.

9028. What is the average number of painters employed by your firm?—The average number per week is about 40, taking the year through.

9029. Have you known any cases of lead poisoning or painter's colic?—I have only known of one serious case. That was a case of alleged lead poisoning.

9030. Are you aware that in the Potteries, for instance, there are many large works which have had no cases of lead poisoning at all?—I was not aware of that.

9031. Whereas in others they have had a considerable number of cases?—Yes.

9032. Do you insure against your liability for payment of compensation under the Workmen's Compensation Act of 1906?—The firm do.

9033. Have the rates been increased recently?—Not to my knowledge.

9034. Have you known men who have temporarily broken down from illness?—One man—the man to whom I referred just now.

9035. Have your men had occasional days of illness due to lead?—No, I cannot say that they have, beyond this particular man to whom I refer.

9036. Do you have a periodical medical examination of your men?—No.

9037. Then is it not possible that some of them may be suffering from the slower and more insidious forms of lead poisoning?—Yes, it is quite possible.

9038. You know, I presume, that lead poisoning frequently undermines the health without immediate violent manifestations?—So I understand.

9039. Do you take a prominent part in the work of the London Master Builders' Association?—No, I take no part in the work of the London Master Builders' Association.

9040. You never attend their meetings?—Never.

9041. You have heard, I suppose, of the prevalence of lead poisoning amongst men who handle lead paints?—Yes, I have.

9042. Messrs. Shoobred are members of the London Master Builders' Association, are they not?—Yes.

9043. But you do not attend the meetings?—No, I do not.

9044. Do any of your people?—Not to my knowledge.

9045. Now there are a number of substitutes offered on the market, the makers of which claim that they will successfully replace white lead?—Well, I have not met with them.

9046. We have been told that the extent of the danger of lead poisoning to which house painters are exposed is not fully realised by many master house painters?—I can quite believe that.

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[Continued.]

9047. Have you yourself realised the magnitude of this lead poisoning evil?—No. As I say, in the course of my experience I have only met with this one serious case.

9048. Do you know that there have been 284 deaths from lead poisoning amongst painters in the last 10 years?—I do not know the actual number.

9049. And that the death-rate from Bright's disease and nervous diseases and phthisis, due to work in lead, is very high?—You are referring to painters only now?

9050. Yes?—Yes, I knew that the rate was fairly high.

9051. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion during the last 10 years?—I did not know that.

9052. And that all these cases which have been reported voluntarily are only a fraction of the whole?—I was not aware of that.

9053. Have you seen a copy of the "Labour Gazette" which was published recently by the Board of Trade?—No.

9054. The table on page 187 of the last issue shows a definite increase in the deaths from lead poisoning amongst painters—18 deaths in the first four months of this year, and 12 deaths in the first four months of last year?—I have not seen that particular extract.

9055. The gravity of the danger is seen if you will compare these figures with those for all lead industries under the Factory Act, in which there have been 10 deaths in the first four months of this year, and 15 deaths in the first four months of last year, showing that the death-rate amongst painters has increased, whereas the death-rate in other lead industries has decreased. Now I am sure you will agree with me that all this sickness and death is very deplorable?—Undoubtedly, unquestionably.

9056. Do you know that this evil has attracted the most careful attention in many foreign countries?—Yes.

9057. Do not you think it is regrettable that this country should be behind other nations in this respect?—Very regrettable.

9058. Now a great many small dangers (I want you to realise this) attend the use of lead; for instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—Certainly.

9059. Do you consider washing accommodation essential?—Certainly.

9060. Including the supply of hot water for washing?—Hot water I cannot speak about.

9061. But just realise; in the winter months, when it is extremely cold, would it not be much more difficult to get paint off the hands with cold water than with hot water?—It would be more difficult certainly. I would not say much more difficult.

9062. Is it generally practicable for the men to have hot water to wash in?—It all depends upon where the job is.

9063. But is it generally practicable. I am not asking whether it is universally practicable, but is it generally practicable to have hot water?—Generally practicable—no.

9064. Do your painters wear overalls?—Yes.

9065. Do you supply those?—No, we do not.

9066. Would you object to a rule that overalls are to be provided and maintained by the employer as is prescribed in other lead industries?—I do not at the moment see any reason why the employer should provide them.

9067. I have told you it is prescribed in other lead industries?—Are you asking me as an employer whether I should object to it?

9068. Yes?—I am not an employer actually.

9069. I ask you, as a witness, whether you would object?—The only answer I can give to that is that I see no reason why the employer should provide them.

9070. How often are the overalls washed, could you tell me?—I should say once a week; but that is a question I cannot answer definitely at all.

9071. Would you be prepared to arrange for the overalls to be washed at your expense at least once a week, as is done in other industries where lead is used?—On the question of expense, I cannot answer. We should be quite prepared to arrange for the washing of them, certainly. There would be no difficulty in that.

9072. It is insisted in other trades that lead workers shall not take overalls home to be washed, owing to the danger that that involves. A man takes an overall home with him; it is covered with paint which dries and goes to a sort of dust, and that is a danger that one has to guard against?—Yes.

9073. Where can overalls be kept from day to day when the worker is continuously at one job?—They are usually kept in the same place as what the foreman on the job calls his shop—the particular room that he has set apart for the mixing of his materials and so on. Usually they are kept there. It may be an empty house, for instance.

9074. Now with regard to meal-rooms. Do you advocate a rule that no man shall eat his food in the place where paint is being handled, or is that impossible?—I should say it is advisable that he should not do so. In certain cases undoubtedly it is impossible.

9075. Now all these precautions, as well as others, are insisted on in mitigation of lead-poisoning risks in the Potteries?—Yes.

9076. Would it not be exceedingly difficult to carry them out faithfully in connection with house painting operations?—Yes, I should say that it would be distinctly difficult.

9077. Now about the various processes. First, as regards dry rubbing down with sand-paper, I understand that this process is indispensable?—Yes, indispensable I should say, on new work certainly.

9078. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—I do not think you could prevent it entirely by any means. You might reduce the danger to a minimum by the use of a respirator.

9079. Have you ever heard of a respirator that is comfortable to wear?—I have never worn one.

9080. Have you ever heard of one that is comfortable to wear?—I have not interested myself in that particular question.

9081. The next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work, the brush has to be pushed into the background of the ornamental work?—Yes.

9082. This gives rise to splashes, which must frequently fall even on the face of the worker. How can you deal with the splashes which arise in this operation?—I do not think that you can possibly deal with them. I do not see how they are to be avoided.

9083. Then with regard to stippling, a certain amount of splashes fall on the stippler?—Yes.

9084. Can you suggest any way of avoiding that?—No, I cannot suggest any way of avoiding that.

9085. Then when the old paint is burnt off, either by a spirit or a charcoal burner, how can you prevent the worker breathing the fumes?—I should be inclined to think that the burning-off lamp is used to a very limited extent to-day; the adoption of liquid paint removers has reduced the use of it to a minimum.

9086. Would you advocate the prohibition of burning off altogether?—I do not know that I would advocate its prohibition, but it would be a very very hard paint or material that could not be removed by the use of a strong liquid paint remover.

9087. But in cases where burning off is still in practice, how would you prevent the worker from breathing fumes?—I do not think that you could prevent it, and I doubt if there is really very much in that. I can quite understand that the fumes from a burning-off lamp would perhaps upset a delicate stomach, just the same as the smell of paint might do, but that there is any serious or real danger from the smell of the fumes I do not believe.

9088. But supposing that medical evidence was produced to show conclusively that there is great danger in it?—Well, if it was, I should bow with all

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[Continued.]

deference to it, but still hold my opinion. That is all I can say about that. Even doctors differ.

9089. Now it appears from your evidence that there are certain indispensable processes in the carrying out of which the painter must necessarily inhale some dust from spray and some fumes containing lead. How are these dangers to be met?—I do not see how you are going to meet them. Ample ventilation of a room may minimise the danger where dry rubbing down is going on.

9090. Is it possible to remove the danger entirely in any way than by using a substitute for lead?—I see no reason myself why the use of white lead should not be entirely abandoned as far as internal work is concerned. That is my present opinion. I know of nothing that I have ever tried or that is on the market, to my knowledge, that has the covering properties of white lead, and I think that the use of white lead is indispensable for outside work in view of the protection of the woodwork. But for inside work I see no reason why white lead should not be done away with altogether.

9091. The Office of Works, and many other people, have succeeded in obtaining efficient non-lead paints for outside work?—Have they?

9092. Yes. Would that weigh with you at all?—Certainly it would. If they have succeeded in securing an efficient non-lead paint, why should not that be used.

9093. The Office of Works have been experimenting for the last nine or ten years, and they maintain that during the last four years they have found a substitute which is highly satisfactory. That weighs with you considerably, I suppose?—Certainly.

9094. What are the usual hours worked by your painters per week?—56 or 56½, but I think it is 56. They work 12 hours a day in the country, I am speaking of London men.

9095. Would you agree as an employer to a strict limitation of the hours of employment to, say, 48 per week, as agreed in the Potteries?—I am not an employer.

9096. (Mr. Sutherland.) But you represent an employer?—I represent an employer.

9097. You can answer for them?—I cannot altogether answer for them on that particular question.

9098. (Chairman.) I put the question to you for this reason: that the medical evidence obtained in a recent inquiry into the earthenware and china trade clearly showed the importance of the workmen being employed as few hours as possible when they came into contact with lead, and both the employers and the employed agreed to restrict the hours to 48?—Yes.

9099. I ask you whether you think that that would be agreed to by the firm you represent with regard to house painters?—Yes, I should imagine that the firm I represent would agree to it if it was agreeable to the employees.

9100. You do not have a periodical medical examination of your workers, do you?—No.

9101. Do you know that, in other industries where lead is used, the Home Office insists on a monthly or even weekly examination by the certifying surgeon?—Yes, I have heard of that.

9102. Do you know that lead poisoning frequently undermines the health without immediately developing acute symptoms?—I have understood that it does so.

9103. Now, to bring this industry into line with others where lead is used, each painter would have to carry a health register?—Yes.

9104. He would have to see the appointed surgeon at least once a month?—Yes.

9105. And the employer would have to pay for the medical examination. Would you object to that?—Again I am answering for my firm. I should say yes, they would object to that.

9106. If a certain painter's health was found to be unsatisfactory, the surgeon could suspend him?—Yes.

9107. That is to say, the man would not be allowed to work with lead for, say, a fortnight or a month, and the employer would have to find him other work or compensate him during that time. Would your

employers agree to that?—I should say they would strongly object to that.

9108. Now, you realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the rigid observance of all precautionary measures in the same way as in other industries where the workers handle lead?—Yes, I clearly realise it.

9109. And you realise that the hours of labour might be reduced, as has been done in other dangerous trades?—I realise that also.

9110. This would involve an extremely complicated and elaborate code of regulations. Are you fully prepared to adopt the necessary machinery to secure complete observance of all the regulations relating to overalls that I have spoken of, mess-rooms, washing accommodation, avoidance of dust, and all other such matters?—No, it would be an impossibility in my opinion.

9111. Taking all these points into consideration, would you say that you prefer that the industry should be regulated by such a code of rules as I have foreshadowed, or that the use of lead should be prohibited?—I should be disposed to say that I should prefer the use of lead being prohibited.

9112. (Dr. Collis.) You mentioned that you knew of one case of severe illness due to lead?—Yes, an alleged case. I have heard it said of this man that he would make a very fine cask of white lead if he was ground up. His, as far as I know, is the only bad case of lead poisoning that I have any personal knowledge of, and I understand that I am only required to give evidence of things which are the result of my own personal observation and experience.

9113. When did this illness occur?—That I could not tell you. I have known this particular man personally for about twelve or thirteen years.

9114. When did you become acquainted with the fact that he suffered from illness due to lead?—Then.

9115. Twelve years ago?—Yes.

9116. And not at all since. Has he remained in your employ?—Yes, he has remained in our employ ever since. He has been away a few times, but not much.

9117. He is still in your employ now?—He is not at work for us at the moment, and he has not been for a week or so, but he regards himself as one of our regular men, and unless he was very hard driven I do not suppose that he would seek work elsewhere.

9118. He has had no serious illness recently to keep him away from work?—No.

9119. You mentioned that you thought that respirators might be of value. What is your experience of respirators?—None whatever.

9120. So that your suggestion is rather hypothetical?—Exactly, purely.

9121. Could you tell me at all what is the constitution of these liquid paint removers about which you spoke?—No, I could not. There are one or two on the market now which are very very powerful, and which I have tried just recently myself. I have observed their action.

9122. I understood you to say in your examination-in-chief that nothing will convince you that the fumes from burning off old paint would be dangerous?—No I did not say that nothing would convince me that they are dangerous. What I did say was that if medical evidence to the contrary was brought before me I should bow to it, but I should still hold my opinion. But I am open to conviction.

9123. I do not detect the difference?—As far as my own experience and observation go, I see nothing to make me grasp or realise that any serious amount of lead could get into the system through smelling the fumes from the burning off. That is my point.

9124. Experiments were carried out for this Committee in the burning off of old paint, and the analyses showed 3·4 milligrammes of lead in 10 cubic meters of air on one occasion, and on another occasion 1·3, on another occasion 0·3, and on another 1·2. Would such results as those in any way cause you to modify your opinion that there can be no danger from the burning off of old paint?—I did not say that I thought there was no danger from it, you see. What I say

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is that I have not realised and cannot realise—I will put it that I have not realised that there can be danger.

9125. But my question was this: Would these analyses cause you in any way to modify the opinion which you have already formed. I did not ask the opinion you have already formed?—Yes, I should say that they would to some extent. On that point, as I say, I am open to conviction.

9126. (Mr. Parsonage.) Are Shoobreds members of the Master Builders' Association? I understood you to say they were?—Yes, I believe so.

9127. But do you know that they are members, because I have reason to think that they are not members of the Master Builders' Association? You do not know positively?—I know positively that they have been members of the Master Builders' Association up to this year.

9128. I will accept that?—The paying of the fee does not come under my personal observation. I assume that the firm are still members. They were up to a few months ago at any rate.

9129. You have not been foreman for Shoobred's for so very long, have you?—I have been in charge of the decorating department of Messrs. Shoobred for five years. For seven years previous to that I was in charge of the whole of their outside work.

9130. Men may have worked for Shoobred's and have suffered from lead poisoning without it coming to your knowledge at all?—I am quite prepared to grant you that. That I have no knowledge of.

9131. Does your firm provide towels and allow time for washing the hands?—Yes, we provide ample accommodation in that way, and soap.

9132. I am very pleased that they do. I know that they do, and I wish that all the other firms in London did the same?—Why did you ask me the question if you knew?

9133. I wished to bring it out. I have asked everyone that question. In your case it is quite correct that your firm does allow time and also provides washing accommodation?—Accommodation exists in 90 per cent. of the London jobs, which are probably done in empty houses, and the ordinary conveniences of the house are at liberty for use, of course. But, assuming that that is not so, we provide everything in the shape of soap, towels, and everything else, and pails, that the men need for personal cleanliness.

9134. On country jobs your men work 12 hours per day?—Yes.

9135. And on all country jobs you provide a mess-room apart from where the painting work is done?—Yes.

9136. And also someone to cook the food for the men?—Yes.

9137. (Mr. Gardner.) When you say that you have not known of men being off work through illness due to white lead or due to lead poisoning, I suppose you mean that they were not off due to direct lead poisoning, that is, they were not off through colic or dropped wrist, or anything of the sort. If they had been off for that, you would have said that they were off for lead poisoning?—If I had known of it, certainly.

9138. But are you aware that Bright's disease and phthisis and some other things are aggravated by lead?—I am not aware of it. I can quite readily understand that they would be.

9139. A man may be off through these troubles and you would not know anything about it?—The particular reason why a man is away is not reported to me as a rule.

9140. Owing to the intermittent nature of the employment of a painter, men might very often be ill and you would know nothing whatever about it?—No. I should know very little about their personal affairs and movements when they were not employed by us.

The witness withdrew.

## TWELFTH DAY.

Thursday, 1st June 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (Chairman).

Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B. (Oxon).  
Mr. F. G. RICE.  
Mr. W. G. SUTHERLAND.

Mr. A. GARDNER.  
Mr. J. PARSONAGE.  
E. A. R. WERNER (Acting Secretary).

Mr. A. G. WHITE examined.

9141. (Chairman.) Do you attend here to-day as the secretary of the National Federation of Building Trades Employers of Great Britain and Ireland?—Yes.

9142-3. Before becoming secretary of the federation were you an employer in the building trade?—I was.

9144. For how long?—For about twenty years.

9145. What is the average number of painters employed by your firm?—It varied a good deal, but somewhere from 100 to 200. Sometimes we had much more than that.

9146. An average of 100 to 200?—Yes, I think so.

9147. What cases of lead poisoning can you recall among your workers?—I can only recall three cases.

9148. Covering what period?—In the period I refer to—twenty years.

9149. What was the name of the firm you were with?—Alexander White and Sons, of Liverpool.

9150. Your experience as an employer was prior to the Workmen's Compensation Act of 1906, I suppose?—Yes.

9151. Did your men have occasional attacks of illness due to lead apart from the serious cases you mention?—There was occasionally colic. One used to hear occasionally that a man was off. We inquired what it was for. He had a little touch of colic.

9152. Did you have periodical medical examination of your men?—No.

9153. Is it not possible that some of them might have suffered from the slower and more insidious forms of lead poisoning without you knowing it?—It is possible, but there was no evidence of that to the ordinary observer.

9154. Not one way or the other?—No. We could not say that the men were inefficient or unable to follow their occupation.

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Mr. A. G. WHITE,

[Continued.]

9155. If you had had the men medically examined, you would have ascertained at once whether slight attacks of lead poisoning had occurred amongst them?—Yes.

9156. I will now ask you a few questions which you will kindly answer in your capacity as general secretary to the National Federation. The question of the prevalence of lead poisoning among house painters has been discussed at your meetings, has it not?—Not in any general way. It has occasionally been mentioned, but not as a specific discussion.

9157. Have you collected any statistics from the branches of your federation?—Only such as I have given you.

9158. What are they?—In what I sent in I mentioned the information I had, consisting of communications received from our branches and certain statistics which I had gathered together from time to time.

9159. What is the purport of these communications from your branches?—The purport of the communications from the branches is to show that the disease is not at all common, in most cases very rare, and that the tendency of the statistics is to show that it is rather on the decline.

9160. (Mr. Sutherland.) Have you those statistics?—Yes; I sent a copy to the Committee, and I have them here. With a view of eliciting information from the membership of the federation, I issued a circular letter of inquiry on 1st March last, which has so far yielded the following results: The Southampton and District Association says no cases of poisoning have come to the notice of any of the members. The secretary of the Lancaster and District Association says: "I have brought your circular before my committee and also before a meeting of painters and plumbers. So far as we can get any information on the subject there have not been any cases of lead poisoning during the last thirteen years, and the average number of painters employed is about 60." The Portsmouth and District Association says: "As regards the question of lead-poisoning cases these appear to be 'practically nil'; and the secretary encloses several letters from members of his branch emphasising the necessity for cleanliness and so on. The secretary of the Otham and District Association reports: "I have brought your circular on the above matter before my association, and am instructed to inform you that 'not one of the members present at the meeting could recall to mind a case of lead poisoning in this district for many years past.'" The secretary of the Nottingham and District Association reports: "In reference to your circular of 1st inst., I find that one of my members, who is a master painter, has already handed in his name some months back to give evidence on the above matter. He informs me that in his own experience of 45 years as workman and master he has never had before him a case of lead poisoning." The Liverpool and District Association has appointed two members, Messrs. Griffiths and Morton, both experienced master plumbers and painters, to give evidence before this Committee. They do not state whether they have had any cases of lead poisoning or not. The Newcastle and District Association referred my circular to the local Master Painters' Association, who are probably submitting evidence through the National Association of House Painters and Decorators. Dublin have done the same. Mr. McIntyre, of Dublin, says: "Dear Mr. White,—Your letter to Mr. John Good re Home Office Departmental Committee on dangers attendant on the use of lead in house-painting was sent on to me through Mr. Sibthorpe, to whom Mr. Good sent it. I have given some time to gathering statistics of the nature asked for, and to a certain extent succeeded. My information as far as definitely stated herein is absolutely reliable. Since the present Act came into force on the 1st July 1907 this association has had its risks under the Workmen's Compensation Act in three separate offices. The statistics I now give are official, and the communication now lies before me. From 1st July 1907 to 30th June 1909 three cases occurred, none of them fatal. From 1st July 1909 to 30th June 1910 three cases, one alleged permanent disablement; two

fatal, a plumber and a painter. From 1st July 1910 to date hereof, two cases, one trifling, which was settled for a small payment, and the second is alleged permanent disablement. These cases cover all Ireland as far as this association is concerned. The number of workmen is not so easily got at, but the Dublin district holds 400 Amalgamated Society men officially furnished to me by their delegate. The Metropolitan (old) did not reply to my letter, but I should say it is less; from 250 to 300 would be about right. In addition to this, you might put the non-society men at about 300 more. This association covers Belfast, Derry, Limerick and Cork."

9161. (Mr. Sutherland.) Mr. McIntyre is the president of the Association of Master Painters in Ireland?—Yes.

9162. (Chairman.) Have you analysed these figures with a view to bringing before us any deduction from them?—I have not analysed those figures. I only received them yesterday.

9163. Have you analysed any of the figures?—The only figures that I have taken into consideration are the official reports which I have referred to here—Board of Trade publications. Those are the only ones I have analysed in any way. Later on I wish to call attention to the Board of Trade publication of Workmen's Compensation statistics, Od. 5386, and quote cases which show that there is a considerable prevalence, equal to 15 per cent. (497), of lead-poisoning cases out of 3,313 cases of disablement without touching the house-painting or building trades at all.

9164. (Dr. Collis.) Is it claimed that some of the cases which we at present ascribe to the house-painting trade are cases occurring in factories?—I do not know what you ascribe to the house-painting trade.

9165. I only ask whether that is the purport of your evidence?—The purport of my evidence is to show that lead poisoning in the house-painting trade is not a serious evil, and that it is a diminishing evil, and can be remedied by reasonable regulations. That is the purport of my evidence.

9166. (Chairman.) That is only an assertion?—Yes.

9167. You must not come here to make assertions. We want facts?—I am giving the facts which I think bear that out.

9168. You shall have an opportunity of proving anything you wish to prove. Did your association ever attempt to collect statistics concerning the number of days' absence from ill-health among painters as compared with workers not in contact with lead?—No.

9169. Did your association ever consider the advisability of having a medical examination made of persons employed?—No; we have no right to make such a medical examination.

9170. But you had perfect liberty to do it?—I think that we should have got into trouble with the workmen; if we had tried they would have objected.

9171. In other lead industries it is compulsory?—It may be, but it is not in our trade.

9172. Would not this have been the best way to discover the proportion of painters showing symptoms of lead impregnation?—Yes, if it had been within our power to do it, certainly; but a voluntary association cannot expect its members to comply with regulations of that sort. They will not do it. We have no power.

9173. You think that, before you do anything of the sort, it ought to be on the initiative of the Home Office?—It would have to be under compulsion by law, or else they would not do it.

9174. Has your association ever taken any collective measures to discover a substitute for white lead in paints?—No.

9175. There are a number of substitutes offered on the market, the makers of which claim that they will successfully replace white lead?—I have heard of such things. I have not found anything satisfactory.

9176. Has your association carried out any practical tests with these?—Individuals have tested them, of course, but not as an association.

9177. We have been told that the extent of the danger of lead poisoning to which house painters are

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[Continued.]

exposed is not fully realised by many employers?—Well, I do not agree with that statement.

9178. Do you infer that the employers do know the extent of lead poisoning?—I think that they realise the danger, and take all reasonable precautions against it as far as their powers go. That is my experience. They may not realise the extent in the sense that they have any statistics before them. They can only go on their own personal experience. They have no other information.

9179. But do not you think that your association should have taken the Board of Trade returns, published every month, and had these discussed before the general body of your association with a view of bringing out the alarming condition which these figures suggest?—I do not know, I am sure.

9180. You do not think they ought to have done that?—Well, I do not think it is for me to express an opinion.

9181. But have you, as secretary, ever suggested it?—No, I have never suggested it.

9182. Did you yourself realise the magnitude of this lead poisoning evil?—My whole position is that the magnitude is very much exaggerated, as far as the painting trade is concerned.

9183. Do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—I do not know that I know it of my own knowledge, but I am quite willing to accept such a figure if you state it.

9184. And that the death rate from Bright's disease and nervous diseases and phthisis due to work in lead is very high?—No. I could understand that if a man's system was reduced by lead or any other poison he would be more liable to take diseases. May I refer to the 284 cases in 10 years. Are there any figures as to the number of workmen that refers to?

9185. No; we have not the return. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same 10 years?—No, but I am quite willing to accept your statement that it is so.

9186. Do you realise that these cases reported voluntarily are only a fraction of the whole, inasmuch as the Home Office have no legal right to pry for such reports and are therefore bound to discourage reporting to some extent?—Yes; they are probably only a fraction of the whole, but they may be a very large fraction; I could not say.

9187. Have you seen a copy of the Board of Trade Labour Gazette which was published in the middle of May?—I think I have. I do not know whether that is the one I refer to here. I saw some figures.

9188. The table at page 187 of that issue shows a definite increase in the deaths from lead poisoning amongst painters?—Yes. I suppose it has been more fully reported now, has it not?

9189. No. The deaths are reported, in any case?—Yes.

9190. Eighteen deaths in the first four months of the year, and only 12 deaths in the first four months of last year, which shows that, at any rate, the death rate is not decreasing?—It is heavier.

9191. It is heavier. The gravity of the danger is seen if you compare these figures with those for all lead industries under the Factory Act, in which there have been 10 deaths in the first four months of this year and 15 deaths in the first four months of last year?—Your point being that there are more deaths in the house painting and plumbing than there are in lead industries proper?

9192. Yes?—I should think that that is probably so. It bears out what in my opinion is the trouble which wants proper regulation. There are precautions taken in lead industries which are not taken in ours.

9193. How do you reconcile those figures with the reports you have submitted to us from various branches where, with the exception of Ireland, not a single member of the associations which have reported has ever heard of a case?—I think that I can account for it. The people that you get the reports from through us represent the best employers in the trade. Employers

of a lower class do not as a rule belong to our organisation. The members of our association take care of their workpeople, and they take precautions. If you walk about the country, going to any railway station, you will see the class of men painting there with no overalls on—beastly dirty clothes and no precautions whatever taken. That class of men, I have no doubt, suffer extremely from lead poisoning. But with regard to that class of men you are not getting any evidence from our members.

9194. Could you tell us the number of men that these firms employ who have reported that they have had no cases?—No, except so far as they give them themselves. I do not know. I tried to get information. I wanted the number of men referred to. That was part of my inquiry.

9195. Without going into it closely, as far as I have seen in the aggregate they come to a very small number. If you say they are picked men employed by the best class of employers, that evidence is not of very much service to us?—Except this: I want to impress on this Committee that this trouble can be kept down by proper precautions, and that those employers who take such precautions do not have the trouble.

9196. In your proof you refer to a statement made by Mr. Gibbs, the secretary of the National Society of Operative House and Ship Painters, before the Departmental Committee in 1907, on the dangers attendant on building operations?—Yes.

9197. Would you kindly read the paragraph that you wish to quote in relation to lead poisoning?—Do you want me to read it?

9198. Or I will read it for you, if you like?—Yes, if you please.

9199. The following question was put to Mr. Gibbs: "I notice in connection with lead poisoning that, during the last twelve months, you have had no less than nine members of your society rendered totally unable to follow their occupation owing to the effects of lead poisoning. About how many members are there in your society?" Mr. Gibbs replied: "Roughly speaking, about 17,000." That refers to the period 1905-6. Now the quotation speaks of nine cases of total disablement in that year. Does that not appear to you to confirm the serious figure already quoted?—Well, I quoted it to show that when you refer to the large number of men it is among, the number of cases is small per thousand.

9200. I have just sent for the statistics of compensation for the year 1909, referred to by you,\* and I find that those statistics do not include anything relating to the painting of buildings, for the following reason. In the introduction to that document it states that the statistics in these tables are obtained from the returns made by or on behalf of employers in pursuance of the order of the Secretary of State under section 12 of the Act. Section 12 gives power to the Secretary of State to require every employer in any industry to which the Secretary of State may direct that this section shall apply to send to the Secretary of State a correct return specifying the number of cases in respect of which compensation has been paid by him under the Act. The order made by the Secretary of State on the 15th June 1908 directed that the industries to which section 12 of the Act should apply should be as follows:—Mining, quarrying, working of railways, any industry under the Factory and Workshop Act, 1901, the business of a harbour, dock, wharf, or quay, and constructional work which shall include the construction of railways, tramways &c., but it specifically says at the end that it does not include the construction of buildings. You also refer to the number of lead poisoning cases for which workmen's compensation was paid in 1909, namely, 497 out of the total of 3,313 cases under the Workmen's Compensation Act?—Yes.

9201. How many of these 497 cases do you consider arose from the building trade?—It will be noted that the bulk of the cases are reported from factories; of these only some of the woodworking section can be

\* See Question 9163.

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held to apply to the building trade, and in that section only two lead poisoning cases occur out of 497. The only other section where the building trade is concerned is that given as "Constructional Work," which only covers the construction of buildings when they form part of an engineering work; here again there are only four cases out of 497. Two refer to the woodworking trade and four to constructional work, and the building trade portion of the constructional work is very small. It is only where on the railroad a station is built or on a dock a small house is built.

9202. (*Mr. Parsonage.*) Do you mean only two cases of compensation to painters?—That was in the wood-working industry. Whether it was painters or not I do not know.

9203. (*Dr. Collis.*) From what are you quoting?—From the Board of Trade statistics.

9204. Are you aware that the cases published in the Board of Trade report are only those which are disputed in the Courts and only represent perhaps one-tenth of the total cases which occur in the Kingdom?—I have no idea what percentage it is.

9205. Neither have we, except that we know that they contain a very small fraction of those notified with regard to factories quite apart from those outside. If there is no dispute on the case and the claim is paid immediately, it does not come to the notice of the Board of Trade, so that the returns are most incomplete?—I do not want to press this too far. My point is that the building trade cases are extremely few out of the total.

9206. (*Mr. Parsonage.*) What year was this?—1909.

9207. How do you explain the smallness of this number?—I do not know; I have not attempted to explain it.

9208. It does not coincide in any respect with the figures that the Home Office have got of certificates of death?—I cannot reconcile it.\*

9209. Nor does it take into account the fact that there were 2,000 cases reported voluntarily to the Home Office from the doctors in the country. Do you not think that it is rather due to the fact that a very large number of painters suffering from lead poisoning have not claimed compensation?—They have only just been able to obtain that within the last four years.

9210. (*Chairman.*) You said just now that you did not wish to make too much of this. You do not assume, I suppose, that those are the only cases that have happened in your industry?—No, not in the least. My evidence is rather cumulative in its effect. The next point bears out again what I have said. This deals with the death rate.

9211. What have you to say about the death rate amongst house painters?—I had occasion to get this information for another purpose altogether, and I obtained it by application to the Registrar-General's Office. It refers to the period of 1890-92, according to his report. I have this: "Bricklayers, 14 per 1,000; carpenters and joiners, 11 per 1,000; plasterers, 14 per 1,000; painters, 13 per 1,000; masons, 14 per 1,000; slaters and tilers, 17 per 1,000; plumbers, 13 per 1,000." My object is to show that there is no extraordinary death rate among painters and plumbers as compared with other trades.

9212. (*Dr. Collis.*) Are the painters a pure class?—These are according to the Registrar-General's returns, and that is all I know about them.

9213. (*Chairman.*) Probably all these death rates which you have quoted are higher than that for all males, but that the trades of bricklayers, plasterers, and masons and slaters and tilers are very dangerous, and the death rates for those might be expected to be considerably higher than that for painters because of accidents?—But you are going to legislate particularly for painters on the ground that they are so affected and that there is such a high death rate amongst them.

9214. (*Dr. Collis.*) With regard to the high death rates, you have not stated the age constitution of these people. No death rate can be read without that?—These

were not obtained for this purpose, but for another purpose I had the information, and it appeared to back up my view, and that is why I brought it.

9215. But it does not back up anything unless you can give the age constitution. Take an age constitution in which there are 1,000 people with no one over 50, the death rate may be only 10. Take an age constitution in a case like that of agricultural labourers, 60 to 65 and over, the death rate may be 14 or 15, and yet the latter people with that death rate may be far more healthy than the others: so the figures of mortality you have at present stated have no meaning without the age constitution?—I submit that, when viewed comparatively, they have a meaning.

(*Dr. Collis.*) I submit that you do not understand the figures, sir.

9216. (*Chairman.*) Are you aware that the average age of all painters as compared with all males is between eight and nine years less?—No, but I would not alter my faith in these figures unless I heard the death rates for the others. Take slaters and tilers, for example.

9217. I understand that the median age at death of a painter is considerably below that of all males—between eight and nine years lower; and that the median age at death for carpenters and joiners is 56 to 57, which is eight to nine years higher than for painters?—What is the median age for painters?

9218. From 48 to 49?—What is it for bricklayers?

9219. From 52 to 53, which is four to five years higher than that for painters?—What is it for slaters and tilers?

9220. In the case of slaters and tilers the figures that we have are very small, and any deduction must be received with a good deal of caution, but even those show the median age at death to be four or five years higher. Now I put this question: with these things before you, do not you agree that the occupation of painters is an extremely dangerous one?—I agree that it is a dangerous one.

9221. Extremely dangerous?—I do not know that I would say that it is extremely dangerous.

9222. How do you account for the median age at death being so much lower than that of any other industry?—There is a good deal to account for it. A painter's life is a very irregular one. He is heavily employed during the spring and summer months. He works long hours in the summer time, and during the winter he is starved, or nearly so; a great many of them are. It is usual to turn off all the men except a few of the best hands, and I have been very sorry many times at what I have had to see painters suffering in winter time. That must tell on the death rate.

9223. I am sure you will agree with me that all this sickness and death is very deplorable?—Yes.

9224. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes, it has attracted attention abroad; that is true.

9225. The use of white lead has been prohibited to an appreciable extent abroad, and the work of painting has been most strictly regulated in many countries where the use of white lead is still allowed?—I believe that it is regulated in Germany, and that the regulations have been successful in diminishing very largely the amount of the trouble. I understand that it is prohibited in France at the end of five years, which expire, I think, in 1914. I do not think that the prohibition has come into effect yet. There is, however, a very large loop-hole there for exemptions, which makes it very doubtful, to my mind, whether the Act will be effective.

9226. It has been prohibited in Austria for interiors for the last two years?—I am not aware of that. I understood that there was practically no regulation in Austria of any consequence. They do not allow you to use it, I think, in powder form.

9227. Do you not think it regrettable that this country should be behind other nations in this respect?—I agree that the industry ought to be regulated.

9228. Now a great many small dangers attend the use of lead. I am going to ask you some questions

\* The return referred to by this witness does not include ordinary house painters. See Question 9200.



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with regard to the various operations, and I should like you to remember that the evidence produced to a former Committee showed that it was the multiplicity of small dangers in the industry which made up the great evil; for instance, the risk of contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—I do.

9229. Then you consider washing accommodation essential?—Yes.

9230. Including the supply of hot water for washing?—Hot water would take it off easier than cold water.

9231. Is it generally practicable for the men to have hot water to wash in?—Yes, it is generally practicable if they like, because there are always size cans, and water has always to be on the painter's job, and heating arrangements always have to be there.

9232. Would you say that there would be no cases in which it would be impracticable?—Very few in which it would be really impracticable.

9233. We have had evidence to the contrary?—There might be cases. I once sent a man to the Isle of Man to paint a lamppost standing at the pier head. It would have been impracticable there.

9234. For example, when the exterior of a house only is painted and the men are not expected to go inside for any purpose?—The men have to get their meals somewhere, and they generally require water, even if the outside of the house only is being painted. It is a necessity of painters' work, and they must have some means of cooking their food, and where they do that they can get hot water.

9235. Is it not rather a pious hope on your part that they can get it? Would you say that they can invariably get hot water in such cases?—I say there is no good reason why they should not have hot water, and that if it was made necessary that they should have it they could get it. At present it is not made necessary.

9236. If the Home Office made it a compulsory rule that employers were to see that hot water was provided for the men to wash with before meal times, do you think that the employers could put that into practice?—I think so.

9237. Do your painters wear overalls?—My painters did; I would not have them on the job without.

9238. Did you supply these?—No.

9239. Would you object to a rule that overalls are to be provided and maintained by the employer as is prescribed in other lead industries?—Yes, I should object for the reason that the employers in a lead industry, like a factory where the same men are employed continually, are in a very different position from the employer who takes on a number of men for a month or two, and then disposes of them, and has all these clothes left on his hands. Next year another lot of men come. He does not know what will fit and what will not. He would have to have a slop shop. We do not always employ the same men, you see.

9240. Are you aware that in the china and earthenware trades, where this rule has just been introduced, there are a very large number of casual labourers taken on from time to time for whom overalls have to be provided?—Then they have to have something like a slop shop. It might be practicable in a case like a factory, but it would not be practicable in the case of ordinary painters with so many small employers.

9241. How often are the overalls washed?—We require them to be clean on Monday morning.

9242. Would you be prepared to arrange for the overalls to be washed at your expense, as is done in other industries where lead is used?—I do not think that it is reasonable, but I would not mind. I think that the men ought to have them done at home. It would be very much easier.

9243. It is insisted that lead workers in other trades shall not take overalls home to be washed, owing to the danger that that involves?—That might be a good ground for it; but I can see considerable difficulties in carrying it out, because men have to go to country jobs.

9244. Where do the painters keep their overalls when they go home?—Usually there was a place found for them in the cellar or in the stables as the case might be, and they used to undress there, change their things, and leave them there.

9245. A good many employers have said that very often the overalls are kept in the paint shop?—I dare say it does obtain, but usually it did not obtain with us; because we used to expect the foreman who had charge of all the paint, and so forth, to keep them quite separate for other reasons than this.

9246. You understand the danger which would ensue if the overalls were allowed to be kept in the place where the men had been working, and so to allow an accumulation of dust on the overalls. That is one of the small dangers that I referred to?—I think that it is a very small one, but there may be something in it.

9247. I assure you that in the pottery industry it is one of the real dangers, because the very fact of the overalls becoming impregnated with continuous layers of dust means that only a touch creates a dust?—But in the paint shop to which you refer there is less lead dust than anywhere. The lead dust is on the job where the men are rubbing down or doing the actual work. It is only lead paste that we use, not the dry white lead.

9248. Is it not the fact that in some cases the overalls are left in the rooms where the men are actually working?—It might be so in some cases.

9249. But can you always provide a place for the painter to hang up his coat where there would be no risk of dust falling on it?—We could if we had to.

9250. But at the present moment you do not?—We do not take the trouble. We try to make the men comfortable. When I went to a customer to make arrangements, I used to ask, "Where can my men have their workshop?" and so forth.

9251. Do you advocate a rule with regard to meal-rooms, so that no man shall eat his food in a place where paint is being handled?—I should decidedly agree with such a rule.

9252. Is it a fact that in a great many cases, now, the men eat their meals in the rooms where they are working?—They sometimes do, but there is no real need for them to do it.

9253. Would it be very difficult to carry out the rules that I have foreshadowed for these various operations in connection with house painting?—There is always difficulty in carrying them out, but if they are necessary, it will have to be done.

9254. But is it always possible to insist on the observance of such rules as those which I have put to you? How would you know whether a rule was carried out?—I suppose that the responsibility would be placed on the employer to carry out certain regulations.

9255. Yes?—He now has to carry out certain regulations under the Factory Acts, and it is only a few more of the same kind of thing. If he had to do it, he would do it. I do not say that he would like it; I am sure he would not.

9256. Now with regard to the processes. First, as regards the dry rubbing down with sand-paper. I understand this process is indispensable?—Well, I do not know that it is always indispensable. I have heard of it being done without. It is in general use.

9257. I do not want you to cite instances. I ask if dry rubbing down in some instances is indispensable?—In some instances it would be indispensable.

9258. In the majority of cases?—I will tell you what makes me hesitate. A few days ago I should have said yes, but I was told that it was customary in London (and perhaps Mr. Rice can help us in the matter) to use a wet process with sand-paper. That is to say, they use the sand-paper wet.

9259. You say that that came to your knowledge in the last few days?—Yes, quite lately; in talking over this very question.

9260. Was that brought before your association?—No; it was merely information given to me by another man in the trade; that was all.

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9261. You would not go so far as to agree to the prohibition of dry rubbing down with sand-paper?—I should not like to off-hand.

9262. Where dry rubbing down with sand-paper is indispensable, how can you prevent the worker from breathing the lead dust?—He could use a mask of some kind.

9263. Is your only suggestion that the men should be compelled to use a mask?—Yes, that is my suggestion for it.

9264. Is that a practical suggestion?—I think so. It is my own suggestion entirely.

9265. Have you seen a mask that would be suitable for the purpose?—No.

9266. Supposing that we cannot find a mask that would be suitable for the purpose?—I think that I could undertake to make one.

9267. Will you undertake that the men would wear it?—I could make one that would be no more objectionable to wear than a pair of motor goggles.

9268. The next process I wish to ask you about is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

9269. This gives rise to splashes which must frequently fall on the face of the workers?—Yes, they do get splashes.

9270. How can you deal with the splashes that arise from this operation?—You can only wash them off afterwards. They will not do any harm unless the workman gets them in his mouth.

9271. Then, with regard to stippling, does the same thing apply to stipplers? Do they get a certain amount on their faces and hands and clothes?—They get a little on their clothes. I do not think that they get much on their faces in stippling.

9272. Not much, but they get a little?—There is a certain amount of spray. I used to consider that stippling a flatted wall was one of the things that gave men colic sooner than anything else.

9273. Do you have old paint burnt off with a spirit or charcoal burner?—A charcoal or spirit burner.

9274. How can you prevent the worker from inhaling the fumes which arise from this process?—He would have to have a mask.

9275. It appears from your evidence, then, that there are certain indispensable processes, in carrying out which a painter must necessarily inhale some dust, spray, or fumes, containing lead. How are these dangers to be met?—My suggestion wherever there is any dust made, or where there are any fumes, is that a mask should be used, a small respirator, to cover the mouth and nose—to be used whenever working among lead dust or fumes, or when engaged in the flattening process. There is something analogous to it in the printers' operation, where they make matrices for printing. There they use lead and antimony, and it is very dangerous. They have to wear masks.

9276. If the men refuse to wear these masks on the ground that they are inconvenient or laborious in their work, what other suggestion would you tender to us for removing the dangers which I have enumerated?—I have no other suggestion than that.

9277. Is it possible to remove the dangers entirely in any other way than by using a substitute for lead?—I should not like to answer that without qualification. I consider that regulations properly carried out—

9278. You are going beyond my point. I have brought you up to this point—that you have admitted that there are certain dangers which the men must come into contact with, and you have suggested that those dangers might be removed by the wearing of a mask. I have asked you how, if the men refuse to wear a mask for any reason whatever, the dangers could be met. You say that you cannot suggest any other means?—I cannot suggest any other means. I would not like to say that there are no other.

9279. Then is it possible to remove the danger entirely in any other way than by using a substitute for lead?—The question does not seem to quite follow. Your question seems to go farther than your former question took me.

9280. Is it possible to remove the danger that remains when they will not wear a mask?—If they will not wear a mask to remove the danger that remains, I see no other way out of it but the prohibition of lead.

9281. Various witnesses have told us about non-poisonous substitutes for lead. Have you had any personal experience with such substitutes?—I have tried various oxide of zinc substitutes, but I have not found them satisfactory.

9282. You contend that white lead is better than any other paint that you have tried?—Better than any I have tried. I have never found an efficient substitute.

9283. Can you give us the reasons?—The chief reason is that its body, its covering power, is so much greater. It is also more durable.

9284. The Office of Works and many other witnesses have told us that they have succeeded in obtaining efficient non-lead paint. I assume that you would place some reliance on such evidence as that of the Office of Works?—I have no doubt they think they have got what they say, and perhaps they have up to a point. Whether that expression "efficient substitute for lead" goes as far as they think is another question. I doubt it myself.

9285. When you have the consideration of the health of a large body of working men in your mind, you do not want to be too hypercritical as to the words used?—No, I do not want to be too hypercritical, but we have to consider that house painting in particular is done not only for the preservation of the building, but that it is also done as a matter of amenity, as a matter of hygiene, as a matter of cleanliness, and a good deal of that work can be done or left undone. If you make it unduly expensive, it will be left undone, and the trouble as far as the workmen are concerned will be worse. They will lose with one hand what they gain with the other, if prohibition is to have that effect.

9286. The Office of Works tells us that the substitute they are using is not only as efficient as lead, but that it is just as durable. They have given it four years' trial, and they assert that it is as economical?—I should say that four years is an insufficient trial. Taking your question with regard to the prohibition of lead, I cannot think that the tests have gone far enough. Take, for instance, ship work. The opportunities for lead poisoning are very great in connection with the painting of the hull of a ship and the painting of the state rooms of a ship. They are very confined little places. Ceilings and walls and everything are painted, and there is every opportunity offered for lead poisoning to take place. If it would take place in a room like this, it would be far more likely to take place in a room like that. I am of opinion that no tests of a substitute can be considered generally satisfactory unless tried on a ship, because the circumstances are so different. The test that it has to stand as regards durability and satisfaction are much greater in the case of a ship than in the case of a house. I could give you other illustrations, but I merely give that one.

9287. What are the usual hours worked by your painters per week?—They are working now only about 50. Those are the normal hours. In the summer time they work longer. Within my experience they have been working as high as 55.

9288. Would you agree to the limitation of the hours of labour, say, to 48 hours a week?—If there was any particular advantage to be obtained by it, I should not object in the least.

9289. It has been agreed in the Potteries that that shall be the limit. The medical expert evidence showed us very clearly that the fewer the hours men worked in lead, the better it was for them?—I should see no objection myself to it, but I would like to say that some of the employers may kick about it; personally I would not.

9290. You do not have a periodical medical examination of your workers?—No.

9291. Do you know that, in other industries where lead is used, the Home Office insist on a monthly or even weekly examination by the certifying surgeon?—I should not object.

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9292. To bring this industry into line with others where lead is used, each painter would have to carry a health register?—Yes.

9293. He would have to see the appointed surgeon at least once a month, and the employer would have to pay the fee for the medical examination. Have you any objection to that?—I think that the medical examination might be a good thing.

9294. If a certain painter's health were found to be unsatisfactory, the surgeon would suspend him?—Yes.

9295. That is to say, that a man would not be allowed to work with lead for perhaps a fortnight or a month, and the employer would have to find him other work, or compensate him during the time. Would you agree to that?—I do not like to answer that.

9296. You realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the rigid observance of all precautionary measures, in the same way as in other industries where the workers handle lead. This will involve an extremely complicated and elaborate code of regulations. Are you fully prepared to set up the necessary machinery to secure complete observance of all the regulations relating to overalls, mess-rooms, washing accommodation, avoidance of dust, limitation of hours, and all other such matters?—Personally, I should not object.

9297. Taking all these points into consideration, would you say that you prefer that the industry should be regulated, or that the use of lead should be prohibited or very closely restricted?—This is what I think; I think you ought to have the regulations wherever lead is used. Where a painter does not use lead, and registers himself as one who does not use lead, and will not use lead, he should be free. I think then the thing would cure itself. If it was possible to find substitutes, the employers would find them to get rid of the regulations; but where it is not possible to get satisfactory substitutes then regulations would be required.

9298. You have told us that there are certain dangerous operations which can only be overcome by the men wearing a mask?—Supposing that this substitute that you have spoken about is used—the one that the Office of Works has found, the rubbing down of that substitute afterwards, if it has no lead in it, is innocuous, is it not?

9299. But that is not my point. I am speaking now of where there is no restriction on the use of lead. The evils exist in certain operations, and the only suggestion you can make is that the men should wear a mask?—I would make other suggestions that have a bearing on it.

9300. You have had every opportunity of dealing with them. You have told the Committee that there are certain operations, the dangers of which cannot be overcome unless the men wear a mask, and then I ask you if you have any other suggestion to make, and you suggest nothing. I ask you how the operations are to be regulated, and the men kept from danger?—I take it that the employer would be responsible for carrying out the regulations, and he would have to employ men who carried them out.

9301. Up to now you have only suggested that the men should wear a mask. I want to know what regulations you would suggest?—I did not think it was up to me to make a series of regulations. I was asked to make my suggestions as to the prevention of lead poisoning, and I have made certain suggestions in my proof.

9302. But you do not answer the question. I must go back to the rubbing down with sand-paper. You have told me that you prefer a code of regulations to the prohibition of lead. I want to know how you are going to get over the difficulty of sand-papering and the dangers which occur in other similar operations, if the men refuse to accept your suggestion of wearing a mask?—I cannot get over it if they refuse. I do not say that it is not possible to do it, but I have no suggestion to make.

9303. From your knowledge, the Home Office could not introduce a special rule to deal with that part of the danger?—But the men might not refuse.

9304. I am assuming that they do refuse?—How do they do in other industries where they have to wear a mask?

9305. But that is not the point. There is no industry where the Home Office insist on a mask being frequently worn, except with regard to the manufacture of white lead, and that is only for a short time, about two hours of the day?—I do not think that it would be necessary to wear a mask the whole time or anything like it. My suggestion is not that they should continue wearing a mask.

9306. You have not got over the point. You leave us where we were. If the men do not wear a mask, the danger is still there. That is what I want to point out?—I follow.

9307. (Dr. Collis.) You said, in your examination-in-chief, that you thought that the greater part of the evil of lead poisoning of which we have heard occurs among the smaller occupiers, who are unable to take special care about their workpeople?—They are not necessarily small firms. It is more a question of the class of work. Take, for instance, the work done about a ship's bottom.

9308. Shipbuilding would not be included in the statistics given?—The same class of men would be used for station work. It is a rough class of work. It is generally done by sailors or men who can climb, and it is dirty work.

9309. People like the National Society of House and Ship Painters or the Scottish Society would not be the class of people you include?—I do not know anything about their membership. They may have the kind of men.

9310. I understand that their men are men who have been trained under the apprenticeship system—the cream of the house painting industry. They are not casuals?—I do not know enough about them to form an opinion.

9311. If that is so, that they are from the better class of workers, you would not expect as much trouble from them as from the others, as I understand your evidence?—Probably not.

9312. We have statistics from these two societies that, out of 1,240 deaths, 39 were due to lead poisoning. When you take the excess compared with all males due to Bright's disease and consumption, you get it that about 13 or 14 out of every 100 of these deaths are due to causes connected with lead poisoning. You would consider that to be a smaller amount of lead poisoning than is occurring among the others, according to your evidence?—I do not follow your question.

9313. You said that lead poisoning was occurring more among the dirty and casual labourer. We have statistics here which represent the sickness of the cleanest and most respectable members of the house-painting trade, and these statistics show that between 13 and 14 of every 100 deaths that occur are due to the influence of lead, and, therefore, according to your evidence there must be a good deal more among the others?—I do not know.

9314. Excuse me; that is the logical inference from your own evidence?—The Chairman asked me how it was that our people had not had the same experience of lead poisoning cases as the returns you had appeared to show existed.

9315. May I put it in another way? Do the employers from whom you have obtained information employ the better class of house painters?—Yes, I am of that opinion.

9316. Now, taking the Irish cases, there were two deaths. Would you tell me among whom those occurred?—They occurred in 2½ years since the Compensation Act came into operation.

9317. I am referring to the two fatal cases which you mention occurred in Ireland?—From the 1st July 1909 to 30th June 1910 there were three cases; one was alleged permanent disablement; two fatal, a plumber and a painter.

9318. What were the numbers among whom they occurred?—My informant says: "The number of workmen is not so easily got at, but the Dublin district holds 400 Amalgamated Society men officially" furnished to me by their delegate. The Metro-

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"politan (old) did not reply to my letter, but I should say it is less, from 250 to 300 would be about right. "In addition to this you might put the non-society men at about 300 more." That is only Dublin, and the Association that it refers to, whose insurance statistics he is dealing with, covers Belfast, Derry, Limerick and Cork.

9319. Would it double those figures?—I have no idea. The painters in Belfast I should think would be a very large number. There is a lot of ship work there.

9320. You consider that in ship work painters are exposed to risk more than in house painting?—I should think so.

9321. And that the internal painting of ships is somewhat comparable with the internal painting of houses except that the danger would be greater perhaps?—Yes.

9322. You have suggested that precautions should be carried out to prevent it. Are you aware that in the Government Dockyards every precaution that can be suggested is carried out without waiting for any legal compulsion?—I was not aware of that.

9323. Medical examination, the supply of hot water for washing, towels, nail-brushes, wearing of overalls, and medical inspection of the men who are removed if there is the slightest sign of any trouble. And yet, notwithstanding that, in the Admiralty Dockyards it was impossible to bring down the number of lead poisoning cases. They began to fall during the last five years. When we enquired why, we found that it was because they had been substituting non-lead paints for lead paints?—Am I to understand that the Admiralty experience is that all the precautions are absolutely useless?

9324. The conclusion is that they have not prevented the occurrence of lead poisoning to any appreciable extent?—You very much surprise me, because our experience is that, if precautions are taken, the men are not troubled.

9325. I have not gathered what precautions you would suggest would stop it?—Those that I have suggested. These go further, and that astonishes me.

9326. But your precautions do not seem to have been used?—Our experience is that with no special precautions, but just the precautions which our experience has gradually forced upon us and upon the men, we find a very small number of cases out of a very large number of men, and I am therefore very much astonished when you say that all these elaborate precautions taken by the Admiralty have had no effect.

9327. You have no evidence whatever that your precautions are based upon experience?—I do not know where we got them from if we did not get them from experience.

9328. I do not know either. We have the Admiralty evidence that, notwithstanding these precautions, the cases continued to occur. You can give me no statistics of an employer who has been employing 100 people and had them examined, and supplied overalls, and given washing accommodation, mess-rooms, and the like, and produced less sickness among the men, than among 100 men where such precautions have not been adopted?—Our experience in our own business, which is a long one, shows us that the cases of lead poisoning are extremely few.

9329. May I suggest that you are ignorant of the cases that are occurring in the trade?—No, we are not ignorant of them. These cases come under our notice. I have evidence here from various people who have written to the same effect.

9330. How many people replied to you from Southampton?—I do not know how many the secretary represents. He might represent about a score of the employers.

9331. How many employers are there likely to be in Southampton altogether?—I do not know, I am sure.

9332. You have a reply from Lancaster representing 60 employers. How many would there be in that town altogether?—I do not know. It is not a large place. It is a very small place.

9333. You had some replies from Portsmouth. How many do the Portsmouth employees represent?—About 50 or 60.

9334. How many employers are there likely to be in Portsmouth?—I do not know.

9335. How many are there in the Oltham district?—Not a large number.

9336. You have some replies from Nottingham?—Yes.

9337. How many do they represent?—The Association is about 70 strong.

9338. How many in Nottingham altogether?—I think the Association is fairly representative of the trade.

9339. You have some information from Liverpool?—No. You have two witnesses coming from Liverpool. The Liverpool Association is well organised. It represents the trade fairly well.

9340. Those towns do not represent anything like the total employers in the district for which they speak?—I do not say that; but our experience, as far as it goes, is so contrary to yours that we find it difficult to understand it.

9341. (Chairman.) Precisely the same conditions prevailed in the potteries. There were 500 potteries, and 350 of them had no cases at all. The whole of the cases occurred in the other 150; so what you cite to-day does not prove anything with regard to the poisoning?—I would not have mentioned it, but I am surprised at the doctor's statement that all these regulations are absolutely ineffective.

9342. (Dr. Collis.) I suppose that the intermittent occupation of a house painter varies with the rest of the building trade?—Yes, it does a good deal.

9343. The fact that he may be thrown out of employment and consequently not be getting wages, and the effect of that on his health, would apply to the builders' trade as a whole?—No, not necessarily; it would affect joiners, for instance. When I said that it followed the building trade, I was looking at the general rise and fall in the building trade. You mean that the building trade as a whole is a season trade?

9344. Yes?—I think that the painter's trade is more distinctly a season trade than the rest of the building trade.

9345. More like paperhangers?—Yes; painters and paperhangers go together; if one is not busy the other is not.

9346. Yet I find that the paperhangers' medium age at death is three years older than that of a painter. He is apparently healthier?—He is a man who has served his time to the painting as well, generally.

9347. He does not seem to die with lead poisoning, anyway. Now where have you seen printers compelled to wear these masks?—I have not seen them at all, but a man who lives next door but one to me, who makes these things, tells me that he has to take this precaution to protect himself from the fumes. It is a very small trade, I understand, with a very few men: it is a highly specialised trade.

9348. You said that printers have to wear the masks?—I said that they are used in the particular trade I mentioned.

9349. I would not say for a moment that individuals in individual trades may not do certain things, but you said that they have to wear them?—I understood him to say so. I will ask him when I go back.

9350. There are no regulations, and they do not have to wear them unless they like. Now, you said that you were prepared to make a mask from your own ingenuity, something in the nature of motor goggles, which would be effective for catching dust and fumes. Will you be so good as to give me some idea of the line your ingenuity would take?—I cannot; I have not gone into it.

9351. We have gone into it a very great deal. A committee investigated the question of respirators, and reported in 1902-3 on the "Ventilation of Factories for the Protection of Workpeople," and decided that there was no form of respirator that it was reasonable to ask the workpeople to wear?—I was not aware of that. If that is correct, my suggestion is useless.

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9352. Then with regard to fumes, can you tell me what form of filter will stop gas?—You could not very well stop gas.

9353. And yet you stated that you were prepared to find a respirator to stop the gaseous fumes which arise from burning off paint?—It is not so difficult as you might think. A man, say, is burning off that door. He uses the light at a certain height, and the fumes rise above that height. If the intake of the respirator was below the height at which he ordinarily worked he would not get any fumes.

9354. He might just as well be breathing below that level without a respirator. I do not see that the respirator would be of much use in keeping off the fumes?—He can do without a respirator if he takes care to avoid the fumes.

9355. Where is the value of the respirator?—For the careless person.

9356. But the respirator will not keep off the fumes if a man is careless. A gas will go through any respirator?—Yes, but you could have the intake of your respirator in such a position that unless he stood on his head or something, he could not possibly get the fumes.

9357. Excuse my pressing the point; he has to breathe freely, and how are you going to allow it?—You have machines in coal mines, for instance, where there is trouble with gas.

9358. You want the painter to use such a mask?—No, I do not, but I say that it is not absolutely necessary that he should have the free intake immediately opposite his mouth. It might be in a position which would be below any line of fume.

9359. Whereabouts? You have given us, as a serious suggestion, the wearing of a mask. This subject has received attention from men like Dr. Haldane, one of the greatest scientists we have to-day, and from men of the greatest mechanical skill, and they have failed to discover a suitable mask. I want to know how you suggest you are going to succeed. You have not made a single experiment?—I should have thought that it was a simple thing. I have not gone into the matter. I have not experimented with it. That is all I say.

9360. If the preparation of a mask is the simple thing which you appear to consider it, has it not occurred to you that the Home Office would have considered it before they interfered with the processes of a trade? Do you think that we should be sitting here on a Committee like this without immediately having given such a point attention? As a serious practical man, do you not think we must have considered that first?—Well, I suppose so.

9361. (Mr. Sutherland.) Have you formed any estimate of the number of masters who employ painters in the United Kingdom?—No, I have not.

9362. For other purposes than this Inquiry, I have had on many occasions to address the employers, and for this Inquiry (unfortunately I have not the papers with me) I got three circular addressing companies to send me their estimates of master painters. I checked them from my own experience, and I formed the opinion that, subject to the actual returns from the Census, there are 22,000 or 23,000 master painters and London builders who overlap. I have made every allowance. I got out a circular to all our members for the purpose of this Inquiry. I had to whip them up twice. We have only 741 returns of employers, and the number of men they employ ranges from an average of 1 to 100. I asked them to fill up the average number of men and boys employed per week in 1910 as painters or as plumbers. A large number of our men do not touch plumbers' work. We got from 741 members a return of 9,224 painters, and 682½ plumbers. That gives us an average roughly of 12½. I estimate 22,000 as the number of master painters, so that by multiplying we get 275,000 painters throughout the United Kingdom?—I follow.

9363. I should think that there were not more than 20,000 plumbers. If you take off 20,000 for those, and say 250,000, that is sufficiently near, is it not?—If I had hazarded a guess I should have said a quarter of a million of painters.

9364. That gives us some data for getting at the relative percentage of lead poisoning?—That is what I would like to see.

9365. According to Dr. Collis, that works out at 1 per cent. of all deaths amongst painters?—The deaths, according to my return, were 13 per 1,000. Taking 1 per cent. of that would give you the figure.

9366. (Dr. Collis.) There is a difference between the percentage of deaths and the number that die per 1,000?—The deaths are 13 per 1,000 according to the figures I have given, and that on 220,000 will give you the number of deaths.

9367. It works out at 30 deaths per annum?—I make it at 28·60.

9368. What is the percentage of the whole number of men employed?—If it is one death from lead poisoning out of every 100, it is 1 per cent. of that. If 28 is divided into 220,000, it gives 13 per 1,000 employed as the percentage of deaths. The deaths from lead poisoning alone are 13 per 1,000 painters at work.

(Mr. Sutherland.) How does that square with your figures, Dr. Collis? Does it make any comparison between your figures and those that have been put in? Is there any basis of comparison?

9369. (Dr. Collis.) The two societies show a much higher death rate?—I suppose that their evidence is true and our evidence is true. There may be room for my figures being true on merits. The societies have opportunities of getting more information than we have.

9370. The societies show a larger proportion of injury due to lead than the figures which you have now given?—I see your point. This is directly in support of my contention that the damage is small compared with the total number of men employed.

9371. Yes, but it is a case of preventable damage?—I do not say that it ought not to be prevented; but I point that out.

9372. (Mr. Sutherland.) The experience of your members confirms the experience of a number of our members who have come before this Committee; men like Mr. Laidler, and Mr. Puttrel, and Mr. Barker?—I know those gentlemen.

9373. Mr. Laidler stated that he did not know of any case of lead poisoning in his own employ or in that of his father, extending over 60 years. Mr. Barker had three cases?—It is that sort of thing that I had in mind when I rather took exception to the view that is taken of the precautions of the Admiralty being inefficient.

9374. The point I sought to make before was that a man in good health does not realise the dangers of sickness, and men like our members, who conduct very good shops, and who are very largely exempt from experiences of lead poisoning, have not been called upon to summon the Association, or consider the question, or make provision for lead poisoning cases. There are general returns issued by the Board of Trade, I know, which everybody does not read unless his attention is specially drawn to them?—There has been nothing striking enough to induce our people to pay any special attention to this question.

9375. It is much the same with our Association. Now I want to ask your opinion of substitutes. In reference to a pigment like white lead, which has held its own successfully against the efforts of all the manufacturers of Europe interested in zinc and other substitutes, and which has maintained its character as a strong preservative, with good covering power and easily fixed; do you think that that could be set aside on the judgment of the Office of Works, with an experience of four years?—Certainly not. I think that there would be an awful row if it was, when the trade realised it.

9376. Do you know anything of the Office of Works paints?—No.

9377. I think that we may say that they have special formula, and in some cases they are proprietary paints, and in all cases they are more expensive than the ordinary paint mixed with white lead, pure linseed oil and pure turps, which give us a perfect paint, apart from its ill effects on the men. Now, with reference

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to the fumes of burning off; what do you think would be the average number of hours a man, taking painters all round, would work at burning off per week?—Taking one man with another it would be extremely small. You could hardly express it by a whole number.

9378. An average of one hour per week would you say, taking it all the year round?—I think it would be much less than that, taking it all the year round.

9379. So that really the danger from fumes of that kind is not serious?—It is very small, and it is generally done in the open air as well.

9380. You do not think that the question of an efficient substitute could be determined by the experience of one body like the Office of Works, with a restricted area of buildings such as they deal with?—Certainly not.

9381. Do you think that, for the purposes of this Inquiry, before such a drastic step is taken as the prohibition of so useful a pigment as white lead, some kind of test under an absolutely independent body of experts should be instituted?—Most certainly I do.

9382. How long would you give as the term of such a test?—I should think that somewhere round about ten years, probably, would be the time.

9383. I would be prepared to take a very much shorter time than that?—For some purposes I would, but not for all.

9384. Do you think that the test should include all kinds of purposes?—It should be tested for all kinds of purposes. It should be tested for iron structures such as railroad bridges, for buildings inside and out, and not only in one place but in many places, because paint behaves quite differently at the seaside from what it does inland. It should be tested for ships, particularly for the hulls outside, because paint behaves differently in different waters: If you send a ship with a certain preparation to the East, it may be quite satisfactory; but if you send it to the West, it may not. In fact, in all the arts where lead is used, it wants to be tested, because there are peculiar circumstances influencing it in all cases.

9385. (Dr. Collis.) Do you consider that this Committee is to make no recommendation short of ten years?—No, I do not. I say that the recommendation of this Committee might very properly be that there was evidence that it was extremely desirable to find a substitute for white lead, but that white lead is such a stable paint in use by all those who have occasion to paint structures of any kind that it is absolutely necessary before making any recommendation that a satisfactory substitute should be found and certified by an independent authority, but as to the time it would take would be for that authority to satisfy itself upon. In some cases there might be a *prima facie* case good enough to act upon even in a shorter time than I have said, but I am looking at this: Take the outside of houses in Liverpool, where my experience is. In some positions paint will last four years, in some positions it will last six years, and I have known it to last for ten years. That is for outside painting of cement. Take inside work. St. George's Hall is a well known building in Liverpool. When it was painted through the last time, it had not been painted for 18 years. The paint on all the walls and on the woodwork and grain-work was perfectly sound. A great deal of it was only repaired and varnished. Those are facts that you cannot very well get over.

9386. You are suggesting a very long period during which the experiments are to go on. What do you suggest is to go on during that time? The Home Office has appointed the Committee to examine into the question and make a report, and on the figures before us of illness occurring I am sure that the Home Office will not consider the question of postponing all action for ten years?—I do not suppose that they would. It will have to be regulated in the meantime.

9387. In what possible way can it be regulated?—You can regulate it, as far as possible. You may not achieve perfect regulation, but I do not say that there should not be any because it would not be perfect. The evidence of Mr. Laidler and other evidence and my

experience indicates that there is a great difference in certain circumstances in the degree of lead poisoning, and those circumstances are due to the precautions which some people take.

9388. But please keep yourself a little more closely to the point. You say that you would not personally be satisfied without something like a ten years test. What is to be done during those ten years?—I do not say that I should not be satisfied under a ten years test, but I think that the Committee themselves would not be satisfied altogether.

9389. I am not asking you to speak for the Committee, but I want your opinion?—My opinion is that it might take as long as ten years.

9390. Your suggestion is that some regulations, indefinite, should in the meantime be enforced?—Yes.

9391. (Mr. Sutherland.) You do not bind yourself to any term of years. You think that the decision as to that should rest with the Committee?—If such a Committee is appointed, certainly. I can only judge from my own experience.

9392. You think it very essential in the interest of all the trades concerned and in the interests of the public?—Certainly. I am looking at it all round. For one ton of anything else used by a painter, he uses 10 to 20 tons of lead.

9393. With reference to the attitude of the trade to this question, it does not matter to the painter if an architect specifies to him that he is to paint a house with milk and water, so long as the architect takes the responsibility for it?—Yes, but he does not.

9394. No, but if an architect specified for a man to paint a house with milk and water?—If he did it and it was bad, the responsibility is on the contractor.

9395. That is another question. The responsibility would be on the architect who specified?—On the contractor, excuse me.

9396. He might try to put it on him, but if the contractor carried out the instructions of his architect, he would be absolved from any liability. My point is this, that as a body, we, as painters, are not concerned selfishly in this question of lead?—No. We do not care a button if we can get anything else to do as well.

9397. If Parliament and the Home Office see fit to prohibit lead, painters will go on working with substitutes, but in my experience and in my judgment there is nothing to equal white lead now as a protective paint?—That is so.

9398. Do you think it desirable to mitigate some of these troubles by abolishing white lead for inside work?—You possibly might do that for inside work.

9399. We have a number of substitutes, basic articles, that can be used for inside work without damage to the public interest?—For domestic inside work?

9400. For domestic inside work?—Yes.

9401. You are strongly of opinion that the public interest would suffer if the prohibition was extended to outside work?—If it was a general prohibition, I am sure it would.

9402. You know that during the last 10 or 12 years in America and on this side tremendous efforts have been put forward to find a substitute that will give anything like the service of white lead?—Almost every manufacturer has been working at it in one form or another.

9403. In America it has been especially so?—I did not know that.

9404. Up to now nothing has been found comparable with white lead for general service?—I have never heard of anything.

9405. That in itself is strong evidence that the experience of the Office of Works should not be accepted as final on this question?—Quite so.

9406. Do you think that there would be any difficulty in separating outside painting, where lead can be permitted, from inside painting, where it would be prohibited. Do you think that there would be a likelihood of evasion if the penalties were made sufficiently definite?—I think it might be. There would be this about it: that the workmen would be perhaps considerably interested in reporting it, and they would have full opportunity of doing so, and if

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the workmen's interest was clear on the point, I do not think that any employer would venture to disobey. It would depend on the workmen.

9407. If a man attempted to evade a law that was passed in the interest of the health of the workman, he would fall very much in public estimation if he were convicted, would he not?—Yes, he would.

9408. If it were prohibited for inside work, you think that that fact would be a protection?—I think that the reporting by the workmen would be a sufficient check.

9409. A sufficient check on the master painter?—Yes, I think so.

9410. Would you prefer the abolition of it for inside work to the irksome regulations which the Chairman foreshadowed?—Yes, if we were left free to use it outside, but it seems to me like playing with the question.

9411. Inside and outside work are in two different categories?—Yes, but the inside work is such a small fraction of the whole use of lead (even if you take the inside and outside together it is a small fraction) in the arts, and I think that we are playing with it to take only that.

9412. This inquiry relates only to the building trade?—Yes. It is a very small fraction of the use of lead, and why should we put that trade to such great inconvenience where the larger portion of the evil is going to remain?

9413. Where will it remain?—In ship painting, and the painting of such bridges as the Forth bridge, and all the rest of it.

9414. That can be dealt with by another committee. Now in the case of railway stations where there is always the presence of sulphuric acid and sulphurous gas ascending, the paint is insensibly softened where zinc is used?—I have never seen zinc used in that position.

9415. No, but if lead is prohibited it will have to be used. The protective power is decreased, and therefore the resistance of the structure is weakened. That is one reason why it should not be prohibited for outside?—In so far as lead paint is a better protection than any other known paint at present, anything else must be inferior, and therefore more dangerous to the structure.

9416. Now if it is not prohibited but regulated, do you think that we could dispense with the dry rubbing down of inside work, because that seems to be the source of a great deal of the danger?—It is the source of a great deal of the danger. I do not say that it could not be dispensed with. I would not like to give a definite opinion about it without very careful consideration. If one was going to do the very best class of work inside one would rub down with pumice stone and water, even between coats. The use of the sand-paper is only a cheap substitute really, and for a minor degree of rubbing down I do not say that it is impossible to do away with it.

9417. The amount of time that a painter spends in rubbing down is relatively small to the amount of time he is engaged in painting?—Yes, very small indeed. A man goes over a door in a few minutes with sand-paper. If he is rubbing down with pumice stone and water he has to be much more careful.

9418. (Mr. Rice.) How long have you been secretary of the National Federation of Building Trades Employers?—For nearly six years.

9419. Have you received during that time any intimation from the Home Office, calling attention to the dangerous state of the painting trade?—No. The only thing was that there was an Inquiry with regard to scaffolding, and in connection with that there was something said about this trade, and we, I think, submitted some evidence in connection with that at the time. That is all that I have ever heard about it.

9420. But was it danger from lead or danger from scaffolding?—There was some suggestion that in connection with the scaffolding regulations there should be some provision for workmen having cleansing arrangements and so on; but nothing came of it.

9421. Apart from that you have received no intimation from the Home Office?—No, nothing official, or it would have been brought before the association.

9422. You have said that the employers among whom you have enquired have known very few cases of lead poisoning?—Yes.

9423. Is not that a reason why they would not fully appreciate the alleged dangers of the trade?—No doubt that influences their opinion. The general opinion of my trade is that this is really not a serious matter.

9424. And their reason for that opinion is that very few cases have come under their observation?—That very few cases have come under their observation.

9425. You have heard our Chairman ask you about the conditions that obtain in foreign countries, and on the prohibition or the limitation of the use of white lead?—Yes.

9426. Are you familiar with any of those conditions?—Only slightly; I know a little about them; not much.

9427. The Chairman asked you about Austria?—Yes.

9428. Do you remember your reply?—My reply to that was that in Austria the only prohibition is with regard to the use of lead as a powder.

9429. Not lead as a paste?—Not lead as a paste. That is not objected to, I think.

9430. How is lead used in England mostly?—In a paste.

9431. (Dr. Collis.) Are you certain that the statement with regard to Austria is correct?—I am under the impression that it is.\*

9432. (Mr. Rice.) Have you any experience of the Belgian regulations?—I have not any actual experience. I understand that there is some small regulation there, but I do not know its exact nature.

9433. You could, I suppose, conveniently from your position obtain all that information?—Yes, I can write for it if you like.

9434. Not from the official sources, but from the Federation of Belgian Builders, perhaps?—Yes, I could get information with regard to that, I daresay.

9435. And, if the Committee desire, you could probably find out from the Belgian builders whether the regulations are carried out, or whether they are a dead letter?—Certainly.

9436. Whether they are in actual use, or whether they are honoured in the breach?—Yes.

9437. (Mr. Sutherland.) You might ask whether they find the regulations difficult to observe or easy to fulfil. If we found that other nations submitted to them easily that would help us?—I will write at once.

9438. (Mr. Rice.) You could probably obtain the same information from France?—Certainly.

9439. Now with regard to the limitation of hours to 48 per week, do you think that could be simply and properly worked, seeing that it would mean opening the shops or the works at different times. I understood you to say that painters in some parts of England worked 56 hours per week, and I take it that their hours are the same as in the other trades?—They are not always the same. They are very often longer. There is hardly a place in England but what you can find some of the branches of the building trade working different hours. I do not think that that is a serious objection in an important matter like this. I think that the greatest objection would come from the men themselves. Painters desire to work as much as they can in summer and to average their wages for the year. The trade cannot be carried on in winter in the same way as in summer, and in all cases they seek overtime in the summer, and they would be probably the heaviest sufferers individually although there would be more men employed, and to that extent looked at in a broad sense it might be all right. The men themselves who have been accustomed to work overtime in the summer would no doubt feel considerable loss in their yearly earnings.

9440. I have in my mind London, where the hours worked in the building trade are 50?—I should have thought 50 preferable to 48. Fifty is a very fair time.

\* For Austrian Regulations, see Appendix IX.

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9441. That would be in accord with a considerable number of towns?—The tendency of the time all over the country is to come to 50.

9442. Now the Chairman said that the dangerous part of the trade is made up of many little things. Do you attach much importance to the necessity of dry rubbing down for instance, except with regard to the appearance of the work?—It has a certain effect in ensuring bite between one coat and the other apart from the appearance. That is the chief reason for it.

9443. To ensure a key or bite?—Yes.

9444. Is that essential?—It is very desirable. I have seen cases where coats have separated.

9445. But generally is it necessary?—I think it could be often dispensed with.

9446. The Chairman instanced the case of stippling and painting of ceilings?—Stippling is not very much done now.

9447. That is what I wanted to bring out. It is not so much done now as formerly?—No. Old-fashioned flatted walls are rather out of fashion.

9448. With regard to enriched ceilings, is it your experience that they are mostly done with water paints or distemper?—Mostly with water paints now.

9449. From which no danger would arise?—I should think no danger would arise, but I do not know what the constituents are.

9450. (Mr. Sutherland.) They are leadless?—They could all be done with water paint. You could prohibit the use of lead for ceilings. There are quite suitable substitutes.

9451. (Mr. Rice.) You do not wish the Committee to understand that the building trade employers hold a brief for the continued use of white lead?—Not the least. I have said so in my evidence.

9452. Your interest is to have an efficient substitute if lead is prohibited?—Yes.

9453. What is your reason for asking for that?—On general grounds. You must consider the public to some extent. You might say that war is a thing that ought to be put a stop to on the ground that it destroys life, but you cannot do it. You must have war. You must draw a line. And when the cost of regulation becomes very prohibitive and is going to interfere with the use of very important preservatives, and all that kind of thing, there comes a point where a line must be drawn. To my mind the line should be drawn where the cost of the work is seriously increased by prohibition as compared with regulation. That is my point—where the cost is seriously increased.

9454. (Dr. Collis.) Do you refer to the cost of the work to the public?—Yes. You cannot enhance the cost to a great extent without interfering with the use of painter's work as a whole, and that is going to reflect very seriously on the men themselves, and on everybody. If you make it too expensive people will not have as much of it. We know perfectly well that there are times when painting work is put off, and it can be put off almost indefinitely.

9455. (Mr. Rice.) One of the usual excuses for putting off painting is on account of the high income tax?—People say: "I cannot afford it just now. My wife wants the place done up, but I cannot afford it just now." It is put on the Budget, or on the want of money, or something else.

9456. (Dr. Collis.) The amount of ill-health occurring in the match-making trade, due to the use of yellow phosphorus, was infinitesimal compared with what is occurring in the house-painting trade, but the use of yellow phosphorus has been abolished. The total deaths in the last ten years before that Act was passed did not come to four. All the phosphorus cases only came to about 20 in ten years?—But I suppose that there was a suitable substitute available?

9457. The substitute is a more expensive thing?—I do not think that a moderate amount of increase would affect the matter. The point is that it shall be effective and not outrageously costly.

9458. When the point was before the House, it was considered that the public would suffer considerably and that matches would be much worse, but I do not know that they are much worse to-day?—I see your point.

9459. I have looked up the figures in regard to phosphorus, and find that in the last seven years there were nine cases with three deaths?—It is not a very large trade. It is very concentrated—in a few factories, I think.

(Mr. Sutherland.) The security of structures does not depend on what you use in matches, but in our case the structure is at stake.

9460. (Mr. Rice.) If an efficient substitute can be found and if it does not make the cost of painting so high as to prohibit or rather to diminish its use, you would agree?—Yes, I would agree with that.

9461. (Mr. Parsonage.) In the returns that you got from these employers, you got no returns of lead poisoning. They have very little knowledge of it?—Yes; they have very little knowledge of it.

9462. Would not that be on account of the employer generally not finding it necessary to make inquiries into the causes of illness of the workmen?—I can only judge from my own experience. My own experience is that, if a regular hand was absent, you would want to know something about him, but if he was a casual hand you would probably not bother much.

9463. The same thing as you were referring to this morning would account for the cases not coming before them?—Yes; it has not come to their knowledge.

9464. This morning you said that probably painters suffered more on account of their seasonal employment and being more liable to disease through being half-starved, as you said, in the winter-time?—Yes.

9465-6. My experience, taken from our returns, is that the death rate and the amount of sickness is higher when trade is good, and that has been confirmed by a debate in the House of Commons. Mr. Lloyd George, when he was speaking on the National Insurance Bill, mentioned that statistics proved that when trade was good and more men were employed, the rate of sickness was higher and the death rate was higher. I do not think it can be taken that the fact of the painter being out of work in the winter time has any effect on his health, except that being away from the paint for a month or two may make him more liable to have lead poisoning when he returns to work?—Supposing that you have a very busy summer, a man may be doing very well and he would probably spend a little more. Many men are rather lacking in foresight and providence, and they spend their money pretty freely when they are getting it.

9467. And so make themselves ill that way?—No; but when the winter comes, they are without work and without money. What you put to me does not seem to me to touch my point, because the men are more employed during the summer season and not during the winter season.

9468. I am taking the first three months of this year, January to March. January and February are the two worst months?—Not always; they used not to be with me.

9469. But on the average they are?—January is the worst month for painters. We used to get the ship work in January.

9470. That is localised. I am taking the whole country. Now you mentioned railway workers and that kind of men who did not wear overalls; but I am speaking of the best class of men, who have served an apprenticeship to the trade. We do not take railway men into our society because they get a lower rate of wages and they are not qualified men; they are good enough for ordinary railway work, but they could not do house painting. Therefore they are not qualified according to the rules of our society, so I do not think that what you said would apply?—My point was that that class of men largely created the heavy mortality.

9471. Now you mentioned Dublin, and you gave the number of men employed. I have four cases here of total disablement, paralysis, and blindness from lead poisoning. This last month we have disposed of two cases, one at Kingston, just outside of Dublin, and one in Dublin, of paralysis and lead poisoning?—The cases I gave you from Dublin were entirely cases where workmen's compensation had been paid by insurance companies, and they did not go beyond that.



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Mr. A. G. WHITE.

[Continued.]

9472. Now, with regard to dry rubbing down, you said that you had been led to believe that dry rubbing was being dispensed with in London, or that sand-paper was being used wet?—Yes, I was told so.

9473. Were you led to believe it?—The statement was made seriously by a master painter.

9474. You mentioned that Mr. Rice was aware that the statement was made to you, did you not?—No; I thought that possibly Mr. Rice's experience in London might confirm that or otherwise. I do not give it as evidence; it is hearsay. I only gave it as a reason why I hesitated to answer the Chairman's question straight away.

9475. Unfortunately the statement has gone on the Notes, and I would like to say that it is absolutely incorrect. It was a very extravagant statement; it could very easily be disproved.

9476. (Mr. Rice.) Do you mean damping the glass-paper with turps?—The party who gave it said either turps or water.

(Mr. Rice.) If you appeal to me, I have seen sand-paper damped with turps, and Mr. Parsonage would agree with me. Probably he has seen it, I should think.

9477. (Mr. Parsonage.) I cannot say that I have. It may have happened once in the course of my career as a painter, and I cannot honestly say I have ever seen it done. I have asked a score or more whether they have seen it, but I have never found one in London who has seen it done. (To the witness.) In your experience, did you ever see it done?—No; it is quite new to me. I do not see anything impossible about it. I think that it might be tested. It is a very simple precaution if it would work.

9478. (Mr. Gardner.) Are you a practical painter yourself?—I am not a practical painter. I have never served.

9479. You think that white lead poisoning is not at all common? That is, I suppose, because you personally have not come in contact with many cases?—That, and the impression I have got from conversation with other members of the trade.

9480. Do not you think that one of the reasons for that is the intermittent nature of the employment? You really do not know always when the men have been suffering from some trouble associated with white lead?—That may be so. As I explained earlier, you have a certain number of men usually who are your regular men. You know a great deal about them. Then there are a certain number of men who come on for the season, and go off again, and you may never see them again. That class of man you will not know very much about unless something happens while he is in your employ.

9481. I take it from your evidence-in-chief that your firm did fairly large jobs?—Yes.

9482. How many on the staff would you have in the season as compared with your winter staff, your permanent hands?—The winter staff would be down to from 20 to 40, and the summer staff might be as high as 300.

9483. So there is a vast difference between the number of men employed. Many of the 250 men employed in the summer only might have trouble from lead, and you would know nothing whatever about it?—A large proportion came back year after year. We usually saw them again. If a man was a decent man and liked the shop, he would come back again. It was a regular thing for men to turn up and remind the foreman that they were there last year and so on.

9484. But until there was a claim under the Workmen's Compensation Act you would not know when men were off for illness?—We used to know when men were off jobs.

9485. That was during the time they were in employment?—Yes. We did not follow them, but the foreman would want to know where they were.

9486. What precautions have employers taken to try to obviate white lead poisoning?—Only the precautions I have mentioned of making men be as cleanly as possible, using overalls, and not messing their hands any more than they could help. If you saw a fellow sticking his hands into the paint, you would naturally tell him that he was a fool, and that that was not the

way to do. And you would not let him clean his brush with his hand in *this* sort of fashion (*describing*). You meet with all kinds of things like that in painting, especially with some of the "stuff" that comes for employment. You naturally put an end to all that kind of thing on the general grounds that it is dirty and injurious to the men. You know that it is bad. The two things go together. The cleaner your men are on a job the better your clients like it. Any decent house-painter tries to get a reputation. The customer says, "I want some nice clean men about the job." That is the very thing you want. Therefore your own interest, as well as that of the painter with regard to lead poisoning, jump together, and you naturally make the men as clean as you possibly can.

9487. That brings us back to the position that the employers are taking no precautions whatever except advising the men in their own interest to be as cleanly as possible?—Quite so; using the expression "their own interest" in a broad sense.

9488. Yes, in a broad sense. Your firm was a builder's firm?—Both painting and building.

9489. You would have no special insurance rate for painters?—Yes, we had.

9490. Had you to pay a special rate for the painters apart from the other men employed?—We paid a cheaper rate for painters than for builders.

9491. (Mr. Sutherland.) That was under the old Employers' Liability Act?—Yes, and under the first Workmen's Compensation Act. That was before the new arrangement.

9492. (Mr. Gardner.) The premiums have been increased under the new arrangement. You were out of business when that came into force?—Yes.

9493. You are aware that rates have gone up?—I am aware that rates have gone up.

9494. You are aware of the present seasonal nature of the trade?—Yes.

9495. And that is rather against the men's health, is it not?—Yes, it is.

9496. Do employers ever try to alter that? Have they done anything to try to get the season extended?—Yes; they have assisted the men sometimes by making representations to the local authorities to have public work done in the off season as much as they can. It is very difficult to do.

9497. With a view of spreading the work over an average number of hours per week?—Yes.

9498. You agree that an excessive number of hours is bad?—Yes, decidedly. I think it is most objectionable. It is no benefit to the employer.

9499. If painting on walls has largely gone out of fashion, as it has, and stippling and painting of ceilings, and if a good deal of non-poisonous paint has been introduced, to what can you attribute the increase of lead poisoning which has taken place of recent years?—I am not at all convinced that there is an absolute increase. There may be an increase in reporting it. You may know more about it because you have been paying attention to it, but I have seen nothing to convince me of an actual increase.

9500. Even in the face of the returns in the "Gazette"?—Even in the face of the returns in the "Gazette" I would not say that there is a real increase. It may be a difference with regard to reporting.

9501. (Chairman.) There is no difference in reporting?—Are these cases only Factory Act cases?

9502. No, they are deaths?—Have all deaths been previously reported?

9503. (Dr. Collis.) Inquests were held on them in the past?—Then I do not understand it.

9504. (Mr. Gardner.) In speaking of a mask you said that a man could use a mask when flatting. I suppose you agree that there must be a poisonous vapour arising from flatting paint?—I am very doubtful about there being, strictly speaking, a poisonous vapour. I think generally that most of the trouble from flatting is due to the spirit which the men inhale. There is a good deal of spirit in the room when that is going on, and my impression is that it upsets the men. We usually had cases of colic reported in connection with flatting jobs, and very seldom in any other way.

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Mr. A. G. WHITE.

[Continued.]

9505. Would not that show that the turpentine and volatile matter in the paint was carrying off a certain amount of lead into the atmosphere?—Lead is so heavy and turpentine is so light that it seems to me a practical impossibility for turpentine to carry the lead.

9506. Even in the form of solution?—Even in the form of solution. I should say that it is impossible, but I do not like to dogmatise on it for a moment.

9507. I suppose that you are not acquainted with present-day substitutes for turpentine?—I have heard of so-called substitutes. I never used them; I did not believe in them. I have no experience of them.

9508. They are ranker and more volatile than turpentine?—They are more volatile and ranker. They have a kerosene smell.

9509. You would not care to rub your hands with such things?—Petrol is a splendid thing for cleaning your hands, and I do not think that they are any worse than petrol in that respect. I have often used petrol. You can clean your hands like winking with it.

9510. With regard to railway workers, I take it you mean the unskilled painter who is employed in doing rough work on railways?—I do not know anything about his skill, but I have seen the sort of man I describe working about railway stations and docks and so on and doing bridge work.

9511. He does not wear overalls, and from the way in which he goes about his work, and so on, you would take it that he has not been trained to painting?—Some men seem to handle the brush all right, but they seem careless about their appearance and do not wear overalls. If you went into a shop where all the men wore overalls you would feel yourself strange if you did not. They would point at you. You would jolly soon get them. You know what men are. If you go into a shop where they are not wearing overalls and you are wearing them you do not continue to wear them.

9512. Do you suggest that there are painters' shops in England where men do not wear overalls?—Well, I do not know where these men come from if not from painting shops.

9513. Would it do away with lead poisoning entirely if these men were prevented from coming into the trade at all?—I think that careful training would have a lot to do with remedying lead poisoning. I am strongly of that opinion, and one of the suggestions that I make is that they should be specially taught about it.

9514. (Chairman.) How are you going to teach the men to avoid dust, which it is admitted is inevitable?—We have had a suggestion here to-day that is well worth testing. There is a difference of opinion about it, but it is quite clear that, if there is anything in the suggestion about using turps to reduce the dust in sand-papery, it is a very important suggestion.

9515. But how are you going to prevent a man inhaling dust if this particular suggestion is not carried out; it is in the air, I take it?—If a man in

sand-papery will take notice of the direction of the draught, and not stand any closer than he need, and not put his nose up against the work.

9516. The lead dust gets into the air?—It does not fly about to that extent. It is pretty heavy, and it is between the sand-paper and the door, and it falls down. You see it at the bottom. It does not fly about like flour in a flour mill.

9517. We have had tests made, and we find that there is more lead in the air in sand-papery operations in coach-painting than there is in some of the worst pottery operations?—There is far more sand-papery in coach-building.

9518. But, still, it was dust, and the air was taken at the breathing level of the man?—Of course, a test like that is worth a great deal of theory. If the dust is in the air, I admit that the man must breathe it, of course.

9519. (Mr. Gardner.) With regard to the moistening of the sand-paper, which I understand you were told was prevalent in London?—I was not told that it was prevalent in London.

9520. It was used in London, you were told?—I was told that it was used in London.

9521. You would be surprised to hear that London is one of the worst places with regard to lead poisoning?—I have been told since I came into this room that Lancashire and London are the worst places, but my answer to that is that they are the two most densely populated portions of the country.

9522. On the question of the prohibition of white lead, are you aware that there is a great deal of zinc used in the interiors of ships?—Yes; I have used plenty in the form of a finishing enamel, but in my experience it was always with a white lead base.

9523. Then with regard to the hull. I understand that you worked on the Allan Line ships?—Yes.

9524. What did you paint the outside with?—The upper part would be painted with a lead paint with a good deal of black in it, and some flesh colour for the boot top, and below was usually —'s patent. Probably it had lead in it, because it covered very well, but I do not know.

(Mr. Sutherland.) It is a composition.

9525. (Mr. Gardner.) Usually a hull is painted black?—It is brought up with lead colour, and the deckhouses are white.

9526. On the question of paint protecting the hull, it is really very little protection. Do you agree with me if I tell you that many of these vessels are painted with a piece of waste dipped in the paint, without brushes at all?—I cannot say that I have ever seen them done in that way.

9527. The ship's crew do it with a piece of cotton waste?—Probably.

9528. You have never experimented with zinc on deck work?—No.

9529. You have been too long away from the trade. During the last five years there have been great improvements in zinc paints?—Have there? I am very glad to hear it.

The witness withdrew.

Mr. THOMAS HALL examined.

9530. (Chairman.) Do you attend to-day as the representative of the London Master Builders' Association?—Yes.

9531. What is the nature of your business?—Builder and decorator.

9532. Where is it carried on?—The Pitfield Wharf, Waterloo Bridge.

9533. How long have you been connected with house-painting work?—For 45 years there, and 30 years as master.

9534. What is the average yearly number of painters employed by your firm?—Fifty a week on an average for the year round.

9535. Have you known any cases of lead poisoning or painter's colic?—In 30 years I have only been told in my establishment of one serious case.

9536. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—Yes.

9537. Has that been increased lately for painters?—I could not say.

9538. Have you known men who have broken down temporarily in your works?—No.

9539. Have your men had occasional days of illness?—I have not the slightest idea of anything except one case in 30 years.

9540. Do you have a periodical medical examination of your men?—No.

9541. Is it not possible that some of them may be suffering from the slower and more insidious forms of lead poisoning without your knowledge?—Yes, that is very possible.

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Mr. THOMAS HALL.

[Continued.]

9542. You take a prominent part in the work of the London Master Builders' Association?—Yes.

9543. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—Just lately.

9544. They must have heard of the prevalence of lead poisoning amongst the men who handle lead paint for some time?—It has always been talked about on occasions.

9545. And yet your association has never attempted to do anything to mitigate it?—I have not been a member of this association long enough to say about that.

9546. There are a number of substitutes offered on the market, the makers of which claim that they will successfully replace white lead. Have you heard of them?—Yes.

9547. Has your association carried out any practical tests with these?—Not that I am aware of. I have carried out one myself.

9548. We have been told that the extent of the danger of lead poisoning to which house painters are exposed is not fully realised by many employers?—I think that everybody realises it.

9549. Do not you think that your association under those circumstances ought to have taken some steps to realise the extent of the danger, and to bring home its seriousness to all your members?—Possibly that may come about yet; I do not know.

9550. Do you yourself realise the magnitude of this lead poisoning evil?—We know it exists; certainly we do.

9551. I am sure you agree with me that this sickness and death are very deplorable?—Yes, certainly.

9552. Do you know that the evil has attracted the most careful attention in many foreign countries?—I know that it has in France, because it has been done away with in France.

9553. Do you not think it regrettable that this country should be behind other nations in such a matter?—I agree with doing away with it entirely for house painting.

9554. You would agree with that in this country?—I would, most certainly.

9555. If that is the case I need not ask you anything else?—The Office of Works is using this new stuff extensively.

9556. I was going to ask if you know that the Office of Works and many other people have succeeded in obtaining an efficient non-lead paint?—Yes.

9557. Have you heard that it has been quite satisfactory in all respects?—I only know that it is being extensively used; that is all I know.

9558. You have not heard anything against it?—I have heard nothing against it; I have heard everything for it.

9559. To sum up your evidence, rather than an extremely complicated and elaborate code of regulations, you would prefer the abolition of lead for house painting both inside and out?—I certainly would. I am most decided about that.

9560. I understand that you are one of the largest firms in the Master Painters' Association?—We are rather extensive. I should like to add that I have already done away with white lead in one of the most dangerous proceedings; that is, in the rubbing down, as I have stated in my letter. You have seen white patches before re-painting. To rub that down to an even surface gives off a very small dust, and that is worse than painting. It gets into the inside. You sometimes use a respirator. I have done away with white lead and got a substitute quite as good with no lead.

9561. Could you tell the Committee what it is?—Yes, Duresco.

9562. (Mr. Parsonage.) That is for filling up?—Yes.

9563. There is now much lead used for filling up now?—I did not know whether anybody else used it.

9564. (Dr. Collis.) You say that you have conducted one experiment with leadless paint?—Yes.

9565. Was that an extensive one?—No, not long enough to speak from, but as far as I can see I am satisfied.

9566. With regard to the one case of lead poisoning, of which you had knowledge, when did that occur?—Thirty years ago.

9567. You have had none since?—No, not a single case. I believe that one was a sort of paralysis. I have never seen it, but I am told.

9568. (Chairman.) Lead poisoning takes all sorts of forms. You may get wrist drop or paralysis. It may affect the eyes and it may affect the kidneys?—The breathing of lead dust is a great deal worse than the handling.

The witness withdrew.

## THIRTEENTH DAY.

Wednesday, 19th July 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (Chairman).

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. O. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER (Acting Secretary).

Commander W. H. COYSH, R.N.R. (Marine Superintendent of the Great Eastern Railway), examined.

9569. (Chairman.) Are you the marine superintendent of the Great Eastern Railway Company?—Yes.

9570. You are attending to-day to give evidence in regard to the paints which you use on the ships at Parkeston Quay, Harwich?—Yes.

9571. Do you exercise full control of the painting work on the ships of your line?—Yes.

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9572. How many painters are employed at the Great Eastern Railway steamship workshops?—We have only two painters in the shops. The whole of the ship painting is done by the crew.

9573. To what extent do you use lead paints in painting the ships of the Great Eastern Railway line?—Up to the present we have used lead paints for a basis for all our paints except black outside.

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Commander W. H. COYSH, R.N.R.

[Continued.]

9574. Do you intend to continue to use lead?—No. We propose to deal with white-zinc paints in the future.

9575. What reasons have you for having determined to discontinue the use of lead?—Because with white paints we find that lead turns the enamel a yellow colour. It does not give such a pure white as the zinc paints do. May I point out that when I say "the base" I am referring merely to stone-colour paints used on the ship for the bulwarks and that sort of thing. In all white paints under deck and in the cabins, I propose in future to use zinc foundations, because they are, as I say, a purer white, and not so liable to turn yellow as the lead paints.

9576. With regard to the interiors of the ships; have you been using leadless paints for some time for internal and external painting of the Great Eastern Railway steamships?—No, we have not. As I say, the groundwork is always a lead paint. The outside after that is enamel paint. What the enamel paints' constituents are I am not prepared to say.

9577. Have you had any experience with leadless paints at all?—Only the zinc paints.

9578. Those are leadless paints. Have you found them entirely satisfactory?—Yes.

9579. Now, first with regard to the interiors of ships; what material do you use for the painting of the interior of cabins?—Enamel paints only.

9580. Zinc enamel paints?—I do not know what the constituents of the enamel paints are, but we buy the enamel paints of various makers and apply them to the cabins.

9581. You do not know whether they are leadless or not?—I am not prepared to say that.

9582. Is that for the finishing?—Yes, that is for the finishing.

9583. You have never specified, in giving your orders for these enamel paints, that they should be leadless?—Never.

9584. Yet you say that you have determined in future to use nothing but leadless paints?—In the future, as the old stock of lead is used up on our ships, I propose to use white zinc paint, because it is better paint, and, although it is rather more costly, in the first instance, I believe it goes a great deal further.

9585. Will that apply equally to the exteriors as well as to the interior of ships?—That will apply to the whole of our ships—interior and exterior. You mean by the exterior painting the bulwarks and so on?

9586. Yes, and the funnels?—Yes. We use a tremendous quantity of enamel paint on our ships. All our white paint is enamel.

9587. May the Committee take it that, as soon as you have exhausted your present supply of lead paint, you will use exclusively zinc paints which are leadless?—Yes, that is right.

9588. Have you taken into consideration the question of the durability of the zinc paints in your ships?—We have not had a long enough experience to tell you that as to lasting.

9589. You are making this experiment without any misgiving?—Without any misgiving. I have had experience of white zinc paint before, but as to how long it lasts in comparison with other white paints I am not prepared to say.

9590. Do you think that your directors would have any misgiving if we were to prohibit the use of lead entirely?—I do not think so. These things are left entirely to the chief officers.

9591. If the Committee saw fit to prohibit the use of lead in the future, it would not affect you?—It would not affect us in the least as far as the marine dock department was concerned.

9592. (Dr. Collis.) Is the reason why you propose giving up the use of lead paints the purely commercial reason that you think you will get better value for your money?—Not altogether that, doctor. As I say, you get a better effect for your money. The value has to be proved yet. We have no experience of that, but the effect is better.

9593. It is not for any hygienic reason?—Not for any hygienic reason at all.

9594. So that you are leaving the danger that we consider to be associated with lead paints on one side?—It has never occurred to us.

9595. You make your change entirely on business lines?—Yes, precisely.

9596. (Chairman.) Do you ever use red lead?—We have used a considerable amount of red lead in our ships.

9597. For what purpose?—Outside painting. It is put on by the builders and has always been specified.

9598. Could that be dispensed with?—If you could get another paint equally as good and protective I should say there is no objection.

9599. You say "if you could." What do you mean?—I mean red lead, to the best of my knowledge, is the best protective paint for the first coat on iron at the present day.

9600. Do you know any other adequate protective paint?—There is a good protective paint oxide which is coming very much into use, but in our service up to date we have used and specified always that all the painting should have a priming coat—two coats—of best red-lead paint. That has been very efficient. We have found it very effective.

9601. Would you have any objection to the prohibition of the use of red lead?—I have an open mind on the subject, if you can find a paint equally as good.

9602. That is not the point quite. Of course you would change at once then; but would you be content to substitute oxide of iron for red lead right off?—I should have to have a trial of it first. I would not say right away that I could discard one paint that I know is excellent for one that I have not much experience of.

9603. You understand why this Committee has been sitting?—Yes.

9604. It is to prevent the continuance of the very high rate of lead poisoning?—Yes.

9605. We have to remedy that in some way or another?—As far as the white lead paints on board ship are concerned, we could dispense with it so far as our service is concerned to-morrow.

9606. Have you tried oxide of iron?—Yes, I have tried oxide of iron.

9607. Has it been satisfactory?—Yes, so far.

9608. For what length of time have you used it?—I have used it before in other ships, but you are here, there, and everywhere. You do not continue in one ship, and therefore you cannot altogether judge of the results. I daresay that some of the other gentlemen round the table could give far more information on that point than I can.

9609. Is the application of red lead difficult?—It is difficult. It is an objectionable paint to deal with, to mix, and apply. It has a very heavy specific gravity, and is not easily put on, and there is a tremendous amount of wastage attached to it.

9610. Is it used principally for protective purposes?—Yes, wholly and solely as a protective paint and for no other reason.

9611. Might it be a serious detriment to substitute paint less protective?—I daresay that there are plenty of equally good protective paints on the market, and after having once coated the ships with red lead we discontinue the use of it afterwards, and use only anti-corrosive protective paints.

9612. We are very anxious not to do anything that would interfere with the stability of the ship?—That would not interfere with the efficiency or stability of the ship.

9613. But would protective paint as a substitute for red lead, if it was not quite as efficient, interfere with the stability of the ship?—In no way whatever. The stability of the ship does not enter into the question at all.

9614. Then why is protective paint used?—As the name implies, purely to protect.

9615. Protect what?—To protect the iron of the ship from atmospheric conditions.

9616. If you had a paint less protective than red lead, would that interfere?—Yes; deterioration would set up, of course.

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[Continued.]

9617. Supposing the Committee saw fit to prohibit the use of lead, white and red, and gave two years interval, do you think that would be a sufficient time in which to find an efficient substitute?—Quite a sufficient time. You would be able to tell by a comparison between one paint and another. There is any amount of excellent anti-corrosive protective paint on the market now which we use, but I cannot tell you what the constituents are. I do not know what their basis is. We find that they are very effective and very efficient.

9618. Have you used —'s paint?—We have used —'s, and we are using other protective paints.

9619. Do you use —'s as protective paint for the holds?—Yes.

9620. Do you find —'s protective paint as efficient as red lead?—We never use red lead after the first coating. After the ship is built and the plates are coated, we discontinue the use of red lead altogether. It is the builders who deal with that, not we. We use anti-corrosive paint after that.

9621. Could you use —'s protective paint for the base?—I could not say; I have never tried it.

9622. (*Mr. Sutherland.*) Is it a proprietary paint?—Yes. It is an ordinary protective paint. There are dozens of them on the market. Ships that are 17 years of age show no signs of deterioration when coated with red lead, and I cannot say that with regard to other protective paints.

9623. With regard to the use of white lead or zinc paints in buildings, your evidence does not help us in that respect, because you have not made any comparative examination of the two?—Not of the zinc paints.

9624. The red lead and the zinc?—No.

9625. You only use the zinc as a matter of colour?—Yes, as a matter of colour. Hitherto we have always used white lead as our base mixed with oils.

9626. That zinc as an under-coat for enamel would preserve the colour better we are all agreed, but that does not help the Committee with regard to the durability of the paint on building structures?—No.

9627. (*Chairman.*) I understand that, as regards your shipping, which is a great organisation, you have decided to abandon the use of lead, not as a question of colour only, but taking other things into consideration as well?—I propose, as far as my department is concerned (that is the shipping pure and simple), to discontinue the use of white lead and to adopt white zinc, from the point of colour principally, and also because I think it goes further than white lead, and is a finer quality of paint—a better paint.

9628. You have come to that conclusion, knowing perfectly well that it would be a very serious step to take if you were not quite sure that it would be satisfactory?—Precisely.

9629. (*Lord Henry Bentinck.*) For outside work as well?—You must bear in mind that nearly all is for outside work.

9630. (*Mr. Sutherland.*) Do you enamel the hull-warks, for instance?—No, the ordinary stone-colour paint that you have on the inside of the well deck of a ship or around a deck house, we do not enamel.

9631. Do you varnish it?—No, we do not varnish it.

9632. Do you mix it?—We mix it with oil and turpentine.

9633. You have no experience of zinc there?—No.

9634. Really the evidence does not carry us further?—We are experimenting at the present moment, and propose to discontinue the use of white lead and adopt zinc as far as my ships are concerned.

9635. (*Chairman.*) You do that without any misgiving?—Without the smallest misgiving at all.

9636. (*Mr. Mason.*) How long is this paint expected at last?—Are you speaking of interior paints?

9637. No I am not, but of the stone colour. We know about enamels?—As soon as it gets dirty it is washed, and we are continually touching up and painting our ships.

9638. Really the question of durability does not enter into the question?—What do you mean by durability? We are subject to rough usage, and if paint is knocked and chipped about we take steps to make it good. A ship may be painted for one trip, and she comes back and, in your opinion, wants painting again. She may go for several weeks and not have a coat of paint put on.

9639. It is mechanical damage rather than chemical damage?—Yes—rather than deterioration from atmospheric conditions, you mean?

9640. Yes. So that even whitening would almost answer the purpose?—I should hardly say that.

9641. With oil—mixed as a paint?—It would not have a very good appearance on our ships.

9642. But as far as lasting qualities are concerned?—No, certainly not. I think that after you have broken away the oil and disintegrated it to a certain extent, the whitening would depreciate and go away much quicker than white lead or zinc. It would powder into dust at once.

9643. Would it not last for weeks?—I do not think so. Put a strong solution of soap and soda on it, and you have the whole of the substance off at once.

9644. That would be so with any paint would it not?—No. You continually use soap and soda on paint.

9645. Soda is used to remove paint in the trade is it not?—You cannot get it off with a solution of soda. You have to rub and wash. Ask any people who are trying to remove paint, and they will rather smile at the idea. You either burn it off or take one of these patent paint removers for it.

9646. What are they made of?—From a strong solution of caustic I should think, but I do not know.

9647. I understand you to say that, if lead of any kind were abolished, it would not affect you in the least?—I have an open mind on the subject. I do not care a red cent. White lead, so far as we are concerned, has treated us very well and served us very well as a protective paint, and has given very good results, but I believe that zinc will give equally good results, and that is as far as I am prepared to go in the matter.

9648. In the case of repairs or anything of the sort, do you think you could find a substitute in the time?—Yes, I think so.

9649. Do you mix your zinc paint at all with varnish?—No. If you do that it spoils the paint. It discolours it.

9650. (*Mr. Robins.*) What kind of oil do you use in the zinc white?—I should use raw oil with zinc white.

9651. Not boiled oil?—No, not boiled oil.

9652. Do you find that it dries all right with raw oil?—It would dry quicker with boiled oil as a matter of course than it would dry with the raw oil, but it would not give such a good effect. With raw oil it takes longer to dry, but the results are better.

9653. You have proved, so far as it goes, that the colour keeps better, I take it, with zinc than with white lead?—Yes.

9654. (*Lord Henry Bentinck.*) The durability of the paint, as far as I can make out, is no great matter to you or to any shipowner?—There are certain parts of a ship where it gets no chafing and no bad use, on the passenger deck, for instance, and on the boats. Therefore, if you got a durable paint that will last twice as long as ordinary paint, it would be a matter for our consideration, of course.

9655. But it is not so important to you as to a house painter, for instance?—I would not say that. We are out to save pennies as well as the house-painter is.

9656. (*Dr. Collis.*) But you renew more on account of mechanical damage?—Yes, chipping through cargo going up against the paint, and all that sort of thing.

9657. (*Chairman.*) But in coming to the conclusion to abandon the use of lead, you have taken the question of durability into your calculations?—I am

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dealing with that now. As far as our ships are concerned at Parkston, as soon as the present stock of white lead is used up, I personally shall not order any more.

9658. If this Committee prohibited the use of white lead, it would not affect you?—It would not affect me at all.

The witness withdrew.

Mr. G. SCHÖBERT examined.

9661. (Chairman.) Are you the manufacturer of the composition supplied to the Great Eastern Railway for painting ships' hulls?—Yes.

9662. Is your composition specially intended for preventing the corrosion of iron and steel surfaces?—Yes.

9663. What is the composition of your anti-corrosive paint?—The compositions are chiefly pigments such as zinc and oxide of iron, and in many cases a small percentage of arsenite of lime, which is specially manufactured by us. It is only added in special cases.

9664. How much arsenite of lime would you say there is in your anti-corrosive paint?—In severe cases something between 3 and 5 per cent.

9665. What vehicle is used?—The usual oil—linseed oil and gums and varnish.

9666. Oxidised linseed oil?—Oxidised linseed oil.

9667. And varnish?—It is made into varnish.

9668. Is it used as a varnish specially made to withstand atmospheric influences and heat?—Yes.

9669. Are there any lead compounds in your paint?—None whatever, not even in the varnish.

9670. Are lead driers added?—None whatever.

9671. Is no lead used in any form for driers?—None.

9672. Do you use turpentine for thinning?—No.

9673. What is your thinning material composed of?—Coal-tar naphtha with a flash-point of over 100°.

9674. Do you get a sufficient covering power without the use of either red or white lead?—Yes.

9675. By what means?—By pure chemical oxide of iron, which has greater covering power than either red or white lead, and for white paints, the zinc white—zinc oxide.

9676. Do you consider the covering of red and white lead to be overrated?—I do.

9677. Why?—Because the painters generally know red and white lead as "genuine red and white lead," and they get a pure article, whereas if they ask for a paint such as white zinc or oxide of iron, or red paints, or yellow ochres, they invariably get paints made from pigments which are adulterated with sulphate of barium and other things. Therefore, they cannot have a good covering paint, because they are not manufactured from the pure pigment—that is oxide of iron or zinc oxide. Ochres vary in their composition. They are natural products.

9678. How does the cost of your paint compare with that of lead paints?—The cost per hundredweight is more than the cost per hundredweight of lead paints, but the bulk which we obtain is nearly twice as much as that of lead paints. The specific gravity of lead paint is very great, and the bulk of the lead paint is very small in comparison with our paint, or even the ordinary zinc and pure oxide of iron paints on the market.

9679. Are your paints then very light?—Very light; in some cases as light as 10½ to 11 lbs. to the gallon.

9680. Is that an advantage or a disadvantage?—It is an advantage.

9681. (Mr. Sutherland.) May I ask what paint we are discussing? Is it known by any trade name?—It is "Schoberts Compositions." It is sold under that name.

9682. Is that the only name?—"Schoberts De-oxidising Paints."

9683. (Chairman.) You said just now that the lightness of your paint was an advantage?—Yes.

9659. (Lord Henry Bentinck.) It would not affect any shipowner so much as it would a house-painter?—Precisely.

9660. There would be no great hardship in forbidding white lead as far as shipowners are concerned?—No, I do not think so; I should not say so.

9684. Will you tell me why?—If you have a paint with heavy pigments, as the painter uses it, the heavy ingredients such as lead are apt to separate themselves from the varnish, or they run. For instance, in ships' hulls, where painting has to be done very quickly, the painter brushes up and down once or twice. That is not sufficient. The heavy ingredients of the lead separate themselves from the varnish or begin to run, whereas if the pigment is of light specific gravity this naturally keeps in suspension. That is the case in the drums. Our compositions could be kept for months in the drums and not have a sediment, whereas lead paints or heavy pigments would fall to the bottom and form considerable sediment within a week.

9685. Do I understand that you mean that your light paints adhere better to iron and steel?—On that account—yes.

9686. Do your customers tell you that it is no more costly to use a leadless anti-corrosive paint than to use lead paint?—Yes, those who have used it, decidedly; in fact they have found it cheaper.

9687. Over what period have your paints been in use?—They have been in use from 4 to 5 years.

9688. Can you name a few of the most important customers who have expressed their satisfaction with your leadless paint and have given repeat orders for it?—Yes, the Lancashire and Yorkshire Railway Company, the Great Eastern Railway Company, and Sir Frederick Bolton. We have had repeat orders from those.

9689. For what purpose do the Great Eastern Railway Company use your paints?—For hulls and for boiler plates inside the ship, for the top sides of ships, and for submarine work. Sir Frederick Bolton's Steamship Company have given repeat orders; in fact we had two or three quite recently. Those were for red paints. They found after a little while that they saved considerably. I think they told me at the time that the cost of their lead paints—red and white leads—came to 29s. or 30s. a hundredweight. It was experimented with some years ago, and they found out that our paint, which cost them 39s. a hundredweight, was going considerably farther, and the hundredweight of ours was close on 10 gallons—9½ gallons—whereas 10 gallons of the red and white lead paints weigh nearly 2½ hundredweight. 2½ hundredweights equal 9½ gallons. At 29s. a hundredweight that would bring the paint up close to 60s. for 10 gallons, whereas for our 9½ gallons they pay us 39s.

9690. Have you any other names to tell us?—Yes, the Farrar Groves Steamship Company; Pritchett's and Gold, Ltd., accumulator makers; and the Brentford Gas Company. The District Railway Company have tested it for close on 18 months, and they have promised us repeat orders. The Brentford Gas Company tested it for close on 12 months or more, and the orders came in without anybody calling on them.

9691. What did they use it for in the gas works?—For their gasometers—for the parts which are in and out of the water. Then we have several foreign governments. The Dutch Government have come back, and four or five Dutch gas companies. We had several from Denmark.

9692. Is yours a very large business concern?—It is at the present time not very large, but it looks to be a very promising concern.

9693. Have you made considerable progress in the last few years?—Yes, very considerable progress.

9694. Have you done anything with any other foreign governments?—Yes, we have supplied the Danish Government and the Swedish also.

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[Continued.]

9695. Have you had repeat orders from those Governments?—We have had in the case of the Danish Government. We have supplied it to South Africa, and we have supplied it to the Darjeeling-Himalayan Railway. After they made their tests (we sent samples 18 months ago) the orders followed four or five months ago. Then another railway company in Australia sent, through their agents here (Adams and Co.), and the Capetown District Railway have used it at various stations there, and repeat orders have been promised recently.

9696. (*Lord Henry Bentinck*.) Is your paint suitable for use on bare iron chiefly?—Chiefly on iron and steel.

9697. Is it suitable for wood?—Yes, but we do not push it for wood. We make it chiefly for protecting iron and steel—not for decorative purposes.

9698. (*Dr. Collis*.) I understand that it takes the place of red lead on bare iron?—Yes, on bare iron.

9699. A great many steamship companies stipulate that the iron plates shall be covered in the first instance with red lead, and your paint would entirely take the place of it?—Equally well as far as I can see.

9700. Could it be used without any lead basis being previously applied?—Yes; not a quarter of an ounce ever comes into the place.

9701. No lead basis?—No lead basis in the varnish or in the paint.

9702. Take a newly-built ship sent from the builders, treated as it is to-day with red lead, would you be prepared to say that your paint would do as a protection for the bare steel?—I am quite prepared. I have tested it for years and years. The natural effect on a newly-built ship is for the mill scale to come off, whether red lead or my paint is used.

9703. That is a mechanical effect?—Yes, from the vibration of the ship. The mill scale will fall off.

9704. That is not quite a point of comparison between the two paints?—No.

9705. You mentioned the introduction of a percentage of arsenite of lime. For what special paints is it introduced?—Chiefly for outside purposes, to protect against sea air. We use it still stronger for the first coating of vessels which are submerged in water. We use it up to 15 per cent.

9706. Is that rather as an anti-fouling?—Not only as an anti-fouling. It proves an anti-fouling if certain varnishes are added to it, but on a new ship for the first or second coat we would put it on simply for the purpose of anti-corrosion.

9707. Both above and below the water-line?—Yes.

9708. The extent is from 3 to 5 per cent.?—Yes, in submarine work we would go up very likely to 10 or 15 per cent.

9709. Is your paint made at home or abroad?—In England.

9710. In London?—Yes.

9711. Where is the factory?—At Plaistow and Stratford.

9712. Schoberts is the name of the firm?—Yes.

9713. Is the formula which you use an English invention?—Yes.

9714. Your own?—Yes. We have patented it abroad also.

9715. You have said that you use a coal-tar naphtha with a high flash-point—you mentioned 100°. You did not say whether Centigrade or Fahrenheit?—Fahrenheit.

9716. How does that compare with the flash-point of turpentine?—The flash-point of turpentine is, I think, 93 or 95.

9717. So that, roughly speaking, it is very closely the same?—Yes, closely the same, but turpentine is corrosive.

9718. Do you maintain that coal-tar naphtha is not?—It is not corrosive.

9719. You mentioned the point that you did not use any lead driers. What do you substitute for lead driers?—I use air. I treat my oils with air in a particular way. I might add a slight bit of manganese if it is wanted, but in the majority of cases I never do that.

9720. The way in which you prepare your oil produces the effect that is produced by lead driers. You have some form of aeration under heat, I suppose?—Yes.

9721. To produce the same effect as is produced by lead driers?—Yes.

9722. What is your opinion of the way in which lead acts as a drier? Have you studied that point at all?—Yes. Lead acts as a very good drier indeed.

9723. But the chemical way in which it acts?—It forms oleates. It carries oxygen or gives up oxygen.

9724. It transfers the oxygen from the air to the oil?—Yes, and partly its own oxygen.

9725. It acts as a carrier?—Yes.

9726. You produce this effect by aerating your oil?—Yes.

9727. That is the chemical reason?—Yes. In some cases there is a slight percentage of manganese added.

9728. That acts in the same way as a carrier of oxygen?—Yes, more so than lead.

9729. With regard to the gasometers that you mentioned, were they new gasometers, or had they been originally protected by any other coating?—I could not say. They tested at the commencement with scraped plates before they gave us the order. In the case of Pritchetts and Gold, Ltd., it was bare work. It stood for three years. I have a sheet at home showing that the paint after three years was like indiarubber.

9730. It was tensile?—Yes.

9731. What exposure had it had at Pritchetts and Gold, Ltd.?—It was inside and outside of the gasometers. We had it in one of Döwling's purifiers.

9732. The test of paint on gasometers is particularly severe?—Particularly severe. You have ammonia vapours and sulphur vapours and the atmosphere, and it is in and out of the water.

9733. How often does a gasometer in the part which is going in and out of the water require to be painted when covered with your paint?—In this particular instance it stood close on three years before they renewed it.

9734. How often has a gasometer to be painted in the ordinary way when painted as in the past with red lead; do you know from your own experience or from what you have heard?—I should not like to say. In many cases every two or three years or four years they have to be painted.

(*Dr. Collis*.) I have heard it suggested that it is a shorter period even.

9735. (*Mr. Sutherland*.) You do not push your paints for building purposes, for houses and decorative purposes?—No, not for inside work.

9736. Mainly for structural ironwork?—Yes.

9737. (*Mr. Fell*.) Do you use your paint at all for motor car and carriage work?—We have had it on motor car and carriage work underneath.

9738. Where?—Private gentlemen have used it on their motor cars.

9739. How has the paint stood?—Exceedingly well, even on the exhaust box, which gets very hot. It has stood there for six months.

9740. Has the car been painted throughout with your paint?—Not the top parts.

9741. Not the steel work and the body?—Not to my knowledge.

9742. Have you tried it on wheel work at all?—Yes.

9743. Has it been quite satisfactory?—Yes.

The witness withdrew.

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Mr. H. B. BAKER.

[Continued.]

## Mr. H. B. BAKER, examined:

9744. (Chairman.) Are you a perambulator manufacturer?—Yes.
9745. What is your firm?—Rothschild and Baker.
9746. Of Birmingham?—Of London and Birmingham.
9747. What length of experience have you had in the perambulator trade?—About 20 years on my own account.
9748. Are you connected with any trade association?—Yes; there is the wholesale perambulator association.
9749. How long has this association been in existence?—For about a year.
9750. Does it now include a fair proportion of the firms engaged in the trade?—Yes, about two-thirds.
9751. Is your own firm one of the leading firms of perambulator manufacturers in the United Kingdom?—Yes, I think that we are about the second largest.
9752. Can you speak to-day in the name of the association?—Not exactly.
9753. Do they know that you are coming here to give evidence?—The secretary did.
9754. Do you think that they would generally approve of what you say?—Yes, I think they would.
9755. How many workers do you employ?—We employ about 180 people at the present time.
9756. How many of these come in contact with paint?—Thirty.
9757. Do you manufacture various patterns and qualities?—Yes.
9758. Have you had any experience of the use of leadless paint for your perambulators?—Yes, for the past three or four years.
9759. Have you used leadless paint exclusively for the last three years?—Yes, we have used nothing else. We dropped the use of crude lead colour three or four years ago.
9760. Do I understand that you use no lead whatever in finishing your perambulators?—As far as we can avoid it. We buy all our paint leadless at present from the paint makers.
9761. What led you to abandon the use of lead paints?—I had a case of lead poisoning or two.
9762. And did that cause you to look round for a substitute?—Yes.
9763. Are you satisfied that the leadless materials that you are now using are equal in every respect to the lead formerly used?—Very nearly. For all practical purposes they are as good.
9764. Do you obtain an equally good finish without the use of lead?—Yes.
9765. Is the cost the same?—Yes.
9766. Can you tell us that you are satisfied that it is no more expensive to use than lead?—Yes; I am sure that it is no more expensive.
9767. Have you had to increase the number of coats of paint used?—No, not even on the cheapest work.
9768. Have you found the durability of the leadless paints equal to that of the lead?—Yes, as far as my experience has gone. I have not seen anything to lead me to suppose that it is not as good as lead.
9769. Your experience covers a period of three or four years?—Yes.
9770. May I take that answer to mean that you have had no complaints from customers as to durability?—Yes.
9771. Do you consider that the three or four years that you have been using the leadless paints is sufficient time to establish their durability?—Ample.
9772. Would you expect to get complaints in very quickly if the paint were unsatisfactory?—I should, within three or four months.
9773. Why is that?—The goods would soon show in the shopkeeper's hands if they were not standing up to the varnish and all that sort of thing. They would chip.
9774. You consider then that three or four years is really a substantial test of the durability of paints on perambulators?—Yes, I do.
9775. Would you say that that test would represent a greater length of time than the life of a motor car?—No. The motor car has rather different usage and is expected to last longer, I suppose—the body work; but I think a perambulator would be a greater test than a motor car. It does not have so many secondary coats or as many coats of varnish on the top to protect the priming coat.
9776. Are you satisfied that the paint you are using is absolutely leadless?—I have a guarantee from the manufacturers that it is so, and I have had no case of lead poisoning since I have been using it.
9777. Are the processes which you follow in painting a perambulator similar to those employed in the carriage painting industry?—Yes; in the better goods it is exactly the same. In the cheaper goods they are modified to some extent.
9778. How many coats would be applied to the cheapest perambulator?—Not more than three.
9779. In the better quality of perambulators would you start with a priming coat of a leadless paint?—Yes.
9780. Would that be sand-papored down?—Yes.
9781. Would filling then be applied?—Yes, the filling would then be applied or two coats of leadless priming would be used.
9782. Do you use an absolutely leadless material for filling?—Yes. I have never had any trouble with that.
9783. Do you use a stopping similar to that used in the carriage painting trade?—Yes.
9784. Is your stopping made up from the same material as the paints?—It is made with a whitening basis.
9785. But it is quite leadless?—It is quite leadless.
9786. I believe there have been one or two cases of lead poisoning in the perambulator trade traced to the use of gimp pins coloured with lead paints?—Yes.
9787. Have you succeeded in eliminating lead even in that branch of your work?—Yes.
9788. Are you using now electro-tinned gimp pins?—Yes.
9789. (Lord Henry Bentinck.) You have noticed a decided improvement in the health of your workmen?—We have not had any lead poisoning since.
9790. (Dr. Collis.) Could you tell me what precautions you were adopting in your factory when you were using lead paints?—Just the ordinary precautions to see that they washed themselves, and did not take food in the workshops and so on.
9791. They had washing accommodation provided?—Yes.
9792. Did they wear overalls?—Aprons.
9793. And did they make use of the washing accommodation?—Yes, when we could get them to do it. We had a deal of bother in that way.
9794. You gave them time in which to do it?—Yes.
9795. So that notwithstanding that they had these aprons, and they were, as far as you could make them, cleanly, with your supervision, cases of illness were occurring?—Yes, we had not very many, but we had a few.
9796. Was it because of the economical side that you had to pay compensation, or was it pure philanthropy that caused you to change over to non-lead paints?—I should think that it was the factory inspector.
9797. What precautions was he suggesting to you to try to get rid of the danger which had occurred and which caused the trouble?—I do not remember that he suggested a leadless paint, but he used to look pretty sharply after the washing arrangements.
9798. Were any suggestions made with regard to trying to remove dust in rubbing down?—No, I cannot say that I remember that.
9799. No question of any exhaust ventilation?—We have that in the shops. It was put in previously.
9800. A localised exhaust ventilation for removing dust?—Yes.
9801. By hoods and ducts?—No. In this case the ventilator is in the centre. It is an arched shop.



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Mr. H. B. BAKER.

[Continued.]

9802. A ventilator for the whole room?—Yes.  
9803. Not localised?—No, not like we have in the polishing.

9804. You polish metal?—We have grinding and that sort of thing.

9805. And you have a hood right on to it?—Yes, and on the sand-papering machines.

9806. Sand-papering what?—Sand-papering the woodwork.

9807. Do you build the bodies?—The panels and parts go over the machine.

9808. Sand-papering the paint?—No, sand-papering the wood.

9809. Before it is put together?—Yes.

9810. Could such an appliance be used for removing dust caused in the rubbing down of paint?—No, I do not think so.

9811. Your evidence is important on that point, because you know how these dust appliances are used in removing dust in sand-papering other things?—Yes.

9812. You do not think it practically possible with paint?—A bulky thing like a perambulator body is too big to get under a hood. Even with small body work it would be difficult, and with a full sized carriage it would be practically impossible.

9813. What is the priming you usually put on?—It is a primary colour called "Tinto" from — of

9814. (*Mr. Sutherland.*) They are the white lead people?—Yes. They guarantee it absolutely leadless.

9815. (*Dr. Collis.*) They are white lead corrodors, and if they guarantee it absolutely leadless I think you are pretty safe. Now can whiting be applied as a priming coat on woodwork for your purposes?—Yes. I have no experience of the actual mixing or grinding of colours. We do not grind them. We buy them ground, as most painters of body work do. Whether it contains whiting or barytes, or some of these other bases, I cannot tell you.

9816. I was wondering how far your work would correspond at all with furniture painting on woodwork?—It is different with regard to furniture painting. There is a priming of whiting put on cheap furniture.

9817. And on the better class too. Could it be used on your work?—To some extent it could. We use a filling-in between the lead colours that has a whiting base.

9818. It has been suggested that for priming purposes certain paints, particularly lead paints, have their value for filling the grain of the wood?—That is so.

9819. I was wondering how it was that the furniture people could do some of the high-class work that they do, using a whiting priming coat and nothing else?—I could explain that. Furniture is not used out of doors, and you do not have to have the same stability. It is used as a mere stopping, and not for protecting the wood afterwards. It is simply to fill up the grain so that they can polish on it.

9820. It has been suggested that the lead priming is only to fill up the grain for the after covering, and I was wondering where the difference came in when whiting was used. You do not use it in the perambulator trade?—We do not use it in the perambulator trade. We use a mixture that we make ourselves for stopping. Where we used lead colour previously we are now using this proprietary colour as a substitute, and then we get on to the filling.

9821. With regard to gimp pins, lead poisoning cases occurred from them. It was the custom to put the gimp pins in the mouth?—Yes.

(*Dr. Collis.*) I wanted to make it clear how the poisoning was caused.

9822. (*Mr. Fall.*) I take it that with perambulator work there is an enormous amount of sand-papering?—A good deal.

9823. And practically there is no possibility of adopting a wet rubbing down process?—It is too expensive. It is used on high-class goods. That is

exactly the same process as you have in all coach shops or motor shops.

9824. You said just now that you had had no complaints?—Yes.

9825. You are wholesale people?—Yes, but we should get the complaints very quickly.

9826. With an ordinary perambulator, no one would take the trouble to complain if the paint began to crack?—Do you mean a dealer?

9827. No; a person who buys the perambulator?—I think so. I think people to-day know what they want, and what to expect.

9828. What variety of colours do you use?—We use an immense variety.

9829. Have you any difficulty?—It occurred to me as soon as I started this morning whether a white enamel is absolutely leadless. I do not see why it should not be made so. I have never raised the point.

9830. Do you use any chromes?—Yes.

9831. You get lead there?—You can produce a yellow without having it made in that way, I suppose. We do not use a great deal; most of the colours follow the coach lines, and they are dark.

9832. (*Mr. Robins.*) I take it that much of your dust is caused by sand-papering the filling?—Yes.

9833. I believe in the process of your trade most manufacturers, even those of your own calibre and larger, do the greater amount of the filling up on bassinettes with whiting, vegetable black, and glue?—A good deal of that is done with the cheaper and middle class stuff.

9834. With the best perambulator makers even a very small percentage of lead would be used, taking the highest finished work?—Practically only the first coat and the stopping, when it would be rubbed down wet. Then what would be used for the filling is dry white lead and gold size.

9835. I speak with authority—it is very rare that the perambulator is rubbed down with the wet process?—Not to-day.

9836. The danger comes from the dust from the sand-papering?—I do not use lead at all.

9837. There is no white lead in the stopping at all?—No.

9838. (*Chairman.*) Do you have to contend with foreign competition?—No. The foreign competition we get is with Japan-stoved stuff. American goods.

9839. (*Mr. Robins.*) It surprises me that there is any case of lead poisoning in the perambulator trade?—We have had two or three.

9840. (*Chairman.*) You will find a good many in the statistics. You say that you have for some years given up the use of all lead paints, and shall continue that?—Yes.

9841. Do you think that that ought to be applied to your fellow manufacturers?—I do not see why not.

9842. Do you think that they would object if we prohibited the use of lead in the perambulator trade?—I do not see why they should.

9843. (*Mr. Mason.*) What class of man paints perambulators—a coach painter or brush hand?—We have some very good men who would come out of the same shops as the coach-painter and the motor car painter. They are the same hands. But we have to employ a lot of cheaper labour, and it is among them that we get the trouble.

9844. The better class of man gives less trouble than the cheaper grade?—Yes, he does not do sand-papering, for instance.

9845. (*Chairman.*) He does not come into contact with so much dust?—No; that is the point.

9846. (*Dr. Collis.*) Do you use lead paint for stoving?—No, I do not, not in the Japan. I have never questioned it.

9847. As far as you known, you do not use it in the Japan?—No.

9848. You carry it on in the same way as for japanning furniture?—No.

9849. Such furniture as bedsteads, I mean?—Yes, exactly in the same way as bedsteads.

The witness withdrew.

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Mr. H. S. BALL.

[Continued.]

Mr. H. S. BALL examined.

9850. (*Chairman.*) Are you the works manager of Messrs. Chubb and Son's safe-making factory at Wolverhampton?—Yes.

9851. Have you been instructed by your firm to attend here for the purpose of giving evidence regarding the use of lead?—Yes.

9852. Is there any employers' association to which safe manufacturers belong?—I believe not. I have never heard of one.

9853. About how many important firms are engaged in the safe trade?—I should think that six would cover the important names, but there are innumerable small makers.

9854. Is your firm one of the largest of those manufacturing safes in this country?—Yes.

9855. Are you, as representing one of the largest firms, qualified to speak with regard to the safe trade generally?—I think so.

9856. Have any of your colleagues, in other firms, cognisance of your attendance here to-day?—Not that I am aware of.

9857. Would not anything you tell us concerning your own works be applicable, in general, to the other safe manufacturers?—I should say so.

9858. Have you, of recent years, largely abandoned the use of white lead?—Yes, ever since we have been at Wolverhampton Works, and for several years before for the purpose of stopping.

9859. In what form is the zinc white used?—We purchase it in the form of powder and mix it into a paste with gold size and turps.

9860. Would that be precisely the same as with white lead?—Yes, practically so.

9861. Would it be precisely the same in the method of use as in the case of white lead?—Yes, precisely.

9862. Is the stopping rubbed down with sand-paper after it has been applied?—Yes.

9863. Do you consider that this is a dangerous process, when lead is used?—I think it is the most dangerous process of any that we have to do with.

9864. Did you have any experience of lead poisoning cases when you were using white lead?—Yes, we had several cases. I am not personally aware of the nature of them. They were slight ones.

9865. Have you removed this evil by substituting zinc white for stopping purposes?—Entirely so. We have had no single case since.

9866. Apart from the risk of poisoning, do you find the zinc white as efficient as white lead?—Quite so. Our head painter states that, apart from the risk of poisoning, he would prefer to use zinc white.

9867. What are his reasons for this?—He considers it superior in results—finish and durability also.

9868. Do you find the use of zinc in place of lead affects the cost?—Although the zinc white costs about 34s. a hundredweight compared with white lead at 23s. per hundredweight, the lead is so much heavier that there is very little to choose in the cost. I would like to add that I think the balance would be in favour of the zinc.

9869. Do you still use some white lead in your painting operations?—Yes, in the form of liquid paint for brush work.

9870. Safes are used entirely inside buildings and are therefore not exposed to any weather conditions?—That is so.

9871. It appears to be very generally agreed that lead is not necessary for surfaces which are not to be exposed to the weather?—I should say that that is so.

9872. I presume, therefore, that you would have no objection whatever to a restriction being imposed on the use of lead for painting safes, if such a step is taken in regard to other painting?—No objection whatever.

9873. (*Mr. Sutherland.*) Do I understand that you use white lead paint as paint?—Yes; I believe that white lead is the basis of most of our paints.

9874. And you use those?—Yes.

9875. You have no lead poisoning cases?—No, because it is all in liquid form. There is no powder.

9876. The lead poisoning cases came from the stopping?—Yes.

9877. And the rubbing down?—Yes.

9878. (*Mr. Mason.*) You have no objection to using a zinc paint in place of white lead paint?—None at all. We are doing so, all the time.

9879. Perhaps I do not understand. You have given up white lead as a stopping?—Yes.

9880. But I understand that you still use it as a paint?—Yes, as the basis of most paints. It is still in use. I have no personal experience of the effect zinc white would have as the basis for liquid paint.

9881. You are quite content to give up white lead as a paint?—As a stopping.

9882. Only as a stopping?—Yes, purely.

9883. Not as a paint?—No. I have no experience at all from which to speak with regard to that.

9884. (*Chairman.*) I do not think that you quite understand the question. I understood you to say that you would agree to give up the use of lead in all respects?—I would hardly go so far as to say that, because I have no experience at all of zinc white as the basis of liquid paint, but only as dry stopping.

9885. But in answer to my question just now, when I said that it was generally thought that for all internal work lead could be dispensed with, and I asked you whether your firm could dispense with lead, you said "Yes"?—I think I misunderstood. As the basis for liquid paint, I have no experience at all of anything but lead.

9886. Would you have any objection at all to the prohibition of lead entirely?—There again I can hardly answer except with regard to stopping, because I have no experience of anything but lead.

9887. Would it be detrimental to your business if lead was prohibited?—Not if the substitutes were equally good. I know nothing of the substitutes.

9888. You cannot answer the question?—No.

9889. If white lead was prohibited throughout the safe-making trade, would your firm readily acquiesce in such a prohibition?—That I cannot answer.

9890. (*Mr. Fell.*) The stopping would only represent a very small percentage, would it not, of the total amount of paint used?—Yes, I suppose it would.

9891. (*Mr. Sutherland.*) That is the source of lead poisoning, because since you have given it up you have not had a case. Is not that so?—That is so.

9892. I presume that the dry rubbing down would follow the stopping?—Yes; that is the dangerous process.

9893. (*Mr. Kinggate.*) Do you sand-paper the paint—the first priming coats? I understand that the priming coats are all lead?—Yes.

9894. Do you sand-paper them?—No, not till after the stopping.

9895. You stop them completely?—Yes, over the priming coat.

9896. Is there a large quantity of stopping?—Yes, a considerable quantity.

9897. (*Mr. Robins.*) What is the primary reason for using the coat of white lead first, instead of using zinc white first? What is the primary reason for using lead as a base now?—We always have done so, and we continue to do so. We have not found any reason for altering it.

9898. I take it then that the reason is really to make the stopping adhere to the iron?—That is the reason for the priming coat, of whatever material it is made.

9899. Safes are regularly plastered with stopping?—Yes.

9900. If you found zinc white paint adhering, you would be quite willing to use it for the first coat as a base?—Yes.

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Mr. CHARLES A. LINE.

[Continued.]

9901. (*Chairman.*) You might ask your firm the question about the prohibition altogether?—Yes.

9902. Perhaps you would kindly let us know their answer?—Yes.

The witness withdrew.

Mr. CHARLES A. LINE examined.

9903. (*Chairman.*) Do you attend here to-day as an expert in the paint trade?—That is so.

9904. Have you studied the subject of the use of lead in paints for many years?—Yes, more particularly in the last 10 years, but really from the time that I was 21 years old: say 35 years.

9905. Were you the founder and for some years head of the firm of John Line and Sons?—Yes, of the original firm of John Line and Sons, Reading.

9906. I understand that you ceased to have any financial interest in the business some time ago?—About 17 years ago, when I heard of the intention of the British wall paper manufacturers to form a combine.

9907. Are you still consulted by them with regard to paint questions?—Yes, constantly.

9908. Do you frequently have painting contracts carried out under your direction?—Very frequently, more or less under my direction, but as a rule it would be to assist a local architect or engineer who had work in hand and came to me as a consultant.

9908. Is your advice sought by others than the firm of John Line and Sons?—Yes, very frequently by practical painters and by the public and professional men also.

9910. Will you name a few architects or others who have consulted you?—Mr. F. B. Andrews, of Colmore Row, Birmingham; Messrs. Osborne, Holland, and Hobbias; also Messrs. Essex and Goodman, Messrs. Cheate, Dunn, Hale, Harris, Harvey, Mansell, Martin, Peacock, Butler, and, in short, most of the leading local architects, &c.; and Mr. Henry Leo, consulting engineer, who, some little time ago, built a factory for Messrs. Mitchell. In that factory there are approximately 14,000 feet of hot-water pipes which had to be painted. Mr. Leo refused to allow the painters to use white lead paint, and he sent for me and I specified a mixture of zinc oxide and zinc sulphide with manganese linoleate drying oil and a little gold size. It was perfectly successful and it did not discolour.

9911. Have you devoted special attention to the possibility of using non-poisonous substitutes for white lead?—Yes, I have.

9912. What led you to study paints from this point of view in the first instance?—When I was about 21 years of age I had an inquiry for what is now a well-known water paint, which was then in its infancy. I carefully went into it and took the advice of chemists, and I was convinced at that time that white lead was more or less unnecessary, and that zinc-sulphide paint ultimately would heat it out. I went in for the thing that I thought was going to succeed.

9913. Did the prevalence of lead poisoning influence you at all in coming to that decision?—Not at that time. I was not concerned about it then; but in the last 10 years I have become astonished and alarmed at it, and that has affected my judgment.

9914. Have you personally known many serious cases of lead poisoning?—Very many.

9915. Can you give us any idea of the numbers?—For months and months, at the suggestion of my brothers, I visited painters personally in and around Birmingham, and it was a common practice to find a fresh case every day. I should say that there are in Birmingham at the present time 150 cases of lead poisoning, very few of which are reported; indeed, only seven cases (according to a lecture by a medical officer of health) amongst house painters and 17 amongst coach painters during 12 months past.

9916. (*Mr. Parsonage.*) We have many cases there?—It is absolutely phenomenal. It is simply appalling. Some master painters will tell you, when you call on them, that they have never heard of a case amongst their men. They say, when you question them, that there might have been one years and years ago in the case of a very dirty painter. If you speak to the operative painter about it, he sometimes considers himself insulted.

He says, "Do you think I am a man of dirty habits?" When you thresh it out with them and get down to the bottom of things, you find out that they are perfectly well aware that the trade in Birmingham is honey-combed with it, and they sigh for relief from the intolerable danger.

9917. (*Chairman.*) You say that you do know that many of these cases are not reported?—I cannot say that they are not reported, but in my opinion they are not, because I have been led to understand that factory inspectors, or, rather, certifying surgeons, are not liable to report them unless the cases occur in a paint manufacturing concern which is under the Factory Acts, for which reason they escape being reported and are never heard of. Moreover, I believe the certifying surgeons habitually omit to report cases which do come to their knowledge; there being no pay for doing so, and it is, in a way, not their business.

9918. They are not bound to report them. Do you consider that lead poisoning cases amongst house painters should be made reportable?—Yes.

9919. Can you produce any statistics to support the statement you have just made?—I cannot say that I have ever compiled statistics, but in the course of preparation for my lectures I have availed myself of information from the Registrar-General; and gentlemen of his staff have computed that in 10 years there could not have been less than 9,418 cases of lead poisoning amongst painters. I have that in writing from the Registrar-General, or, rather, from a gentleman at Somerset House who has charge of the Statistical Department.

9920. Have you something to say about Dr. Jones, of the County Asylum, at Ohell?—I have a letter. It appears that some considerable number of years ago Sir Thomas Oliver reported about Ohell Asylum, and that being so, I wrote to Ohell Asylum in these terms: "April 12th 1911. The Medical Superintendent, Ohelbury Asylum, Essex. Dear Sir, I have been requested to write an outline of the evidence upon plumbism in painters which I have been asked to give before the Departmental Committee upon the prevention or mitigation of this evil result of using lead paints. In the 'British Medical Journal,' 22nd September 1900, Dr. R. Jones' most valuable statistics appear. 133 patients were workers who had used lead, divided thus: painters, 75; decorators, 13; plumbers, 18; gas-fitters, 13; grainers, 3; gas-motor makers, 2; colour grinder, 1; file outter, 1; tea lead roller, 1. Of these persons the mental condition was diagnosed as: mania, 37; melancholia, 33; dementia, 10; dementia and epilepsy, 10; dementia with paralysis, 24; general paralysis, 7; alcoholic mania, 3. And Dr. Jones found lead in brain and cerebellum. I have the honour to appeal to you, Sir, to assist me with later information for which I should be ever grateful to you. I write brief articles and lecture with lantern slides entirely at my own expense, and I have quoted 'Dr. Jones' as proof of the danger to painters of white lead. You may like to know that sulphate of lead is now being made on a commercial basis. Your obedient servant, Charles A. Line." The reply came as follows:—"County of London, Ohelbury Asylum, Woodford Bridge, Essex, April 12th, 1911. Dear Sir, I am just starting off for some time, and I much regret I have not the opportunity to go further into the question of lead and mental diseases. I have read your account with interest and am sorry I cannot help you at present. The condition is less frequent now than when I wrote. Yours faithfully, Robert Jones." I took that to be an admission that he had so written.

9921. (*Mr. Sutherland.*) What is the date of the 133 patients?—I cannot remember, but I think that it is 1899. Sir Thomas Oliver is of opinion that it is less

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[Continued.]

frequent now; that is to say, that there are somewhat fewer painters who become maniacs through using white lead.

9922. (Chairman.) Do you think that that is attributable to the improvement in other trades?—It is impossible for me to say; but I think the painters take more precautions, knowledge on the danger having spread.

9923. Have you collected any statistics of the number of fatal cases?—I have not myself. I have entirely relied on information which I have seen in the Board of Trade Returns, and which was furnished to me by the Registrar-General.

9924. I suppose you know that the Registrar-General's Returns include 284 definite deaths from lead poisoning among painters in the last 10 years?—I understood that those were the reported cases; but I do not think, and I do not for a moment believe, that they are a tithe of the cases that occur—not a tithe of them. They could not be.

9925. (Mr. Sutherland.) You would not multiply that by 10, would you?—I should multiply by more than 10.

9926. (Chairman.) I believe that you are not in any way financially interested in any one brand of paints rather than another?—Not in any way.

9927. Even when you were financially interested in a firm of decorators, was your trade such that it was equally to your interest to supply either lead or zinc paints?—At the time when I was financially interested in John Line and Sons, Reading, the firm supplied decorators. My personal proclivities are very strong indeed in favour of zinc paints and against white lead paints, but I am not financially interested. If a ton of zinc sulphide paint were sold to-day, or a cwt., it would not make a particle of difference to me.

9928. Two important factors in connection with any substitute for white lead are the cost and durability of the paint. Do you agree with that?—Yes, I agree with that.

9929. Has it been your experience that an equally durable paint can be made from zinc at much the same price as a lead paint?—Yes, that has been my experience. I should not hesitate, if I were painting my own property, to discard white lead on economical grounds, and use zinc sulphide, properly thinned, for all undercoating and all interior work.

9930. What do you say about exterior work?—I should also use it, properly thinned, but I should apply varnish over it, or add varnish to the last coat in that case, I think. But to lessen cost of maintenance, I should prefer a paint the base of which would be zinc oxide, containing about half per cent. of lead (occurring naturally in the ore) ground into zinc white paint (not foreign lithopone, however) composed of 36 per cent. of zinc sulphide in the zinc white. Asbestine might be added in a small proportion with advantage. I specify half zinc oxide with half zinc white to make the stiff pasté ground with 20 lbs. of oil to the cwt., supplied ready for being thinned out with turps, oil, and liquid manganese drier.

9931. Are the relative costs and durability of the paints dependent at all upon the pigment?—I think that very much more depends on the thinnings, and if you would allow me, I could explain why.

9932. Yes, please give your reasons?—You might take a semi-transparent, an opaque, or a transparent pigment with suitable thinnings, and you could make it into very durable paint indeed without using a particle of white lead or a particle of zinc oxide. You could also apply improper thinnings to white lead, and it would not be durable at all, especially if you used the kind of driers that most painters, unfortunately, use. On the other hand, you can take zinc oxide and you can apply the right thinnings to it, carefully selecting manganese linoleate drier and get a perfectly durable paint, which, in the opinion of His Majesty's Office of Works, has from two-and-a-half to three-times the durability of white lead, and I believe that it has. Not only so, but if you take zinc oxide and mix it with plumbago—that is to say, with graphite—you can then obtain a protective paint for iron and steel of which I have examples here, which

has phenomenal durability. I have brought some plates of cast iron and steel here which were painted a good many years ago. (The witness produced the plates.) These plates have been hung up inside a factory smoke-stack for approximately 12 months. After being taken down and washed, they have been carried about as samples, and left in the damp and the dry since August 1906. You may cut the paint off the steel with a pocket knife. It is perfectly flexible, as it ought to be. On the other hand, paints which are chippy, which readily break and fracture, are no good. This is graphite. If you cut it off you see that it is perfectly flexible like so much india rubber. This has no zinc oxide in it, but that has.

9933. Which is the better?—For dark colours the graphite is perfectly satisfactory. It has this advantage, that if you apply it on a hot water heating installation, you lose no radiant heat; whereas with aluminium, you lose 25 per cent. of radiant heat. It is not generally known, but it is so. I have proved, in some chemical works close to a gasworks, that if you mix zinc oxide and graphite it resists ammonia fumes, and the presence of sulphuretted hydrogen better than anything they ever had. I call it ferro-sote from *σάζον* (sozein) to protect, and *ferrum*, iron. It protects the iron. It is a simple compound of zinc oxide and graphite which they mix themselves at the works. For light grey tones I use mostly white zinc oxide darkened with graphite or titaniferous magnetic iron oxide.

9934. What are the thinners which you use?—Pale drying oil. These paints should be applied warmed, and either linseed, tung, or sunflower seed oil, prepared or cooked with manganese oil drier may be used with a little turpentine for diluting the stiff paste.

9934a. Are the oils and driers commonly used for lead not suitable for zinc paints?—They are quite unsuitable in my opinion.

9935. Why?—As a rule they are a wet solution of manganese which causes blistering; otherwise they are very often barytes which has very little, if any, drying power. Then they may be lead acetate, which to my mind is very poisonous, or they may be litharge or oxide of lead. All these things are inadmissible in the case of zinc, particularly in the case of zinc sulphide, because if you add oxide of lead to zinc sulphide, the whole thing turns black.

9936. What should be used as driers for zinc paints?—In my opinion, manganese in very small proportions, the linoleate or the borate, or the resinic if properly added to linseed oil which has been previously clarified and heated to 212 degrees, at which temperature you can well stir in the manganese oil and spirit solution drier. It forms an ideal oil for paint, whether white lead or zinc oxide. I believe in the driers being in the prepared oil and not sold separately for using with cold raw oil.

9937. How should the oil be prepared?—I am not able to say positively from my own personal knowledge of having seen it prepared. But I have ascertained from several independent sources how it is prepared, and, putting these different independent observations together, I have every reason to believe that this is what takes place: The oil, linseed or other, should be warmed to about 160 degrees Fahrenheit to coagulate the albumen, just as when you boil an egg the transparent albumen becomes opaque. When it becomes opaque it sinks down, and this can be facilitated by the addition of a little dilute sulphuric acid. This will throw down what we call the footings which consist of impure albumen and resinous oil, which can be used for putty but not for paint. The clarified oil is pumped into another vessel and then heated to 212 degrees Fahrenheit, after which about 2 per cent. of linoleate or borate of manganese is added in a spirituous solution, such as turpentine solution. What I maintain is that it not only mixes—you can easily mix a solid drier with the paint—but you can make this liquid drier amalgamate, which is a very different thing from mixing. It permeates the whole of the oil in such a way that 2 per cent. will do the work of almost 20 per cent. of any other drier, and thereby you save the cracking of the paint.

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[Continued]

9938. Is the oil so treated suitable for zinc paints?—Eminently suitable.

9939. Is it a perfect oil for zinc paints?—It is quite suitable for making enamel or for painting.

9940. Would further driers have to be added to it?—Only in very bad, damp, cold weather when the paint is liable to chill in the drying, then liquid drier is used (not terebine however, that is a lead drier).

9941. Is an oil so prepared not generally known in the trade?—It is well known, but it is exceedingly difficult to sell it until a painter has once bought it. The difficulty is to get him to buy it the first time, because he kicks at 5*d.* per gallon extra. But after he has once bought it he will give 5*s.* 6*d.* a gallon instead of 3*s.* 6*d.* for something else, and he will not make trouble about the 2*s.*

9942. With what particular zinc compounds do you get the best results?—For inside work I have always obtained the best results with sulphide of zinc for undercoating and finishing coats, and with zinc oxide for enamels; but for outside work the sulphide can be used with proper driers and a little varnish or ground into oxide half and half.

9943. What is the value of zinc sulphide?—Zinc sulphide commercially sold has nearly double the bulk of white lead, and it is worth from 22*s.* to 24*s.* per cwt. according to the price of oil. It is about the price of white lead, but with double the bulk. I say to a painter: "Will you have zinc sulphide, because if so we will pack it in two kegs. If you have white lead we can pack it in one keg." The man says: "What is the meaning of that?" and I say: "It covers twice as far," and with equal density, nearly as much as double the weight of white lead.

9944. In what way is it better?—It does not discolour and it is non-poisonous. Its covering power is very great. It is dense. It is considerably better than white lead in covering power. I have a letter in my pocket from a practical man, saying, "It covers better than any white lead I have ever used." Then another advantage is that there are certain staining pigments which are inadmissible with white lead, but which are perfectly admissible with zinc sulphide—anything of a sulphurous nature.

9945. How does it compare with white lead in regard to covering power and density?—Its density is equal to that of white lead, and it has greater covering power. If you spread it out very thinly, it does not obliterate quite as well as white lead. The great point is that you can use it thicker.

9946. Do you consider preliminary priming coats of lead paint necessary before zinc paints are applied?—Not at all necessary.

9947. What would you use for undercoats when painting with zinc paints?—I should use a first class water paint, thinned with a silicate of soda emulsion. We call it petrifying liquid. It has great advantages. You can apply it with a distemper brush instead of a small paint brush, and, however thickly you lay it on, it sets hard right through, and is capable of being rubbed down, and it effects a very great saving in labour.

9948. Does such a water paint give you a hard foundation?—Yes, a perfectly hard foundation. If it form a blob-like a marble on the wall and you break it off the next morning, it is nearly as hard as marble; but if it were white lead running down in a tear it would be simply a little oil sack.

9949. (Mr. Sutherland.) You are speaking with regard to wood?—Yes, not iron.

9950. Wood or plaster?—Wood or plaster.

9951. (Chairman.) Take a paint made of zinc sulphide precipitated with barium sulphate; is this not commonly known as lithopone?—It is; but I would not call it that myself. I have had offers of lithopone as low as 6*l.* a ton. The persons who offered it stated how much zinc sulphide there was in it. I did not believe them, but they said there was very little. Such a paint ought to have at least 25 to 30 per cent. of zinc sulphide in the pigment in my opinion. British zinc white (sulphide) paint contains 36 per cent. of the ZnS. You must not confound it with lithopone.

9952. There is good lithopone and bad lithopone?—Yes; some of it is very inferior.

9953. What would you use for finishing coats?—It would be according to the colour required to be produced. If I wanted a white colour, I should use a good zinc oxide for finishing coats in all cases, although the other could be used with good results.

9954. What do you mean by "a good zinc oxide"?—It is very little understood. Few painters know how the material is produced. It is produced by the direct, or indirect method when the zinc spelter bars are volatilised by intense heat and passed over into the condenser. Then from a portion of the vapour or the gas which is produced from the zinc—that portion which precipitates first—from this vapour the zinc oxide falls through the condenser tubes near the furnace. This is gritty and crystalline and probably very suitable for a rubber company to make tyres with. If you wait until the zinc oxide vapour or gas has travelled through half a mile of pipes, then at the end of the condensing pipe you get an extremely fine product which is practically impalpable and fit for use in the making of enamel or paint. These grades of fineness are called red seal, green seal, and so on.

9955. Is zinc oxide with proper physical properties readily obtainable?—It is readily obtainable, if you have an expert who knows how to buy it.

9956. Is zinc paint equally suitable for finishing with an enamel surface as with a flat surface?—It is quite suitable. The difference is this: if you wish to get an enamel surface you can get it without buying enamel. If you use this drying oil it gives a surface which shows scarcely any brush mark and which looks as good as most enamel work; but if you wish the same zinc oxide ground in oil to dry flat you add turpentine and let it stand overnight, and when the oil floats up you skim it off, and add gold size and it dries flat.

9957. Will you tell us how zinc paints, such as you have described, compare in cost with lead paints in your experience?—As a matter of fact zinc sulphide paints with a given number of coats, as compared with white lead paints with the same number of coats are cheaper. If a painter estimates for 3 coats and he is not bound to use white lead in competition with a painter who is bound to, then the latter will lose the job. The man who uses white lead suffers. He will lose 7*s.* to 8*s.* on every cwt. The man who has estimated for zinc sulphide paints will beat him out entirely, as he had done many and many a time.

9958. Next, on the subject of durability, have you made any tests which enable you to speak with authority?—I did, in my own house, 15 or 16 years ago. I was induced to buy a house and I had the paint burnt off. We began from the wood. With regard to some of it, there may have been a little white lead left on the wood. We did the whole work with zinc sulphide paint, and it wore remarkably well outside for about 10 years, because the finishing coat had varnish in it; but at the same time I must say that I have neglected the painting of the outside and it certainly is not in good condition now. As to the inside of the house which was done at the same time, most of the panels were flatted, and the stiles and rails were finished in a tinted enamel paint, and the whole thing is in good condition still.

9959. (Mr. Sutherland.) After 16 years?—After 16 years.

9960. (Chairman.) What do you say about the outside?—I think I said just now that after 10 years it looked fairly well, but now it does not after 16 years. It certainly ought to have been done again five years ago.

9961. (Dr. Collis.) The outside after 10 years looked perfectly well without repainting?—I will not say that it looked perfectly well, but it was passable.

9962. (Chairman.) Do you know of any cases of outside painting with lead that have lasted for as long in about the same condition?—I have seen many cases of outside painting with lead in Birmingham that were no good at all after three years, but it is a phenomenal atmosphere.

9963. Can you mention other cases where paint work has been done with zinc paints to your knowledge

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and with satisfactory results?—I might mention Mr. Henry Martin, an architect of Birmingham, who showed me the walls of his staircase painted 27 years ago and washed every year since. I went there with the architect who has charge of the New Zealand schools. The walls of Mr. Martin's staircase are in very good condition now. They were painted with zinc oxide paint. The purity of the colour is remarkable. The same pigment in white lead would have blackened. Ten years ago a painter, since deceased, was called in to repair broken pieces of the plaster on the staircase, and Mr. Martin particularly told him to use oxide of zinc and match the colour; but he used white lead and matched the colour which was tinted with Prussian blue. Where he patched it, it is very much discoloured, but the remainder of the wall is perfectly right after 27 years. That is an inside job.

9964. Can you give any other instance?—One of the best is Messrs. Cadbury Brothers. I have a letter from them.

9965. Would you read it?—Messrs. Cadbury Brothers wrote to me on the 20th October 1910. I ought to say that Sir Thomas Oliver had asked me for any tangible proof of any good business house that had used zinc oxide paints successfully, and I asked Messrs. Cadbury to oblige me with information. This was their reply: "Mr. C. A. Line, 39, Beaufort Road, Edgbaston. Dear Sir, In reply to your inquiries re zinc white paints, we have for years used zinc oxide paints in preference to white lead on every possible opportunity, not only for interior but exterior work. We may add that our experience justifies us in continuing this course." I had been to their works by request to consult with a Mr. Griffin, the gentleman who has charge of their public institutes, &c., and a Mr. Morley, their foreman, with reference to using zinc sulphide paint. While I was there I asked Mr. Morley to take me round the works and show me where they had been using zinc oxide. I kept on saying, "Show me some that was done years ago so that I may see how it has worn." He took me from place to place and I said, "Why do you not show me some of the old zinc oxide painting?" He said nothing until we got out of the works and walked up the road, and then he said to me, "You have been expecting to see zinc oxide painting that was done years ago, have you not?" I said, "Yes, I have," and he said, "It was all done long ago, and it looks exactly the same as if it had been done only last week, does it not?" I thought that it had been done within a month or two, because it was snow-white and in perfect condition on the ceilings and match-boarding.

9966. Have you any other instance to give?—I do not know that I can call to mind any other particular instance. But I know hundreds of instances where zinc sulphide water paint thinned with silicate emulsion has outlasted white lead without discoloration or cracking, and remained washable even in an atmosphere charged with chemical fumes.

9967. Have you any instances with regard to outside painting?—I cannot call to mind any, for the simple reason that painters who buy zinc paints from my brothers' firm very rarely state where they are going to use them. They do not know very often where the paint is used; but I have a case in point now where they know where it will be used. Zinc oxide was specified for 93 tons of ironwork to be erected by Messrs. Keay, of Birmingham, and is to be painted exclusively with zinc oxide paint, and there will be no doubt whatever about that.

9968. Zinc paints are, of course, manufactured largely by paint makers and grinders in this country?—Yes, they are commonly made by almost any paint grinder in England, generally from lithopone.

9969. Are the zinc compounds of which these paints are made, also produced in the United Kingdom?—Zinc sulphide paint is only produced in two works, one at Charlton and the other at Widnes. The Widnes proprietor, I am told, advertises himself as a manufacturer also of zinc oxide.

9970. Do other firms of paint makers import their zinc oxide and zinc sulphide from abroad?—They import the zinc oxide, and they import zinc sulphide under the name of lithopone. It is inferior to English manufacture.

9971. From what countries does it come?—Lithopone comes from Holland, Germany, Switzerland, France, and America.

9972. What do you think would be the effect if the demand for zinc paints were greatly increased in consequence of any recommendations which this Committee might make?—I have not the slightest doubt that capital would immediately be found for the manufacture of zinc oxide in England, and in fact I have been approached more than once. I was asked a few days ago by a solicitor, who represents some exceedingly wealthy clients, whether I really thought there was room in the paint trade for capital, and I said, "Distinctly for two things—one, the manufacture of zinc oxide in England, and the other, the growing of poppy oil on the East Coast." Moreover I hold sunflower seed oil in high esteem as suitable for being cooked or prepared by heat to make it into pale manganese drying oil.

9973. Do you think that the increase in the demand would cause the price of zinc compounds to go up?—I do not think so, because there is always the competition of zinc sulphide.

9974. To sum up then, has the whole of your lifetime's experience in connection with the trade and your study of paints led you to believe that the use of lead in paints could be prohibited without involving any serious difficulties for the users of paints?—I distinctly think so. I do not think it would involve any difficulty for the users of paints, nor do I think that property would suffer in any way whatever, even if it were a question of making a joint for which many engineers use white lead. They might just as well use plumbago. They could make joints without white lead.

9975. Such a prohibition would put an end to the serious loss of life and health entailed by the use of lead paints?—Yes, it would.

9976. (Dr. Collis.) You referred to the fact that you considered that, with respect to deaths occurring from lead poisoning, the information at the disposal of the Registrar-General was not complete?—I certainly do not think it is complete.

9977. Can you, for instance, give us any definite case of death which, in your opinion, was caused by lead poisoning, where the death certificate stated something different?—No, I am not able to do that. I do not know of an individual case, but I should look at the thing just in this light—from the point of view of the enormous number of cases that I meet with of men in a critical state of health. I compare that with the fact that the Registrar-General and his officials have reported something under 300 fatal cases in ten years. I simply take it as a proportion sum, and it is incomprehensible to me how such a small number of fatal cases could have been reported, when there is such a large number of cases of illness. The Registrar-General certainly has good reason for computing that in 10 years 9,400 cases occurred; and yet that only 284 of these people died is quite unthinkable.

9978. But that computation, I think, is calculated on the basis of what we know in factory cases, namely, that each case of death is accompanied by so many cases of illness, and, therefore, he has calculated that the deaths in the house-painting trade would represent so many cases of illness?—Yes, I believe that he has. That is stated in his letters to me. I have the letters here.

9979. So that the 9,400 cases of illness are merely computed on the number of cases of deaths which he knows. If your statement is correct that he has not correct information of the total number of cases of death, the number of cases of illness should be proportionately larger?—Well, that may be so; but my answer to that would be that the people have died, but their deaths have been put down to other causes. I may say that I have the advantage of knowing a medical man, James Jones, now of Lewisham Road, an exceedingly careful

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and successful homœopathic physician, in whose house my wife lived for seven years. I have always had this homœopathic physician as a personal friend, generally as a consultant. I know the opinions of others, and every one of these gentlemen is agreed that very many fatal cases are attributed to other causes which might have been safely attributed to lead-poisoning.

9980. You mean, for instance, Bright's disease?—Yes, and paralysis, mania, colic, or something or other—all sorts of things really brought on by and inseparable from lead poisoning, but where the cause of death has not been certified as lead poisoning. Possibly the doctor who certified may not have had the means of knowing that it was attributable to lead-poisoning. He may have used his best judgment, and said, "This man died from paralysis." He puts it down as such, and it gets on the certificate as something other than lead poisoning. I make bold to say that the medical profession have not attributed to lead poisoning anywhere near as many cases as they should have done.

9981. While that is a possibility, that is rather a personal opinion; you are not able to justify it by figures?—No, not by figures. I reason it out. I have a note here, "Lead Poisoning, page 563," published by Young, Pentland: "In the five years ending 1890, 1,822 deaths from accidental poisoning in England and Wales. Of these 541 or 29 per cent. due to lead." Now we are told only 94.

9982. Do you know the figures for all industries?—I have another note—that during the five years ending 1895 there were 672 deaths from plumbism.

9983. Those would be taken from the Registrar-General's Death Returns for the United Kingdom?—Yes.

9984. For all industries?—That is taken from the 1891 census. During the five years ending 1895 and the five years ending 1900 there were, respectively, 541 and 672 fatal cases. Taking men in the asylums—132 madmen who had worked in lead—nearly all of them were plumbers, painters, or decorators. I have come to the conclusion that nearly all people who die from lead poisoning are plumbers, painters, or decorators, and there is no question about it. The potteries used to contribute a big share, but they do not contribute a big share now, nor do white lead works.

9985. The whole of the factory industries now contribute less than house-painting alone?—That is so—alI owing to the Factory Department.

9986. Do I understand with regard to first coats of paint which are applied, especially on woodwork, that the surface can be brought up without using lead?—Yes, that is so.

9987. So that you do not hold that lead has any special properties innate to itself in filling up the grain of wood?—Not necessarily. There are other things which are useful for filling up the grain of wood. There are plenty of fillers other than lead.

9988. Lead will do the work, but other things will do it equally well?—Yes.

9989. How far is the filling up of the grain of new wood an important point? I ask the question from this point of view—that in the furniture trade they only seem to use whiting for that purpose?—Plaster very largely.

9990. Whiting is the most usual, is it not?—As a matter of fact the discovery was made years ago by Church, of Grand Rapids, Michigan, that if you heat plaster of Paris (calcium sulphate) to 212 degrees and introduce into it desiccated glue, you can grind the two together and make a perfect wood-filler; but if you attempt to grind them at a higher temperature the glue frizzles, and if you attempt to grind them at a lower temperature it clogs, it is too damp.

9991. So you think that there are several substances, including the one which you have mentioned, which can be used as an absolute substitute for the first priming coat of lead?—Yes, I am of that opinion.

9992. I make rather a point of this, because several of the witnesses before this Committee have laid great stress on the point that it cannot be replaced. But, in your opinion, it can be replaced by several substances?—There are several substances which will fill up wood as well as white lead. In America shellac and zinc

oxide are used, and quite successfully. I have some boards prepared thus here, and the total number of coats from start to enamel finish is four.

9993. In the use of paints not containing lead for outside work, your experience is not so large, is it, as your experience with regard to their use for internal work?—No; on the other hand, my experience is 50 times as large with regard to outside work as inside. The material that I know of that is used for outside work is sulphide of zinc thinned with petrifying liquid.

9994. That contains no lead?—That contains no lead.

9995. What is your experience of that?—It is the most durable thing I know for exterior painting, but I do not always recommend that to be put on if the building has been previously done with a flexible or elastic oil paint, for the reason that it gets very hard and is liable to crack on the elastic oil paint.

9996. That would have contained lead?—Yes.

9997. If you were bringing the work up from the base, what would you use?—I should not use oil paint to bring work up from the base. I would use zinc sulphide-water paint precipitated with barium sulphate and thinned with an emulsion containing a little varnish and silicate of soda or silicate of potash.

9998. Have you had experience of the painting of external surfaces with such paint?—I have had experience of it for 36 years.

9999. With regard to woodwork, how long would you expect it to last if exposed to the air—not bad conditions near gasworks, but ordinary exposure?—I was not thinking of woodwork but of plaster or stucco surfaces, or stonework.

10,000. Let us take that for a moment and then come back to woodwork?—In that case it would last longer than any other paint in existence.

10,001. For how long?—Ten to 15 years on the outside.

10,002. Do you say that it would not want renewing at all for 10 or 15 years?—In certain atmospheres it would not, but in other atmospheres the staining pigments in it would discolour. That would somewhat depend on what was underneath it.

10,003. Let us take an atmosphere in which what you have spoken of would last for 10 or 15 years. If a surface were painted by the ordinary method used to-day with lead paint, how long would it last in such an atmosphere?—Three years in London.

10,004. But in the same atmosphere as the other lasts for 10 years in?—It might last without renewing for five or six years.

10,005. That is four or five years less?—Yes. One is doubly as durable as the other.

10,006. I will not take a bad place like Widnes, but in the atmosphere of Birmingham or of London or Glasgow, how long would you expect the zinc-sulphide-painted house to last?—It would last almost as long in those atmospheres as in any other, but white lead would not.

10,007. How soon would the lead paint want renewing?—It would certainly want renewing in two or three years, or would be unsightly in 18 months.

10,008. Now, turning to the painting of woodwork, the external parts of windows and such like, would you suggest the same method for undercoatings?—Yes, but not for finishing coating. For finishing coating I would certainly advise varnish paint.

10,009. If the woodwork was so dealt with, for how long would it last in an ordinary atmosphere?—It may fairly be expected to last for 10 years.

10,010. For how long would it last under similar exposure if it was painted with lead in the ordinary way?—It would not last half as long.

10,011. Does the presence of the varnish make a material difference, in your opinion?—It does. But there is another consideration which one has to take into account—the oxidising influence of lead on the thinnings. The thinnings being linseed oil, too often contain unsuitable or too much drier.

10,012. We are presuming that the lead painting is done in the best way that it can be done in?—Supposing that that be so, then white lead has the

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tendency of continuing to oxidise the oil whilst it is in contact with it, and it does oxidise it. This oxidising tendency goes on and cannot be stopped; but there is no such tendency with zinc, or at any rate only what is attributable to atmospheric influences which do not act so prejudicially on zinc as on lead pigments. Of course where sulphuric acid fumes are allowed to permeate the atmosphere, that would destroy zinc paint also.

10,013. Does not that tendency produce a brittleness of film?—It produces a film so brittle that you can easily crack it off. *This is off ironwork inside Snow Hill Station, Birmingham (producing a specimen).* It was under glass, it has not been exposed outside.

10,014. (*Mr. Sutherland.*) Is that white lead?—Yes. I can produce some that came from a drill hall at Stoney Lane, Birmingham, off galvanised iron. After three years exposure of the white lead paint, it was brittle as it possibly could be. It did not adhere properly. I put my knife to it and stripped off a piece 20 inches long. It stood upright.

10,015. Was that on glass?—No, on galvanised iron, which is fluted.

10,016. (*Dr. Collis.*) We are getting from woodwork to metal, but I wanted to clear up the point with regard to the painting of woodwork exposed to external influences. You have had considerable experience of such wood work and you suggest sulphide of zinc paint?—Yes, with petrifying liquid in it—a water paint, not an oil paint.

10,017. You have known it to last for 10 years without requiring renewal?—It was not a zinc sulphide water paint that lasted for 10 years, but a zinc sulphide oil paint.

10,018. There was no lead in it?—No. The varnish was in the last coat.

10,019. Does that materially add to the life of the paint?—Yes, it does, in my opinion.

10,020. That being so, how then would it compare with your zinc or non-lead paint?—If the paint were white lead from the bare wood upwards the oxidation would go on undoubtedly, and it would not last as long as zinc paint; but zinc sulphide paint, on the other hand, needs the addition of varnish and the last coat should be done in that way. If zinc oxide had been added, it would have increased its life.

10,021. If varnish is added to lead paint, that makes the painted surface last longer, but not so long as the surface painted with zinc paint?—I agree; but that ought to be qualified in this way; that very much depends in both cases on whether the thinnings are suitable or unsuitable.

10,022. I am presuming that it is done *secundum artem*—in the best possible way in regard to both?—Yes.

10,023. There are good and bad ways of doing everything. Now with regard to the metal work, there are various preparations, are there not, besides zinc, which can be used on metal work?—Yes. I would strongly recommend the use of graphite paint on the metal work.

10,024. Bringing up from the base?—Yes. As a rule, you will find some red lead on it or red iron oxide paint.

10,025. But without the red lead on it?—Graphite paint, I think, is superior, and in my opinion, ought to be applied on all metallic surfaces before they leave the works where they are constructed.

10,026. Have you known metal treated with non-lead paints from the base, which has stood as well as metal treated with red lead, and has been as protective?—I have not compared it with red lead. Red lead certainly is said to possess some advantages. *This steel plate covered with zinc and graphite has been so treated.* It has been well exposed to extreme heat and frost and damp and everything else, and it has been buried in the ground.

10,027. Your experience has been on house decorating and painting rather than upon engineering work?—Yes. I have not had very great experience in regard to the painting of engineering work.

10,028. We have had other evidence on that point. Your evidence definitely points to the fact that, if

properly treated (by which I understand you to mean not more expensively treated), non-lead containing paints are as effective both as protective paints and with regard to lasting?—Yes, and as decorative paints.

10,029. (*Mr. Sutherland.*) You said that you considered that Birmingham was honeycombed with lead poisoning cases?—Yes.

10,030. Have you figures to support that?—Yes, I have collected them myself. I have been to see the individuals.

10,031. How many cases have you personally seen?—I have personally seen at the very least 150 cases in Birmingham.

10,032. One hundred and fifty cases of painters suffering from lead poisoning?—Yes, supposing that I go to a painter whom I know very well, and he says, "I am sorry to say that I have five men ill." I go to another one, a very good man, whom I have known for 30 years and who was always a deadly opponent of zinc paints, but who has had a waking up. He found that he had to defend a case in the courts and to pay 300*l.* Before the case was settled, he got notice from a surgeon at Oldbury of another case, and so it goes on all round. At Acoc's Green, the best painter there has had to pay 90*l.* to a man who cannot work. I would not have any difficulty in running you round Birmingham with me in a motor-car and spotting 50 cases straight away between breakfast and dinner.

10,033. One hundred and fifty cases amongst Birmingham painters would represent nearly 20 per cent. of the painters?—In my opinion there are a great deal more than 20 per cent.

10,034. It is a very large proportion, and, with all respect, I should question it?—I think that every painter who uses lead is affected. I very much question whether he can possibly escape. A man tells me that he has worked for 30 years with lead paints and there is nothing the matter with him; but when he opens his mouth you can see the blue line on his gums.

10,035. Why do you prefer zinc sulphide to zinc oxide?—It is more easily sold. It is 22*s.* a cwt., and zinc oxide is 4*s.*

10,036. But does that matter if zinc oxide is better than the other?—I do not think it is better for inside work. The other answers perfectly well.

10,037. It is more amenable than zinc sulphide for general purposes?—Yes.

10,038. Why do you mix varnish with it?—As an extra protection in the finishing coat. I should not mix varnish with it for undercoats, but turpentine and gold size and a little oil.

10,039. What the Dutch call stand oil?—No. *This oil is made in London. (The witness produced a bottle of oil.)* It comes from a firm called Adler, at Millbank. I have besought those gentlemen to give me particulars and details of it, but they will not do it.

10,040. That is not the equivalent of Dutch stand oil?—No.

10,041. It is very expensive?—Whatever price the raw linseed oil happens to be, this drying oil is easily saleable at 5*s.* a gallon more all the year round.

10,042. If your zinc paint will stand for 10 years outside and for 27 years inside, what are you going to do with the painters?—As I go round the streets of Birmingham and call on some of my best friends, it is a common thing for them to say, "Come in" and to give me a chair and treat me in a magnificent manner; but when it comes to asking them to recommend zinc for a job they say that they cannot do it. I say, "Why not? you know it is suitable." They say, "We should never be called in again." That is a common answer. If it were a church or a chapel, reason would come to their aid, and they would say, "It will cost 20*l.* for scaffolding and, therefore, the painting must be done with the most durable paint, having regard to its remaining in a good decorative condition." Suppose that they put beautiful tints in white lead, like John Taylor did at Lloyd's Bank, Colmore Row. I said, "You have great experience. Why do you use it for



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Lloyd's Bank? You know that the tints will spoil"; and he said, "But I shall be dead and gone."

10,043. I have used zinc paints for chapel decoration, but after 12 years it has needed doing again?—The condensation in some chapels and the atmosphere where gas is burning would cause that.

10,044. This was in gas. Why do you think that varnish should be added for outside work?—To give it extra protection.

10,045. The Dutch have made a very exhaustive examination of all these paints and with a strong bias in favour of zinc paints, they have come to the conclusion that in all situations, such as railway stations, zinc paints cannot be used because of the acids in the air which soften them?—You will not make me believe that.

10,046. They had a most unbiassed and elaborate Commission to enquire into the subject extending over five years, and they made careful experiments?—I have heard that the Austrians did something of the kind, but the gentlemen who did it perhaps were not well aware of the best methods of thinning. I daresay that they did not know very much about this beautiful drying oil which we have the advantage of.

10,047. In Holland they have the stand oil and other oils to perfection, and there were architects and practical men on the Commission to which I referred just now, as well as chemists?—Do you think they have a drying oil containing 2 per cent. of liquid drier put in when the oil is hot?

10,048. Yes. You will see that in their report?—I should be very much interested to read it.

10,049. (Chairman.) They use a manganese resinate oil?—Yes, or borate. I would add linoleate. It is an advantage. If I were recommending a zinc oxide paint, I would recommend the Dutch oxide made by a process which leaves in it the lead naturally in it. I do not believe in the fad of purity. What is the good of steel without a bit of nickel in it. The 1 per cent. of lead was put there by a power much more wise than we are, and if it pleased God to make zinc oxide with 1 per cent. of lead in it, let us be thankful.

10,050. But zinc oxide is not a native mineral?—The small percentage of lead is in the ore as it occurs naturally, and what is best for the use of man.

10,051. (Mr. Fell.) Have you had experience of the painting of vehicles—carriages or motor cars?—Not so much. It has not been my line of things nor have I supplied coach-builders to any great extent. I think that as a rule coach-builders are very strongly prejudiced in favour of certain good old varnish manufacturing firms, and so on, and it is difficult to induce them to move; and they are right in that respect, because it is serious if the paint and varnish of a coach go wrong.

10,052. But apart from varnish, what do you say about painting coaches with non-lead paints?—Three railway companies I understand are doing painting at the present time without using white lead for the bodies of the carriages.

10,053. (Chairman.) Which are they?—I am not able to say, but the information comes from an office not far from here.

10,054. (Dr. Collis.) What is the office that gave you the information?—If I recollect rightly it was the Home Office, the Factory Department.

10,055. (Mr. Mason.) Is there not a particular name for the oil you have described?—We call it pale boiled drying oil. We are very careful about the word "drying," because the drier has not to be added to it except in bad weather.

10,056. Do I understand that this is a sort of proprietary article that can only be bought from one firm?—No, not at all. If I am correctly informed by experienced decorators upon whom I have called, they say, "We have had it offered to us." The Bournville Village Trust said, "We have had the same article offered to us elsewhere." They had a bottle of it. Messrs. Blundell, Spence and Company, I think, have been buying a large quantity lately of sunflower seed oil with the object of using it to make a drying oil. Chinese wood oil has the remarkable property of drying hard all through instead of drying from the surface

inwards. A small percentage of that is added, so that it aids it.

10,057. This is not linseed oil, is it?—It is practically linseed. That is sold as linseed oil, but we do not require that it shall be stated that it is all linseed. We think that there are better oils than linseed. I should take sunflower seed oil, Chinese wood oil, and the poppy oil to be better.

10,058. (Mr. Sutherland.) The last of those is very expensive, is it not?—There is a big offer now of something like 9,000 or 10,000 tons of it, which we could not have had two or three years ago.

10,059. There is no test attached to it, is there?—Yes. A firm at Hull bought some some years ago and wished they could get more, and when they could get more they immediately placed an order for 25 tons. People will use it if they can get it.

10,060. It is purely in the experimental stage? Yes, amongst most varnish makers; but there are experts who have had long experience of its uses. I have written to Dr. Blackler of the Paint and Varnish Society, and submitted samples to him, and asked him to test them, but I have not heard from him yet. (Since then Dr. Blackler has reported satisfactorily.)

10,061. (Mr. Mason.) You were saying just now that it was possible to make an enamel with zinc oxide without the use of varnish?—No, I did not say that.

10,062. I thought that you did?—What I endeavoured to convey was this—that it is possible to obtain a surface resembling enamel and looking practically as well as enamel without buying enamel. If you use this particular oil with zinc oxide pigment it gives a beautiful surface showing scarcely a brush mark, and it can be mistaken for enamel.

10,063. Have you had any experience of the painting of the inside of factories?—Yes, a very large experience, but not bridges and iron work.

10,064. I do not exactly mean the painting of the insides of factories; but painting as carried on as a factory business. I will put it in that way, as in coach painting or furniture?—I have been called in repeatedly in Birmingham by people who make wooden bedsteads. They used white lead as a base and the bedsteads discoloured and were returned. I recommend zinc oxide and it was perfectly successful, also zinc sulphide for undercoating; but I can save money by using improved zinc white: it combines the advantages of both kinds of zinc pigment.

10,065. (Dr. Collis.) How long ago?—That dates back to at least six years, and the said bedsteads and suites of furniture treated in that way without white lead gave every satisfaction. Messrs. Wales, one firm in Birmingham, have done a lot in that way. You may see in the Midland counties many advertisements on windows of what is called Master polish. The advertisements represent a figure subject—an attractive looking female holding out a box of Master polish, and it reads, "We sell Master polish." The pieces of glass had to be backed up. Previously they were painted with white lead and made to adhere to the outside of the shop window; but they discoloured and looked bad very soon. But since they have used zinc oxide in a proper combination containing varnish they have been quite successful. Mr. J. Ornikshank Smith wrote the formula for that.

With regard to basic lead sulphate, I entirely agree with Sir Thomas Oliver that if a man eats it or if he smears it on his pipe and sucks it it will kill him. With reference to the use of it in a room, I have tried it and I cannot detect the least smell from it other than from the little turpentine in it. There is no nasty leady smell given off. That has been proved. I was invited to go to Liverpool to hear Professor Baly lecture on the toxicity of white lead, and I was favoured with a private view of his apparatus by Mr. Roscoe Hardwick, the Secretary of the Society of Chemical Industry, and he carefully explained to me in the laboratory the whole process by which Professor Baly has been proving the fact, as I understand, that in the vicinity of newly painted surfaces painted with white lead there are certain poisonous fumes given off,—volatile gases. I was interested in this. On my way back from Liverpool, I found my grand-children

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both ill. One is three years of age and the other is a year old. I enquired what had happened and I found that the premises next door to where my son and his children lived had been painted, and the children had been subjected to the fumes of hydrated carbonate of lead. The children were in a front room with a bay window. The sun was shining on that bay window and on the next door bay window close to my son's premises. My son has to live in the nearest house that he can get to his work. The fire was burning, the sun was shining and the children were playing in the room. The door was locked and they were left in there with their toys, and they were subjected to the fumes of white lead paint for two hours. Then they were taken out for a walk, and when my son's wife had them out the children began to vomit very badly. She could not detect what was the matter, and they were so bad and exhausted that she went for the doctor. He could not detect what was the matter. It was incomprehensible to him. He did not think that the food was at fault, but that an irritant poison of some kind had caused the illness. I did not tumble to it, at all—you know what I mean. A little later on I wrote to my son and said, "Did not I see painters painting next door at the time?" and he said, "Yes." I certainly had come to the conclusion that the vomiting that those children were subjected to from about mid-day until midnight until they were practically exhausted was caused by the irritating nature of the white lead paint. That is not the only instance that comes to my mind.

10,066. (Mr. Kinggate.) With regard to jointing, you mentioned that engineers were using something for jointing in the place of lead?—Plumbago.

10,067. The only thing that we are interested in in the coach-building industry with regard to jointing is the jointing of wood and ironwork together, where they use lead. Would plumbago be applicable for jointing woodwork and ironwork?—I have not had sufficient experience to say, but if I were doing it myself and if I were going to bolt a piece of ironwork on to the splash-board of a van, for instance, I should not hesitate to bed it in zinc instead of white lead, but I should put gold size or turpentine, at any rate gold size, and a bit of varnish to cause it to adhere, and I would screw it up tightly. There is one point that I would like to mention and that is with reference to the causes of blistering. One of my sons, at 18½ years of age, has been awarded a scholarship at Emmanuel College, Cambridge, for Natural Science, and he is a remarkably good chemist for his age. I asked him to work out for me the chemical equation showing why resinous acid in wood combining with the carbonic oxide in white lead forms (in my opinion) expansive and volatile gas underneath the paint film, causing blistering. He has put it so that the man in the street can understand it. He says:—

"Resinous acid + carbonate of lead = resinato of lead + carbonic acid.

Carbonic acid = carbon dioxide (a gas) + water." So you may safely conclude that the cause of blistering is very largely the use of white lead. Personally I have never seen a single blister anywhere after zinc paint has been used. That ought to be helpful.

10,068. (Mr. Robins.) You were mentioning Cadbury Brothers. Is it within your knowledge that their vans are painted on a non-poisonous system?—No, I have no knowledge of that. I have only knowledge with regard to their works inside and out.

10,069. (Mr. Sutherland.) Is the painting visible now?—Yes, perfectly.

10,070. (Mr. Parsonage.) Do you know that they usually paint at Cadbury's with white lead?—Zinc oxide—very little white lead. They used white lead in the past, but they have given it up.

10,071. Within the last year they have used considerable quantities of white lead paint at Cadbury's, Bournville?—Not within my knowledge.

10,072. In addition to that, they used a paint sprayer for putting on the paint, and we refused to allow our men to work it, and they discontinued the use of it?—Because you found it poisonous?

10,073. Yes?—That was perfectly right.

10,074. I was invited to go down to Cadbury's works to see the process. I know that they still continue to use white lead. It is only very recently if they have given it up. (Mr. Line.) But I now produce their letter stating the fact that I have alleged and signed by a partner in their firm. There are facts known to me which explain the position as you view it. The Cadburys were only experimenting with the paint sprayer. Probably they wanted to prove that white lead paint was poisonous. (Mr. Parsonage.) You suggest, with regard to new wood work, using water paint as a ground for applying zinc paint?—Yes, or for under-coating enamel.

10,075. Would you bring it all up with water paint before you applied the enamel?—Yes.

10,076. That would knock off a great deal of the work of the painter?—Yes, it would lessen the work of the painter.

10,077. Do you think that many customers would agree to their work being done with water paint and a coat of enamel being put on just to bind it down?—I do not know that they would know enough about it, but tons and tons of water paints are sold in Birmingham for that very purpose.

10,078. I have known it used in London, I am sorry to say, to scamp work. It was not in the specification?—I do not think an architect would know enough of the advantages of it to specify it; but I would distinctly disagree with anyone who called it scamping.

10,079. Take Duresco?—We must not mention names, I understand.

10,080. I am using a word that is in common use. It is not a proprietary article?—Yes. Duresco is a registered title. There is an attempt to make it a dictionary word like "linoleum."

10,081. Would you prefer to use it for new wood-work? You suggested water paint?—I would prefer to use zinc sulphide paint—oil paint thinned out with turps and gold size for undercoating. It has the splendid advantage of drying on wood in a damp position.

10,082. You suggested water paint put on with a distemper brush?—Yes, or a ground brush.

10,083. It would require a lot of rubbing down for mouldings?—I would not use it for mouldings, but only for matchboardings.

10,084. There is not much matchboarding. I thought that you referred to general painting work?—I should apply it slightly thinned with a 4" panel brush on window casings, skirtings, and doors. It sets as hard as a rock right through to the wood, and never blisters.

10,085. It will chip off very easily?—I do not think so.

10,086. You get some Duresco, and try it?—I would be very pleased to try it out of compliment to you, Mr. Parsonage, but I have had so many years experience of it, and I have seen so much of it done with perfect results that nobody would induce me to believe that it would chip off.

10,087. You apply the enamel to bind the other?—No. I should finish it with a coat of varnish paint, but not to bind it down. You could not rub the Duresco off without using steel wool. Sand-paper would take a very long time to move it, and in fact would be practically useless.

10,088. How about washing?—It is perfectly washable, and you can scrub it with a wire brush. May I ask you a question? Is there not a bare possibility of somebody having foisted something on you that was not Duresco, because that is a common practice? There are painters in Birmingham, I am told, who buy up old Duresco kegs when they can, and put their own stuff in it, and it goes on to jobs and is palmed off as Duresco. For that reason we put the date under the kegs. I say to architects, "When the painter brings the keg turn it upside down and see the date. Do not say anything to the painter."

10,089. Would not any paint strip off galvanised iron?—I would not recommend water paint for it. I would not recommend Duresco.

10,090. Oxide or sulphide of zinc would strip?—You agree that everything depends on the thinning.

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10,091. Yes?—Supposing that it had been treated with a little dilute sal ammoniac to remove the greasiness off the galvanised iron, then it would be fit to receive the paint.

10,092. It has to be specially prepared before it is painted, you mean?—Yes. Railway companies always prepare it with a coat of turpentine. As to decorative results we cannot get them with white lead because it discolours. (*The witness produced some coloured slides.*) All these beautiful tints in these pictures are produced with zinc oxide.

10,093. (*Dr. Collis.*) If lead was abolished, would there be any tints or colours which could not be obtained as economically as at present for decorative purposes?—Oh no! There would be no increased cost in painting.

10,094. Not in any colours whatever?—No.

10,095. For greens or chromes?—Lead chrome is not permanent; it changes very quickly. You can obtain better chromes without using lead.

10,096. And better greens?—And better greens. —'s Green is made by roasting a combination of potassium chromate and boracic acid.

10,097. So that in your opinion there are no tints or colours which for decorative purposes cannot be obtained without the use of lead?—I do not know of any.

10,098. (*Mr. Kinggate.*) A non-poisonous yellow chrome can be obtained from zinc?—Yes.

10,099. Is it perfectly suitable?—It is perfectly suitable.

10,100. (*Dr. Collis.*) Without entailing a prohibitive expense?—I could not say the relative expense exactly; but my opinion is, from what I have heard, that there is nothing material in the difference.

10,101. (*Mr. Fell.*) Is it a commercial article?—Yes, a commercial article both in yellow and green, made with zinc. I may say, gentlemen, if you have not seen it, that Mr. J. Newton Friend, of the Birmingham University, has written a book which every painter ought to keep by him. It is called "An Introduction to the Chemistry of Paints," and it is very useful indeed. There is a splendid article in the "Building News" which I read when coming up in the train, on "Materials used in paint manufacture," by Heckel. He mentions lead chromate, and says how it is made. My attention was drawn to it by a young Birmingham architect.

10,102. (*Mr. Parsonage.*) I want to clear up what seems to be a misunderstanding. With regard to the number of cases of lead poisoning that you have come in contact with in Birmingham, you did not mean 150 at the present time, did you, but that you had known 150 cases?—By no means. I believe that there are 150 men suffering from it now, and more.

10,103. You believe that there are?—I say that there are. I have no hesitation about that whatever.

(*Mr. Parsonage.*) Dr. Legge put Birmingham second to London and Manchester third. I had London first, Manchester second, and Birmingham third. We have a large number of cases from Birmingham.

The witness withdrew.

## FOURTEENTH DAY.

Thursday, 20th July 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. J. PARSONAGE.  
Mr. A. GARDNER.

Mr. A. L. O. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*).

Mr. EGBERT GRANT HOOPER, F.I.C., F.C.S., examined.

10,104. (*Chairman.*) Will you please give the shorthand writer a note of your qualifications?—I am Superintending Chemist of the Government Laboratory, Chairman of the London Section of the Society of Chemical Industry, and Member of the Council, past Vice-President of the Institute of Chemistry and the Society of Chemical Industry, and past member of the Council of the Chemical Society, and author of two or three books on chemistry, with which I need not trouble you.

10,105. You appear here to-day as the representative of Dr. Dobbie, the principal chemist of the Government Laboratory?—Yes. He wishes me to represent his views on the subject.

10,106. Has he authorised you to give an official reply to certain questions regarding the estimated amount of lead in paints?—He has.

10,107. This Committee when they begin to deliberate on the evidence will probably have to consider the arguments for and against recommending a restriction in the amount of lead to be used in paints?—Yes, I quite understand that.

10,108. If they decided to make such a recommendation, would any special difficulties arise in determining whether or not a sample of paint contains more than

a prescribed percentage of lead?—I do not think that any difficulty would exist.

10,109. The proportion of lead could readily be determined by analysis?—Certainly.

10,110. Even if the permissible proportion were small, say, for example, 5 per cent. of the whole dry substance of the paint?—I think that there would be no difficulty with quite a small quantity.

10,111. As an alternative the Committee may find it necessary to consider the possibility of recommending a restriction in terms of soluble lead?—Yes. There would be no difficulty, I think, in devising a plan for the determination of soluble lead.

10,112. Could a solubility test be applied as in the case of pottery glaze?—Yes, certainly, very much in the same way. One would have to prepare first of all the dry substance of the paint, that is, free it from oil or vehicle, just as one usually has to free the ordinary glaze from the water with which it is mixed.

10,113. Would a solubility limit allow of a freer use of such compounds as white lead?—Not in the case of such readily soluble substances as white lead, but it would allow of a freer use of the less soluble ones, such, for instance, as lead sulphate.

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10,114. And, I suppose, sulphide of lead?—And sulphide of lead in the case of black paints. Sulphide of lead, being a black paint, would obviously be limited in its application.

10,115. I suppose you agree that ordinary white lead is all soluble?—Yes.

10,116. With sulphate of lead only about one fourth is soluble?—Yes. One would like at this point to put in a note of caution. It is well in speaking of all lead compounds that one should always speak of them in terms of lead oxide. That is only a part or a constituent of the total compound. Obviously, all the different compounds of lead are made up of lead oxide on one side, and, generally speaking, an acid on the other—in the case of white lead, lead oxide plus carbon dioxide or carbonic acid; in the case of sulphate of lead, lead oxide plus sulphuric acid; in the case of acetate, lead oxide plus acetic acid. So that it is convenient, with the object of comparing one with another, that one should always speak in terms of lead oxide.

10,117. How would you prefer to express the solubility of "ordinary white lead"?—One would say that in ordinary white lead the whole of the lead oxide is soluble. In the case of lead sulphate only about 17 per cent. of it is soluble, but that 17 per cent. of lead oxide is equal to about 23 per cent. of lead sulphate.

10,118. Of sulphide of lead (galena) very little is soluble, less than one-twentieth is it not?—Very little is soluble, but there appear to be some lead sulphides on the market, what one may call commercial sulphides, which show a much greater solubility. The pure lead sulphide is soluble only to a very small extent.

10,119. What other forms of lead sulphide are there?—We have purchased forms of lead sulphide, for example, which gave a solubility in terms of lead oxide equal in one case to 36 per cent. and in one case to 40 per cent. It was not a pure lead sulphide, but it was purchased as lead sulphide, and other people might purchase a similar substance and find that it was not a pure lead sulphide.

10,120. Do you say that some lead sulphide sold contains 36 to 40 per cent. of soluble lead?—Our experience is not very extensive. Out of four which were examined at one time we found that two purchased yielded 35·6 per cent. in one case and 40·7 in the other case, whereas one which we prepared for ourselves, and which we know therefore to be actual lead sulphide with nothing else in it, showed a solubility of only 3·1.

10,121. The chemist must be very cautious then, in accepting sulphide of lead as containing a very small amount of soluble lead?—Yes, when it is a commercial thing, but probably that is not more peculiar to lead sulphide than to the other lead compounds. I daresay that it is within the knowledge of this Committee that white leads, for instance, are sold of almost all grades of purity, and therefore of solubility, but they are not really white leads.

10,122. Speaking of lead sulphate, and taking your evidence with regard to about the fourth of it being soluble oxide of lead, if lead sulphate were used instead of ordinary white lead in making up a paint of definite solubility, one could use four times the amount of sulphate?—Yes.

10,123. That is to say, paint containing 20 per cent. of lead sulphate would have the same solubility as if it contained 5 per cent. of ordinary white lead?—Yes.

10,124. Then under a 5 per cent. solubility rule a master house painter would have the alternative of using not more than 5 per cent. of ordinary white lead, or not more than 20 per cent. of lead sulphate, whichever he considered would make the better paint?—That is so.

10,125. What would be the effect of a limitation of lead in paint in terms of solubility?—It would undoubtedly tend to develop the use of the less soluble lead compounds at the expense of the more soluble lead compounds.

10,126. Would this be a desirable result?—From the point of view of health, certainly. I am scarcely prepared to speak from the point of view of practical application.

10,127. I am speaking with regard to health. You say that it would be a desirable result?—Yes, it would be.

10,128. You have mentioned lead sulphide as available for use in dark pigments. I am speaking now of lead sulphide that contains only 5 per cent., approximately, of lead oxide?—Of real lead sulphide?

10,129. Yes. How much lead sulphide could be used in a paint which has to be of a solubility of under 5 per cent.?—Practically the whole. In the case of a black paint, for example, the black paint might be composed wholly of lead sulphide, and it would still contain not more than 5 per cent. of soluble lead monoxide.

10,130. If the users of a paint find that lead is almost indispensable for certain dark colours, such as dark greens, could not lead sulphide be used?—I do not think any large proportion of lead sulphide could be used in a dark green paint, because it saddens the colour too much. There is no need for it, because the darkness of shade is generally produced by varying the other constituent—the Prussian blue. The Brunswick green paint of all shades would be made up of yellow lead chromate and dark Prussian blue. Now the shade which will be produced will vary according to the proportions of those two. If I want a dark one there will be a relatively small proportion of yellow lead chromate and a relatively large proportion of dark Prussian blue. If, on the other hand, it is very light colour that is required, then the proportion of lead chromate will be large, and the proportion of Prussian blue will be small.

10,131. We have been told that in certain dark colours, particularly dark greens, it is necessary to use more lead oxide than in lighter colours. I want to know whether you consider that lead sulphide could be used as a substitute. What do you suggest could be used as a substitute for the larger proportion of oxide of lead?—I should suggest that in the darker ones the point would be reached by the use of an increased proportion of Prussian blue.

10,132. Would you assume that you could get the same effect, at the same time limiting the amount of danger, by reducing the quantity of lead oxide?—Yes. I think it wants to be made quite clear that a green paint very likely consists wholly of lead compounds. For example, I have the analyses of a group of green paints here which I may use as an illustration of the kind of things that are to be found. All of these paints contain a certain amount of barium sulphate. For instance, the proportion varies in six examples from  $\frac{1}{2}$  per cent. up to 14 per cent. of barium sulphate. All of them contain a small amount, more or less, of chalk, the proportions varying from six-tenths per cent. up to 37 per cent. The Prussian blue varies from 0·6 up to 6·2 per cent. Obviously the one with six-tenths per cent. would be very much lighter than the one with 6·2 per cent. The lead chromate varies from 2·4 up to 13·2 per cent. So that if I take the first example, for instance, with six-tenths per cent. Prussian blue and only 2·4 per cent. of lead chromate, that will represent a very light green. If I go to the other extreme, and take one with 6·2 per cent. of Prussian blue and 5·8 per cent. of lead chromate, that will represent a dark green. The total proportion of lead compounds in these six paints varies from 6 per cent. up to 18 per cent. All the rest of the paint consists of non-lead compounds.

10,133. Eighteen per cent. of raw lead is very dangerous for the workpeople, is it not? I take it that the 18 per cent. is all soluble?—It would be mostly soluble.

10,134. So that we could not get over our difficulty by the suggestion which you put forward?—No, but I am pointing out to you that, first of all, the green paint does not as a general rule contain a very large proportion of lead. It will only contain a total, at the outside, of something like 16 per cent. in the normal condition. If you were to reduce the total lead in a paint to 5 per cent., it would really mean that you would take away two-thirds of the lead compound in such paint as this.

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10,135. Would that destroy the colour?—No, not of necessity. The yellow lead chromate, for instance, might be represented by the yellow zinc chromate, which is a much less poisonous substance.

10,136. The Home Office have, in another industry, assumed that any excess over 5 per cent. of soluble lead is dangerous to the workpeople using it?—Yes.

10,137. So that no suggestion put forward dealing with anything like 16 to 18 per cent. would be of any effect?—No, but practically the whole of the lead might be replaced by zinc chromate without altering the colour. In other words the yellow portion of the green might be entirely zinc; so that if such a regulation were brought into use the lead would be wholly displaced and zinc chromate would take its place.

10,138. Without much alteration in the price?—There would be some little alteration in the price, but not a very serious one.

10,139. You would not care to speak as to the practical effect of such a change in regard to the durability of the paint afterwards?—No. It has been laid down quite generally that white lead is the most durable paint, and, following that, I take it, all lead compounds, but next to them zinc compounds.

10,140. You would not speak positively from the practical point of view?—I have no knowledge from the practical point of view.

10,141. Could the method of testing for the solubility of a pottery glaze be applied to the estimation of soluble lead in paints?—Certainly. I see no real difficulty.

10,142. Are you prepared to suggest a form of words which could be used?—Yes, I should like to suggest a form of wording, it being understood that with increased experience some slight modification might be necessary. That being understood I think that this form of words would probably suffice: "After the day of no paint or wash shall be sold, or used for colouring, coating, or protecting any wood, stone, metal, or any building or construction, or part of any building or construction, unless such paint or wash is free from lead and lead compounds, or unless when tested in the manner described below it shall yield not more than a definite proportion (say, 5 per cent.) of soluble lead or lead compounds calculated as a percentage of lead monoxide on the dry substance of the paint or wash. By 'dry substance' is meant the paint or wash substance dry and free from turpentine, oil, varnish, and varnish material, gelatine, size, and other fluid or adhesive or water-proofing material."

10,143. Could you also give us a form of words in which the method of testing should be prescribed?—Again I should like to premise that it might be necessary with further experience to vary slightly. But that being understood, I think that this method of testing would probably be applicable:—"Method of Testing.—If the paint or wash be mixed with water, turpentine, oil, varnish, size, or other adhesive or water-proofing substance, it shall first of all be freed as far as possible from such vehicle or adhesive or water-proofing substance by drying or by treatment with ether, petroleum spirit, alcohol, water, or other neutral solvent or solvents. If the residual substance so obtained shall contain insoluble varnish matter, size, or other adhesive material which cannot be removed except by the action of re-agents which affect the other constituents of the paint or wash, then the proportion of such varnish matter, size, or other adhesive material shall be ascertained by suitable means, and a deduction be made for the same from the weight of residual matter taken for the determination of the soluble lead, so that the proportion of soluble lead found to be present shall be calculated as a percentage on the dry matter free from varnish matter, size, &c. For the determination of the soluble lead, a weighed quantity of the dried or dry material, freed as far as possible from oil or other vehicle or adhesive substance as above described, is to be continuously shaken for one hour, at the common temperature, with 1,000 times its weight of an aqueous solution of hydrochloric acid containing 0.25 per cent. of actual or real hydro-

chloric acid. This solution is thereafter to be allowed to stand for one hour, and to be passed through a filter. The lead salt contained in an aliquot portion of the clear filtrate is then to be precipitated as lead sulphide, and weighed as lead sulphate." Those are the actual terms used in the description of the test as applied to pottery glazes.

10,144. With the exception of the removal of turpentine and varnish, and other such constituents, which are necessary additions in the case of paints?—Yes. The point that I had in my mind in reference to some slight modification that might be necessary is connected with this point. On the removal of the oil from the paint it is sometimes found that traces of oil remain with considerable persistency attached to the dry substance of the paint, and if you apply water to such dry substance you will find that it does not, as we say, "take" the water—that it does not mix with the water. It is like oil and water; it tends to form a globular condition. We have had only a very limited experience of actually submitting lead paint substance to the action of this dilute hydrochloric acid solution which I have just described, but in that limited experience we have seen that, in one case at least, there was such a tendency to hold the oil by the dry substance that a slight modification might be necessary in the treatment of that dry substance before it was subjected to the action of the hydrochloric acid to dissolve the lead.

10,145. I take it that this system of testing which you have put forward is similar to the one that Dr. Thorpe invented?—It is similar to that which was worked out in the Government Laboratory for use in connection with pottery glazes.

10,146. (Dr. Collis.) In freeing the lead paint from its oil and other constituents, is it possible that an appreciable amount of lead might be removed as an organic lead compound?—We have not experienced that. Lead oleate, for example, is soluble in ether, and therefore, under certain conditions, supposing the oil was in a very rancid state, showing a large amount of free fatty acid, it is quite possible that a certain amount of lead might go in solution in the oil. It would have to be watched.

10,147. I think you know that Dr. Baly has been showing that lead tends to form an organic lead compound when paint is mixed, and I wondered whether in separating out the oil and other vehicles from the paint it was possible that any appreciable amount of lead would be removed, sufficient to make any difference to the 5 per cent.?—As the result of very wide experience we have no reason to think that that would happen.

10,148. Do you think that the amounts would probably be so small that they would be negligible?—Yes; they would be negligible, but I think that that would have to be watched.

10,149. (Mr. Fell.) Is there any substitute for lead chromate?—Yes, zinc chromate.

10,150. In your opinion is it as lasting as lead chromate?—I am not in a position to say that. I should have thought that it was almost equally good, that is, as good as a zinc paint is as compared with a lead paint.

10,151. One of the difficulties that we have to face is that we have not so far been able to find a substitute for lead chromate?—I think that zinc chromate would be a substitute with which to replace the lead if it is the lead that you want to get rid of, although chromic acid itself is poisonous. The mere replacement of lead would be made by substituting a zinc chromate.

10,152. The chief difficulty comes in with light colours, for instance, when you get primrose colour produced from lead chromate?—Yes.

10,153. The ordinary zinc substitute will not stand the weather in the same way that the lead chromate does?—Possibly not, but I have no experience of that.

10,154. I want to know whether you have any special formula for a material that could be used in place of lead chromate, of equal durability?—I may say as one illustration of where a very delicate colour is required that we have substituted in one official matter a permanent yellow dye substance for lead chromate which was previously used, and so far as that has gone (it is

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only a matter of five or six years as yet) it has answered perfectly well in that case.

10,155. Is it exposed without varnish?—Yes, that is exposed without varnish. It is not a paint substance, but a mere colouring substance. I put that forward as an illustration of the substitution from the mere colouring point of view and not from the paint point of view. There are good lasting yellow dye substances which could very easily be used where a very delicate shade was required.

10,156. (Mr. Mason.) By whom do you suggest that this test that you speak of should be made?—I see no difficulty in various officials throughout the country being made responsible for this test; though, if the number were not very great I imagine that all the samples could come to the Government Laboratory. If, however, it was intended that the local authorities should carry out these provisions, then I think that these authorities would probably go to their own local officers, and arrangements such as those connected with the Fertilisers and Feeding Stuffs Act would be applicable in this case.

(Chairman.) At the present moment samples of all glazes that are required to conform to the 5 per cent. solubility standard are taken by factory inspectors and sent to the Government Laboratory, examined, and reported on. If they exceed the limit then proceedings can be taken. In the case of paints, supposing that we had a 5 per cent. solubility standard and said that not more than 5 per cent. of soluble lead was to be used in any paint, the factory inspectors would go round and take samples of different paints and they would send them up to the Government Laboratory to be tested, unless another method is suggested. If they were found to be all right, very well, but if not, prosecution would follow against the employer who provides the paint for the men to use.

10,157. (Mr. Sutherland.) With regard to the point of lead as the base for greens, chromes, and reds, did you deal with that? I am sorry that I was late, because I wanted to hear all your evidence. This is a very important question to paint manufacturers. It is equally as important to paint manufacturers as the lead question is to lead corroders. I have the assurance of a large paint manufacturer that there is no substitute for lead as a base commercially for greens and reds. I do not know whether you dealt with that point or not?—The red has not been dealt with. I might say a word or two upon that. There is a lead chromate, for instance, which is a very valuable colouring substance, but I do not think there would be at all the same difficulty in replacing the red as there would possibly be with the yellow. The red chromate is of such a colour that I think that it could be well replaced by certain shades of oxide of iron on the one hand, and on the other hand by certain shades of vermilion though vermilion is very costly.

10,158. That is the point that I was going to put to you?—It is very costly, so that it would only be in the case of the finer varieties that one would use that.

10,159. There are a great many vermilion substitutes termed "vermilionettes," and they enter very largely into the painting and decorating trade, and the abolition of lead, or its restriction to 5 per cent., would kill that business?—I am not sure that it would. There are other lakes. Those that you were referring to, known as "vermilionettes," are, generally speaking, made by the combination of a lead compound with an artificial red dye substance. It will be known to many of the members of the Committee that quite as good lakes are prepared without the use of lead at all, but by the use of aluminium. In other words, alum produces splendid lakes, and the original lakes were largely alumina lakes. So that as regards vermilionettes I do not think any real difficulty would arise in the replacement of lead by aluminium, as far as the colour goes. I am not dealing with the lasting effect of such paint. That is another matter.

10,160. Lakes are transparent, and are usually used as glazes, not as body colours. The vermilion substitutes give solid body colours which you cannot get with lake. Generally speaking, lake is used thin

over a lighter surface or in small quantities?—That is a practical question which I would not like to answer.

10,161. To deny the trade very valuable colours hits a very large number of people such as manufacturers?—I see them using vermilionettes in painting house doors, and they appear to use them in exactly the same way as ordinary paint is used, so far as regards the upper coat. The under coat has been already applied as a neutral or colourless substance. The upper coat is made of vermilionette.

10,162. I did not hear your evidence as to greens. Did you suggest any alternative for lead?—I suggested that zinc chromate might be a good substitute for lead chromate. We meet with a few of them, but we have no knowledge as to how they wear as compared with lead chromate.

10,163. A large manufacturer told me that a zinc base is commercially impossible for greens, and that they could not get the depth to carry, not the adulteration, but the body which they put in for greens?—You will not forget, sir, in any case that there is a certain amount of conservatism in connection with all trades.

10,164. But I was speaking of a man who has no restriction in his mind in that respect. He is quite open to adopt anything that is good?—I could not speak upon that without actual experimental investigation.

10,165. (Chairman.) Would you say that it would be beyond the wit of man to devise some substitute for lead chromate?—I should not have thought that it would.

10,166. (Mr. Mason.) It has occurred to me that there would be no difficulty in regard to the analysis where paint was bought ready mixed in the same way that one buys a glaze?—No. One would have to free it from oil. There are certain laboratory difficulties, but that is provided for to some extent in what I have drafted. It is conceivable that in certain cases a man without experience might find some difficulty in extracting what is called the vehicle. In the present day that may be composed of many other substances besides merely oil and turpentine. I mean that there is a tendency to use such substances as size and other modified albumenoid substances, even such as casein, which is being used. Those substances are insoluble in such solvents as would take out oil and turpentine completely. But supposing that it were impossible to remove the whole, one would have to make allowance for the fact that, when you operated upon your dry substance, that dry substance might conceivably retain, say, 5 per cent. of an organic material, such as an insoluble gelatine. You would simply calculate on 95 per cent. instead of 100 per cent.

10,167. If a painter bought a ready-made paint he could get a guarantee that it did not contain more than 5 per cent. of soluble lead?—Yes.

10,168. If, however, as one has to do every day, one has to match another paint already on a wall or on a vehicle, the paint is mixed by the painter himself?—Yes.

10,169. He would simply go on adding a little more of this and a little more of the other until he got his shade, and at the end of the time he would not know where he was with regard to the amount of lead?—I quite agree as far as pushing the responsibility back to the original vendor of the paint is concerned. In such a case the painter would take on himself the responsibility. But supposing that the constituents mixed were each, and all of them, of less than 5 per cent. soluble lead, any amount of mixing would make no difference.

10,170. Of course not, but if an entirely lead compound had to be used there would be difficulty there?—White lead for instance?

10,171. Yes?—Then he would pull up the proportion of soluble lead at once.

10,172. There would be greater difficulty in the paint trade than there is with regard to pottery glaze in that respect, you would agree?—Not of necessity. I think that there would be more than there would be in the milk trade, for instance.

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10,173. I know nothing whatever about pottery, but I believe that in the pottery trade a man buys his glaze ready mixed. Does he ever mix two or three together?—Yes, he compounds.

10,174. (Chairman.) Very often he does. There are glaze makers who provide glaze ready made, but in a very large number of cases it is mixed in the lead-house of the pottery?—In a large number of cases they use at least three glazes for different pottery and those are of different combinations.

(Chairman.) I have known cases in the pottery trade where a small manufacturer has purchased on the open market remnants of glazes and mixed them altogether and used them.

10,175. (Mr. Sutherland.) Assuming that these restrictions were placed on the trade, would it be possible for a Government department to standardise all these paints?—I would suggest that if a man purchased always under an analysis, he would have the guarantee of standardisation that you refer to. If he went to a wholesale man he might say, "Tell me the composition of this," or he might be content to know that it contained less than 5 per cent. of soluble lead, which would be good enough in a general way without going so far as to say, "What are the constituents?"

The witness withdrew.

Mr. A. GUNNEW examined.

10,181. (Chairman.) You are attending here to-day as the representative of Messrs. Szerelmey and Company, Rotherhithe?—Yes.

10,182. Do you manufacture leadless paint supplied to Government departments and others?—Yes.

10,183. Is your paint intended to be used as a substitute for white lead in paints?—Yes, we think that it should not be necessary to use white lead. I will not say altogether, but very largely, white lead might be superseded by non-poisonous substitutes.

10,184. What is the composition of your non-poisonous paint?—There are two compositions, roughly, one a basis of white zinc (zinc oxide) and the other oxide of iron, and then, of course, the vehicle.

10,185. What vehicle is used?—Linseed oil.

10,186. Are there any lead compounds in your paint?—No, speaking generally.

10,187. What do you mean by "generally"?—Once in a dozen times, perhaps, there may be a very small percentage—5, or 6, or 7 per cent.—of lead in a colour which has a basis of lead.

10,188. Used for what particular colours?—Chiefly in connection with the preparation of greens.

10,189. Do you use any lead for reds, for instance?—No.

10,190. For yellows and greens?—Yes, for yellows and greens.

10,191. What is the maximum amount of lead you use in those circumstances?—I am not prepared to say off-hand. It depends on the colour.

10,192. What is the maximum amount you use in any colour?—I am not prepared to say, because we do not manufacture the yellow pigment. I shall have to inquire from manufacturers.

10,193. Do I understand that as far as your paint is concerned you use no lead at all?—We try not to use any lead at all.

10,194. It is not a question of trying, but do you use any at all?—I cannot say that lead never enters into the composition, but very seldom and very little.

10,195. About how much lead sometimes enters into the composition?—We may get an order for a green paint, and perhaps 5 or 6 or 7 per cent. of the pigment may have a lead basis.

10,196. Would you prepare that green paint yourselves?—Yes.

10,197. Would not you know exactly how much lead was there?—We should not prepare the yellow pigment. We should buy that from a paint colour maker.

10,176. We have to deal with a class of men who are in difficulty with regard to making both ends meet, and they would not worry about the side issues?—It would be quite simple for a man only to purchase a thing that conformed to the regulation that it should not yield more than 5 per cent. of soluble lead.

10,177. The American Government in certain States have had pure paint regulations under which all paint sent out in cans has to have the formula on the can, and the proportions of everything, but I do not think that that has worked successfully?—I had in my mind that declarations of composition are required in certain cases in the United States. It is not a very great hardship. The tendency is to demand more and more an express statement of the composition of articles which are purchased.

10,178. In the States?—Everywhere I should say.

10,179. I do not think that it obtains here?—Not with small men.

10,180. A man deals with firms that he has known for many years, and he knows that they are thoroughly trustworthy. He asks for the best of its kind in what he is buying, and he is content without a declaration?—What I mean is this: directly the State or the local authority interferes with any one constituent, the necessity for knowing what the actual constituents are comes into existence.

10,198. May I take it that, with the exception of green, you use no lead in your compositions at all?—No lead at all. We try to avoid the use of lead.

10,199. But that is not the point; it is not a question of trying, but of what you do. Are lead driers added?—No.

10,200. In no case?—I will not say that. Sometimes lead comes into the preparation of terebene.

10,201. What instances are there where lead driers are added?—Sometimes in the winter time we have to add a small proportion of terebene to help the drying.

10,202. What proportion of lead would that contain?—Perhaps 0·05.

10,203. Something infinitesimal?—Something infinitesimal—very small.

10,204. Do you use turpentine for thinning?—Yes, we use very small quantities.

10,205. Would you go so far as to say that under no circumstances should more than 5 per cent. of lead be added to any colour?—No. I should say that it is possible to get a very wide range of colours by the addition of a very very small proportion of lead.

10,206. You would not go so far as to say that 5 per cent. should be the absolute maximum?—No, I should not say that.

10,207. What would be an outside maximum; could you give us an idea?—It depends upon the colour.

10,208. Take any colour you like?—I think for some colours you need not have any lead at all.

10,209. I know that, but I am speaking of what might be required for some particular colours. Could you give us any idea what the maximum would be?—It might be 50 per cent.

10,210. Do you mean that seriously?—Yes, quite; 50 per cent. of the dry pigment.

10,211. But how much lead would that mean?—Fifty per cent. of the pigment.

10,212. Fifty per cent. of the whole of the paint?—I think paints are supplied—I do not say by us, but by makers—which contain such a proportion.

10,213. Do you think that is absolutely essential?—No, I do not, but if a man is determined to have a certain colour it may be necessary to use that proportion of lead.

10,214. That is what I want to get at. Are there certain colours in which it is absolutely essential to use such a percentage as that?—I cannot answer that. I am not a paint colour producer.

10,215. There may be such colours?—There may be such colours.

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10,216. Why do you come here and make a statement that there may be such colours if you do not know?—Because you ask me. You see we have our own processes.

10,217. It is better to say that you do not know than to say there may be, because you raise doubt in our minds? I think you should examine a colour expert on these points. I do know this as a fact—that certain colours are produced from a lead basis, others from a zinc basis, others from a baryta basis, and so on.

10,218. What is the point of your coming here to-day?—We have been makers of non-poisonous paints for the last fifty odd years. We do not use lead at all. When I say that we do not use lead at all, I mean that we are not makers of lead paints. It may occasionally be necessary in the producing of a colour to employ a pigment which contains a proportion of lead in its base. We do not make these pigments ourselves, but buy them from a colour maker.

10,219. Do you get a sufficient covering power without the use of either red or white lead?—Yes. I have here a few specimens that I painted myself yesterday afternoon with zinc (*producing the same*).

10,220. Are you quite sure that you get sufficient covering power with all colours without the use of either red or white lead?—I think if the paint is properly prepared and the work properly done there is no choice between the use of lead or zinc.

10,221. For any colours?—For any colours.

10,222. Then to what do you attribute the request of some people for colours in which it is considered to be quite necessary to use lead?—Lead has more density than zinc and, perhaps, the painter is more accustomed to its use—its application. If he gets hold of a zinc paint it may be improperly mixed. He thins it down, perhaps, too much with turpentine.

10,223. Is it a question of bad mixing?—Very often it is a question of bad mixing.

10,224. Not a question of the virtue of the paint itself?—It is this. If you take a pound of lead paint and a pound of zinc paint, I believe you would get the same amount of covering out of the pound of zinc paint as you would out of the pound of lead paint, weight for weight. Your zinc paint will spread over a larger area, but if you confine it to a certain area (this table for instance) you get the same covering from a pound of zinc as from a pound of lead.

10,225. How does the cost of your paint compare with that of lead paint?—The cost of our paint is rather more in the package.

10,226. Do your customers tell you that it is more costly to paint with the leadless paint than to use lead paints?—I ought to explain our position a little here. We are makers of particular kinds of paints sold under the trade name "Szerelmey Iron Paints." They are made from a basis of oxide of iron or a basis of oxide of zinc of the very best quality. We also specially prepare our oil. I believe the durability of paint is determined more by the oil than by the colouring pigment. We start with the very best oil we can buy and we improve its quality, and consequently our paints are a little dearer in the package, but we think they are cheaper on the work.

10,227. Over what period have your paints been in use?—About 55 years.

10,228. Has your paint always been found to be durable?—Very.

10,229. Do I understand that you have had no complaints on that score?—We have had no complaints on that score.

10,230. Can you name a few of your most important customers who have expressed satisfaction with your leadless paint and have given repeat orders for it?—Here is a list which I had made out yesterday of a few people who have been ordering paint from us for some years past. Some of them go back a good deal longer than others. The ledgers were searched from the present year to 1899. Orders have been received from the Kidderminster Corporation in 1911, 1910, 1909, 1908, 1907, 1906, 1904, 1902, 1901, and 1899. Then the Exeter Corporation 1911, 1910, 1909, and 1908. Then the Grays Thurrock Urban District Council—a

long list—and the East Sussex Asylum. They are public bodies. I said: "Get a few public bodies and get a few private people and other users." We have taken two brewers. There is one at Petersfield, whose orders go back to 1906. That is as far as we searched. Then we have taken brewers at Ely, then two private gentlemen, one at Maplewell, near Loughborough, and one at Debden Hall, Loughton.

10,231. Have you ever received repeat orders?—Yes. Here is a list of some with the years and the months.

10,232. Going back in all cases, how far?—Some 10 years, others less and others further.

10,233. Going back from five to 12 years?—Yes. Here is a letter from the Furness Railway Company, who write to say they have pleasure in stating they have been using "Szerelmey" paint in the Harbour Department for more than 15 years, and it has always given satisfaction. They continue: "It is used for painting the inside of all our floating plant and for the channel buoys, and is excellent for any iron or steel in contact with sea water." The letter further says: "I wish it to be understood that you use this testimony for no other purpose than the one prescribed—for the Home Office Inquiry—and not for advertisement." A letter from Chard says: "I have pleasure in testifying that the quality of Szerelmey & Co.'s leadless paints is excellent. I have used them for a considerable period and find them wear well. On the outside of two properties in this neighbourhood they have stood for more than four years and are still in very good condition." That is from an architect in the employment of the firm of Mitchell, Toms and Company, Limited, wine merchants and rectifiers, brewers and malsters, of Chard, in Somersetshire. Mr. Langton Cole, the official architect of the London Stock Exchange, where our paint has been used from the beginning, says "In reply to your letter of the 7th instant, I have used large quantities of Szerelmey paint for the exterior of the Stock Exchange and other buildings in Throgmorton Street, also for my own and other houses at Sutton, in Surrey. I am pleased to say that the result has in all cases been satisfactory." Mr. Cole's father, who has been dead now many years, showed me Szerelmey zinc paint at his house in Sutton which had then been on over 20 years. I met his son on the station platform four or five years ago, and in answer to a question he said that that paint was still on the doors.

10,234. (*Lord Henry Bentinck.*) On wood-work?—On wood-work inside. That is about 36 years ago.

10,235. (*Chairman.*) Is your paint used as much for wood-work as for iron-work?—Quite.

10,236. And for exterior work?—Yes, generally.

10,237. For outside as well as inside?—For outside as well as inside.

10,238. Do you find the durability outside perfectly satisfactory?—Yes. Do you wish me to speak of paints generally?

10,239. I am speaking of your own paint. Do you say that it is quite as satisfactory outside as inside?—Yes, quite. My brother-in-law has a rectory at a place near the sea, in Kent, on the Romney Marsh, about a mile from the sea as the crow flies. He had the outside of his rectory painted with our paint. At the end of five years, when the house was re-painted with the same kind of paint, the old paint was found to be in very good condition considering the length of time and the exposure of the house—I do not know why the work was re-painted; possibly for appearance sake or to comply with requirements of diocesan authorities.

10,240. (*Lord Henry Bentinck.*) What colour?—Very pale green.

10,241. Was there any lead in it?—I do not suppose there was. It was very pale, perhaps an ounce of colour in 5 pounds of zinc.

10,242. (*Chairman.*) Have you supplied any of your paint abroad?—Yes. The Crown agent for the Colony of Bermuda frequently orders.

10,243. Have you testimonials?—They do not give testimonials, but there are a series of orders extending from 1907 to 1911.



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10,244. Do you supply to Bermuda only?—We send to other places. I have not a note of the others. The Crown agents take the Malay States and other places. I do not quite know what ground they cover.

10,245. Do the Crown agents order constantly?—Yes.

10,246. Do you supply your paints to India?—The Great Indian Peninsular Railway, which I believe now is under Government authority, many many years ago used to order our paint, year after year, for their bridge work. This was oxide of iron paint, not zinc. They discontinued the use of our paint, I suppose, on account of its price, and put the specification out to public tender. We lost, and after about three years of tendering successively, and reducing our price to the very lowest possible, we discontinued tendering. We were able by rearrangement of the machinery at our new works to produce the paint at rather less cost, and we approached them again. Tenders came out for 15 tons, and we were asked if we would supply five tons *pro rata*, and we said that we would do so. That paint was sent out to India by three different manufacturers, with special instructions to the engineers that it should be watched. At the end of 10 years from that time we secured their orders again.

10,247. (Lord Henry Bentinck.) What colours?—Red. In discussing the merits of Szerelmey paint as compared with others, the then engineer to the Railway Company said: "We take care we get what we ask for." I said: "We give you more than you ask for." As a fact, we supplied the Company with the specification showing the quantities of oil and pigment in the paint. We did not supply the formula for the preparation of the oil. In the preparation of the oil we give certain advantages which I do not believe any other manufacturer gives. It was prepared originally by Colonel Szerelmey, the originator of our firm.

10,248. (Lord Henry Bentinck.) These testimonials which you have handed in are testimonials for what colours?—All colours.

10,249. Therefore it does not follow, I suppose, that they are all leadless paints by any means?—Yes, all leadless paints. When I say "all leadless paints" there may be some colours in which lead does enter to a very very small extent.

10,250. You said that you had not found any substitute for lead in greens and yellows?—Many of our greens have no lead in them.

10,251. I understood you to say you had not?—No; I meant that there are some tints of green which, as far as I know (I am not quite certain), it would be impossible to reproduce except with a lead basis. Some are of an arsenical basis. We will not use that under any consideration.

10,252. The last witness, the superintendent of the Government Laboratories, suggested that zinc chromate was a substitute for lead in greens. Have you tried that?—I do not know. We probably have zinc chromate on the works. You see these yellow colours have their own distinctive tones, and a man may say, "I want this paint matched." He has to paint a room to a paper, and he says "I want this particular colour matched." Then we have to look about to get the shade of yellow that will produce that colour. We may use a zinc chromate, or we may use something which has a basis of barytes; we may have to use barium, or we may have to use something which has a basis of lead; but the use of lead in our works is a negligible quantity. We set ourselves against its use.

10,253. I understand that, but at the same time I understood you to say that there were certain tints where it would be impossible to find a substitute?—I should not be prepared to say that if I were put on oath, but that is my impression.

10,254. (Sir Godfrey Baring.) Do you find that zinc paint will stand the action of London air well externally?—Better.

10,255. Better than lead paints?—Yes, because the sulphur in the air does not affect the zinc paint as it does lead.

10,256. You would say that zinc paints were specially suitable for exterior work in manufacturing towns?—Yes, in manufacturing towns.

10,257. (Dr. Collis.) Have your paints, which have been used extensively for many years, been used from the first coating for putting on the bare wood and on the bare plaster?—It is quite possible, but as manufacturers we do not know, as a rule, how the painter will use them. As a fact, it is very difficult for us to find out where our paint is used. We simply supply to order. When it leaves our works we have no further control over it.

10,258. It is supplied as any other paint is without any stipulation at all that it should only be used for second or third coats?—Just so. Here is one coat over green (producing the same). That is zinc white, the same as this is (producing another specimen). I put a little pinch of red into it—a very small quantity. That would serve as a primer. Here is one coat on a soft piece of bare wood.

10,259. (Lord Henry Bentinck.) Does that contain no lead?—This undercoat may contain a very very small percentage of lead. I cannot quite say what that is, it has been on about ten years. All these undercoats have been on about ten years.

10,260. (Dr. Collis.) Do you think that if such a percentage as five of lead was permitted by law, there would be any difficulty in obtaining any of the colours to which you referred, when saying that lead it still used for them?—There might be.

10,261. There might still be trouble in producing some of the colours?—Yes; it might result in certain colours being left out and people having to do without them. I do not think that it would constitute a real hardship.

10,262. Take one of these greens: what would be the percentage of lead in such a paint when it is made? Take one of the greens you speak of, which you consider there would be difficulty in obtaining; I suppose there are other substances which would produce it?—I do not know. We do not manufacture such. We have our standard shades, which are prepared expressly to avoid the use of anything that is poisonous.

10,263. And your paint is perfectly satisfactory?—Yes. I have seen colour cards upon which certain greens have been shown which I know must contain arsenic. We should not make such, but I do not say that we should not make a paint which contained a certain percentage of lead. We do not consider it so dangerous, used in a very small way, as arsenic would be.

10,264. (Mr. Sutherland.) Your paint is used mainly for breweries and estates and engineering work, and work of that kind?—Yes.

10,265. It does not enter largely into the building trade through the ordinary channels?—No, it does not. The painter and the builder as a rule are against us.

10,266. I would not put it in that way?—They are.

10,267. They are familiar with the other, and they find it good. Yours is a special proprietary article, is it not?—Yes.

10,268. So that does not imply hostility to your paints so much as familiarity with good stuff which they already possess?—I do not want to say anything against the building trade, but my general experience is that, as a rule, the painter is opposed to the use of our paint.

10,269. But there are a number of paint manufacturers like yourselves and others one could name who really cater for a public quite outside the painting and the building trades?—Yes.

10,270. And you belong to that category?—Yes.

10,271. (Chairman.) Do I understand by that that you do not encourage business from other sources?—We should, but we cannot.

10,272. Why?—First of all the price is against us, and, secondly, our paint lasts too long.

10,273. (Mr. Sutherland.) No, we cannot accept that?—That is a fact.

10,274. (Mr. Parsonage.) You say that the painters and building trades would be against you?—Yes.

10,275. Would your paint require any special thinners for use, or could it be used with turpentine thinners?—We send our paint out as a rule ready for use.

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10,276. Absolutely ready for use?—Absolutely ready for use.

10,277. How long would it remain without wanting any thinning? Is there a sediment if it is kept open for a few days?—If it was left open for a few days, a skin would form on the top.

10,278. And would there be a sediment?—In the majority of tints there should be very little sediment. If the paint is well made there will be an absence of sediment. With zinc paint there should be absolutely no sediment.

10,279. Supposing I wanted to do a room egg-shell gloss, if I wanted to do a room dead flat or finished with varnish gloss, could you supply those different paints with those shades direct from your works?—Yes.

10,280. (Mr. Robins.) If lead was abolished altogether, would your firm suffer any great hardship?—We might, because we are a small firm, and although we have been advocating the use of zinc for 50 odd years, other big concerns might squeeze us out.

10,281. You do not think that with the introduction of zinc you would suffer a hardship, do you?—I think if zinc were generally introduced we might suffer because big concerns would be able to manufacture at a less price than we could, and people would not, perhaps, look at the extra advantage we give them. They would think: "Szerelmey is a zinc paint; so-and-so is a zinc paint." They would not differentiate between other zinc paint and our zinc paint, and the zinc paint supplied by another firm might be cheaper, and in consequence we might suffer.

The witness withdrew.

Sir HENRY CUNYNGHAME, K.C.B., examined.

10,282. (Chairman.) You are legal assistant Under-Secretary of State for the Home Department?—Yes.

10,283. I believe that you have devoted considerable attention to the question of lead poisoning arising from the use of lead paints?—Yes, for some years.

10,284. Do you consider the evil to be a very real and serious one?—Yes, and a remediable one.

10,285. In your opinion, is it imperative that some action should be taken in this country to mitigate the evil?—Certainly.

10,286. Either by a measure of prohibition or restriction of the use of lead, or by a code of regulations?—Yes.

10,287. Have you given attention to the action taken in this matter by certain foreign Governments?—Yes.

10,288. What action has been taken in France?—A very drastic one. The law\* dates from the 20th July 1909, and it comes into force at the expiration of the fifth year from that date. "No white lead or linseed oil containing lead or special product containing white lead shall be used in any painting operation of any kind carried out by working painters either on the exterior or interior of buildings." That practically is the law. It is very drastic. The rest of it is only administrative.

10,289. Has any other country adopted a definite measure of prohibition?—Yes, Austria. The Austrian regulation† only goes so far as the prohibition of lead for interior painting generally.

10,290. At what date did that decree come into force?—April 1st, 1909.

10,291. Where the use of lead is still permitted in Austria, the work has to be done under a very strict code of regulations, has it not?—Yes; and the regulations may be summarised very briefly in this way: Regulations as to ventilation, washing and dressing rooms, the marking of vessels containing lead paint, and women and young persons not allowed to handle. Overalls must be worn, and in certain cases there must be examination by a surgeon. That very briefly summarises the sort of regulations. It gives an idea of them. They are rather too complicated and long for me to go into details.

10,292. That is quite sufficient. Have similar codes for regulating the use of lead paints been adopted by other countries where the use of lead has not been prohibited?—In Germany, it is a Gewerbeordnung for the whole German Empire.‡ Unlike some trade regulations of Germany, which are made by individual States, this applies to the whole German Empire. These again are rather long.

10,293. Will you please give a summary of them?—You may say that the workers are not directly to handle pigments containing lead. Then the grinding of white lead with oil or varnish shall not be done by hand. You see that this goes a little beyond the mere

dealing with paint alone; it deals to a certain extent with the manufacture. Then the processes of rubbing down and pumice-stoning of oil colour or stopping not clearly free from lead shall not be done except after damping. That is an important provision. Then there is a rule as to overalls.

10,294. Are the overalls provided by the employers?—It says that the employer shall see that every worker is provided with overalls. I do not know whether there would be any restriction as to charging the painter with that. I do not suppose that they would consider that part of the code. But anyhow the employer has to see that the painter has them. Then, there shall be provided also washing utensils, nail brushes, soap and towels. There one may remark that if you were to make the prohibition of lead universal, and it applied to small cottages and buildings and so on (as to which I will say something presently), I am in favour of it. You could hardly have washing utensils necessarily provided. It goes a little far. I do not quite understand the application of this code. It seems to me to be very general in its character. I do not exactly see how it fits in to the various trades, which is a matter of difficulty.

10,295. (Mr. Sutherland.) Are you speaking of the German regulations?—Yes. Then the employer has to inform workers who handle lead colours of the danger to health, and give them a copy of a warning pamphlet. Then there are other regulations for painting, distempering, whitewashing, plastering or varnishing when carried on in connection with another industry. And then some of the previous regulations are generally applied together with further ones about washing. There is a rule that the employer shall issue regulations which shall be binding on the workers. The employer is to make rules for his workers such as that they shall not consume spirits in any place where work is carried on. I do not know why they have not put beer down, because the acetic acid that arises from the fermentation of beer is quite capable, I should have thought, of changing white lead into the acetate in the stomach, as has been found in certain cases. They have left beer out and only prohibited spirits. They shall not partake of food or drink where the paints are (that is very sensible) or leave their place of employment until they have put off their working clothes and carefully washed their hands. They shall wear working clothes. The smoking of cigars and cigarettes is prohibited during work. A pipe, like the beer, has been carefully preserved—I suppose because they thought that they could not go too far. Then there is this interesting provision—that any worker who, after repeated warning, contravenes the provisions may be dismissed at once without notice, any contract notwithstanding. The employers must entrust the supervision of the workers' health to a duly qualified medical man. Roughly speaking, those are the principal points. I do not go into detail. Then there is a register to be kept of workers, and a register also of their illnesses and dates of recovery. That pretty well gives you an idea of the scope of the regulations.

\* See Appendix VIII. † See Appendix IX.

‡ See Appendix VI.

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10,296. Then with regard to Belgium?—In Belgium the law\* chiefly seems to be directed to this—that white lead shall not be sold in the form of powder or dry when intended for paint work. It must be ground up with oil. Dry rubbing and punicing of surfaces are forbidden altogether if there is lead in the paint. It must be done wet. Then there are provisions for dealing with offences. Those are the chief provisions of the Belgian code.

10,297. Have you formed an opinion as to the probable efficacy of such regulations if a similar code were adopted for this country?—Yes.

10,298. You think such regulations would mitigate the evil, but not remove it entirely?—I have always been of opinion that, if sufficient care is taken, you can use almost any ingredient quite safely, by forbidding it where it is unnecessary, and, if it is to be allowed at all, putting it under sufficiently strict regulations. I do not see why anybody should get lead poisoning at all. I think that it can be remedied and that there ought to be regulations.

10,299. Would it be practicable to enforce such regulations in a trade scattered throughout the United Kingdom?—If that means would it be practicable to absolutely prevent anybody under any circumstances from using white lead when he ought not to do so, I can answer, No. It is not practicable, just as it is not practicable to prevent theft through the United Kingdom. You cannot by law absolutely make sure, in a trade that is carried on largely, that there shall be no breach. But that is not what we aim at. Supposing that you can cure ninety-nine hundredths of an evil (and you can do that), that ought to be sufficient for anybody, and would justify the making of strict regulations.

10,300. But my point is, would it be practicable to enforce such regulations in a scattered trade like house-painting?—I think so. If you said generally "nobody shall use white lead for any purpose at all for paint" I think that in a little while those who did it would be gradually got hold of and hauled up. It would be possible to enforce that generally.

10,301. That is prohibition?—Yes.

10,302. It would be quite easy to enforce prohibition, but would it be possible to enforce rules for the protection of the workpeople in such an industry as house-painting?—You might make a rule that nobody should use any white lead at all if any other kind of paint would do, and that the only times that anybody was allowed to use white lead were in virtue of some special relaxation necessary for his trade, and then I think that those places where the exceptions were granted could be known and could be watched, and there would be no difficulty in administration through the whole country. Notwithstanding that, I do not think you could be perfectly certain that somebody in a corner would not be found breaking the regulations. But I think that you would do an enormous deal of good, and put an end to the great poisoning that is going on now.

10,303. (Mr. Sutherland.) By regulation?—By regulation and by prohibition—the two.

10,304. The Chairman's point was regulation?—Yes.

10,305. (Lord Henry Bentinck.) Similar to the German regulations. Would it be possible to carry those out in England?—I will say something about that in a minute. I should do it in a little different way. I am in favour of the general character of them.

10,306. (Chairman.) You think, I suppose, that the prohibition of the use of lead would be a more practicable solution, with the exemptions that you have suggested?—That is a general question, and I would like to answer it in this way, if you would allow me. In the first place I think that it would be necessary to define what you mean by "lead." For instance, the yellow may be as dangerous as the white lead, and you might have to consider what to do with that—I do not know. It is a smaller thing and perhaps may be left alone. But you would have, I think,

to schedule lead so that no ingenious person could get round the schedule and make something which was not white lead, but which was just as dangerous. You would probably have to give power to the authorities to put in the schedule from time to time anything proved to be an evasion of the regulations which you intended to make. Then there is the marking of packets. The regulation of that would be rather a good regulation—making it illegal to sell white lead unless it was marked as white lead. That would prevent people from buying it and pretending afterwards that they did not know that it was white lead. You could get at somebody for doing that. I do not think that the difficulty that has to be met is at all insuperable, and I only mention it. There are a good many different matters which have to be dealt with. There are the exteriors of buildings and the interiors of buildings, for instance. In the word "building" I comprehend a conservatory, and I would say, "any place where there is a door which a man can enter." I would not call a chicken-house or a dog-kennel a building. I can think of several instances, but I will only mention some. There are difficulties which will have to be met, such as we always meet in the factory department, where we overcome them bit by bit. If you were to be deterred by difficulties of definition you would never do anything at all. You have to meet them, and every lawyer does that successfully after a trial or two. Then there are articles manufactured in a factory, such as wash-hand stands painted white. Then there are objects painted not in a factory—a fowl-house or an agricultural implement painted by a gardener. Then there is an important little group—artistic work. I suppose that you will allow the president of the Royal Academy to continue to paint portraits with a little white lead. It would be a stupid Act that did not allow the use of white lead for that kind of purpose. That is provided for in one of the codes by saying that people may be allowed to grind a very small amount; but I do not like that plan; I would rather make an exemption. Then there is a big group—ships and boats. I believe that for sea purposes zinc white is better than white lead. Many Liverpool firms think so at all events. The question is with regard to foreign ships and boats. You would have to be rather careful how the thing was framed so as not to put English workmen, English shipping, and English shipbuilders at a disadvantage with regard to their foreign rivals. I do not think that there would be more difficulty in that than we have had with the dock regulations. We have met them and overcome them. Then there is work of a scientific character and work on a small scale. With the exception of those matters which I have mentioned, I would like to say that I cannot see why another atom of white lead should ever be used at all. With regard to the interior of buildings, I painted a room of my own nearly ten years ago with zinc white purposely to try what effect it would have. The paint is beautiful to-day. I have had the door in my room at the Home Office painted half with zinc white, and it is excellent. I do not give my own testimony alone—it is absolutely universal. The Netherlands Commission held an extended inquiry, and everybody who has gone into the question says that zinc white will do for interiors. I think it criminal to allow any more white lead to be used for such purposes. You may consider the question of giving time to use up stocks, but that is not a matter with which I am concerned in advising at present. I do not see why zinc white should not be used all over the country where gentlemen's houses exist. I have used it, and all the evidence points to its safety; but you have a little difficulty in one respect. There are a few places where an abnormal quantity of sulphurous acid or sulphuric acid exists in combination with rain or moisture. That moisture combined with those acids (you must have moisture and acid) will change the zinc white into sulphate of zinc. It will soften and deteriorate the paint. I do not think that that applies to motor cars, for instance, because there you have a thick coat of varnish, which prevents rain getting in, and motor cars might be entirely done with zinc white,

\* See Appendix VII.

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but it is possible that in certain places where there is a great deal of sulphuric and sulphurous acid about you would have difficulty. It is a pity that there is any, but there it is, and you have to meet it. It might be necessary to deal with it by way of exemption.

10,307. (*Mr. Sutherland.*) Railway stations are a danger point with zinc, are they not?—Yes. I think that you might exempt the gutters in some places.

10,308. Not the girders?—You might. If once you showed a competent authority like the Secretary of State that it was absolutely necessary for the safety of girders or gutters to use white lead, then I think that under proper precautions he might give for a special industry or for a special place or special time and occasion, leave to use white lead—under such precautions as he might lay down—but I would make the rule, “No white lead for interiors or exteriors,” the exception being white lead which the inspectors could look after, because they would have a list of the exceptions.

10,309. What would you do with a district like Manchester, where the atmosphere is very humid and full of smoke, with regard to external work?—I would consult representatives of the Manchester Corporation and engineers and employers and different people from Manchester, and if they proved that it was absolutely necessary to use white lead for the safety of buildings in Manchester, they should have special leave to do it; but they would have to prove the special circumstances, and special precautions would have to be taken.

10,310. (*Chairman.*) I take it that permission to use white lead would be accompanied by restrictions or special rules to protect workpeople?—It would be accompanied by restrictions as to the mode of using, certainly.

10,311. Even in Manchester, for girders at a railway station, you would not allow the workmen to use white lead in their paints unless concurrently there were restrictions to protect the workpeople?—No; I should discourage its use by every means in my power.

10,312. (*Sir Godfrey Baring.*) The exception to the prohibition would only be allowed by Home Office licence?—Yes.

10,313. (*Mr. Sutherland.*) The French regulations provide: “A regulation of the Public Administration issued after conferring with the Consultative Committee of Arts and Manufactures, and with the Commission on Industrial Hygiene shall, if necessary, specify special operations which may be exempted from the preceding provisions.” That is what you suggest?—That is the same thing. I do not like exemptions, but I recognise the necessity for them as I have said. There are objects not in a factory which you might find it necessary to exempt—for instance, somebody might show you a little trumpery thing like a photographic developing dish which could not be painted with zinc white, because the acids used in photography would dissolve the paint. If you did not exempt those they would all come from Germany.

10,314. The Austrian regulations provide for similar exemptions to the French: “Provided that this regulation shall not apply to the process of laying on a first priming coat over old lead paint when pure white paint is being renewed, or to the process of laying on paint which is frequently exposed to the influence of aqueous or other vapours.” That is a point that you made?—Yes.

10,315. Following that, it says: “The industrial authorities when establishing precautionary measures elsewhere stated may grant an exemption permitting the use of the substances named in paragraph 1.”?—Yes. I mentioned artistic work. That would want exemption. I should draw the Act so that it included artistic work, but I should give special exemption to artists. Then there is work on a very small scale, little tiny things which are necessary; and then there is work of a scientific character, to which reference has been made. It is because I think that there ought to be these exemptions that I am prepared to advocate a very stringent wholesale rule with regard to the use of white lead, allowing it only as the exception.

10,316. (*Chairman.*) A restriction of the amount of lead to not more than 5 per cent. would, no doubt, secure substantial immunity from lead poisoning, as it has done in the Potteries?—I do not like it, but you know now more about it than I do. You have heard the evidence. If you allow them to put 5 per cent. you have always to go fussing about to see that they are not putting six, and you will have immense difficulty over the country. I have read most carefully the whole of the French experiments, and I daresay that you have had them before you. I do not believe that it is necessary for painting to put lead in, but I bow to your decision.

10,317. Would you rather have entire prohibition?—I would have the whole thing prohibited entirely, and if they want an exemption up to 5 per cent. let the trade ask for the exemption. Make it a large exemption if you like, but when you have once a well-marked exemption the inspectors can focus their attention upon it.

10,318. (*Mr. Sutherland.*) You draw a very great distinction, do you not, between the climate of France and the climate of England?—Yes.

10,319. What is available there would not be suitable here perhaps?—I do not think there is much difference except in towns like Manchester.

10,320. Take Lancashire?—I have just come back from there, and they have made it an awfully sulphurous place. I should look round for the places where trees did not grow. If I saw that the trees were not growing well, I should accept that as evidence.

10,321. (*Chairman.*) Supposing that the Manchester Corporation and others came up and said that the trees would not grow and the atmosphere was very bad and very much against the use of zinc paints, you might have to exempt the whole of Manchester. It has been proved beyond question to us that you cannot have regulations to combat the evil?—That is a very good question, and it presses me. I will answer that by saying that it would not be enough for the corporation of Manchester to come and tell me that they were inconvenienced. They would have, by actual experiment, to show that a zinc paint used there was really likely to decay in such a way as to injure the iron gutters and permanent works of their town. If they merely said that with zinc white a little more painting was required, I should say that that was not enough. I should not grant exemption to everybody right and left.

10,322-3. (*Mr. Sutherland.*) No. There would be no value in the restrictions if you did?—No. The only reason why I am for prohibition is, that I want to make it easier to apply a wholesale general rule, and I am afraid that, unless you had some power of easing it, it might be too strong, and perhaps check our trades, which we do not want.

10,324. (*Lord Henry Bentinck.*) Have you studied the substitutes for white lead paints?—No. I only know something of the sulphates of lead and of zinc. I have not made a profound study of it at all.

10,325. We have just been examining a man who supplies paint for outside work to the Stock Exchange in London. That would be a very sulphurous atmosphere, would it not?—Nothing that I have seen in London at all compares with what you have in Manchester. The trees show it. Even plane trees will not grow properly.

10,326. Probably efficient substitutes might be found for bad atmospheres?—Very probably.

10,327. Therefore it would be a dangerous thing to allow Manchester to come to you and ask for exemption when all the time an efficient substitute existed?—If the persons who granted the exemptions did their duty, and if I had the honour of conducting the inquiry, we would find out whether there was a substitute, and if we did not I would only give exemption for a few years, and keep a watch on the substitute question.

10,328. Would it not be safer to lay down a time limit of two or three years before bringing in a general Act?—I think that that solely depends on two things—the amount of white lead in the country, and the expectation of people getting rid of it, and the other uses to which it can be put, which are considerable.

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A certain amount of time should be given for painters to learn the use of zinc paints, because of the different mode of putting it on and handling it.

10,329. My point is: is it not better to lay down a strict time limit, with no exemptions, than to bring in an Act at once and allow exemptions afterwards?—If there were no alternatives to choose from; if it was a question of the present method or total abolition, I would go for total abolition, but it would be rather inconvenient in certain cases. I do not see how artists could paint pictures without white lead. They insist on saying that white lead has better covering power than zinc white.

10,330. You would not allow a whole town to contract out of the Act?—It depends on how the power of exemption was exercised. I do not like it. I agree with you.

10,331. (*Dr. Collis.*) In speaking of entire abolition, the purity of materials is such that there is sure to be some trace of lead even in the preparation of zinc paints, and we should have to consider some small percentage beyond which analysis should not carry you?—I should say, "no person shall knowingly use or prepare any paint containing lead, and in no case shall prepare any substance containing more than .01 of lead"—a trace.

10,332. (*Chairman.*) Does not the best zinc oxide contain about 3 per cent. of lead?—I did not know that. I should not have thought that it contained so much.

10,333. (*Dr. Collis.*) The zinc oxide prepared by the direct method from the ore contains from 3 to 4, or even a higher percentage of lead. We have that point to take into consideration?—If they cannot prepare zinc without lead, it must be taken into consideration. We must not be unreasonable and destroy trade; we can do the thing without that.

10,334. Yes. The point that one has in one's mind rather is that they can get some of the best forms of zinc paint prepared by the indirect method. They can get it nearly pure?—This is a point which I would deal with by the schedule. The Secretary of State should have power to deal with the schedule from time to time, and if he found that the making of zinc that contained lead was a totally unnecessary process, and ought to be struck out of the schedule, it would be struck out.

10,335. You think prohibition, with exemption, better than allowing 5 per cent. solubility?—The difficulty is this: an inspector goes round to a man and says, "Is there any lead in this paint?" and the man says, "Yes, I am allowed to have a certain amount." The inspector says, "How much does this contain?" and the man says, "That is for you to find out. I do not know what there is." The truth might be that he had put in 10 or 20 per cent. that morning. The inspector has to have it analysed, and three weeks elapse before that can be done. The inspector has lots to do, and the end of it is that no action is taken, and everybody mixes paint as he likes. That is why I do not like the 5 per cent. I would much rather have, if possible, a thing that was quite pure. It is bad enough to let them have a certain percentage in the Potteries, but there you have them all in a ring fence where they can be looked after; but how in the world could you look after gardeners and people of that sort, scattered all over the country?

10,336. Do you think that it would be possible to prohibit the sale or exposure for sale of materials which contain over 5 per cent.?—With regard to white lead I would prohibit the making of it for the purpose of paint, the sale of it, and the use of it.

10,337. If you prohibit the making of it, what would you do in cases where, at any rate, a small percentage could not be dispensed with?—If you point out that it is absolutely necessary to allow 5 per cent. to make a thing workable we must allow it, and invent the best means we can of meeting the difficulty that may arise. That is my answer to that. I did not know that there was this necessity for a proportion of lead. I consider allowing a percentage an evil, not in itself so much as by creating very great difficulty of administration.

10,338. Would the prevention of the manufacture or sale meet the difficulty of administration?—It would do

a great deal towards it. If somebody said that he could not make paint flow without a certain amount of lead you would have to allow the oil shop, the paint seller, to sell him lead to an unlimited quantity to mix in his paint, and you would not know how he would use it. A man may not know whether he is using white lead or zinc. It requires rather a knowledgeable man to know which was which, and a gardener would not know which was which.

10,339. Could you not prevent the selling or exposing for sale of an article containing over 5 per cent.?—I agree, but supposing a man mixes up his own paint. If a man is going to mix up paint he will have his materials as a rule by him. It is rather hard to expect him to buy nothing but ready-made paint. Supposing that he is not going to use it up straight away. I would deal with it by way of exemption. I would not draw a hard-and-fast line and say that everybody might use 5 per cent. for ever, but I would give the Secretary of State power to allow the use of 5 per cent. where it was shown to be necessary if that could be shown. Depend upon it, gentlemen, if twenty years hence we are alive we shall wonder why people ever used 5 per cent. at all."

10,340. In Belgium they prohibit the sale of dry white lead.—Yes. I have no objection to your taking away with one hand what you grant with the other if you like, but I do not want the 5 per cent.

10,341. We are trying to see how we can make it administratively possible to deal with this. You would have to catch it at the shop of the manufacturer, and not pursue it to its use?—It would take one a few days and a good deal of thought to see one's way through this labyrinth, but it is worth trying. I am not prepared to do it now.

10,342. (*Mr. Mason.*) Can you tell me whether foreign Governments look after their regulations with the same strict caution as regulations in England would be looked after?—My experience is that a number of foreign countries make extremely strict rules that sound tremendous, and look so on paper, and then do not take much pains to see them observed. The Germans are very particular, but some nations (I will not specify them particularly) are, I think, uncommonly lax. In a country like Turkey you will see the most formidable set of rules, and you say "How do people live under them?" and you are told there is nobody to enforce them. We are all the same. We also in this country have many rules and laws that we do not enforce. If you make rules too strict and impossible to obey, they are of no use. If I thought that the rule that I have suggested was too strict I would not suggest it; but I do not think it is. You will get them all to adopt zinc white before you have done.

10,343. I was inquiring of a large motor manufacturer in a foreign country with regard to white lead regulations, and he said that he had never heard of them. He knew nothing whatever about them. He was using white lead just as happily as ever?—I can perfectly believe it.

10,344. These regulations of foreign countries are shown to us, and we are told what foreign countries are doing, and it is said "Here is Old England far behind"?—You ought to inquire of somebody who has studied the question much more than I have. In Switzerland they have rules, too, I believe.

10,345. (*Mr. Kinggate.*) Is there any French regulation or law with regard to the use of lead in the coach-building industry or motor-car industry? The regulation does not seem to convey to me that they come under Section 1. It says, "Where painting work is done on buildings," but it says nothing about carriages or motor cars? It is only buildings, and I will say at once that I do not think that that is nearly sufficient. I do not at all see why you should forbid it for buildings and interiors and let a whole lot of people in a factory, painting wash-hand stands for instance, be poisoned.

10,346. I was under the impression that it did apply until I saw the appendix?—It certainly does not go far enough if it stops at buildings.

10,347. I did not know whether you would think that it applied to anything done in a factory. To me

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it reads as if it applied only to buildings? I think that you are right.

10,348. (*Mr. Robins.*) I speak as a painter, and there is real difficulty from a painter's point of view with regard to the question of 5 per cent. My experience on first going into the trade was that colour mixing was a general process, and we had to grind the colours with a pestle in a mortar and on a stone, whereas to-day colour makers do that?—Yes.

10,349. In process of time, and with the economics of factories, we find that there are standardised colours which are made at certain works, and that lessens the work of a painter with regard to mixing colours. From one point of view it takes away perhaps to some extent the development of a painter's ability if he is not allowed to mix his own paints, but I hold myself from a health stand-point, that if all paints were mixed by paint makers and were sold ready-made, the difficulty would be removed, and it is being removed. There would have been greater difficulty 25 or 30 years ago than there is to-day, because every coach-painter was mixing his own colours, and he had to grind them before he commenced to paint his coach. It would perhaps be half a day before he could do anything at all, whereas now the colour is standardised, and is ground at the paint makers. In the old time all colours were bought in the dry?—The covering power is greatly improved by the fineness of grinding, which the painter could not get previously.

10,350. He could not get it—that is quite right. My impression is that in years to come there will be less mixing of paint by the painter himself, and it will be far easier to deal with the question?—I thought that it might be worth while to consider whether you will allow 5 per cent. in the manufacture of paints at works properly registered, not allowing it in the case of private people at all.

10,351. My idea is that the painter should not be allowed to mix his paint?—That would meet a great deal of the objection that I have raised.

10,352. (*Mr. Mason.*) Would there be any difficulty in prohibiting imported goods painted with lead colour?—Yes; I think that there would, because you see you would have to cast on the Custom House

Officers the duty of finding out what the paint was. They could be helped in that, and I do not think that the difficulty would be quite insuperable; but there would be that difficulty. People might say "If we are not allowed to paint with white lead why should others enter into competition with us with things painted with white lead?" My answer to that would be that if it could be shown that the painting of imported articles with white lead paint gave a great commercial advantage to the people who were doing it to the detriment of our people, then there might be something to be said for prohibiting the import of such articles. That has been done in the case of lucifer matches. You might make an order of some kind to deal with it. It might be worth considering whether it should be put in an Act, but I do not think the case arises. The advantage over zinc of painting in white lead is so exceedingly small that I do not think that anybody would trouble about it.

10,353. Some old-fashioned people might think that lead was better?—The foreigner would at once proceed to use zinc white, and he would be on a level with the English producer. I do not think that we are concerned with the health of the people in France.

10,354. I do not put it that way, but certain customers might think that motor cars from America painted with lead would last longer?—It might possibly be so, but I should rather doubt it. If you made a rule that nobody should vend such an article it might bother the Americans very much. They could bring the motor cars over, but they could not sell them.

10,355. (*Chairman.*) The Daimler Company have abolished lead altogether?—I quite believe it. The varnish is amply sufficient to protect the cars even in the case of sulphurous fumes.

10,356. (*Mr. Robins.*) A great number of chassis which are painted with lead colours are imported into this country. They have to be sand-papered, and there is extreme danger to the painter from those imported lead-coloured chassis?—He should be obliged to clean them wet. I do not know what rules you would make with regard to that. If you had a rule that they should not be painted with white lead that would meet it.

The witness withdrew.

Captain F. M. TUKE examined:

10,357. (*Chairman.*) Are you the marine superintendent of the Orient Steamship Company?—Yes.

10,358. You are attending to-day to give evidence in regard to the paints which you use on ships?—Yes.

10,359. Do you exercise full control over the painting work on the ships of your line?—Yes.

10,360. How many painters are employed at the Orient Steamship workshops?—They vary from 27 to 40 about.

10,361. In addition, no doubt, some painting is done on board the ships by the sailors?—Yes, a certain amount, a very small amount.

10,362. To what extent do you use lead paints in painting the ships of the Orient line?—We use no lead paint at all with the exception of the funnels and the ventilators. I have found out that there is lead used in those.

10,363. How long have leadless paints been in use for the ordinary internal and external painting of the Orient line?—As long as I can remember.

10,364. Could you give us an estimate of the length of time?—In sailing ships I can go back to 35 years ago and say that we were using white zinc.

10,365. Have you used no lead for ordinary purposes during the whole of that period?—I will not say that we have used no lead, but to a very small extent at any rate.

10,366. May I take it that you have used no lead with the exception of the funnels and the ventilators for the last, say, ten years?—Yes, quite that—that is, for painting.

10,367. Now first with regard to the interiors of cabins. What materials do you use?—Patent enamel

paints. We use rystolite and satinette. Those are the two best enamels on the market.

10,368. Are those built up right from the wood or metal on leadless priming paints?—Yes, on the zinc coating.

10,369. Next, in regard to deck spaces, crews' quarters, and the like, what do you use?—Generally white zinc; otherwise we put a little colour in; sometimes a yellow colour.

10,370. Is it a leadless stone colour paint you use?—Yes. We just simply colour the white zinc to make a little different shade.

10,371. What do you colour that with?—Any yellow stuff they have; yellow ochre or whatever it is.

10,372. What do you use for painting the holds?—White zinc and oxide (red) generally.

10,373. How often is the interior of a ship painted?—The holds about once in four years.

10,374. Are you perfectly satisfied with regard to the durability of the paints which you use for interior work?—Quite.

10,375. Is there any difference between the cost of your interior painting and the cost of similar work done with lead paint?—I should say there is no difference in cost at all. I should say that lead is just as expensive as zinc or zinc as lead.\*

10,376. If painting with lead was cheaper than painting with zinc, would your company go back to lead?—No, certainly not. They would use the best paint for the purpose.

10,377. They would not?—Certainly not.

\* The witness wrote later, "I find lead is cheaper."

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Captain F. M. TUKE.

[Continued.]

10,378. Are the results for interiors in every way as satisfactory as where lead is used?—Entirely.

10,379. Now, with regard to external surfaces, what paint do you use for hulls?—Beginning at the top we use ordinary black paint. I could not tell you the constituents of it.

10,380. But there is no lead in it?—There is no lead in it.

10,381. What paint do you use for deck-houses, rails, and other upper works?—An enamel paint for the deck-houses and white zinc for the rails.

10,382. What paint do you use for the funnels and the ventilators?—We call it buff colour. I found out that there is white lead used in it to protect the iron to a certain extent when it is exposed to the weather.

10,383. Can you tell us what percentage of white lead is used in the paint for the funnels and the ventilators?—I know that it is a very small amount, but I could not tell you the exact amount.

10,384. Does the paint used for the funnels and ventilators form a considerable proportion of the paint you use?—No, a very small proportion indeed.

10,385. Would it be impossible to do without lead for painting funnels and ventilators?—I am making the experiment now. I do not believe myself that it will make any difference at all.

10,386. How often are the exterior parts of a ship painted?—Once in London and then again in Sydney, in Australia. They are painted, say, every two months.

10,387. Are you perfectly satisfied with the durability of the paints which you use for exterior work?—Yes, entirely satisfied.

10,388. Supposing that you painted your ships, say, once in every two years, would you still be satisfied with the zinc paint with regard to durability?—Yes; with regard to once in two years, nothing would stand two years' wear with us, I am certain. It would not much matter what you put on.

10,389. You are perfectly satisfied with the durability of the paints that you use for exterior work now?—Yes, quite satisfied.

10,390. Is there any difference between the cost of your exterior painting and the cost of similar work if it were done with lead paint?—I am hardly in a position to say the cost of lead because we have not used lead, but I do not think myself there is any difference at all. I should think that lead was cheaper if anything.

10,391. Lead paint cheaper than zinc?—I should think it was a little cheaper.

10,392. Are the results for exteriors in every way as satisfactory as where lead is used?—As far as I know, they are certainly quite as satisfactory.

10,393. To sum up then, may we understand that it would not affect your company in the least if the use of lead paints were prohibited?—Not in the least.

10,394. (*Dr. Collis.*) Do I understand you to say that you think lead would be cheaper?—Yes; I am under the impression that lead is cheaper than white zinc, but we use so little really that I could not say the price.

10,395. If that is so, why did your company originally decide to use non-lead paints?—It was decided in my early days, when I first went to sea; I think 40 odd years ago.

10,396. (*Lord Henry Bentinck.*) By the company?—No, not by this company. They have never used anything else but zinc paint in this company since I have known them with the exception of the small quantities mentioned before.

10,397. (*Dr. Collis.*) It is really a matter of very old custom?—Very old custom. White lead is never used now because it always turns yellow.

10,398. That gives a reason?—That was one reason I know.

10,399. You renew the paint about once every two months, I understand?—Yes, the external work.

10,400. Is that because it is worn out?—Because it is worn out.

10,401. Is that due to damage or the weather?—Partly the weather, and the hull of the ship is knocked about by lighters and passenger tenders coming alongside.

10,402. That is a traumatic sort of injury. Do you renew mostly because of such injury rather than weather effects, do you think?—I think that the weather certainly has a certain amount to do with it. The damage starts it. Once the surface is rubbed off the weather does the rest.

10,403. Whatever paint you use is rubbed off?—Yes; it does not matter what paint you use. That is why I use the enamel on the external work on the deck-houses. That goes for two voyages, or practically eight months.

10,404. (*Mr. Mason.*) What sort of paint do you use for the hull under the water line?—Wood's composition.

10,405. And on the bare metal, what do you use?—Priming. We put it on about once in 12 months.

10,406. Made of —?—I could not tell you.

10,407. Is no red lead used?—Not that I am aware of.

10,408. Is not lead of any sort used?—I could not tell you. It is a patent thing, and if I asked the people they would not tell me. I know there is copper in it.

10,409. (*Mr. Parsonage.*) With regard to the application of paint by the workmen, do you find any difficulty with the men with regard to applying the leadless paint?—No, none whatever.

10,410. The men that you take on may be employed in using lead paints at different times. You take them on as you require them, do you not? They are not always employed in using the one material?—Our men are practically permanent men.

10,411. You keep a certain number of permanent men, but you take your men on down at the yard at six o'clock in the morning?—At seven o'clock in the morning.

10,412. These men may have been working in house, painting work with lead?—I see what you mean.

10,413. I wish to ascertain whether there is any difficulty with the men using the leadless paint if they come off work where they have been using the other?—Not the least. I should have thought it would have been the other way about.

10,414. I know the hours at which your men are taken on, and I know you have a certain number of permanent staff, but men may be taken on casually. They may come from another yard or a house?—We have no difficulty. No question has ever been raised.

10,415. A man would readily adapt himself to using the leadless paint if he was a painter?—I think so. It would be to his advantage, I should think.

10,416. (*Mr. Sutherland.*) Do you buy the zinc in paste or ready mixed?—In paste, not ready mixed.

10,417. What do you mix it with?—Oil.

10,418. Ordinary linseed oil?—Yes, linseed oil.

10,419. And turpentine?—A certain amount of driers.

10,420. Varnish?—No varnish.

10,421. What sort of driers do you use—patent driers?—Yes, patent driers.

10,422. (*Chairman.*) It is very interesting to hear that on your line of steamers you have never used lead?—Lead to my recollection has hardly ever been used excepting in small quantities as before mentioned. I remember hearing about white lead when I first went to sea, and I know the trouble they used to have in keeping the paint white.

10,423. How many ships have you in your line?—Nine, and it is constant work for those.

The witness withdrew.

## FIFTEENTH DAY.

Wednesday, 26th July 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*.)

Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*).

Mr. GEORGE ELLSON examined.

10,424. (*Chairman*.) You are Resident Engineer to the South Eastern and Chatham Railway at Charing Cross and Cannon Street stations?—Yes.

10,425. Are you in charge of the painting operations on the Charing Cross and Cannon Street river bridges?—I am.

10,426. Have you been instructed to attend here to-day before the Committee for the purpose of giving evidence regarding the materials that are used for painting those bridges?—I have.

10,427. Have you used various non-poisonous painting materials somewhat extensively on the South Eastern and Chatham Railway?—We have used them rather extensively.

10,428. In the first place I believe you are prepared to speak of the use of ordinary coal-tar?—Yes.

10,429. In what way is it prepared for use?—Coal-tar specified as being freed from ammoniacal liquor is obtained. To this is added 5 per cent. by weight of raw linseed oil and 100 grammes per gallon of pure bitumen. The latter ingredient is not coal-tar pitch but natural pitch. The mixture is boiled for three hours in a copper and applied as necessary after cooling. The tar is laid on as thickly as possible, and two coats are given.

10,430. Where has the ordinary coal-tar paint been used?—At Charing Cross and Cannon Street river bridges over the River Thames, and other smaller bridges.

10,431. How has this paint been applied?—In summer we put it on cold. We find if we heat it that the resulting coat is too thin. That is my experience of it. The addition of bitumen corrects this. In winter it is necessary to heat it, or it would be an endless job to put it on. In fact, you could not put it on because it would get too thick. We add bitumen to prevent it getting too thin in the summer, and it gives body to the coating. We also find that the addition of 5 per cent. of rawlinseed oil corrects its tendency to get hard and brittle after it has been exposed for any period.

10,432. Has that paint proved durable?—It has.

10,433. And efficient in every way?—Yes, very efficient indeed.

10,434. Would you please name some of the conditions under which it has been used?—It has been used on the under-side of Cannon Street bridge, on the whole of the main girders, and therefore it has been tested there on an extensive scale.

10,435. How long has it been found to last in that position?—Eighteen years. In 1893 the bridge ironwork was last coated with tar, and it is now in very good condition.

10,436. Was it in a good condition at the end of the time?—It is in excellent condition now. I have two photographs here showing its condition now. It is almost as good at the present time as when it was put on.

10,437. Would you tell us if this particular paint could be used throughout your system for bridges?—Yes, it could be used as far as protection is concerned, but appearance has sometimes to be studied.

10,438. Is its appearance not good?—It is black and you only get a black appearance. But from a

protective point of view it would be as good as anything else.

10,439. How many coats of such paint are applied?—Two usually.

10,440. Have you found it economical for such work?—Yes. The chief item of its cost is that of the labour in applying it.

10,441. That is good for the workmen?—Very good. For underneath work it is economical, as only two coats of tar are necessary as against three coats if lead paint is used.

10,442. Would you say then, speaking from a business point of view, that on the whole it is as economical as lead paint?—Yes.

10,443. Would that paint be durable in other situations?—It is not so durable as other paints when subjected to deleterious atmospheric conditions such as you find in London railway termini, where the conditions are severe owing to the atmosphere being heavily charged with sulphurous fumes given off from the locomotives.

10,444. Are you prepared also to speak of the use of silica graphite paint?—I am.

10,445. Where has that paint been used?—It has been used in Charing Cross station and in Cannon Street station roofs.

10,446. There, I presume, it is exposed to severe atmospheric conditions?—Very severe. The atmosphere is charged, as I said before, with the fumes from the locomotives and with steam, and in the winter months it gets very heavy indeed.

10,447. Unless the paint were a good one, corrosion would take place very rapidly, would it not?—Undoubtedly.

10,448. Have you found this paint efficient under these conditions?—Very efficient.

10,449. How does its efficiency compare with that of lead paint?—It is better than lead paint. I can give you an instance of that. From 1903 to the early part of 1905 we painted Cannon Street station roof with lead paint, as had been the practice on the South Eastern Railway for a number of years. Now in fifteen or sixteen months from the time that paint was put on I found that it was beginning to scale and peel off the underside of the main rafters and the purlin girders. That was seven years ago. We painted Cannon Street roof again with three coats of silica graphite paint two years ago, but there is not at the present time any sign anywhere of any scaling or peeling off. So that I think that that proves conclusively that it is superior to lead paint.

10,450. May the Committee understand that silica graphite paint is absolutely leadless?—Absolutely.

10,451. What colour did you paint the roofs of the stations?—The first coat was a dark chocolate colour; the second coat was a dark grey colour and the third coat was a dark chocolate colour again to get the necessary distinction in the three coats, so that it may be ascertained that three coats have been put on in each place.

10,452. Is a silica graphite paint ever used in a white state?—No, it could not be used in a white state.



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Mr. GEORGE ELLSON.

[Continued.]

10,453. You have also had experience of carbonising coating paint, have you not?—Yes.

10,454. Where has that paint been used?—We tested it in Cannon Street station roof when it was painted in 1903, to compare it with lead that was put on at the same time.

10,455. What kind of paint was that?—A black paint. It has a coal-tar base, I believe, but it is a manufactured paint, and it is called "carbonising coating." I do not know how to distinguish it in any other way. This carbonising coating that was put on was applied as a matter of fact in 1904. I examined it about three years after, and then I found that it was just in about the same condition as the lead paint. And then when we came to repaint the roof in 1909 and 1910 I again had an opportunity of examining it very closely, and I found that there was practically nothing to choose between its condition and that of the lead paint. It was equally as good as the lead. The lead paint that was put on was a very good paint. I might say that there were only two coats of carbonising coating put on as against three coats of lead paint. So that is in its favour.

10,456. What opinion have you formed of its durability and efficiency?—That it is equal to the best lead paint.

10,457. I understand that you are prepared to put in a table showing the cost per square yard of painting with the different materials that you have mentioned?—Yes.

10,458. Which of the paints do you find most economical in use?—The silica graphite and the carbonising coating paint, both of which cost a total of 34d. per square yard, made up of 6d. of a penny or material and 1.68 for labour in applying.

10,459. How does the cost of the ordinary lead paint compare with that?—It is a little more costly. The lead material costs a trifle more. The cost of the lead material is 87s. per square yard.

10,460. And the cost of the labour?—The cost of the labour is about the same. The total therefore works out at 2.558d. per square yard.

10,461. What is the cost of painting with coal-tar paint?—The material is very cheap. It costs 135d. per square yard for material, but the cost of labour in applying it is high. It is 3d. per square yard, giving a total, with the material and labour, of 3.135d. per square yard.

10,462. Then it has the advantage in two directions, it is efficient from the point of view of the railway company, and it is satisfactory to the workmen because it gives them more work?—Quite.

10,463. Have you made any trials of leadless white paint?—Yes, in a small way.

10,464. Was it satisfactory?—Yes.

10,465. Entirely satisfactory?—Yes.

10,466. Would you say that it was as good as white lead paint used in similar positions?—I should say that zinc white paint in the atmospheric conditions prevailing in London railway termini is as good as the best lead paint.

10,467. And is it as durable?—Quite as durable and as efficient.

10,468. Then so far as your painting work is concerned would a prohibition of the use of lead cause you any difficulty?—No.

10,469. Now we should very much like to see the photographs you have brought, please. (*The witness produced some photographs.*)—First, I have two photographs which are typical views of the tarred work at Cannon Street railway bridge. There is nothing the matter with that. There is no corrosion there. You see the tar in little ridges. It goes like that after a period of years, but it has perfectly protected the ironwork, from an engineering point of view. I have three photographs of the tarred work at Charing Cross railway bridge (*producing the same*). That is a detailed one. The work is in perfect condition. That shows the end view of the girders in perfect condition.

10,470. (*Lord Henry Bentinck.*) How long has that paint been on?—Five and quarter years. These three are views taken of Cannon Street station roof—silica graphite paint. In those two it has been on for two

years. In this particular case it has been on for three years. That is the wind screen at the end.

10,471. Have you found improvement in these kinds of paints since you began using them at all? Have they changed?—No.

10,472. They have always been satisfactory from that point of view—for how long—five years?—Yes, we have had five years' experience of this. Here are two views taken in Charing Cross station, of the roof work. The influences are very severe, as, in addition to the bad atmospheric conditions, dust settles on the surface of the girder work and holds the moisture, which is very trying to the protective coating on the structure.

10,473. (*Dr. Collis.*) Do you know whether these paints are used at all as on other engineering work elsewhere? Besides the use that your company is putting them to, do you know of any other?—Not from personal experience—only by what I hear from manufacturers of paint, and what I read.

10,474. I thought you might possibly know through them and others the use of the paint. You have had a successful experience, and your experience might possibly have induced others to use them?—I do not know whether that has been so. I believe it has.

10,475. Can you give me the names of any large structures which have been so treated?—No, I am afraid that I cannot offhand, but I do know that people (I cannot bring anyone to mind at the moment) write to Mr. Tempest, the chief engineer of the South Eastern and Chatham Railway, and ask what his experience of this paint is, and on his replying that it is satisfactory, possibly that would be the determining factor in deciding them to use it.

10,476. I wondered whether there were any other large railways that had been using it for their bridges?—Yes, I think so.

10,477. King Edward VII. Bridge at Newcastle and the Forth Bridge, and places like that?—I could not say definitely, but it is in fairly general use on other railways.

10,478. You mentioned that these paints are all dark, and that you cannot therefore get any artistic effect. Is it possible to paint over them with lighter colours successfully?—It is. We have done that at Charing Cross station.

10,479. How many coats would you have to put on if you were going to put on a light coat of zinc oil paint?—You would get a fairly good result by putting one coat on, but you would get a better result by putting on two. You would get no sign of the graphite appearing underneath if you had two coats of lighter colour.

10,480. (*Chairman.*) A leadless lighter colour?—Leadless or lead, whichever you chose.

10,481. (*Dr. Collis.*) You at present put two coats on?—We did that at Charing Cross station. We put two coats of lighter paint on.

10,482. If you were leaving it without decorating probably you would put two or three?—Three of the graphite paint.

10,483. If you were going to decorate with a lighter colour you would only put two coats of the lighter colour?—I would recommend two coats of the graphite and two coats of the lighter colour—four altogether.

10,484. It would require more labour and a little more cost in material?—Yes, if you desire to get a decorative effect.

10,485. It can be obtained at greater expense?—Yes undoubtedly.

10,486. (*Mr. Sutherland.*) What sort of men apply the silica graphite? Are they normal painters?—No. We put ordinary painters to it, but as a rule on engineering work a general labourer is employed.

10,487. It is done by labourers, then, and not by painters?—By labourers.

10,488. Is the woodwork at these stations coated with the same material between the rafters and purlins?—No, we have not coated the woodwork with it, but I do not think that there would be any reason why it should not be used for woodwork.

10,489. But why do not you coat it with it?—Because the woodwork is a light colour. If we coated

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Mr. GEORGE ELLSON.

[Continued.]

it with silica graphite paint we should have to put four coats on to get the light colour. We coat only with three coats, which is all that is necessary when using one light colour straight away.

10,490. Three coats of lead paint?—Yes, three coats of lead paint.

10,491. Then those paints are only useful where either black or chocolate or dark red is available?—Yes, those paints alone, but you can use lighter tints over them.

10,492. On the top?—Yes.

10,493. I understood that. What experience have you had with zinc white paint? You say that it is as good as lead paint?—When we painted Charing Cross station some big manufacturers of paint wanted us to test their zinc paint and so they sent along a quantity and it was applied there.

10,494. Ready mixed?—Ready mixed.

10,495. So you do not know what the formula was of that?—No.

10,496. You do not know what it was mixed with?—No.

10,497. It might be varnish and zinc?—It would not be varnish.

10,498. Varnish would be in it?—I do not think I should like to say that.

10,499. Do you know that the Government Commission of Holland investigated this matter for a period extending over five years, and instituted very extensive experiments, and they came to the conclusion that in all situations such as your railway termini zinc paint was not as good as lead?—Well, I cannot agree with that conclusion in view of the experience that we have had:

The witness withdrew.

Mr. JAMES M. ORR examined.

10,507. (Chairman.) Do you attend here to-day as a representative of the Association of Master House Painters in Scotland?—Yes.

10,508. What is the nature of your business, and where is it carried on?—Our business is that of house painters and decorators carried on in Glasgow.

10,509. What is the average yearly number of painters employed by your firm?—The average is about 110, I daresay.

10,510. How long have you been in the painting trade?—Personally I have been connected with the firm for about 25 years. I have been a partner for 18 years. My father has been in business for about 52 years.

10,511. Have you known any cases of lead poisoning or painter's colic?—There were only two cases I ever heard of where painter's colic was suggested as the cause of illness, in the course of 52 years. In at least one of these cases it was very problematical. In the other case the man is a master painter in Glasgow to-day in robust health.

10,512. Have your men had occasional days of sickness possibly due to lead?—Not that I have heard of.

10,513. Do you have periodical medical examination of your men?—No, we do not.

10,514. Then how do you know that they have not had occasional days of sickness?—I am not speaking from any personal knowledge or experience. I never heard of any man ever off sick where his sickness was attributable to anything of the kind.

10,515. But I suppose that you have had a great many cases where men have been off from illness?—Very seldom; not many at all.

10,516. Do you mean to say that your men go from one year's end to the other without being off for a few days through sickness?—I hear of very very few cases.

10,517. Would you hear of those cases if they were away from sickness?—I would hear of most of them—not of all, I must admit.

10,518. You know, I presume, that lead poisoning frequently undermines the health without immediate violent symptoms arising?—I cannot say as to this.

10,500. But what experience have you had?—It was not a very large experience, but it was a severe test. The manufacturers sent two gallons of paint, and it was applied at the same time as we put the other on. I have made two examinations of it since, and I find it standing equally as well.

10,501. You do not know really what the component parts of that paint are?—No, I do not know that. I only know that it was sent to us as being the best zinc paint.

10,502. (Mr. Gardner.) With regard to your structural ironwork and the coal-tar paint, do you only use that on the under-sides of bridges?—No. At Charing Cross railway bridge the three inner rows of main girders, which, as you know, are braced structures, are painted entirely with coal-tar paint, and they are exposed to the weather and the heat of the sun just as any other work outside is. It has been on for 5½ years, and it is in good condition now—excellent condition.

10,503. When you painted in 1903 to 1905 with lead paint, you say it peeled in about two years?—Not entirely. There were signs of peeling and flaking.

10,504. But since you painted with the silica graphite, after two years there was no sign of peeling?—Not anywhere.

10,505. Was the surface of the paint in 1903 as well cleaned as it was the second time?—Yes, it was under my personal supervision in both cases, and I can speak very definitely on that point. It was cleaned very carefully and very well in both instances.

10,506. Then there was no question of scamping?—Absolutely no question of that. Of course, if this were not seen to it would make a lot of difference in the result.

10,519. The incidence of lead poisoning is published month by month by the Board of Trade; do you see the Labour Gazette issued by them?—I have seen it at times.

10,520. Have you noted that 284 deaths of painters have been definitely certified as due to lead poisoning in the last ten years?—I have seen that, but I must say, with all respect, that I question the figures very materially as applying to Scotland, or to house painters alone. I have often been desirous of knowing who really were included under the head of painters. I have seen the figures from these returns, but I could not by any calculation reconcile them with the experience of the painting trade as we know it in Scotland. In a matter of over 50 years we cannot find in our association a trace of a single death that was certified to be due to lead poisoning amongst the whole of the painters of Scotland.

10,521. Would you be surprised to hear that that is precisely the same kind of evidence as we have had from the English employers?—That leads me to say that I have always been curious to know on what basis those figures were made up.

10,522. The basis on which those figures are made up is that the doctor certifies that a particular man has died from lead poisoning, and that his occupation is that of house painter, and the Registrar-General notifies these cases to the Home Office?—But the point is this: In Scotland painters are painters alone. In many parts of England and in Ireland painters are very often plumbers as well, and in England men are employed as painter's labourers. I would like very much to know if painter's labourers are included under the heading, because I can perfectly understand if that is the case the numbers are inflated very materially.

10,523. On page 267 of the July 1911 issue of the Board of Trade returns, it shows a definite increase in the death-rate from lead poisoning among painters; 27 in the first six months of this year and only 19 in the first six months of last year. Do you agree with me that that is an alarming increase?—I would; but at the same time, as I say, that would be subject to the qualification I spoke of.

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MR. JAMES M. ORR.

[Continued.]

10,524. But supposing that these figures which I am quoting are most assuredly correct, then would you say that that was an alarming increase?—I would, but at the same time, as I say, I would like very much to know particulars.

10,525. I am afraid that you must take these figures as being absolutely correct?—I do not doubt the figures, but I doubt the class of men to whom they apply.

10,526. These figures that I have given to you are English figures. Scottish statistics have not been collected in past years, but with the same processes and the same materials the risk must be the same?—With the same processes and the same material the risk ought to be the same, but the fact remains that the results are not the same.

10,527. I am not surprised to hear that at all, because in some of the Potteries, in fact a large number of the Potteries in North Staffordshire and in Scotland, they have had no cases at all, and then quite unexpectedly, without any warning, a firm which has been immune has a crop of cases?—All I can say is that, so far as we can discover, there has been absolute immunity practically throughout Scotland from lead poisoning, and there is no variation from year to year.

10,528. But if you were a member of this Committee and you had this appalling number of deaths amongst house painters, and you were told that the conditions prevailing in Scotland were precisely the same as those that prevail in England, would not you make the deduction that the risk was the same whether it was in England or Scotland?—The deduction I would make would be that there ought to be the same proportion of deaths in Scotland, but the fact is that there is not.

10,529. Well, that is what you tell us, but, as I say, most of the employers representing the English house painters have made precisely the same statement. No one knows anything about it. It is something new to them. At any rate, that is the impression that the employers have made on us. No one has heard of any cases; no one has noticed any illness amongst his work-people, although these figures of death are so appalling?—Might I ask if there are any means of arriving at a classification? Is there any means of discriminating between different classes of painters? My own contention is that this appalling death-rate does not apply to house painters proper at all, but that it applies to either painter's labourers or to men working in shops where both plumbers and painters work.

10,530. You understand that it does not apply to painters in workshops?—Is that so?

10,531. It only applies to house painters who are employed in work in houses?—But even within that classification there is this difference: that in both Ireland and England men are employed as painters' labourers. If those men are included in the classification, the basis on which the figures are taken is altogether wrong, because those men are not trained as painters at all, and do not observe the same precautions.

10,532. I do not think it matters to this Committee what the classification of the men may be. What we are sitting here to do is to make some suggestions to avert what is a very serious evil, and whether they are painters or painter's labourers the same thing applies if the men are employed in the use of this dangerous material. Do not you agree to that?—I do to a point, but the point I am on is this: Painters as a class in Scotland are men who take ordinary care in the matter of personal cleanliness. They know that their hands should be kept clean. Men who are not trained painters might very well do things which might lead to lead poisoning, and I hold that they are the men who are bringing this aspersion on the painting trade, because they are not observing ordinary conditions.

10,533. Now from the figures that I have read to you the gravity of the danger is seen, if you compare these figures with those for all lead industries under the Factory Act, in which there have been 20 deaths in the first six months of this year and 19 in the first six months of last year. So that there has been an increase of one only in this instance. Do you follow

that?—Do I understand that those are workers in the painting industries?

10,534. There has only been an increase of one in all the factories, but in the house painter's trade there has been a large increase, and the deaths from lead poisoning in the house painter's trade are more numerous than in all the other industries where lead is used?—Well, I cannot account for that condition.

10,535. These are actual facts. You are not surprised to hear it? The incidence of lead poisoning is greater in the house-painting industry than it is in the whole of the other lead industries put together?—As I say, I do not accept that on the face of it as applying to the house-painting trade.

10,536. But you must admit that it applies to men who are employed in house painting?—Not necessarily; I would like to know how many under that classification are plumbers and painters.

10,537. But it applies to men who are employed in the actual painting. I do not care what their names may be?—But that is where my point comes in. It says in the figures I have seen, "plumbers and painters."

10,538. Dr. Collis will ask you further about that. In addition to this the death-rates from Bright's disease and nervous diseases, due to work in lead, are very high?—Personally I have no knowledge of that. I was not aware of that.

10,539. You may take it from me that they are very high indeed. There are also a very large number of non-fatal cases, most of which are never recorded, as they are not required to be notified to the Home Office?—I take that under qualification. I cannot really speak as to that.

10,540. I am sure you will admit that, if these figures are correct, all this sickness and death is very deplorable?—Yes, if the figures are correct, but that is the point that I question as applying to the house-painting trade.

10,541. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes, I am aware of that.

10,542. That the use of white lead has been prohibited to an appreciable extent abroad?—But I would also say that I know in Holland, where they have had five years' careful investigation, they are allowing white lead now after most elaborate and scientific tests for five years.

10,543. And that the work of painting has been most strictly regulated in many countries where the use of white lead is still allowed. Do you know that?—Yes, I know that.

10,544. You may take it from me that, if they do not have prohibition, they will have very strict regulations?—I can quite understand that.

10,545. Do you not think it regrettable that this country should be behind other nations in this respect?—So long as it is behind—yes, but that is a point I do not quite admit. Until I know more definitely about the Dutch, I am not prepared to admit that we are behind.

10,546. I am asking a very simple question. Do you not think it regrettable that this country should be behind other nations in this respect?—As I say, the point depends on what one calls behind.

10,547. Suppose that they protect their workmen from the evils ensuing better than we do?—I quite favour any ordinary protection that is possible.

10,548. Let me put it in this way: If the evil exists as is shown by these figures—if the figures are correct—do not you think that we should do something to remedy it? Would you, as an employer of labour, think so?—I think you should.

10,549. Something must be done, either by regulating the work very closely or by restricting the use of lead?—Well, I certainly do not favour the restriction of the use of lead, but I quite favour such regulations as would minimise the possibility of danger.

10,550. Now no doubt you realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead?—I do not see how it is possible to apply the same

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precautions, because the conditions are perfectly different.

10,551. I did not say the same precautions. I said observe precautionary measures of the same kind—I mean with regard to protecting the workmen?—Certainly precautionary measures can be adopted in a factory that cannot possibly be adopted in other places where men are working.

10,552. Will you agree with this, that if the evils are as great as we think they are, precautions should be introduced to protect the workmen from those evils?—I quite admit that.

10,553. And if by any chance we find it impossible, owing to the kind of work in which men are employed, to introduce precautionary measures, then that we ought to abolish the use of lead?—If you find it impossible to have precautionary measures.

10,554. You would then agree that we ought to abolish the use of lead?—Yes, but I do not think that it is impossible.

10,555. I ask you whether you think, if we find it impossible to introduce precautionary measures, we ought to abolish the use of lead?—If that were so, but that is hypothetical.

10,556. I will put the question to you again, because I want a direct answer. If you find, as an employer of labour that it is impossible to introduce precautionary measures to protect the workmen, then I take it you would agree to the prohibition of lead?—Yes, I would.

10,557. Now, perhaps you are not aware of what the details of these precautionary measures would be?—No, I am not aware of that.

10,558. I will tell you. First of all, there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed. Would you agree to that?—So far as Scotland is concerned it is quite unnecessary. No painter works in Scotland without overalls, which are washed every week.

10,559. So there would be no difficulty in that rule?—I do not personally agree to the giving of overalls to the men where there is a fluctuating number. It would lead to constant friction and trouble.

10,560. Are you aware that in Germany one of the new rules is that the employers are obliged to find the overalls, and see that they are properly cleaned?—I was not aware of that.

10,561. The Home Office lay great stress on the importance of men wearing overalls and on their being properly cleaned?—In Scotland that is the present state of matters, and that largely accounts for the immunity we have, it seems to me.

10,562. You would not agree to the compulsory provision of overalls by the employer and his being responsible for seeing that they are regularly washed?—I think that it would lead to abuse.

10,563. In an industry where I recently deliberated on this question, the employers agreed to provide the overalls, and to see that they are properly washed?—What industry was that?

10,564. The Potteries?—That is where the difference comes in. Men work under one roof, and go in at one door and go out at one door, and a proper check can be kept, but with us it is impossible.

10,565. We, secondly, come to the provision of a meal-room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used?—That I think applies entirely to a place where men are working under a roof. With two men working in a house ten miles away, could you insist on an employer providing a meal-room for his men.

10,566. I think you will agree with me presently that the precautions would be absolutely unworkable, and then we shall come back to prohibition?—I believe in precautions.

10,567. But they must not be your precautions. They must be what we decide to be proper precautions. They must be precautions that without question protect the workmen. The Home Office have laid it down as a cardinal principle that under no circumstances are any workmen who are employed in handling lead or where lead is used to have their meals in that room?—One

could easily make a rule that the workmen were not to take meals in any room in which they were working. That could easily be arranged.

10,568. I understood you to say just now that it could not?—I beg your pardon. I thought you meant the provision of a special mess-room in a workshop for the taking of meals. One cannot carry a portable mess-room round to every job, but at the same time the rule could be made that men were not to take their meals in what they call the paint shop.

10,569. I suppose you agree that at the present moment a large number of men are obliged to have their meals in the room where they are working?—Not obliged.

10,570. But they do?—Sometimes; not often. Our men very rarely do.

10,571. You are very lucky in the kind of work you employ your men in, but it occurs in many cases?—I quite agree with a rule of that kind.

10,572. Third, the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing, and where they will not collect unnecessary dust when not being worn. Would you agree to making a provision of that sort?—It could be made on jobs of a sufficient size, but in any case a man's outdoor clothing is taken off.

10,573. But is it not very often the case that a workman takes off his coat and hangs it up in the room in which he is working, as I have seen done myself, and so that coat becomes contaminated with the lead dust, which naturally falls about the room?—No. He would hang up his coat in a place where lead dust is not present. May I say that the place where lead dust is is the place where the man is working. He is not working in the paint shop at all, and therefore there is no lead dust there.

10,574. But he mixes the paint in the paint shop?—Yes, but there is no lead dust in mixing white lead. We never use dry white lead. We always get our white lead made up in the form of a pulp.

10,575. I have been to some of these paint shops, and I have seen the paint scattered on the floors, drippings, and so on, and that produces dust. It is trampled under foot, it gets into the air, and men breathe it, and that is highly injurious to them; and it gets on to their clothes too. Now are you prepared to agree to a provision that under no circumstances are the men's clothes to be in such a room?—It is not very workable, but it is possible to work it. It is a question of regulation with the men.

10,576. It is not very workable, you think?—It is not.

10,577. Then, as I mentioned just now, there is the provision of cloak-room facilities, so that clothing put off during working hours shall not under any circumstances remain in a room where lead is used?—I do not see how that is possible in many cases.

10,578. You told us just now how important you consider proper washing accommodation. You mentioned that as a very important point, did you not?—Well, I mentioned that washing is a very important thing.

10,579. One basin or other utensil is insisted on in other lead industries to every five men?—May I ask, if one has 50 jobs and men working in 50 different places, how is it possible to arrange for washing? Still at the same time that does not mean that there are no facilities for washing. On the smallest job a man has an empty pail and water and soap and a cloth with which to dry himself.

10,580. It has been proved beyond question by the Home Office by past inquiries that it is absolutely essential that the men should have every opportunity of getting this dangerous material off their hands before they go to their meals; and the Home Office have laid it down as a strict rule that there should be one basin or other utensil to every five men with hot and cold water, soap, nail-brushes, and a sufficient specified number of clean towels. Do you think that that would be practicable in your industry?—I do not see how it could be done, but at the same time I think that quite ample facilities could be provided apart from that

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10,581. Mr. Sutherland and I went to see some men working in Manchester the other day. Every arrangement was made for them to wash their hands. There was one pail for about six men, and we were told that there was towel accommodation, but the towel had to be found. The men were wiping their hands on their pocket handkerchiefs. That is highly dangerous. Unless the men are certain to be provided with a proper number of towels and they are pretty handy for them, because they have only a certain amount of time in which to get their mid-day meal, and unless the soap and nail-brushes are provided for them, the chances are that they will not bother to use them at all, and so they are at once in a dangerous position. Now can you assure this Committee that it would be possible to provide washing accommodation such as I have suggested, hot and cold water, nail-brushes and towels?—It would not be possible to provide hot and cold water in every case, but every painter who knows his trade at all knows how to get rid of paint from his hands by putting on oil when he is washing his hands with soap, and unless a man is a very untradesmanlike tradesman he will wash his hands several times a day.

10,582. I quite agree, but some men are very careless. You know what men are?—It depends on the men.

10,583. What you have to provide for in this workaday world is for careless men. The State allows you to employ a very dangerous element in your work and says, "If you employ this very dangerous element you must protect the men"; and it is the careless men that you have to provide for. Do you feel absolutely sure that such washing accommodation could be provided for the men as I have suggested?—I do not see that washing accommodation of the kind you mention could be provided in every case, but it could be provided in many cases.

10,584. And in the cases where it could not be provided, the men would be running the risk of the dangers which the Home Office admit are very great?—But I do not admit that.

10,585. I did not say what you thought are very great, but what the Home Office thinks?—Well, I do not think with the Home Office.

10,586. Now let me take you to another point. Provision would have to be made for the avoidance of dust: some means would have to be devised for getting rid of any dust which the men might breathe. Do you think it is possible in every case, by means of an exhaust draught or the like, to remove the dust from the men while they are at work?—No, it is not. You could open the windows.

10,587. That would not do. The wind might be in the wrong direction and might blow the dust in amongst the men. You could not always arrange for a man to stand in a particular part of the room to catch the right kind of wind. Could you possibly devise anything with regard to internal work so that the dust that the men generate in the course of their work could be removed?—It would not be quite possible to do it in every case. Would that mean if they were working in a house of ten rooms an installation in everyone of those rooms?

10,588. Yes?—Working in 50 houses would mean 500.

10,589. I put to you these suggested regulations?—They are quite impossible.

10,590. Now with regard to the fumes in burning off and the spray which may be breathed in certain operations. What would you suggest as a remedy for that?—We can burn off without fumes at all.

10,591. Can you?—Yes, with chemicals.

10,592. I have seen burning off, and other employers have told me that it is impossible to burn off without fumes?—That is not the case.

10,593. I am not speaking of solutioning but of burning off?—The point is this: It is the removal of paint that is wanted. In many cases we do not burn off paint at all. We do it by other means.

10,594. May I ask you to deal with burning off first. Where burning off is in progress, are there any possible means of removing the vapours which arise from burning off, so that the men do not breathe

them?—I do not think so, and I was not aware that there was any particular danger from it.

10,595. It is regarded as a danger. You cannot suggest anything by which that can be remedied?—No, I do not see how it could be done.

10,596. Are you aware that the attention of this Committee has been called to the existence of poisonous emanations from liquid paint?—I was not aware of that.

10,597. That in the actual process of painting a wall, for instance, there are certain emanations in the shape of vapours which arise, and which are highly injurious to the people who are painting?—I have always understood that those emanations applied more to the vehicle with which the lead was mixed than to the paint itself.

10,598. Experiments have been made which show that certain vapours arise from the actual process of painting. How would you meet that danger?—If that is so, I do not see how it could be met at all; but I question it.

10,599. We have had evidence from one witness on the point, and we shall have others before the Inquiry is closed. Now, in addition to these precautions that I have suggested, the Home Office insists—and they would insist in your industry—on a periodical medical examination of the workpeople at the expense of the employer. Would you agree to that?—We would not object to it. I daresay that men would object in the first instance, but if it had to be done it would be done, I suppose.

10,600. In the pottery industry—and I suppose we should not go back on that—medical examination takes place once a month?—It would be a very difficult thing to get a certified examination of every painter once a month, when men are scattered over 100 miles and in inaccessible places.

10,601. The special rule would enact that in no case, unless it was through some illness of the man or the neglect of the certifying surgeon, would men be allowed to work at their occupation unless they had been medically examined. Would that interfere seriously with your trade?—It depends on what that means.

10,602. Well, it means this: that unless a man was ill or unless the medical officer was at fault, you would have to see that every man was examined once a month?—In the painting trade men are taken on and taken off as work may arise. If it means that one would require to send for a doctor every time he took on a new man, and have him medically examined, it would be absolutely impracticable.

10,603. I will not say that you would have to send for a doctor, but you would have to make some arrangements by which a man is certain to be examined?—Supposing a man works in three different places in a month, as many do, is every one of the three employers to get a doctor's certificate?

10,604. One certificate would do. Casual workers in the Potteries get a certificate if they are all right, and keep it in their pockets?—I do not see how it would be possible to have every painter examined once a month.

10,605. May we take it that you see great difficulties in carrying out that practice?—Certainly, very great difficulties.

10,606. You are sympathetically inclined, but you see practical difficulties?—That is what it comes to.

10,607. Then in the pottery industry, in addition to medical examination, the employers have agreed to give compensation to any worker who is withdrawn from work by the doctor's orders on account of doubtful health. Let me give you an illustration of what I mean. Supposing the doctor examines a workman and says, "Look here, you have not lead poisoning but you are very inert. I must suspend you for a month," the employers have agreed to give that man compensation for that month. Would you agree to give similar compensation under similar circumstances?—So long as I was satisfied that the doctor knew what he was doing; but if any man who was laid up with indigestion and cared to call a doctor in was to be off for three or four weeks, I would object to it very strongly.

10,608. Perhaps I did not make myself quite clear. What I mean is this: the doctor in the course of his round examines a man and says: By the look of his eyes, by the look of his gums, or by his wrists, which

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is a very signal sign of lead poisoning, the man is in such a condition that he has not lead poisoning, but the doctor thinks he may get it, and he suspends him for a week or a month, as the case may be, or for three months. The employers in the pottery industry in such cases as that have agreed to give the men half wages up to three months. Would you agree to that?—I would agree to that so long as the signs of lead were really definite.

10,609. That is not the point. The point is, if the certifying surgeon suspended the workman would you agree then to give him compensation?—I believe I might, but I see it is liable to very great abuse.

10,610. The employers in the pottery industry have agreed to that. Would you agree to a similar condition?—Under certain qualifications.

10,611. I cannot take any qualifications?—The qualifications that I speak about are these: a man comes to my shop and is taken on to-day. Next Monday the certifying surgeon says, "You require to be off." Am I to pay that man for three months if he is only three days working with me? That is what it comes to. You are dealing with employers, and the point is who is the employer in a case of that kind. I would be perfectly willing to pay, supposing a man, one of our own men working with us, was thought by the doctor to be in danger. I would pay compensation while that man was off, but I could not do it with a casual man.

10,612. You would have to take it for better or worse, I am afraid. It is the old story. If you employ a man for only a month, and the certifying surgeon suspends him because he thinks he may be liable to an attack of lead poisoning, you would be responsible?—In that case one would not employ a man at all without a medical certificate. That is what it comes to. It would be a very great hardship to the workmen as far as I can see.

10,613. At any rate, may we take it that you would agree to level up to the Potteries?—I would agree to do all that was reasonably possible.

10,614. I did not ask that; "reasonably possible" is a very vague term. I want to pin you, if I can, to the conditions which prevail now in the pottery industry?—But the conditions are not parallel at all.

10,615. Let me put it in a simple form to you: would you agree, if the certifying surgeon suspended any workman because he thought he might be in danger of contracting lead poisoning or plumbism, as it is called, to give that man compensation to the extent of three months at half wages?—So long as he had been three months with us.

10,616. Now, taking all these points into consideration, would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed, or, as an alternative, that the use of lead should be prohibited or very closely restricted?—I much prefer regulation.

10,617. I must ask you to be kind enough to remember what I have suggested to you would be the regulations. You have told us that in a great many cases it would be absolutely impracticable to carry out those regulations. I ask you again, would you agree to regulations such as I have foreshadowed, being perfectly certain that they must be carried out in every instance; or if they could not, would you agree to prohibition?—If you put it that way, I would rather agree to the regulations as you put them than have the prohibition.

10,618. Then I am afraid I must put it to you in this way: can you tell me how such a code of special rules as I have foreshadowed could be enforced? How, for example, would you remove the dust generated in dry rubbing down with sandpaper?—The point with me is that I do not know that it is altogether necessary to have dust in dry rubbing down with sandpaper. If paintwork is old, then it can be rubbed down with pumice stone and water.

10,619. In every instance? Would you agree that in no instances dry rubbing down should be permitted?—I would not say that, but I would explain. In the case of painting new work, the rubbing down with sandpaper can be done at a time when there is no

powder or dust that will come off; that is to say, while the paint is in such a condition that powder will not come off.

10,620. Would you agree that no work should be done, with regard to painting, that generated dust?—That is, white lead dust?

10,621. Yes?—There is dust of very many kinds in the painting trade, but I think I see your point. One could say that where dry rubbing down was required, it should only be in cases where the rubbing down is done while the paint is not in an absolutely hard gritty condition where rubbing down would generate powder or dust.

10,622. Would you agree that in the future in your painting industry there should be no work performed which generated lead dust?—That is a practical question which would require very careful thought, but I think it is possible from what you have put to me.

10,623. Do you think it is possible? Would you be surprised to hear that the English employers of labour have, all of them, with one or two exceptions only, said that it would be impossible to work free from dust. I have taken them through process after process. They have admitted that dust must be generated, and they cannot get rid of it, and in the end they have said, "We prefer prohibition to these rules; because they are impossible to carry out"?—If one were starting in an old room which had been painted for a number of years, and where the paint was hard, polishing might be done by another process.

10,624. What would you say in regard to new paint after the first coat?—After the first coat I hold that there is no powder or dust to any extent generated.

10,625. In rubbing down after the first coat—in glass-papering between coats—do you say that there is no dust?—No dust to speak of.

10,626. But that small quantity of dust, that you wish to minimise, the Home Office consider a very grave evil. We have had evidence from the greatest medical gentlemen in the country, and they state that almost the whole of the evil, in all the lead industries, is the dust generated in the course of the work, and this Committee must insist, or otherwise the matter will be referred back to us, that in future the men should be protected from beginning to end from any dust that is generated. If you say that it is absolutely impracticable to protect the men in that respect, I want you to tell me so frankly and candidly?—Personally I think our whole Scotch experience goes in the direction of the idea that the thesis that lead poisoning is due to the inhalation of dust is a fallacy.

10,627. But we cannot accept that against the medical evidence of the country?—But doctors differ.

10,628. But they do not differ in this case?—Might I say that we have had 50 years' experience in Scotland where lead dust has been generated, and in all those years there has not been a fatal case that can be pointed out. Is there not something wrong in the line of argument?

10,629. (Mr. Gardiner.) There are lead-poisoning cases in Scotland?—I spoke roughly just now; but what is the number of cases?

10,630. (Chairman.) You do not seriously suggest that there are no fatal cases of plumbism in Scotland, do you?—What I say is that, so far as one can gather from information got carefully in a variety of shops, we have not discovered one fatal case.

10,631. I am afraid that I am not much more forward than I was when I began, because you tell us that you prefer precautionary measures, and when I ask you how you are going to put those precautionary measures into practice, you suggest nothing to us?—No, but I say that in Scotland we have those precautionary measures, which have been effective to a very large extent.

10,632. I am afraid that I shall have to go over the whole of these operations from beginning to end, because I cannot take general remarks as evidence?—It is a wide question altogether.

10,633. You are the only witness I think we have had representing the employers who has not assured us that there is a great deal of dust generated in many of the operations of house-painting. You want

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to minimise that, and say that the dust generated is very slight, and that what dust is generated is innocuous. Now, I am afraid I must take you through all the processes. First, as regards dry rubbing down with sand-paper. I understand that this process is indispensable?—In certain cases.

10,634. Would you agree, as a master house-painter, to the prohibition of any sort of sand-papering?—I do not think I would.

10,635. Then I am quite right in saying that this process is indispensable in some cases?—I cannot see how it is possible to apply a wet rubbing down between coats, but rubbing down between coats is not injurious rubbing down.

10,636. That is your opinion. I do not suppose that a single member of the Committee would agree with you?—That may be.

10,637. Am I quite right in saying that this dry rubbing down is indispensable in some cases?—I think it is.

10,638. Now where dry rubbing down with sand-paper is indispensable, how can you prevent the lead worker from breathing lead dust?—They might use masks.

10,639. Do you think that your men would like to wear a mask?—I am certain that they would not, but if it was necessary they would have to.

10,640. Supposing that they refused to wear masks, what would you suggest as the alternative?—There is no real alternative.

10,641. Then supposing that the Home Office said, or this Committee said, that in their opinion the dust generated from dry rubbing down was highly dangerous, and that unless you could suggest some precaution to relieve the men from the evil arising from it, they would have to prohibit the use of lead, what would you say to that?—I would say that, if the Home Office laid down such a rule, we would require to adhere to it, but the quality of the painting would be very much poorer than it is now.

10,642. I do not think I need go further into the processes. I think you agree with me in this: that if, in the opinion of this Committee, the present conditions which prevail are highly injurious to the workpeople, we ought to insist on some remedy being introduced to relieve them from that evil?—I would say so certainly. We hold in Scotland that we have the regulations.

10,643. (*Lord Henry Bentinck.*) Does the number of your men that you have in your employment vary?—Considerably.

10,644. You take on, I suppose, in the busy season a great many more?—Yes.

10,645. Are you in close touch with the men that you take on? If they are off for illness do you examine into the cause of the illness, or what they are suffering from?—No. We are not in very close touch with them.

10,646. My point is that they might be suffering from some form of lead poisoning without you really knowing it?—They might be. There is quite that possibility.

10,647. Your men are insured, I suppose, by you?—Yes.

10,648. Do you pay lower premiums than the premiums that the English employers pay for house-painting work?—It depends on the company. We pay less than most of the English employers to the company we insure in. The companies' rates vary.

10,649. Do you get off cheaper than the English employer?—Yes.

10,650. You insure for less?—I think so.

10,651. Are you sure on that point?—Yes. As I say, companies vary. All the tariff companies have the same rate right over, but in Scotland the question of lead poisoning has never been raised by our insurance companies. No particular notice has been taken of it.

10,652. (*Chairman.*) How much less do you have to pay for the insurance of your house-painters than is paid in England?—I know that with many English companies 25s. and 30s. are being paid, and I know that in Scotland some pay 12s. 6d. I have heard of that.

10,653. What do you pay yourself?—Fifteen shillings, I think.

10,654. Do you pay 15s. for your house-painters?—Yes.

10,655. As against 25s. or 30s., with the English painter?—Yes. It is all a question of the company. It is difficult to arrive at the point you are at.

10,656. Do you get this low rate from a non-tariff company?—Ours is a non-tariff company.

10,657. (*Dr. Collie.*) Could you tell me how many men are permanently on your staff?—It is a little hard to say, but I would say about 40 to 50 are what we call our regular men.

10,658. A little less than half of your staff?—Pretty much. Our regular men are on practically all the year through.

10,659. How old is the oldest of those men?—I think about 65.

10,660. What is the average age of the 40 to 50 men?—I would say about 45 or so.

10,661. What would be the average age of working men on permanent employment?—I am really speaking father without knowledge. The men's ages I do not know.

10,662. I now want to know how you have studied the question of the freedom of the Scotch house-painter from illness. The first thing to study is the average age of the people you have in your own employment, in order to compare that with the average age of people in other similar employments. Of course, you are prepared to give us those data?—I was not aware that that was a question I should be asked, or I could easily have found it out.

10,663. You have given us a broad and very emphatic statement, so it is only fair to you to give you the opportunity of stating the facts on which that statement is based?—The facts are the absence of facts.

10,664. That is an unusual way of basing argument?—It is, but that is what I say. If one can say there is no illness, it is more emphatic than saying that there have been ten cases of illness.

10,665. But I want to know how far you have carried your investigations. The Chairman has already pointed out to you that there are other things besides absolute lead poisoning to which the influence of lead gives rise, and I want to know how far you have studied the question from that point of view?—My point is that there are other contributory causes affecting the mortality of the men apart from lead poisoning.

10,666. You have made a very emphatic statement, and I am bound to ask how you have come to the conclusion. I ask you first, What is the average age of the people you have in your employment? It is a simple point to ascertain. You have been giving evidence on this special point?—I am not prepared with definite data, as I say.

10,667. How much time has been lost by the various men in your employment, taking the 40 to 50 on your permanent staff?—Do you mean by illness?

10,668. Yes?—Some painters lose half the year, but not through illness.

10,669. I am asking about those of your permanent staff who are employed the whole year, as you have said?—I could not tell you of any quantity of time lost. It is the rarest thing to hear of a man being off work on account of illness—so rare that we have never thought of taking specific note of it.

10,670. But have you taken out any detail, because we have to study these points when we are considering the question of illness in occupations?—You mean how many hours a man has been off work through illness in ten years?

10,671. Yes?—I could not tell you that.

10,672. This is the bed-rock of the Inquiry into such a subject as this. Now you said that in Scotland in your opinion dust is not a cause of lead poisoning. Would you kindly quote your medical support for that?—I do not quote medical support, but I go back on the fact I have stated several times already.

10,673. But I want to know on what facts your statements are made. You surely will give us medical evidence to establish the point?—My point is this: I compare the number of deaths which are said to occur

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in England with the number that are said to occur in Scotland, and I say that until I know how far the English deaths are the deaths of men who are not house-painters in our Scotch sense, I would draw the conclusion that it is due to less cleanly habits on the part of the painters' labourers and plumbers.

10,674. We shall come to all these points. If you will only answer the questions as I ask them we shall get on much faster. I want the basis of your statement and the medical support that you have for making the statement that lead poisoning is not caused by dust?—I have no medical support.

10,675. Dr. Alexander Scott has given great attention to occupational diseases. He is a physician of your own city. Have you inquired of him?—No. I have never heard of him. There is no physician of that name mentioned in the Glasgow Post Office Directory.

10,676. Your statement is a lay statement without medical support?—Yes.

10,677. Are you aware that consumption is one of the diseases the influence of lead gives rise to, apart from absolute lead poisoning?—I was not aware of that.

10,678. The Registrar-General shows that to be so, in his figures for England and Wales of people employed in lead occupations?—I take it to be so.

10,679. How is it that we find amongst Scotch house-painters that deaths from phthisis are in considerable excess?—I was not aware of that. I have not known a man of ours with phthisis.

10,680. In answer to Question 4007, before this Committee, I said: "In the Scottish society the incidence of plumbism is decidedly lower, that of Bright's disease somewhat lower, but that of phthisis decidedly higher. The figures are very close to those given by the Registrar-General for plumbers, painters, and glaziers." You cannot explain that?—I can. I think it is due to other causes altogether.

10,681. Will you suggest a cause?—The painting trade being considered a "light job," the less robust members of families are often put into it; and also I would say irregularity of employment might contribute to it.

10,682. How is that?—If a man is irregularly employed, he has less means of nutrition, and his system will not have the same power of resistance.

10,683. I follow your point. What experience have you had of the use of non-lead paints?—We have used them to some extent.

10,684. To what extent?—Not very largely. Many years ago we used Charlton white for a time.

10,685. Not in recent years?—We use Duresco, if you call that a non-lead paint.

10,686. That is a water paint?—Apart from that we have not used non-lead paints to any great extent for many years.

10,687. So you have really no experience on that point?—We had experience 20 years ago.

10,688. But not recently?—Not quite recently.

10,689. You have had no experience of modern non-lead paints?—No great experience of them.

10,690. You are unable to say whether they are as efficacious for your work as the paint you at present are using, or not?—We discarded them very largely because they were not as efficacious.

10,691. That is many years ago?—We have used them in the last four or five years.

10,692. I thought you said twenty years ago?—We used them at that time to a considerable extent, and discarded them. Since then we have not used them so much as before, because we have found them not so efficacious.

10,693. You have not made recent experiments?—Not recently.

10,694. You have no experience of how far they might or might not be valuable in replacing lead paints?—No.

10,695. You have said that you would rather have regulations, if something is to be done, than any form of prohibition or limitation?—Yes.

10,696. Can you suggest to me how regulations can be enforced in the house-painting trade? It is no use

passing a law if you do not look after it?—Masters require to lay down stringent rules and see them enforced.

10,697. We have found in the past that getting masters and occupiers to lay down stringent rules in factory work does not get them enforced. We have in the Factory Department, you know, Factory Inspectors?—Yes.

10,698. Perhaps you are outside their influence. Do you suggest that such Factory Inspectors should be appointed to look after the house-painting trade?—I do not see how it could possibly work. It is not practicable.

10,699. So that even if means, by regulation, could be devised for removing the dust, and for everything else, you do not consider that there is any practical means that could be adopted for enforcing them. First you do not think that they are possible, and if they are possible you do not think they could be enforced. That, I gather, seems to be the position?—Not altogether. There are regulations that are possible.

10,700. (Chairman.) The main regulations that I suggested to you, you said were impossible to carry out?—Some of them are.

10,701. (Dr. Collis.) Even those that you think could be carried out, you do not think could be enforced?—I see a difficulty in enforcing some of them. A Factory Inspector going to a factory would see that each rule is carried out. A similar inspector employed in the painting trade would have to go round to every job that the men were on. It might help to keep the men up to the mark.

10,702. Do you think it possible to carry out inspection in private houses?—That is one of the difficulties.

10,703. How much do you think such an inspection is likely to cost the nation?—I have no idea.

10,704. You cannot say whether it would probably cost the public a great deal more than any deterioration which there might be in employing paints which do not contain lead?—I am not in a position to answer that question.

10,705. If it was found that the cost was in excess of what the public might have to pay, due to the fact that non-lead paint is not quite as good as lead paint, what would you say?—If you put it in that way, there is no question that the cost to the public would be very much greater if they discarded lead.

10,706. People differ considerably on that point, and your experience on this matter does not seem to be recent. Are you aware of the fact that the Office of Works have, for the last four years, discarded all paints containing lead?—I say that four years is not a long enough period.

10,707. How long would you say?—Ten years.

10,708. You think that during ten years we ought to do nothing?—Not necessarily.

10,709. How long do you think we ought to stand still, and experiment?—I say that four years is not sufficient to justify making a change.

10,710. Do you think that during the ten years we should do nothing?—I do not say "do nothing."

10,711. What do you suggest we should do?—I suggest regulations of some kind. I would not discard white lead.

10,712. What form should the regulations take?—Something on the lines laid down, as far as they are practicable.

10,713. You have not admitted that any of them are practicable, or that those that are practicable can be carried out?—In Scotland we are at present carrying out a system of regulations which has so far proved considerably effective. I cannot accept the figures quoted here as being applicable to the house-painting trade at all, and therefore we are looking at it from two different points of view altogether.

10,714. Are you aware that cases of lead poisoning which occur among house-painters and plumbers do not have to be notified to the Home Office?—Yes.

10,715. In factories and workshops they have to be notified. You are aware of that?—Yes, I suppose they are.



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10,716. I daresay you know that the Scotch people are quicker perhaps than the English in taking up a point of law?—So they say.

10,717. That may account for the fact that we have received a certain number of voluntary notifications from people who have apparently mistaken the law, and think it safest to send in every case of lead poisoning to us, to be on the right side?—Yes.

10,718. Scotch people being quicker perhaps to notice the law do not send us as many. In 10 years we have had close on 2,000 (1,973 exactly) of these voluntary notifications with regard to which there is no compulsion whatever. In 1910 there were 232, of whom 197 were house-painters and 35 were plumbers. There were 5½ times as many house-painters as plumbers, and the witness who gave us that evidence said "This is about the relation of house-painters to plumbers which usually exists?"—My point is that we have no painters' labourers in Scotland at all.

10,719. We have to protect the labourer?—The large percentage is due to men who have no training as painters, and do not know what means to take to avoid risk.

(Chairman.) That is only a statement.

10,720. (Dr. Collis.) We have had 12 cases notified voluntarily from Glasgow in the last five years, but you have not been able to ascertain any cases, you tell us?—We asked and we found no case of death resulting from lead poisoning.

(Dr. Collis.) These are cases of illness that I am putting to you now. Information with regard to Scotland has not been asked for until recent years.

10,721. (Mr. Parsonage.) You ascribe the number of lead poisoning cases in England to painters' labourers. You make out that that is the difference with regard to the conditions?—I give that as one possible explanation.

10,722. Have you any knowledge of the extent to which painters' labourers are employed to do painting in England?—No, but I know that they do a lot of preparatory work.

10,723. That would be rubbing down, I take it?—Yes.

10,724. But your own statement is that there is no danger from the rubbing down?—No, I did not say that. I said that there was no danger in the particular kind of rubbing down that I spoke of.

10,725. What rubbing down is there where labourers are liable to a risk that painters are not?—If one sand-papers a door instead of using pumice stone, there is risk.

10,726. Do labourers in England sand-paper doors at all before they are painted? Have you ever seen them on old paint?—I have not seen them.

10,727. What knowledge have you to go on? You make an assertion, but I want to know on what you base that assertion?—I base the assertion on the fact that painters' labourers are employed in conjunction with painters, and those are very likely men who are not men of the same habits as painters.

10,728. You have no knowledge of the class of work that these labourers do? You would not expect a labourer to get lead poisoning if he was put to wash off a ceiling or strip paper off walls? Have you any knowledge that labourers in England do painters' work?—I have no definite knowledge.

10,729. You have no knowledge whatever that they do painters' work?—I have been told that they do painters' work. I have been told that they assist painters.

10,730. (Chairman.) What you have been told cannot be taken as evidence. We want to know your own experience?—If it comes to that, I never have worked in England.

10,731. It is not quite fair to come down from Scotland and tell us that lead poisoning is caused by the employment of labourers unless you can support your statement?—I had no other means of accounting for the figures.

10,732. (Mr. Parsonage.) You have no reason, but you are trying to give a reason. You have no facts on which to base your assumption, but you try to find

something? The facts are that the conditions in Scotland are not those in England.

10,733. Take Manchester. There is a standing agreement, which is strictly observed, and Mr. Sutherland will bear me out, that no labourer in Manchester is allowed to do any preparatory work of any description. He is not allowed to wash a ceiling or strip wallpaper or anything. A painter's labourer in connection with painting in Manchester is unknown, but there have been five verdicts of death from lead poisoning during the present year. One of these cases is a master painter. A labourer is not even allowed to handle a distemper brush in Manchester. That is an agreement between the master painters and the operatives?—What does the labourer do?

10,734. He assists with the scaffolding and prepares the men's meals, and so on?—Does he not touch paint at all?

10,735. He is allowed to do lime-washing. That is all that he is allowed to do. It is in a printed agreement. He does not touch paint?—Who keeps the shop? Who looks after the material?

10,736. He may sweep up?—That is my point. Then he is doing the very thing where he is most apt to meet danger according to you.

10,737. You have yourself said that there is no dust in the paint shop?—I have held all through that there are other things than dust which may induce lead poisoning; and this applies in a special degree to a man working in the paint shop.

10,738. Is it not ridiculous? Say one labourer on a job and 20 painters are employed; he sweeps up. Do you say that he contracts lead poisoning from that?—That is not my point. I do not personally think (I know I am against the medical evidence altogether) that lead poisoning is due to inhalation of the lead dust so much as it is due to dirty habits in regard to the fingers and finger nails, and a man working in a paint shop lading out paint or making it up or helping with paint, if he is not a careful man, will get his hands smeared with paint and may get lead poisoning.

10,739. You would attribute the death of the master painter in Manchester to dirty habits?—It may be. I have known dirty master painters. You put the question, and I must give the answer.

10,740. How do you account for some painters from Scotland going to London and getting lead poisoning? They use the same material?—The difference comes from the diet to some extent, and habits.

10,741. What do they live on different in Scotland from England?—They live on porridge in Scotland sometimes, and broth.

10,742. Would you suggest that one of the regulations should be that painters must eat porridge for breakfast?—I would, very gladly.

10,743. You would seriously suggest that?—Honestly, I would. A man comes down from Scotland, where he has been living on a particular kind of diet and drinking a particular kind of water. He comes to London, changes his whole method of diet, and drinks different water. His whole organism becomes upset, and he is more liable to any illness.

10,744. The rules in my society say that a man to join must have served five years at the trade before he is 21. We get applications to break that rule, and they are always refused. I do not say that a few do not get in who violate the rule. We have always any number of lead poisoning cases on hand. We have paid out no less than 4,800*l.* odd in 52 cases of paralysis from lead poisoning in six years. We only pay for paralysis. I could bring you a sheaf of doctor's certificates now, describing men as suffering from Bright's disease and other diseases. They have to be rejected. If we recognised them we could not meet the claims that come in. Our society is a painters' society with no labourers or plumbers. If we take in a man who has served his apprenticeship as a plumber and painter he has to give up the plumbing?—All I can say is that your experience is very different from Scotland, whatever the cause of it.

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10,745. You will not admit that there are any deaths from lead poisoning in Scotland?—I say that as a matter of fact we have no record of one in fifty years.

10,746. You have not, personally?—No, and we have inquired from the biggest employers in Scotland, men who have been in the trade for over fifty years, and not one of them can recall a case.

10,747. How much time do the men that you employ permanently lose in the winter?—Very little.

10,748. Do not they trouble to look for work in another shop?—We have an average of 40 men who are practically employed the year through.

10,749. That is a very different thing. You may have 10 in the winter and 80 in the summer?—No. The winter and summer staffs are different things. I was trying to give as nearly as possible the number of men regularly employed.

10,750. (Chairman.) I thought you said that the average number was 140?—No! 110, of whom about 40 may be called permanent "staff." We do not pay off certain men if we can avoid it. We call them our staff. We may have to suspend them for an odd week or so.

10,751. Sometimes it is two or three hundred?—It comes up to 200 sometimes.

10,752. (Mr. Parsonage.) What regulations do you carry out with regard to cleanliness in your shops? You speak of regulation?—The only regulation is that we insist on the men being clean and wearing clean overalls.

10,753. Every witness from the employers has stated that he insists on the workman bringing clean overalls on a Monday morning?—It is quite possible.

10,754. But you would not term that a regulation to prevent lead poisoning?—The wearing of overalls is a very important point.

10,755. Do you provide nail brushes?—Not nail brushes.

10,756. Do you provide towels?—Yes, sometimes.

10,757. And soap?—Yes, and there is always something besides towels that men can use.

10,758. What is that?—Scrim cloth.

10,759. And stuff that they strain the distemper through, and all that; in fact, anything that is on the job in that way. That is precisely the same as they do in England. You have no regulation that I can see that is not followed out here?—All I can say is that the result is very different.

10,760. (Mr. Gardner.) In speaking of rubbing down paint between coats, you said that paint could be rubbed down with sand-paper, so that there would be no dust?—Yes.

10,761. How could that be done?—By putting a little oil on the back of the sand-paper or wetting the sand-paper.

10,762. Is that generally done?—It is not generally done, but it can be done.

10,763. It can be done?—It is done.

(Mr. Gardner.) I have never experienced it.

(Mr. Parsonage.) I have never known it.

10,764. (Mr. Gardner.) With regard to your experience since the present Workmen's Compensation Act came into operation, so far as your association goes, no men have claimed for lead poisoning under that Act?—I have not heard of a single case.

10,765. I believe that you would be very astonished to learn that within the last eight years we have paid two death claims for lead poisoning in Scotland?—I am astonished.

10,766. And that we have quite a number of sick cases due to lead poisoning—Bright's disease and phthisis—due to lead as the primary cause?—I am not aware of it. It has not come before our association.

10,767. One member of your association, two years ago, had a claim for a death from plumbism. Are you aware of that?—I would like his name.

10,768. In Glasgow—Bryson. It was proved that plumbism was not the cause of death, although the man was suffering from it. The case was not reported to you?—No, there is no occasion to report.

10,769. There are quite a number of cases which have not come under your notice. Do you think medical examination of workmen at all practicable?—

A monthly examination is quite impracticable. I do not see how it could possibly be done with any assurance of success. If the onus were put on the operatives, so that they would require to produce their medical certificate when applying for work, it might be practicable.

10,770. (Mr. Sutherland.) You are very solicitous for the men in your shop. You have a character for that?—We try to be.

10,771. And your class of work is good general high-class work. Now do you think that in relation to that class of work it would be possible to dispense with dry rubbing down, which the Home Office authorities locate as the serious source of the evil. Do you think that it would be possible to submit to a regulation abolishing dry rubbing down?—It certainly would be irksome, I admit, but it is possible.

10,772. It would be irksome, but could the trade meet it in some way that would preserve the use of lead and still preserve the quality of the painting which follows from the use of lead?—I think they could.

10,773. Do you think that it would be worth trying?—It would be worth trying.

10,774. Do you think that that regulation would meet with opposition? If it was a question of the abolition of lead, or submission to regulation, and that was one of the regulations, do you think it would meet with opposition from the employers?—In the first instance it would, as any deviation from the accepted course meets with opposition.

10,775. I know that, but assuming that it became law, do you think that the employer would fall in with it, and see that it was enforced?—Decidedly, I would say so.

10,776. Now, with regard to dry rubbing down: in a great many cases the sand-paper is used merely to take the fine ribs off the surface of the paint. Is not that so?—Yes.

10,777. And not to cut the surface of the paint?—No.

10,778. So that in those cases, which form the great proportion of the process, the dust from dry rubbing down would be very small?—That is exactly my opinion.

10,779. The serious cases of dust from dry rubbing down would arise when you were cutting down sharp colour?—Yes.

10,780. But that does not form a great proportion of the painting work?—No.

10,781. Relatively a very small proportion?—A very small proportion.

10,782. Now with reference to insurance, the tariff rate (for this purpose we can only take the tariff rate) is the same in Scotland under the new Act as it is in England, 30s. less whatever rebate there may be?—It is quite possible.

10,783. Under the old rate, when lead poisoning was not included, the tariff rate was higher in Scotland than it was in England?—That may be. I am not in a position to say.

10,784. That points to the fact that lead poisoning in Scotland is not as serious as it is in England, because lead poisoning in England has sensibly affected the tariff rates?—I see.

10,785. (Chairman.) You only gave us a non-tariff office?—Yes. May I say that we have tariff companies in Scotland, and I think that you can get a fair basis of comparison.

10,786. Have not they made arrangements with the tariff companies in England for a uniform rate?—I do not know.

10,787. (Mr. Sutherland.) It is the common practice, is it not, for the men to have overalls, and for the men to provide them?—Yes.

10,788. It is the same in England in most shops. It is not necessary for us to insist on that, because the master already insists on it?—I would not employ men who had not overalls.

10,789. With regard to provision of meal rooms, did I understand you to say that it was impossible to get a separate meal room on a job?—No, I did not say that. What I did say was this: I thought that the Chairman meant that we should fit up a special meal room. You could easily arrange to have meals in a different room.

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10,790. You agree that it is necessary?—Yes.

10,791. And also a separate room to hang the clothes, quite apart from the room where the work is being carried on?—Yes.

10,792. (*Chairman.*) I want to know in what way you could provide a room for meals in some cases?—The point is this: If the rule were made that a separate room must be found for meals, we would see that it was done. We would get another apartment. There has been no regulation ever made as to where a man took his meals. He might take them in the room where he was working; he might take them in the paintshop; or he might take them in another room. If it were thought for the health of the men advisable that the rule should be made that the men should not take meals in the work room, that could be observed.

10,793. Supposing that they are only painting one room?—That is the point.

10,794. (*Mr. Sutherland.*) If it was part of the regulations that they should have separate meal rooms, could they be provided?—I would say a separate place to take their meals. I do not like the term "separate meal room."

10,795. Could they be provided?—Yes.

10,796. (*Chairman.*) Could they be provided in almost every case?—Yes, I think so.

10,797. (*Mr. Sutherland.*) Could the provision with regard to separate rooms for hanging the clothes be enforced, if it was the rule? Do you think that customers would offer any objection, knowing what the law was, and the danger arising from the old practice?—If that were the law we should have to inform our customers and make arrangements.

10,798. You think that it could be done?—Yes. It is a question of adjusting ourselves to the new conditions.

10,799. (*Chairman.*) How could the rule with regard to meal rooms be enforced? How is the Home Office to know that the men are being protected in respect of those two points?—As a matter of fact, men generally get their meals in the kitchen of the house they are working in.

(*Chairman.*) It is not practicable in many cases. They would be laughed at if they wanted to go into the kitchen for such a purpose.

10,800. (*Mr. Sutherland.*) At most jobs there is provision for washing in the shape of buckets of water?—There always is.

10,801. Speaking generally, there is no difficulty in getting hot water?—Speaking generally; but in a new house, where water is not laid on, it is difficult.

10,802. But they can heat water?—Yes.

The witness withdrew.

Mr. G. CARFRAE examined.

10,803. (*Chairman.*) Do you attend here to-day as a representative of the Association of Master House Painters in Scotland?—Yes.

10,804. What is the nature of your business and where is it carried on?—House-painter in Edinburgh.

10,805. What is the average yearly number of painters employed by your firm?—About 100.

10,806. How long have you been in the painting trade?—Personally, 29 years.

10,807. Have you known any cases of lead poisoning or painter's colic?—None at first hand.

10,808. Have your men had occasional days of sickness possibly due to lead?—No case in all our experience that I can find out by asking old men.

10,809. Do you have a periodical medical examination of your men?—No.

10,810. If you have no such examination by a doctor, is it not possible that some of the men may be suffering from the slower and more insidious forms of lead poisoning?—It is possible.

10,811. You know, I presume, that lead poisoning frequently undermines the health without immediate violent symptoms arising?—Yes.

10,812. The incidence of lead poisoning is published month by month by the Board of Trade. Do you see the "Labour Gazette" published by them?—No.

10,813. Do you know that there were 284 deaths of painters, definitely certified as due to lead poisoning, in the last ten years?—No, I do not know that.

10,814. And that there is a definite increase in the death rate from lead poisoning amongst painters during the last six months?—It is the first I have heard of it.

10,815. These are English statistics. Scottish statistics have not been collected in past years, but with the same processes and the same materials, the risk must be the same?—Yes, if the processes are the same.

10,816. In addition to this, the death rates from Bright's disease and nervous diseases due to work in lead are very high?—I hear that for the first time.

10,817. There are also a very large number of non-fatal cases, most of which are never recorded, as they are not required to be notified to the Home Office?—That is also new information to me.

10,818. I am sure you will agree with me that if these figures are correct, all this sickness and death is very deplorable?—Certainly.

10,819. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I do know that.

10,820. That the use of white lead has been prohibited to an appreciable extent abroad?—I know that.

10,821. And that the work of painting has been most strictly regulated in many countries where the use of white lead is still allowed. Do you know that?—I know that.

10,822. Do you not think it regrettable that this country should be behind other nations in this respect?—Decidedly.

10,823. Something must be done, either by regulating the work very closely or by restricting the use of lead?—Yes, where necessary. I may say that it seems to be more in England that the cases occur, than in Scotland.

10,824. But I have asked you the question, which you have answered, that, given that the materials are the same, and the processes are the same, there cannot be any difference in the two countries?—Well, Sir, I do not know whether I am in order in bringing it in at this point, but I think that the processes are different in England.

10,825. Perhaps you would kindly tell us in what way the processes are different in Scotland from England?—They use more oils in Scotland. In England, particularly in London, they use a very much smaller proportion of oil. They bring up their paint to what we call flat, turpentine being the principal medium for thinning it. It dries quickly and they rub it down, and they can get two and sometimes three coats on in one day. A process of that kind is almost unheard of in Scotland. Of course when there is very little oil, the rubbing down causes a dust that flies about. I have spoken to some of our men who have worked in London and know the conditions of labour there.

10,826. Do you think that the difference of putting more oil in the paint makes the men immune from the dangers of lead poisoning in Scotland?—Well, it prevents the lead floating about in the atmosphere to some extent.

10,827. You do admit that a certain amount of dust is generated in the process of painting?—Very little.

10,828. But there is some?—There is some.

10,829. Do you admit that the dust is highly injurious to the workmen?—Yes, if inhaled.

10,830. It is only a question of the quantity with you. You think that in Scotland there is less dust about than there is in England?—Yes, a great deal less.

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in Scotland, because with so much oil it does not float about so much in powder.

10,831. You no doubt realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead?—Does that apply to North and South Britain—all over the country?

10,832. Yes. The potteries of Glasgow and outlying districts are in effect precisely the same restrictions with regard to the use of lead as are the potteries in North Staffordshire; similarly, any regulations issued to the painting industry would apply equally to Scotland as they would to England?—I follow.

10,833. Are you aware of what the details of these precautionary measure would be?—To some extent, I have a certain number sent to me by a white lead works; that is all.

10,834. First of all there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed. Would you agree to that provision?—I would rather the onus were put on the men.

10,835. But that has not been done in other industries. The reasoning is this: if a dangerous element is allowed to be used in any particular industry, the employers must see that any dangers to the men which ensue in the course of the occupation are removed. Would you agree to any rule which the Home Office enacted, by which the employers should provide the overalls for the men and see that they are properly washed?—Decidedly, if it is made a regulation.

10,836. Secondly, comes the provision of a meal-room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used. Would you agree to such a provision?—It would be extremely difficult to carry it out.

10,837. Again, in the pottery industry it is laid down that under no circumstances are the men to be allowed to take their meals in any place where lead is used?—I can understand that in a factory, but where you are sending men all over the country it is different.

10,838. I quite see the great difference, but I am only telling you what sort of regulations the Home Office would insist upon if lead is to be permitted to be used in the future. I want your kind assistance with regard to whether it would be practicable to introduce these various rules. The third is the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing, and where they will not collect unnecessary dust when not being worn. Would you agree to making a provision of that sort?—I agree with that.

10,839. Do you think that it is possible to do that?—I think it is possible. It is a little difficult, but it can be done.

10,840. The next is the provision of cloakroom facilities, so that clothing put off during working hours shall not, under any circumstances, remain in a room where lead is used.—It is practically impossible to carry that out.

10,841. You see, do you not, the danger which arises at once? Again, taking the pottery industry, no workman is allowed to have his outdoor clothes in the room where lead is used, because it collects on his clothes and he takes it home?—It is practically impossible to prevent that in the house-painting trade.

10,842. Now comes the introduction of proper washing accommodation—one basin or other utensil to every five men, the supply of hot and cold water, and soap and nail-brushes, and a sufficient number of clean towels?—If you leave out the hot water the rest can be managed, but you cannot always depend on getting hot water on jobs.

10,843. Would you agree that hot water is very much better to wash paint off the hands than cold?—It is not always necessary, if you use soap.

10,844. Take a cold winter morning, would not you prefer hot water?—Yes.

10,845. And so would the workmen?—Yes, if they can get it.

10,846. Provision would have to be made for the avoidance of dust?—Yes.

10,847. Some means would have to be devised for getting rid of any dust which the men might breathe?—Yes.

10,848. Would that be practicable? Let me give you an illustration. Is it practicable to provide means for removing the dust in sand-papery?—No.

10,849. You say that it is not practicable to avoid the dust in sand-papery?—No, it is not practicable to avoid the dust.

10,850. Now, with regard to the fumes from burning off and the spray which may be breathed in certain operations?—Are these supposed to be dangerous?

10,851. Yes?—You cannot avoid them I am afraid.

10,852. Are you aware that the Committee's attention has been called to the existence of poisonous emanations from liquid paint? Have you heard of that? As the paint is put on the surface, the vapours that arise from that are highly dangerous. Have you heard of that?—I can understand that they are, in a confined area.

10,853. Have you anything to suggest to us with regard to how men can be protected from those vapours?—It is principally where turpentine is used as the medium for thinning the paint. In a confined area I have experienced myself that it makes you slightly dizzy.

10,854. Have you anything to suggest to us as a means of removing that evil?—No, you cannot remove it, but I would not keep a man very long at it. I would have him relieved.

10,855. In addition, periodical medical examination of the workpeople, say once a month, would be insisted on at the expense of the employer. Would you agree to that?—It is adding another burden, and all these things only make painting work more expensive. That is the only thing against it.

10,856. The tendency of the present day is that the democracy are going to have fair play?—They will not have quite as much work.

10,857. That is a question which we are not here to inquire into, but what we are here to inquire into is the mitigation of the evils which unquestionably arise in this industry. Do you think that it would be practicable to have a monthly medical examination?—Quite practicable.

10,858. And that the employer should bear the brunt of it?—Yes, just in the same way as he has to pay insurance at the present moment.

10,859. Together with the payment of compensation to any worker withdrawn from work by the certifying surgeon's orders on account of doubtful health?—Yes. It is all practicable. The only objection is the question of expense.

10,860. Would you have any objection to the expense?—None whatever. It will affect everyone in the same way if it is made the law.

10,861. Taking all these points into consideration, would you say that you would prefer that the industry should be regulated by a special code of rules or that the use of lead should be very closely restricted?—If it lies between the two, I would certainly say that lead should be continued under a special code of rules rather than that it should be prohibited.

10,862. But you understand that this Committee have to report to the Home Secretary. Can we tell him that we are satisfied that a special code of rules would meet the evil? You have told us that in one or two instances rules which might be considered imperative are impracticable. Now what would you suggest we should do under those circumstances?—So far as Scotland is concerned, I do not see that any rules are necessary, but if they are necessary for one part of the kingdom and will be applied to the whole of the kingdom, then I should say, make up your code of rules and see that they are adhered to as far as possible.

10,863. But that would not be sufficient. We have to put it to the Home Secretary that a certain list of rules is first of all practicable; secondly, that they could certainly be carried out; and thirdly, that they would remove the evils which the Committee think exist. Now what sort of recommendation are we to

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make with regard to the removal of dust which is generated in the process of sand-papering, and which all the medical evidence goes to show is one of the greatest of all the evils?—I say that you could make it a stringent rule that painters use more oil and other binding materials than they do in London now.

10,864. You have admitted that that would not entirely remove the dust?—Not entirely, but it evidently would mitigate the evil of lead poisoning.

10,865. But it does not remove it, and we have to remove the evil. It is no good our going to Parliament with a half-hearted measure. We are sitting here to present something to the Home Secretary for him to present to Parliament. The tendency of the people irrespective of party, is that they are going to see now that, if there is a real evil existing in any particular industry, that evil is going to be removed. All the best medical evidence of the country points to the profound evil of lead dust, and unless we can suggest its entire removal another Committee will be appointed to settle the question. Now I ask you as a practical man, what are we to do on the question of removing dust generated in the process of sand-papering and other operations?—I am afraid that it is beyond my power to answer that.

10,866. (Mr. Gardner.) Have you had experience of non-poisonous paints?—Yes, some.

10,867. Has it been extensive?—No, not very extensive.

10,868. Has that been of late years or some time ago?—Within the last ten years, I should say.

10,869. Right along?—Not continuously.

10,870. Have you found them satisfactory?—No.

10,871. What non-poisonous paints have you used?—Only zinc.

10,872. Has not that been satisfactory?—No.

10,873. (Mr. Sutherland.) Was it zinc oxide?—Yes. I have not found it satisfactory.

10,874. (Mr. Gardner.) Did you treat it as zinc or purely as a lead paint? Did you treat it as a medium that you had to give some special attention to, or was it used in the ordinary manner?—It was used in the ordinary manner for the sake of getting extra whiteness.

10,875. No special treatment?—No special treatment.

10,876. Do you think that medical examination of the workmen would be practicable?—I think that it is practicable.

10,877. If you send your men to a country job, as you do repeatedly, how are you going to get them examined every month. Would you send the doctor away after them to see how they were getting on?—In these out-of-the-way places, they would require to be examined by a doctor in the vicinity. As for the ordinary country job, the man as a rule comes home for the week end every second week, and if it is not very far away, every week.

10,878. How near at hand?—From jobs 60 to 80 miles away.

10,879. Do you think that it would be quite practicable to have them examined every month?—Yes.

10,880. What about the men who come floating in and floating out of the shop, starting at the beginning of the season and going on for a month or so and then going off? What would you do in those cases?—That is a matter of detail. Unless a man could show that he had passed the doctor he would not be taken on. He would have to carry his certificate with him.

10,881. Do not you think that it would be a very expensive procedure for the employers?—Yes, undoubtedly the whole thing is expensive.

10,882. You have no knowledge first hand of any cases of white lead poisoning?—None whatever.

10,883. I suppose you are aware that there have been deaths in Scotland from white lead poisoning?—I have heard that such a thing has occurred.

10,884. And that there are cases of illness?—I have only knowledge of one case at second hand, within the last 60 years, of illness.

(Mr. Gardner.) I am sorry to say that we have too many cases of sickness due to lead poisoning.

10,885. (Chairman.) You told me that you have no knowledge of the number of deaths in England?—No.

10,886. You have no knowledge with regard to any part of the country?—No.

10,887. (Mr. Parsonage.) You think that if more oil were used in London, that would cause less danger?—Decidedly.

10,888. Do you know why more oil is not used in London?—It is not speedy enough for getting two and sometimes three coats on in one day.

10,889. Have you had any experience of getting two or three coats on in one day in London?—Not at first hand. This is from men of my own who have worked in London, and have known cases of illness amongst their friends working with London decorators, and they have attributed it to that.

10,890. Two or three coats in one day?—Two or three coats in one day.

10,891. (Chairman.) What you hear from someone else is not evidence?—I cannot speak first hand.

10,892. (Mr. Parsonage.) Do you not think that the reason for using so much turpentine in London is on account of the atmosphere, and that if they used oil paint it would not dry?—No.

10,893. I can assure you that that is the reason. What would be the average number of painters that you would employ?—I think, taking all the year round, about 100.

10,894. What proportion of labourers do you employ?—Not above 2 per cent.

10,895. Not above two labourers to 100 painters?—No, not above two labourers to 100 painters.

10,896. Do those labourers do anything with regard to painting?—They may limewash a cellar occasionally, but they are generally just taking materials about.

10,897. They would sweep up the paint shop on the job and do that kind of thing?—No.

10,898. Have you used zinc paints on outside work?—Once.

10,899. Did you find it answer?—No, it was a failure.

10,900. (Mr. Sutherland.) Do you know any reason why oil paint should not dry in London?—None whatever.

10,901. Oil paint is used extensively in Lancashire, which is very humid, and has a less dry atmosphere than London?—I have used oil paint in London.

10,902. Do you think that it would be possible to dispense with dry rubbing down?—It would be possible.

10,903. Would it be a little more expensive?—Much more expensive.

10,904. Why do you like white lead? If the Home Office really enforce regulations or prohibition, and if the principal source of the evil of lead poisoning is due to dry rubbing down, do you think that painters would meet the case by some treatment that would give good work?—They would have to. It is possible, as I say, but much more expensive.

10,905. Why, as a master painter, do you prefer white lead?—Because it lasts longer, and it is more durable. It stands more washing.

10,906. And does not lead admit of better workmanship? You can brush out white lead to a fine surface, but zinc you have to lay on thicker?—I do not altogether agree with that. With zinc you require more coats.

10,907. Yes, you require more coats if you are going to brush it out thin, but even then you do not get the body, do you?—Not with the same number of coats.

10,908. No. As a matter of fact white lead lends itself better than does zinc to workmanship, does it not, of which Scotch painters are proud, like a good many English painters?—Yes.

10,909. And that will probably account for their preference for white lead?—I cannot say that it does.

10,910. What would you ascribe the preference for white lead to?—It is more economical to begin with, which appeals to the Scotsman. It lasts longer and you get a better job with less labour.

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(Mr. Gardner.) Due to long knowledge of the material.

10,911. (Chairman.) If the use of lead were prohibited, in what way would it affect the painting industry?—It would make it more expensive, and there would be less of it done. That is all.

10,912. Do I understand you to say that the carrying out of these new rules would be very expensive?—Yes.

The witness withdrew.

Mr. W. F. DOBIE examined.

10,915. (Chairman.) Do you attend to-day as a representative of the Association of Master House Painters in Scotland?—Yes.

10,916. What is the nature of your business and where is it carried on?—In Edinburgh; house painter and decorator. That is how we speak of house painters in Scotland. That is nothing in the way of cabinet maker or upholsterer or anything of the kind.

10,917. What is the average yearly number of painters employed by your firm?—It varies from 100 to 150. About 100 on the average.

10,918. How long have you been in the painting trade?—From 40 to 45 years—about 43 years.

10,919. Have you known any cases of lead poisoning or painters' colic?—I have never heard of any fatal cases. I have been making careful enquiry lately from my foremen to find what information I could, and we have heard of three cases. One man was laid up for a week or two, and two others for a few days, and on enquiry I have discovered that these men were at a country job, where their diet was of a peculiar character, and that may have had something to do with it. It was said to be lead poisoning.

10,920. Have your men had occasional days of sickness possibly due to lead?—No, not that I know of.

10,921. Do you have a periodical medical examination of your men?—No.

10,922. If you have no such examination by a doctor, is it not possible that some of the men may be suffering from the slower and more insidious forms of lead poisoning?—It is quite possible.

10,923. You know, I presume, that lead poisoning frequently undermines the health, without immediate violent symptoms arising?—I do not know it. I will take that as a fact from you.

10,924. The incidence of lead poisoning is published month by month by the Board of Trade; do you see the "Labour Gazette" issued by them?—No.

10,925. Have you noted that 284 deaths of painters have been definitely certified as due to lead poisoning in the last 10 years?—No, I do not know about that. I should say that that does not refer to Scotland.

10,926. No, but I suppose you agree that we should not have a law passed to apply to England and not to Scotland?—It would be very hard lines on Scotland if the same necessity did not occur there.

10,927. But do you think that it would be possible to have a law prohibiting lead in England and not in Scotland?—It might be possible.

10,928. Would it not be very unfair to the English?—It might be rather rough on them perhaps, but it is possible.

10,929. Do you think that it would be a wise thing to do?—I think that it would be very unjust to prohibit it in Scotland when there is so little cause of trouble.

10,930. That is not an answer to the question. Do you think that it would be a wise and just thing to prohibit the use of lead in England and not in Scotland?—It is difficult to say in that case.

10,931. Are you aware that the death rate from lead poisoning amongst painters increased to an alarming extent in the first six months of this year?—No, I am not aware of that.

10,932. You say that in Scotland you have had very few cases of lead poisoning?—Very few. I have heard of no fatal cases, and I can only trace these three that I speak of. There was one other case that was called lead poisoning that I might mention—a

10,913. I do not think that you can answer this question. Might not the expenses of the new rules be as great as the cost of the extra paint that would have to be used if lead was prohibited?—It is impossible to answer that question. It would be a toss up which was the more expensive.

10,914. So that it would not matter, from that point of view, which you had?—If we were bound to have one or the other, no.

colourman of ours, who was in our employment for about forty years I think. During twenty-five years of that he was a colourman in the workshop making up colour, and it used to be said of him that his system was full of lead; but after leaving our employment he was a pensioner of ours for many years, and he died somewhere between 80 and 90.

10,933. I am not at all surprised to hear of good records, because in some of the potteries there have been no cases at all, and then quite unexpectedly without any warning a firm which has been immune has had a crop of cases. Now, the gravity of the danger is seen if you compare the figures for house painters with those for all lead industries under the Factory Act, in which there have been 20 deaths in the first six months of this year, and 19 in the first six months of last year. So that there has been an increase of one only in this instance, but in the house painters' trade there has been a large increase, and the deaths from lead poisoning in the house painters' trade are more numerous than in all the other industries where lead is used?—I cannot understand that at all. It certainly does not refer to Scotland.

10,934. Then, in addition to this, the death-rates from Bright's disease and nervous diseases, due to work in lead, are very high. There are also a very large number of non-fatal cases, most of which are never recorded, as they are not required to be notified to the Home Office. We have that from trade union returns and from other sources?—You say so, but I must say my own experience does not bear that out at all.

10,935. Are you speaking from experience of your own firm or for the whole of Scotland?—Only from the experience of my own firm and hearsay from other firms.

10,936. I cannot take that. I may tell you that in the course of the inquiry in the potteries, it was ascertained that, out of 500 potteries in England, about three-fourths of them had had no case of lead poisoning at all. The whole of the cases were confined to the other portion. So that it is quite possible that in your works you may have had no case of lead poisoning, whereas it may be fairly prevalent in other works?—But in the course of business that has been going on with my father and myself—60 years—there would be some tradition of lead poisoning if it had occurred.

10,937. Your works may be conducted on the most admirable principles. I am sure you will agree with me that, if these figures are correct, all this sickness and death is very deplorable?—Yes, if that is correct.

10,938. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes.

10,939. That the use of white lead has been prohibited to an appreciable extent abroad?—So I understand.

10,940. Do you not think it regrettable that this country should be behind other nations in this respect?—Not if the conditions in which the work is done are more favourable with us than elsewhere. Possibly other countries have done much the same as in England, and different from Scotland.

10,941. You agree that we ought to level up to other countries with regard to protecting our work-people?—That depends. I would say that you should

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not level up Scotland to other countries, because there is not the same necessity.

10,942. You agree that, if the figures are correct, we should level up to meet the evil?—Yes.

10,943. Something must be done, either by regulating the work very closely, or by restricting the use of lead?—I cannot accept either of those personally because I do not see the necessity for them.

10,944. I am speaking of the whole country?—I will take your statement, but I cannot give an opinion upon it.

10,945. Taking the figures which I have given to you as correct, something must be done to meet such a deplorable evil?—Yes, if the figures are correct.

10,946. That must take the shape of regulations and special rules protecting the workpeople, or the prohibition of lead?—Well, yes.

10,947. No doubt you realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead?—Again I must speak for my own firm.

10,948. Will you kindly not speak for your own firm, but on the figures I am giving you?—As I say, if these figures are correct it might be necessary to do something.

10,949. But do not you think that it is absolutely imperative to do something?—Certainly, on these figures, if they are correct.

10,950. You may take it that these figures are correct; there is no question about the figures; the Home Office have had them analysed with the very greatest care?—That may be, but there must be some special conditions affecting those figures.

10,951. Perhaps you are not aware of the details of the precautionary measures to which I refer?—No.

10,952. First of all there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed?—As a matter of fact my workmen put on clean overalls every Monday morning. They require no supervision with regard to that.

10,953. Yes, but the Home Office would enact that the employers should see that the workpeople had on clean overalls from time to time, at least once a week, and that the employers should provide them?—The employer could not undertake that, because of the way in which the men are employed. For instance, workmen are employed from the very south of England to the very north of Scotland, and are scattered. It is impossible to supervise them.

10,954. How are you going to be sure that the provision of their wearing overalls is adhered to?—It could not be except as a regular practice among them. It is part of the training of an apprentice that he is taught to do no work without having overalls on.

10,955. Secondly, we come to the provision of a meal-room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used?—That would all depend upon the customers.

10,956. Would it be possible to insist on such a rule being carried out?—In most cases it would be. In fact in most cases it is done.

10,957. But I want to know about the instances where it could not be done. What is the proportion?—I do not know that there is any case where it could not be done, except where men are working in a house doing only one room, say a drawing-room. If the owner of the house did not allow them to make use of another apartment, what could they do?

10,958. Then your answer is that you could not ensure a separate room being provided in every case?—No.

10,959. Then the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing, and where they will not collect unnecessary dust when not being worn. Could you insist on that provision?—I do not quite follow that. They wear the overalls over their outdoor clothing.

10,960. They take off their coats?—They take off their coats, but then they have a waistcoat and trousers.

10,961. I include the coat in outdoor clothing?—They do not have an overcoat. They have an ordinary coat and the waistcoat and trousers are touched by the overalls, and the overalls are left on the job when they go away.

10,962. Where do they leave the overalls?—They usually throw them down in a corner of the room where they are working.

10,963. With the dust that has been generated during the day and collected there?—Yes.

10,964. So that when they come in the morning they are liable to inhale the dust that is on their overalls?—Yes, if there is any.

10,965. Is there any possibility of providing them with a cloak-room for putting off their coats during working hours, so that they shall not under any circumstances remain in a room where lead is used?—That would be scarcely possible unless again, as I say, customers would allow the men to use some of the rooms in their houses for that purpose.

10,966. Then the introduction of proper washing accommodation; one basin or other utensil to every five men, supply of water both hot and cold, soap, nail-brushes, and a sufficient number of clean towels. Could that be provided for?—Hot water would not always be available, but soap and water are always provided as a necessity of the work.

10,967. And a sufficient number of clean towels?—Instead of towels, they use chamois skins as a rule for drying themselves.

10,968. Provided by the employer?—Yes; they are always at the work as part of the tools.

10,969. Would you agree, if the Home Office insisted on it, that a sufficient supply of clean towels should be provided for the workmen?—Yes, that could be done, but well-trained painters are trained from earliest apprenticeship to wash their hands after doing work before they start their meals.

10,970. Do they always do it?—Yes.

10,971. How do you know?—Have you seen them doing it?—Often.

10,972. In every case?—I have seen them time after time.

10,973. Mr. Sutherland and I the other day, in Manchester, saw three or four men wiping their hands on their handkerchiefs?—Quite likely.

10,974. Is not that a very great evil?—Yes, that is very bad.

10,975. How are you going to ensure that other men shall not do that?—The only way that you can ensure it is by training the apprentices.

10,976. The men that we saw were trained men?—Badly trained evidently, if they did that.

10,977. Can you ensure their all being well trained?—Yes, you can ensure their all being well trained, but you could not always ensure that they would not do that. There might be exceptions.

10,978. Provision would have to be made for the avoidance of dust. Some means would have to be devised for getting rid of any dust which the men might breathe. Is it practicable to provide means for removing the dust in sand-papery?—I do not think that there is any appreciable amount of dust in sand-papery. Whenever you come to the preparation of hard work, water and pumice stone are used. The only time when sand-paper is used is between the coats, and there is necessarily a softness which prevents there being actual dust.

10,979. Is the practice of sand-papery different in Scotland from what it is in England?—I do not know. I could not say what it is in England. Between the coats we smooth the surface preparatory to the next coat being put on, and there is always a certain amount of adhesion in the material in the half-dry state, and most of the dust adheres to the sand-paper.

10,980. Do you maintain that there is practically no dust in sand-papery?—Very little.

10,981. What do you mean by "very little"?—It is difficult to explain. As I say, most of it adheres to the sand-paper itself. So much so that if you see a painter

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rubbing between the coats he has to renew the sand-paper very frequently, because it gets clogged up and loses its efficiency. You can pick up on a job any number of pieces of sand-paper that have been thrown aside because filled up. The dust is of that character that it cannot float about very much.

(*Chairman.*) In England the employers have admitted that the dust in dry sand-papery is very considerable. I think Mr. Sutherland would say it is appreciable.

(*Mr. Sutherland.*) There is an amount of it. There is bound to be some.

10,982. (*Chairman.*) Should you say it is different in Scotland from what it is in England?—I should not think so.

(*Mr. Sutherland.*) I should not think so.

(*Chairman.*) Then the Home Office would insist on some means being provided to prevent that dust from coming in contact with the men.

10,983. (*Mr. Sutherland.*) There is a point which Mr. Carfrae made which relates to Scotland which has not been made before, and I think it is an important one, and that is the larger quantity of oil in the paint. What do you think about that?—I think that that is a very important point. If you talk about that there is one very important point to my mind that makes probably a very great difference between England and Scotland, and that is the quality of the oil. We are very particular in Scotland about using the very purest of oil, with great elasticity and adhesive qualities. There is a great deal of oil in the market which has not those qualities, and it breaks off short, and possibly there is more dust.

10,984. (*Chairman.*) Then there are the fumes in burning off and the spray which may be breathed in certain operations. How do you propose to get rid of them?—It is quite easy to do without burning off. I was not aware that there was anything injurious in burning off.

10,985. Could you insist on no burning off being done in the future?—Yes. If it is injurious, it could quite well be done without. There are numerous solutions now-a-days which take the place of the lamp, and can be quite well used instead.

10,986. Are you aware that the attention of this Committee has been called to the existence of poisonous emanations from liquid paint?—I am surprised to hear it.

10,987. How would you deal with such an evil?—It is impossible to deal with it. Might I go back for a moment to the so-called dry polishing?

10,988. Do you mean sand-papery?—Yes. I would like to point out that the time occupied by an ordinary workman in sand-papery is a very small proportion of the time occupied in the painting, and the time occupied in painting is a very small proportion of the time a man is occupied. The other part of his time is generally spent in paper hanging and size-colouring and other things.

10,989. In addition to the precautions that I have suggested, a periodical medical examination, say once a month, would be insisted upon, at the expense of the employer. Would you agree to that?—If that was made compulsory, then of course one would have to agree to it. It would come back on the public. The customer would have to pay for it in the end. That would not matter.

10,990. Together with the payment of compensation to any worker withdrawn from work by the doctor's orders on account of doubtful health?—That would come under the present Employers' Liability Act.

10,991. (*Mr. Sutherland.*) No?—Would it not?

10,992. (*Chairman.*) In the pottery industry the certifying surgeon has the power to suspend a man up to three months, because in the certifying surgeon's opinion the man may be likely to contract lead poisoning, and the employers have agreed for a period of three months to pay half wages. Would you agree to anything similar?—One would agree to any of these things, because, as I say, they are covered by insurance, and the customer has to pay, so it does not much matter.

10,993. Do you think that the cost of these regulations would be very excessive?—I should think they would be. They would add to the present burdens.

10,994. That would mean appreciably extra cost to the public?—Undoubtedly.

10,995. Now supposing that lead were prohibited, would that mean that the substitute would cost more than the lead paint?—Yes, for outside work.

10,996. And the public would have to pay more in that case too?—Yes.

10,997. So that it is a choice between two evils, the public being the carriers of the burden in each case?—Yes.

10,998. Does it matter which of the two burdens he has to carry—the burden of extra cost in administrative matters or the extra cost of the substitute?—I think that it comes to the same thing in the end. I think it would mean prohibition each way. Those administrative proposals would be so impossible to carry out that it would simply mean not using lead at all.

10,999. Do you think that on the whole it would be better to prohibit the use of lead than have the regulations?—I do not think that either is necessary.

11,000. I know, but of the two what would you say?—But I cannot admit it.

11,001. Will you put yourself in the position of the Home Office, with Parliament looking on anxious to protect the workpeople in this industry where the incidence of lead poisoning is terrible—I will not say in Scotland?—I cannot answer that. I cannot put myself in the position of the Home Office there. It seems to me an impossible position.

11,002. You can put yourself in the position of realising that this Committee is sitting for a specific purpose, and trying to produce a remedy for an admitted evil. I ask you whether, taking the figures to be correct, you do not think that Parliament has to do one or the other—either make rules to prevent the evil or prohibit the use of lead?—The rules are impossible to carry out.

11,003. So you mean to say that the employers would have no option but to go in for prohibition?—That is all. There is no other option to my mind under those conditions.

11,004. (*Dr. Collis.*) With reference to the point which you have made, that you consider that there is no lead poisoning worth considering in Scotland, would it astonish you to hear that a great many of the English employers who have given evidence before this Committee have said that they have no knowledge whatever of the occurrence of lead poisoning in the trade in England?—I would not be surprised to hear that.

11,005. Notwithstanding the figures that we know, of deaths sent to us by the Registrar-General which have occurred in England?—Well, I cannot understand those figures. As I say, they puzzle me altogether. I cannot understand them under ordinary conditions. They seem to me to require some explanation.

11,006. You understand that each one of these cases of death is a case upon which an inquest has been held, and the cause of death more closely inquired into than any other cause of death except deaths from accident, which the Registrar-General has knowledge of? So that it is very difficult to throw any doubt upon the cause of death in these cases?—I cannot understand how it is possible that under ordinary conditions of painting work there should be so many deaths.

11,007. That is a matter for us to inquire into, how it is possible; but the fact remains that these deaths have occurred, that is to say deaths the cause of which in every case has been carefully inquired into, because it is part of the law that an inquest is held upon any case of poisoning. I would suggest to you that the English employers who have given evidence here seem to be equally ignorant with yourself as regards the occurrence of lead poisoning in their trade among their workmen?—I cannot account for it either way.

11,008. The population of Scotland, I think, is only about one-eighth of that of England, is it not?—I could not say the exact figures just now, but I will take your statement for that.



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11,009. If there have been 983 deaths in England and Wales in 10 years there would be only one-eighth of that—about 45 deaths—in that same 10 years in Scotland if the incidence was the same. That only gives between four and five deaths per year, which, since the numbers themselves are few, might lead to the fact that it had not come to your attention?—It is quite possible.

11,010. So that the incidence in Scotland may possibly—I do not say it is—be equally as great as that in England?—That is quite possible.

11,011. Certain other illnesses, besides lead poisoning as such, are associated with the influence of lead. Would you allow that if those illnesses are present in excess in any community, that would be some evidence that the influence of lead is present in that community? What I mean is this: We find on examining statistics of deaths of people exposed to lead that there is an excess (apart from the deaths from lead) of deaths from Bright's disease and from consumption?—Is that caused by the lead?

11,012. The conclusion is, as it is associated with this class of employment, that there is some relation between the two?—Of course, I must accept that, as a statement.

11,013. When we come to examine the deaths among the Scottish Society of Painters, we find that the number of deaths from Bright's disease is higher than normal, and that consumption is decidedly higher than normal, and that the calculated figures of deaths which have occurred in the society are very close to those given by the Registrar-General of England and Wales for plumbers, painters and glaziers. The conclusion, then, which we seem to be justified in drawing is, that both classes, being exposed to the same influence and showing the same excess of deaths from certain causes, are being affected in the same way by lead?—But how can glaziers be affected by lead?

11,014. It happens that the Registrar-General gives them as a class all together. He does not separate them for England and Wales. He puts plumbers, painters and glaziers all together, so you have to take his figures unseparated. That is the point. I quite agree with you that, with regard to glaziers, they are a minor quantity of the whole number. I am only drawing your attention to the logical conclusion—or rather what seems to us to be the logical conclusion we must draw from these figures—that in Scotland the influence of lead in painting is not different from its effects with regard to England and Wales?—You speak of Bright's disease. I have no recollection of any workmen of mine ever being affected with Bright's disease, for instance. I must not say that it has not been so, but I have no knowledge of it; and I come very much in contact with the men when they are ill. I always hear about their illness, and I try where I can to assist them in any illnesses they have. So I do not think it is possible that I should not know. I usually know what is the matter with any of my men when they are away ill.

11,015. The statement which I read is made on an analysis of 305 deaths which occurred in the Scottish Society of House and Ship Painters in the course of ten years. The figures are small, I will allow, but for what they are worth they point in the same direction as those we have had for England?—I got my foreman to enquire at a society that he was connected with—the Shepherds. It is a friendly society. They say that they have only had two cases of painter's colic in 15 years, and those were not fatal cases but illnesses. They have had to pay for illness for only two painters in 15 years, and there are 30 painters in the society.

11,016. That gives a certain incidence even then. You do not know, I presume, the ages of those 30, or how long they had been exposed to this in their trade?—They would be all ages.

11,017. It makes a considerable difference whether a man has been a long time in the trade or newly exposed?—It is a very old society. There must be men of all ages.

11,018. That gives us two cases in 450 members per year. That is a definite attack rate. It is low in a sense, but still it is 44 per cent. even on those

figures. So they are not so small as they first appear, when you begin to work them out as the attack rate. In the Potteries the attack rate is about 1.4. So that even your figures give an appreciable attack rate, although it may not to you at first sight seem great. I only wish to bring your attention to these points. So that it is possible that the influence of lead in producing illness may be going forward in Scotland to an extent that has not been at present disclosed?—That might be possible.

11,019. (Mr. Parsonage.) You say that painters usually use chamois skins to wipe their hands with?—Yes.

11,020. Those are the skins you send on the job for washing the paint with?—For all washing purposes.

11,021. They get a lot of lead in those from rubbing down with pumice stone and water and then drying the door off with the skins. Nothing carries dirt or keeps dirt more in it than a chamois leather does?—They are always washed thoroughly.

11,022. It is about the most dangerous thing they could use, I should think?—After the use of soap and water?

11,023. Yes. Do you consider painting a healthy occupation?—Yes.

11,024. Will you tell me why it is that the Hearts of Oak, one of the largest friendly societies in the country, refuses to take house painters in?—I did not know that. I am very much surprised to hear it.

11,025. It is a fact. That is a peculiar thing, is it not?—Very peculiar.

11,026. If a man wanted to get into the Hearts of Oak—a painter—he would go in under another occupation. Many go in as paper-hangers?—But a house painter and a paper-hanger are the same.

11,027. He would call himself a paper-hanger. They do not know the difference. We know it, but they do not?—I am surprised to hear that.

11,028. That was the fact. I do not say that it is so now?—I can understand the painter's business being an unhealthy one under certain conditions. Take a ship painter painting such a vessel as the "Lusitania" or "Mauretania," where there are hundreds of small state rooms, and ceilings and walls are all painted together in a confined atmosphere for days and days and perhaps weeks at a time. That I can understand would be unhealthy; but the ordinary conditions of a house-painter's work, where he is doing either colouring of a ceiling or a cornice, or putting papers on the walls or painting woodwork, are not unhealthy. Besides that, the rooms are, as a rule, well-ventilated and airy apartments, and the conditions under which the men work (I am speaking for my own business, I admit) are essentially healthy.

11,029. (Mr. Gardner.) If painting in a state room on board a vessel with white lead paint is dangerous, what sort of space would you require to work in for it to cease to be dangerous?—It is more the confined nature of the space they are working in, and the want of ventilation and fresh air that are the trouble. We know perfectly well that the fumes of turpentine, and the fumes of varnish even more so, where there is absolutely no lead, and the fumes of enamel, which is made of zinc and gum, cause headache and that sort of thing in a confined area. There is no lead in it, and yet nothing affects the atmosphere more than varnish does. In our own place I see a lot of varnish being used, and I feel the effect of it in a headache way, and there is no lead in varnish whatever.

11,030. (Mr. Sutherland.) There is a small quantity in varnish, but it is infinitesimal in the boiled oil that they use for varnish?—They use manganese driers entirely now.

11,031. Litharge?—They do not have lead.

11,032. Have you tried any leadless paints?—I have used zinc paint very freely.

11,033. What is your experience of it?—It is an excellent paint. I have usually used it with a preparatory coat or coats of lead. I have finished with zinc. But there is this difficulty—that you cannot produce a flat paint with zinc. It is impossible to get a zinc paint flat. The nearest you can get to it is

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what you know as an egg-shell gloss. You cannot get a dead flat.

11,034. Have you used Lithopone?—No.

11,035. Charlton white is Lithopone?—Yes, I have used that.

11,036. (*Chairman.*) Are you aware that the Office of Works have introduced a formula for painting both for inside and outside work, which they tell us is highly satisfactory after a trial of four years?—That depends upon what their standard of satisfaction is.

11,037. They paint all kinds of buildings from Buckingham Palace to, let us say, a labour exchange. Would not that influence you in your statement that leadless paints are not efficacious?—You can get a perfectly pure white effect with leadless paint, but I think it is necessary to have a foundation of lead to start with.

11,038-9. But would not you say that what is good enough for Buckingham Palace is good enough for any of His Majesty's humble subjects?—You would think so, but I know I have seen painting at Windsor Castle that I would not like to see turned out of my establishment. I do not know Buckingham Palace.

11,040. You believe that you get better work, as workmanship, with white lead?—With the combination.

11,041. But with lead?—Yes, with lead and zinc. I like to finish with zinc paint very much indeed, and for certain purposes it is exceedingly satisfactory, more especially where it used with enamel, because it is so white and keeps its colour.

11,042. Do you think that you could not get as good work if white lead were abolished?—I think not. I am certain you could get no dead flat surface. The reason is this: that to make zinc to a suitable consistency for working you have to add so much oil to it. As you know, the more oil you add the more gloss there is, and the more turpentine you add the flatter the paint is. With lead you can add a sufficient amount of turpentine to get a dead flat surface.

11,043. (*Mr. Parsonage.*) Could not you substitute varnish for the oil and so get the flat?—The varnish makes it glossy.

11,044. Yes, but it would harden the paint and answer the purpose if you took a smaller quantity of varnish compared with oil, and you could use more turpentine?—But there are certain decorative effects, if you want to produce that dead flat, which you could not get in that way.

11,045. (*Mr. Sutherland.*) Have you had any experience with zinc paint for exterior work?—Different kinds of reds and greens and oxides, but I do not think that anything is so good as lead for the purpose, if mixed with good oil. That is a very important point. You get an india-rubbery elasticity that makes a skin. In enquiries that I have been making, my foreman was telling me (I do not know whether this is admissible, because it is second-hand information and not my own knowledge) that, at a job he was working on, they were doing some outside work with white lead and they got instructions to do some more outside work of the same character. Their white lead was finished and they used zinc white for the remainder of it, and when he went back to that job some years afterwards he found that the lead paint had stood very much better than the zinc. But, personally, I have no experience of zinc paint for outside work.

11,046. You know that the technique of working with zinc paints is very distinct from that of working with lead paints?—Quite so. With lead paint you get a stringy elastic character in the lead, whereas with the zinc it is more of a globular character and shorter and does not form the fine skin.

11,047. In the use of zinc, you have to apply it much thicker than lead paint; consequently you cannot get the fine brush work?—Yes.

11,048. For situations where sulphurous acid and gases abound, and humid atmospheres, zinc paint, unless specially protected with varnish, as is done by the Office of Works, would disintegrate?—I do not know sufficient of the chemical action to say that.

11,049. The Dutch Commission, in reference to this matter, emphasises the point that in all situations like railway stations and manufacturing centres, where

there is a lot of sulphurous acid in the atmosphere and humidity, lead is very much better than zinc?—The humidity I can understand—the moisture—but I could not speak of the action of chemicals.

11,050. That was demonstrated. Now with reference to the ignorance of employers in regard to the ravages of white lead, roughly the number of deaths represents one in 9,000 of the employes taking the employes as 250,000 right throughout the Kingdom. Twenty-eight deaths per annum represent one in 9,000 employes, so you are not surprised that a great many employers are ignorant of the seriousness of the mortality due to lead poisoning?—No.

11,051. As the Chairman said, our members came up with very much the same experience as your own. Large numbers of them in a long experience had not had any cases in their own shops. Now, do you think it possible to dispense with dry rubbing down with sand-paper?—Not to make a good job. You can dispense with it, but it is at the sacrifice of the quality of the work.

11,052. There is one of the most important of the evils, so far as we know. Would it seriously affect the quality of the work? Do you think that if dry rubbing down were abolished, the master painters could not find some other way of meeting the case and getting up a nice surface?—I do not know. I do not think there is any possibility of getting the fine surface necessary previous to enamelling or varnishing or flattening without dry rubbing down.

11,053. In most cases of dry rubbing down with sand-paper, you do not rub down to cut the surface?—No.

11,054. You take the superfluous nibs off?—Yes, the rough top and any brush marks there may be.

11,055. In normal cases you do not get much dust from that?—No, I do not think so. As I say, the paint is scarcely hard, and therefore clings to the sand-paper, and does not come off in dust.

11,056. (*Mr. Parsonage.*) If it clogged the sand-paper, you would say, "It is not hard enough to do yet." You would allow it to stand over until the following day?—It might be too soft. There is a state in which you can sand-paper where it is not hard enough for pumice stone.

11,057. (*Mr. Sutherland.*) That is common experience in rubbing down, is it not?—Yes.

11,058. Overalls are used by employes now without any sense of injustice on their part?—Every painter in my employ, man and boy, wears overalls.

11,059. And in every good shop it is the same?—In every good shop it is the same.

11,060. If it were the law, do you think that your customers would respond, and give your workpeople separate rooms where they could have their meals and hang their coats?—It would be very difficult in many cases, but it would be possible. The customers would be obliged to do it. They would complain very much, as they do sometimes if the men want to go into the kitchen to boil their tins with their food. If he finds them walking in the garden at the meal hour the customer grumbles. He is very inconsiderate sometimes, and often forces men to do things that we do not approve of.

11,061. If there were a law established to meet the case of this excessive death and sickness, do not you think that the public would realise their responsibility in that respect?—They would have to.

11,062. (*Chairman.*) What do you mean by "they would have to"?—They would have to give facilities for a separate room.

11,063. It is not proposed to issue special rules for the public?—If we were doing a drawing-room in a house, there would be a table in the centre of the room where the men would keep their paints and materials. We would say to the customer: "You must give us another room in the house for our men to take their food in," and they would have to do it.

11,064. Apropos of your answer to Mr. Sutherland with regard to the use of zinc paints for producing flat work, we have been told that zinc paints in oil can be treated in such a way as to cause the oil to float. The

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oil is poured off, and turpentine and gold size added. The resulting paint, in the opinion of the witness I am speaking of, was quite satisfactory for flat painting. Have you tried that?—No, I would not imagine that it would be so, because you would not have the adhesive quality with the turpentine, and if you add the gold size you bring back the glossy nature again.

11,065. (Mr. Sutherland.) If the prohibition of white lead included other compounds of lead, it would carry with it all yellow chromes and reds?—Yes, and that will lead to more adulteration than we have at present. They try to make out just now that barytes is a good basis for striking colours on. I for one always demand them to strike them on lead. It will make a grand excuse for adulteration.

The witness withdrew.

Mr. E. GUEST examined.

11,069. (Chairman.) Do you attend to-day as a representative of the Association of Master House Painters in Scotland?—I do.

11,070. What is the nature of your business, and where is it carried on?—House painting business, exclusively carried on at 1191, Argyll Street, Glasgow, and 3, Kensington Terrace, Ibrox.

11,071. What is the average yearly number of painters employed by your firm?—About 30.

11,072. How long have you been in the painting trade?—Thirty-seven years in the trade altogether. I was a trained apprentice for six years.

11,073. Have you known any cases of lead poisoning or painters' colic?—No.

11,074. Have your men had occasional days of sickness possibly due to lead?—Not as far as I am aware of.

11,075. Do you have periodical medical examination of your men?—No.

11,076. If you have no such examination by a doctor, is it not possible that some of the men may be suffering from the slower and more insidious forms of lead poisoning, without your knowledge?—That is quite possible, but we have always taken very great interest in our men. If they are off a day we usually ask the reason, and we have never had the slightest indication of such trouble.

11,077. You know, I presume, that lead poisoning frequently undermines the health, without immediate violent symptoms arising?—I have been told that, but I have had no experience.

11,078. The incidence of lead poisoning is published month by month by the Board of Trade; do you see the "Labour Gazette" issued by them?—Yes.

11,079. Have you noted that 284 deaths of painters have been definitely certified as lead poisoning in the last ten years?—I have, and I have always been very much surprised because of the entire absence of information on that point myself.

11,080. Do you know that in every case a post-mortem examination has been made by independent doctors, and that their certificate says "lead poisoning"?—I do not dispute the post-mortem examination and the result, but I say this, from a knowledge of working in Ireland as well as in Scotland, that the conditions in Scotland are very different. If you got the results from Scotland, the percentage would be very much smaller than in England or Ireland.

11,081. Are you aware that the death rate in the first six months of last year shows an alarming increase?—No, I am not aware of it.

11,082. I am not surprised to hear that in your business there are no cases of lead poisoning, because in some of the potteries they have had no cases at all, and then quite unexpectedly, without any warning, a firm which has been immune has a considerable crop of cases?—There is no analogy to be drawn between the conditions of labour in a pottery and the house-painting trade in Scotland.

11,083. From the figures which I have read out to you, the gravity of the danger is seen, is it not?—If the figures are right, then I would say it is a serious condition of affairs.

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11,066. It goes further than that? It restricts the scale of colours?—Undoubtedly.

11,067. We cannot get the corresponding colours from a zinc base at all, and those that we can get have not the same staining power, and they are very costly?—I should not imagine that you can strike a lemon chrome from zinc.

11,068. You can strike a chrome, but it has no staining power. It evaporates directly. Do not you think that that would seriously restrict the decorative aspect?—It is a very serious difficulty. Up to the present time our experience has been with white work or slightly tinted off the white. It has not gone beyond that. We have not any other experience, but I can quite imagine that what you put to me may be so.

11,084. If you compare these figures with those for all lead industries under the Factory Act, in which there have been 20 deaths in the first six months of this year, and 19 in the first six months of last year, you will see that there has been an increase of one death only in this instance; but in the house-painters' trade there has been a large increase, and the deaths from lead poisoning in the house-painters' trade are more numerous than in all the other industries where lead is used?—I can only speak for Scotland.

11,085. I am speaking of the figures that we have. Are you surprised to hear what I have just quoted?—I am very much surprised indeed, so far as I know the trade in Scotland, that there should be anything like an increase, because I think the conditions in Scotland have improved considerably during the 37 years that I have been in the trade.

11,086. In addition to this the death rates from Bright's disease and nervous diseases, due to work in lead, are very high?—I suppose I must take it from you.

11,087. There are also a very large number of non-fatal cases, most of which are never recorded, as they are not required to be notified to the Home Office?—I can only say I am surprised at that condition of things. It has never been brought home to me. Some of our men have been for over 20 years in our employment.

11,088. I am sure you agree with me that all this sickness and death is deplorable?—Yes, and if preventible should be prevented.

11,089. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes, I am quite aware of that, especially in France and Germany and Holland.

11,090. Do you not think it regrettable that this country should be behind other nations in this respect?—But I do not admit that we are behind.

11,091. Please remember the number of deaths I have given. There are no restrictions obtaining in the house-painting industry in this country?—If my memory serves me rightly the condition of things in France that called for legislation was very much more serious than ever it has been in this country.

11,092. I suppose you would agree that we ought to use every means in our power to protect the workmen in this country?—Yes.

11,093. Something must be done, either by regulating the work very closely, or by restricting the use of lead?—Yes, I agree that something should be done.

11,094. No doubt you realise that if the free use of lead is allowed to continue the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead?—Yes. I think that reasonable precautions would eliminate the evil.

11,095. Are you aware of the details of the precautionary measures which are in practice in other lead industries?—I am not familiar with them, but I have an idea.

11,096. I will give you an outline. First of all, there is the provision of overalls by the employer, who is responsible for seeing that they are regularly

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washed?—That would be almost impossible in our trade, because of the casual nature of the employment, because of the men being employed at considerable distances from the workshop, and outside of the workshop, and because of the objection from the men's point of view to using overalls that have been used by other tradesmen.

11,097. Secondly, comes the provision of a meal room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used?—That state of things does not exist so far as either of my establishments is concerned, and we give the men facilities for getting their food cooked.

11,098. In your own establishments?—Because of the fact that we prohibit smoking on account of the danger of fire, the men immediately go outside the premises after they have taken their food.

11,099. But where do they eat the food in your place?—We have, in both of our shops, a small apartment, apart from the general paint room, where there is a fire.

11,100. What about when they are working outside?—We have never had any difficulty whatever in getting a suitable place for our workmen outside. I have heard objections from other people.

11,101. You have been very fortunate in that respect?—Our men have been very fortunate in that respect and we have been fortunate too. I never heard of any lady or gentleman objecting to giving reasonable facilities to tradesmen.

11,102. Have you heard of any cases outside your works where men could not get a separate room?—I heard of a case where a lady objected to the men taking their food in the kitchen, but I came to the conclusion that she was not a lady or she would not have objected.

11,103. Then the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing, and where they will not collect unnecessary dust when not being worn?—You see that we are in a different position altogether from an ordinary workshop, where the work is being done continuously in the workshop. The outside job for the time being is the work room. In that matter I think an obligation might be laid upon the men to provide weekly overalls, to be under their own care and custody.

11,104. I am asking now about the provision for keeping overalls in a place where no lead is used?—It would not be a serious difficulty if the men were at the shop, but there is no work in our workshops. They work away from there.

11,105. It is a difficulty when they are away?—There is no difficulty whatever.

11,106. I do not understand your answer?—The point is: Is it desirable that the men's overalls should be kept in a separate department from the actual paint room?

11,107. Separate from the room where they are working?—I do not see any difficulty in carrying out a regulation of that kind.

11,108. Next, the provision of cloak-room facilities, so that clothing put off during working hours shall not, under any circumstances, remain in a room where lead is used?—There should be no difficulty in carrying out a regulation of that kind.

11,109. How would you ensure such a regulation being adhered to?—I would put an obligation on the men to carry it out.

11,110. How would the Home Office know whether it was carried out?—I do not see how you could carry it out.

11,111. It is impracticable?—I think it is. I do not see how you could enforce the recommendation. Some of our jobs we do not visit once a week.

11,112. Now the introduction of proper washing accommodation: one basin or other utensil to every five men?—There, again, you have difficulty. Just now I have about 60 men employed; I do not think that there would be an average of a dozen of those men coming to the shop at all for weeks, and when they do

come they are only there for a few minutes in the morning.

11,113. I quite see the difficulty. You cannot control it?—We cannot control it. I quite agree that if you could get the men to carry this out systematically it would be beneficial to them and beneficial to us too.

11,114. Then the supply of both hot and cold water, soap, nail-brushes and a sufficient number of clean towels. Could you ensure those being provided?—As a rule we always provide towels and soap.

11,115. "As a rule" would not do. I want to know whether there would be no question about their being supplied?—There would be no question about it.

11,116. How would you ensure the rule being observed?—The only rule would be that every job should be equipped with soap and towels, but how you are going to force the men to use them is quite a different matter altogether.

11,117. Then provision would have to be made for the avoidance of dust; some means would have to be devised for getting rid of any dust which the men might breathe?—The painter is only called in, you see, because there is dust. Primarily, the reason why he is called in is because a thing has got dusty and dirty.

11,118. I am referring to lead dust?—I beg your pardon. I have heard a good deal about this dry dust, and so on, but I cannot follow it in Scotland after 37 years' experience. I can follow it in Ireland.

11,119. We are dealing with the industry as a whole. I ask you what means can be devised for eliminating the dust that the men breathe?—I really do not see. It must be taken as a condition of the trade. There is other dust besides lead dust which is almost as noxious.

11,120. Do you answer that you can devise no means to get rid of the dust?—Really I could not. I wish I could.

11,121. Then the fumes in burning off, and the spray which may be breathed in certain operations. How would you deal with those?—I do not think that it would be a great hardship to abolish the burning-off lamp altogether. There is an ever increasing number of liquid substances for removing paint which seem to answer the purpose.

11,122. You are probably not aware that the attention of this Committee has been called to the existence of poisonous emanations from liquid paint?—No, I am not aware of that.

11,123. If it is the case, how would you propose to protect the workmen from the noxious vapours that arise?—Well; again I go back to saying that I have no knowledge of that.

11,124. I am not asking you what your knowledge is, but how can the workers be protected from this risk?—I do not see how it can be avoided at all. Somebody must mix the paint. It is impossible to mix it by machinery.

11,125. I am speaking now of a man who is painting a wall. We have had evidence to show that emanations arise from putting lead paint on to the wall?—Yes, oxidation takes place. Without that the paint would not dry.

11,126. That is harmful to the workman, and how would you meet the difficulty?—As long as you paint, you cannot stop it.

11,127. Then, in addition to what I have mentioned, a periodical medical examination, say once a month, would be insisted upon, at the expense of the employer. I ask you two questions on this point; first of all, whether the employers would bear such expense, and secondly, whether they could enforce such a regulation?—We could not enforce it unless you laid down the law on the matter, and made it compulsory for us to do so.

11,128. Supposing it was one of the new regulations, would you bear the expense?—Yes, willingly, if I thought it was going to effect any useful purpose.

11,129. Could you undertake to see that such a rule was carried into force? I want to know whether it would be possible for you to be certain, taking into consideration the jobs all over the country, and your men being away from you, and bearing in mind the

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[Continued.]

fact that you would be liable to a fine, and probably serious trouble, if it was not carried out, that it would be carried out?—The difficulty might be removed if the Government appointed special doctors in special districts, to whom the men could go to get a certificate. If we employed a particular individual, he might be considered to be prejudiced. Another point is that our men might be away in the country, and at a great distance from the place of examination. If the Government appointed statutory officers all over the country, who would be accessible to the men, I see no difficulty whatever.

11,130. The Government do appoint the certifying surgeons?—My point is whether they would be numerous enough to be accessible.

11,131. You see difficulty in that respect, that the men may not be near enough to the certifying surgeon, to be certified?—It might mean a very great additional expense, besides the cost of examination. You could not reasonably expect a workman to come a number of miles for examination without being paid for his time.

11,132. I see the difficulties that you refer to in that respect. Then there is the question of paying compensation to any worker withdrawn from work by the doctor's orders on account of doubtful health?—I am afraid that that would prove a great hardship to the men in this way: that whenever an employer got a certificate of doubtful health of an individual workman, he would be very likely to discontinue that man, and the man himself would find, I believe, great difficulty in getting employment. That is to say, he might be suffering from something else altogether apart from lead poisoning, which might make him more susceptible.

11,133. But putting the man's position aside for a moment, would you as an employer agree to pay compensation under such circumstances?—Yes, but I would immediately take steps to get rid of all the delicate men in my employment in my own interest.

11,134. Taking all these points into consideration, would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed, or as an alternative, that the use of lead should be prohibited?—I think that in the meantime regulations would be better for everybody concerned. I am still impressed with the infinitesimal damage that is done.

11,135. But it will not be sufficient for you to make that general statement. You have told us that most of these regulations are impossible to carry out?—Yes, but there are regulations which have been suggested that might be carried out that I believe would be beneficial.

11,136. I am not speaking of what you consider sufficient, but of what the Home Office would most assuredly insist upon if lead is allowed to be used in the future. You have said that in the majority of cases it is impossible to carry out the rules, and I say that if that is the case and the Home Office insist on those rules the alternative would be prohibition?—A modification of those rules, I think, would be a very great help.

11,137. But there would be no question of modification, I think. This Committee is sitting to deal with a very serious evil. We have to report to the Home Secretary, and the Home Secretary has to put before Parliament our Report, which must contain either a prohibition of lead or such restrictions in the way of special rules that we can be certain that the men will not be injured?—If there are two alternatives only, prohibition or those rules without any modification whatever, I would take the rules and regulations in the meantime and wait hopefully that the Home Office would give us a solution of the difficulty.

11,138. That is not sufficient. We are a body of practical men, and we have to recommend to the Home Secretary, after consultation with the employers and workpeople and the medical authorities of the country and other experts, a practical solution of the difficulty. It is no use our recommending as a practical solution regulations that you and other employers tell us cannot be carried out?—I would most respectfully suggest

that, if the Home Office make regulations, they will tell us how they are to be carried out.

11,139. But I am afraid that you do not see the seriousness of the position?—I see it and appreciate it.

11,140. We have heard of the most alarming condition of the workpeople employed in house painting. I am not saying whether it applies to Scotland or not. The mortality rate has increased in the last few months. We are sitting here as an impartial body to devise some means to meet this evil. The suggestions that I have made to you as to probable rules which the Home Office would enforce, you tell us are impracticable?—I beg your pardon. I did not say that they were all impracticable.

11,141. You have told us that it is impracticable to insist on the overalls. You have told us that it is impracticable in some cases to have a meal-room. You have told us that it is impracticable to have any device for getting rid of dust. You have told us that it is impracticable to enforce these rules?—I think my evidence was rather to the effect that I thought it was desirable that the men should have clean overalls every week.

11,142. I do not want to waste your time or the Committee's time, but I shall have to go through the whole of these rules again, I am afraid, because you have given the answer with regard to certain regulations which the Home Office would consider necessary, that you think it would be impossible to carry them out. Now, I ask you, in view of that, what are we to do? Are we to prohibit lead altogether, or are we to put forward a lot of rules which you say cannot be carried out if they are issued?—I prefer to take the regulations.

11,143. But do not you see that that is not a serious answer. You tell us in one breath that the regulations cannot be carried out?—I do not see how they can be carried out.

11,144. Then, what is the use of playing with the Committee by saying that you would rather have regulations when you say immediately after that they cannot be carried out?—I am very sorry if you think I am playing with the Committee. I am very serious, and I am speaking with long practical experience.

11,145. Would you kindly answer the question. You see my difficulty. Your evidence has to be dissected. What can we say about it? First, "Mr. Guest" has said that, if these figures are correct, the evil "must be dealt with. As a humane man," he said, "it must be combated." Then, I went on to ask: "How is it to be combated, by prohibition or regulations?" and he replied, "That the regulations could "not be enforced"—Some of them.

11,146. Some of the most important ones cannot be enforced. Then, I come to the point of what I am to say as your conclusions on this very grave question?—First of all I say that the conditions regarding England and Ireland in the painting trade are totally different from what they are in Scotland.

(Chairman.) I will not take up the Committee's time any further.

11,147. (Dr. Collis.) Could you tell us exactly how the conditions are different in Scotland from what they are in England?—I would put it rather more regarding Ireland, because I have an experience of Ireland, and only a very casual one of England. I have six years' experience of Ireland.

11,148. You have stated that there is a difference between the way in which it is carried on in England and in Scotland, so I presume that you are prepared to say what the difference is?—In England there is a very much larger proportion of flat work with turpentine than there is in Scotland. There is a great deal more oil work in Scotland than there is either in England or in Ireland.

11,149. How do you think these differences affect the health of the workpeople?—In rubbing down, with sand-paper, a flat surface done with turpentine, there would be a very much larger preponderance of dust than there could possibly be with an oil paint.

11,150. With regard to the emanation of volatile lead compounds, to which the Chairman drew your attention?—Again, there, I think, there would be a

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very much larger amount of evaporation with turpentine paint than there would with oil. Then, again, in Ireland they have a lot of workmen whom they classify as whitewashers or whiteners. These men do all the whitewashing and practically all the preparatory work before painting. Now, in Scotland the painter does all the whitewashing and all the preparatory work for it, and all the preparatory work for the painting. He may be one week without doing any painting at all, and the next week he may be painting for so many days or all the week.

11,151. Your contention is not that the danger while he is occupied is less, but that he is exposed to the danger for a less period?—Yes.

11,152. (Mr. Sutherland.) Compared with Ireland you mean?—Yes, compared with Ireland.

11,153. (Dr. Collis.) The danger may be there and illness may be occurring due to the influence of lead to which your attention in Scotland is not being drawn, because it does not produce the symptoms of lead poisoning, although it may be at the same time undermining the constitution or weakening the health of the workmen?—That is quite true.

11,154. Are not we coming back rather to the same point?—It comes back to this, that we all admit that lead is of a poisonous character, and, more or less, substances are given off that are detrimental to health.

11,155. What experience have you had of the use of paints which do not contain this poisonous substance?—We have experimented and we have carried out work, and we never could get the covering properties in any of the substitutes, nor yet could we get the protective character for outside work.

11,156. How recently have you carried out these experiments?—Two or three years ago.

11,157. What substances have you used?—Charlton white and zinc white.

11,158. For interiors and exteriors?—Yes.

11,159. Do you not find it valuable for interiors?—Some people pin a good deal of faith on its non-discolouration under the fumes of gas. In one particular instance we had a very large ceiling all ready flatted for the finishing coat. It was suggested that we might try zinc white. We had to give two coats where one coat of lead would have made a suitable job, and better in every way than zinc white.

11,160. Was the zinc used in the same way as the lead?—Not the same way exactly, but by the very best method. It was steeped overnight in varnish to break up the globules, and allow it to mix. In fact, extra precautions were taken to ensure that it would be satisfactory.

11,161. We have had a good deal of evidence placed before us by people who have given time and attention to the subject of zinc and other paints which do not contain lead, and which they, for their respective purposes, have used and found as effectual, and in many cases more effectual, than paints containing lead. This evidence is not confined to what has been placed before this Committee, but is the evidence also given by experts before the Swiss inquiry into the subject. Do you not think that the opinion of these experts ought to be considered?—Certainly.

11,162. And it is possible that, if lead ceased to be used, the paint trade would find that the work done by these experts was of great value, and that they could do work as effectively as to-day?—Climatic influence has a great effect upon paint, and we find ourselves that we have sometimes to adapt ourselves to the particular climate or particular exposure of the paint. So far as Scotland is concerned, I am quite positive in my own mind that zinc white would never justify its existence against white lead. If you take France or Switzerland, they have a very much clearer atmosphere and a very much drier climate, I think.

11,163. Do not you consider the conditions, at any rate, of England are as adverse as anything that you will find in Scotland?—I do not think so.

11,164. Do not you think that the air of Scotland is as pure as the air of England?—Well it has agreed with me very well. I think there is a distinct difference in the climate of Scotland. We have a good deal of foggy, misty weather.

11,165. We are not without that in England?—No but it is quite a different fog from ours.

11,166. Take Manchester for instance?—I have been in Manchester, but even there the conditions are not quite the same.

11,167. Are the conditions better in Manchester than they are in Scotland?—I do not know. I have travelled a good bit, and I am bound to say that I think the climate of Scotland puts one of the severest tests upon paint that we can get anywhere.

11,168. I am not in a position to judge of its effect upon paint, but London is not without its reputation for fogs?—I know.

11,169. Do you think that a paint that can be successfully used here might not have some success even north of the border?—Well it might. As I say, circumstances alter cases. We have in Scotland to diagnose the case as we find it, and sometimes we find that one varnish, for instance, that will suit on one job will not suit on another.

11,170. That experience is not unique. We have had evidence given us by very large users of paint in England, for instance, the Office of Works, that for four years they have been able to do entirely without lead in their paints both for external and internal work, and are pleased with the results?—How many coats and what was the price per yard?

11,171. They say that the price was no dearer, and if anything a little less?—That has not been my experience.

11,172. Your experience is not so great as theirs?—I would not put my experience against theirs. I do not know what their experience is. I can only speak for myself.

11,173. I only wondered whether such evidence as we have had would in any way affect you in choosing between the two alternatives which have been placed before you, and whether the difficulty will be as great as you anticipate?—On that point I would like to say that we had, some years ago, two tenements of equal size. We finished the first tenement with white lead, and we kept an accurate record of the cost of the work both in material and time. We were persuaded to try Charlton white on the next tenement, and we found that both the time and the material were very much in excess of the first, and the work was not so satisfactory.

11,174. Your workmen are not so used to using the one material as the other, I presume?—There is really not much difference in that respect—not all that difference.

(Dr. Collis.) There seem to be two schools of thought on that point.

11,175. (Mr. Gardner.) With regard to the regulations, at the present time men have not reasonable facilities for taking food on their jobs away from the room in which they are painting?—I have never known any great difficulty. I have never known any great difficulty, in fact. I speak as an apprentice, as a journeyman, and as an employer for 23 years.

11,176. In a business such as yours, you do not find that the men working in a house get the use of another room to take their food or for keeping their overalls. They have to be kept where they work?—That is one of the difficulties about the overalls, but as far as the food is concerned we have never had difficulty about getting into the kitchen for food.

11,177. Have you never known food handed in when men are working at painting a bathroom?—I only speak of our experience. I would be very indignant if I knew that such a thing happened.

11,178. In an ordinary tenement, a painter has only access to one room to keep his material and food and clothing. Regulations would require another room, and that is a difficulty, is it not?—The usual practice, so far as tenements are concerned, is that they give you a house for a workshop.

11,179. One room?—No; it is a house.

11,180. Not always. I do not suppose that a great many employers supply towels and soap to the men for washing?—I can only speak for myself. I am very anxious to see that regulation. I spoke to a man last week about not keeping himself clean.

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11,181. As a general rule, what do you say?—As a general rule, in Scotland, the men are exceptionally tidy and clean.

11,182. With regard to your experience of non-lead paints, I admit that Charlton white may be a very unsatisfactory material to work with, but do not you think that if the employers were to experiment a little with some of the other compounds and treat them away from white lead altogether, they would get better results than they have got?—I am not at all prejudiced in favour of white lead. I would like to see it abolished, but I can only speak from experience.

11,183. (*Mr. Parsonage.*) Why would you like to see it abolished?—Because of this incipient danger.

11,184. But you do not know of that danger, you say?—I said I never knew any of the men to suffer.

11,185. But you accept the evidence?—Yes. If we could get anything like a substitute we should be delighted, but those we have tried have not the covering power, and a number of them are the very opposite from white lead, as you know. The more you work with white lead the finer the surface, but the more you work with some of these substitutes the more corded and rough the surface gets.

The witness withdrew.

Colonel R. J. BENNETT examined.

11,190. (*Chairman.*) Do you attend to-day as a representative of the Association of Master House Painters in Scotland?—Yes.

11,191. What is the nature of your business and where is it carried on?—Painters and decorators, at 50, Garden Street, Glasgow, and Wellington Chambers, Ayr.

11,192. What is the average yearly number of painters employed by your firm?—About 150.

11,193. How long have you been in the painting trade?—Over 50 years.

11,194. Have you known any cases of lead poisoning or painter's colic?—Not in our establishment.

11,195. Have your men had occasional days of sickness possibly due to lead?—No, not that I know of.

11,196. Do you have a periodical medical examination of your men?—No.

11,197. Is it not possible that some of them may be suffering from the slower and more insidious forms of lead poisoning without your knowledge?—That is so.

11,198. You know, I presume, that lead poisoning frequently undermines the health without immediate violent symptoms arising?—I believe so, but I have no experience of it.

11,199. Do you ever read the "Board of Trade Labour Gazette"?—Occasionally.

11,200. Have you noted that 284 deaths of painters have been definitely certified as due to "lead-poisoning" in the last 10 years?—No, I have not.

11,201. Or that the death rate during the first six months of this year has increased to a very appreciable extent?—I have not noticed that.

11,202. You say you have had no cases in your own works?—No.

11,203. I am not surprised to hear that, because in some of the potteries they have had no cases at all, and then quite unexpectedly, without any warning, a firm which has been immune has a crop of cases. Are you aware that the cases of lead poisoning in the house painting trade are more numerous than in all the other industries where lead is used?—No.

11,204. Are you surprised to hear that?—I am.

11,205. In addition to this, the death rates from Bright's disease and nervous diseases due to work in lead are very high?—I have no experience of that.

11,206. And there are also a very large number of non-fatal cases, most of which are never recorded, as they are not required to be notified to the Home Office?—I am surprised to hear it.

11,207. I am sure you agree with me that all this sickness and death is very deplorable?—Very.

11,186. (*Mr. Sutherland.*) I take it that, if regulations were decided upon, the muster painters in Scotland would enforce them. The obligation would be upon them?—I am quite certain that you would get the loyal support of the Associated Masters of Scotland.

11,187. I did not quite catch what you said to Mr. Gardner. You were saying something about the reediness of zinc paints. Do not you think that the substitution of zinc paints for lead paints would deteriorate the quality of the workmanship amongst painters?—Undoubtedly. My experience of those substitutes is that the quicker you can get over the ground the better. If you lay on the paint at once with one brushing, it is far better than going back two or three times.

11,188. Putting it on thickly you mean?—Yes, and because of its transparency or want of body you have to put it on very much thicker. It forms into a skin, and would eventually result, I daresay, in a great deal more dry scraping than you have just now.

11,189. That is a remote contingency, and would not come on for some years after, but it is a contingency which, as practical painters, you have to look to?—Yes, and it would be very much more liable to blistering, I think.

11,208. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I have heard so.

11,209. That the use of white lead has been prohibited to an appreciable extent abroad?—I have heard so in France.

11,210. Do you not think it regrettable that this country should be behind others in this respect?—Certainly, if it were so.

11,211. And that something should be done either by regulating the work very closely or by restricting the use of lead?—I think by regulation.

11,212. Have you had any personal experience with paints which contain no lead or very little lead?—Yes, of zinc white.

11,213. What period would that experience cover?—Perhaps 15 years.

11,214. When did you make your last experiments with leadless paint?—Two years ago, but not alone. It was mixed with lead—50 per cent. of lead.

11,215. Have you ever used any leadless paints in their entirety?—Duresco and various others.

11,216. Duresco is a water paint?—It is a water paint.

11,217. Have you used ordinary oil paints which are leadless?—I have used them for outside railings.

11,218. Have you found them satisfactory?—No, they have not been satisfactory.

11,219. Are you aware that the Office of Works and others have told us that they have used leadless paints with entire success for some years past?—No, I have not heard so.

11,220. Would that affect your opinion as to the suitability of leadless paints?—If I inspected the work, I could tell you. I would require to see it.

11,221. No doubt you realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead?—I believe that that would be necessary in England, but I do not think it would in Scotland.

11,222. Do you think you could differentiate between England and Scotland in this respect?—Yes.

11,223. Do you think that the employers of labour in England would welcome that innovation?—I do not think so.

11,224. Do you think it is practicable? Do you think, as a business man, it would be a practicable thing to do?—The result would be that the Scotsman would do all the work in England.

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[Continued.]

11,225. Now, are you aware of the details of the precautionary measures which obtain in other industries?—No.

11,226. First of all, there is the provision of overalls by the employer, who is responsible for seeing that they are properly and regularly washed. Would you, as an employer, agree to that?—As a matter of fact the men do that now. My own workmen do it.

11,227. Would you agree, as an employer, to provide overalls and see that they are properly washed?—I think not. That would be a matter entirely for the workmen.

11,228. Would you guarantee that provision should be made for a meal-room, so that in no case whatever could any of the men take their meals in a room where lead is used?—I cannot say that, for this reason: that every new house we go to is a new workshop, and we are not there, you see. In 90 per cent. of these houses that we go to provision is made in some part of the house for the men to have their meals.

11,229. Would you agree to the provision of a proper place to keep the overalls, where they will not contaminate food or out-door clothing, and where they will not collect unnecessary dust when not being worn?—I could not agree to that because of the exigencies of the trade. It is scattered from John o' Groats' down to Exeter.

11,230. Next, could you provide cloak-room facilities so that clothing put off during working hours shall not under any circumstances remain in a room where lead is used?—I could not say so.

11,231. Would you agree to introduce proper washing accommodation—one basin or other utensil to every five men?—That is already done in my shop.

11,232. But with regard to outside work I mean?—Outside, they always have water in the house.

11,233. Would you agree that they should have one basin or other utensil for every five men?—They have far more than that now.

11,234. And a supply of hot and cold water?—Sometimes we are prohibited from using fires in a house. People do not want us to, so I could not undertake to supply hot water.

11,235. Would you agree to the supply of soap, nail-brushes, and a sufficient number of clean towels?—That is a matter for the workman. Most of my men carry them.

11,236. But could you, as an employer, obey a regulation of the Home Office to that effect?—Certainly, if it was a regulation.

11,237. Then provision would have to be made for the avoidance of dust; some means would have to be devised for getting rid of any lead dust which the men might breathe. Would you agree to that?—I do not see that there is much lead dust.

11,238. Is it practicable to provide means for the removal of dust from sand-papering?—Only by the ventilation of the room.

11,239. By exhaust draught?—Opening the window.

11,240. That would not do, because you might get a contrary wind that would blow the dust in the men's faces. Could any means be derived for local exhaust draught to carry away the dust which the men generate in the course of their work?—It would add considerable expense, which the customer would have to pay.

11,241. But would it be possible, say, in sand-papering this wall, to provide any apparatus by which the dust could be carried away?—In 99 per cent. of cases you do not do that to the wall.

11,242. But would it be possible, in sand-papering this wall, to provide any apparatus by which the dust could be carried away?—There is nothing but the opening of the windows. If there is a regulation, perhaps something will be found.

11,243. At the moment you cannot suggest anything?—No.

11,244. Do you think it is possible to deal with the dust in the way that I have suggested?—Yes, at considerable expense, which the customer would have to pay. This seems to be the crux of the whole matter, and in Scotland, where we do as fine work as any part

of the country, we do not experience this which seems so fatal in London. Regulate the trade so that no one who has not served his apprenticeship to the trade will be allowed to work at it and you will, if not cure, at least considerably lessen the evil.

11,245. Now, there are a certain amount of fumes in burning off and spray which may be breathed in certain operations. How would you get rid of those?—I have no experience of that. In 99 cases out of a 100 we use a liquid for burning off. Ammonia will burn off quicker than any lamp.

11,246. You are probably not aware that the attention of this Committee has been called to the existence of poisonous emanations from liquid paint?—I know that by your asking me here.

11,247. Can you suggest any means by which those noxious vapours could be removed from the workmen?—Yes, by making a regulation to do away with the burning off; but again I say, in the hands of trained workmen there is no fear.

11,248. I am speaking now of the ordinary painting of a wall. There are certain vapours which arise from the actual painting operation, and I want to know whether you can suggest any way by which the workmen would not come into contact with those vapours?—No, not at the moment.

11,249. Do you think it would be possible to obviate this danger by any form of rule?—It might. Every day we are bringing out inventions for other things, and if a few minds were giving attention to it it might be done.

11,250. I suppose it would be rather an expensive operation?—Clearly.

11,251. In addition to this a periodical medical examination, say, once a month, would be insisted upon at the expense of the employer. Would you object to that?—I think the men would.

11,252. But would you object?—I do not see why we should pay. If we did, we should add it to our bills.

11,253. A further expense to the British public?—Yes, which they object to. They think the painter's bill is high enough already.

11,254. Then there is the question of the payment of compensation to any worker withdrawn from work by the doctor's orders on account of doubtful health. Would you agree to pay that?—We are insured and the insurance companies would pay that.

11,255. But it would be another charge on the employer?—Certainly.

11,256. (Mr. Sutherland.) It would not be covered by your present policy?—If we had to pay more, we should have to charge more. At present we think we pay plenty and we never have had a case.

11,257. (Chairman.) I have given you very briefly a few regulations which the Home Office would probably enforce if they continue to allow the use of lead. In reply to those suggestions I have made, you have told me that many of them could only be carried out at very great expense?—Yes.

11,258. Would it be possible to enforce such regulations? How could you enforce such regulations amongst your own men? How could you be quite sure that the rules were observed?—That would be a difficulty. We have, say, at the present moment 60 workshops. It is not as if the men were all in one place like men at a mill or soldiers in a barrack yard. Our work is so scattered through the country that we have not control except by the foreman in charge.

11,259. Is it not practically impossible to enforce such a set of regulations?—I do not know that it is quite impossible, but it would certainly take some education. It might take a few years.

11,260. Now, taking all these points into consideration, would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed, or, as an alternative, that the use of lead should be prohibited?—Regulation by special rules, certainly. You cannot do away with white or red lead so long as the Admiralty insist on its use in all these specifications.

11,261. Are you quite sure that these rules could all be observed; for instance, on the question of



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removing the dust?—I have told you that they might be observed at great expense, which the customer would have to pay.

11,262. Now, what is the objection to using leadless paints?—I have had no experience of them, except mixed.

11,263. If lead was prohibited, what harm would ensue to the trade?—In a very short time it would disappear, I should think.

11,264. I have told you that the Office of Works have used leadless paints for the last four years to their entire satisfaction. Why should not that system of painting be universal throughout the country? Against that, I would tell you that I washed a ceiling a few weeks ago that my father painted in 1847, and the ceiling and cornice were as fine as the day they were painted.

11,265. But I want you to realise, if you kindly will, that we are sitting here to deal with a very serious evil?—That is so.

11,266. And we have to recommend to the Home Office some means by which this evil can be combated. Now, I want to know how we are to combat this very serious evil. You told us that the question of removing dust is very nearly impracticable. Most of the other witnesses have said that it is impossible. You say you think that it might be done in some years?—Yes.

11,267. Now, what are we to recommend the Home Office to do with regard to this evil? None of you gentlemen, if I may say so, have brought forward any possible solution of this very great evil. Now we must do either one of two things: we must either recommend the prohibition of the use of lead in the future, or we must say that the employers have come forward and have made certain suggestions, taking the processes seriatim, by which, in our opinion, the evils can be removed. You have made no suggestions?—Where there is electric light in a house you could apply a fan by putting in a plug.

11,268. But where there is no electric light, what would you do?—We would have a difficulty which would have to be overcome by some invention such as could be carried about.

11,269. Do you think it would be practicable for us as a Committee to say to the Home Secretary, "Lead should be used as before. The employers are going to think over inventing some means by which the evil can be removed"? Do you think the Home Secretary would accept that or that Parliament would accept it?—I think not.

11,270. Then what are we to do? I ask you as a business man and a humane gentleman to deal with this very serious problem?—It certainly seems a very serious evil, but after 50 years' experience, we have not it, in Scotland.

11,271. I am not talking about your experience, but about the cases of lead poisoning presented to us by the Registrar-General. Is there any practical suggestion but prohibition?—I would much rather have regulations.

11,272. But if it is impossible to introduce regulations to remove the evil, have we any alternative as a Committee than to recommend prohibition?—That is a matter for the Committee to consider. I could not take it on myself to say. I would say regulation instead of prohibition.

11,273. You would not be surprised, I suppose, if under the circumstances, we did recommend prohibition of the use of lead?—They would certainly be surprised in Scotland.

11,274. I wish I could get you to focus your mind on the situation as it is presented to us here. We have to deal with this evil; none of the employers representing either England or Scotland have brought any practical suggestions before us which can remove the evils which undoubtedly exist, and I ask you what are we to do under the circumstances? Is there any other alternative but prohibition? You have admitted that if we presented a report to Parliament with no recommendations it would not satisfy either the Home Office or Parliament. Then is there any other

alternative but prohibition?—It is a very serious matter.

11,275. You do not like to commit yourself?—No, I cannot commit myself.

11,276. But you have nothing to recommend with regard to removing the evil?—No, I have no experience. I don't admit the evil if you confine the business to trained and efficient workmen.

11,277. (Dr. Collis.) You consider, I understand, that if the regulations which have been suggested could be carried out, they could only be carried out at considerable expense?—That is so.

11,278. Which expense would fall on the public?—That is so.

11,279. Do you not think it likely, considering the extra expense that having a house painted with lead paint would throw upon them, people would themselves promptly and immediately stop asking for lead and choose what would then be much cheaper, lead substitutes like zinc?—I have no experience of the substitutes at the moment.

11,280. But I am speaking of the public. Do you not think that the public would then choose a cheaper way of having their houses and places decorated and painted?—We are doing that to a large extent at the moment. Over 30 per cent. of the ceilings, walls, and cornices now are being done with water paint—Duresco, and so on.

11,281. When it was found that the price of oil paints containing lead was rising still higher and higher, do you not think that the public would then cease to ask for them or to have them used?—Yes. At the present moment it is not cheaper to use these other materials.

11,282. You have already suggested that, if the regulations came into force and were practicable, that would add very considerably to the amount of money that the public would have to pay?—Yes.

11,283. That would make the use of lead paints more expensive?—Yes.

11,284. Do you not then think that the public would cease to ask for lead paint and use the substitutes?—It might be so.

11,285. Then what is the good of drawing up regulations?—I am thinking of the public. They would require their premises done three times or four times for the once that they have them done now, and everybody is glad to get painters out of the house. They are glad to see the men, but as glad to get them out.

11,286. But your statement is not in accordance with those given to us by the experts, who have given many years to studying paints which do not contain lead?—Well, I have no experience.

11,287. If their suggestion is correct, the durability and permanence of zinc paints is closely to be compared with the durability and permanence of paint containing lead, and the expense of applying lead paints when such regulations as you have thought might be introduced were applied, would be so much greater that surely the public would promptly cease to ask for or allow lead paints to be applied?—But I have said, or tried to say, that these paints are only of value when they have 50 per cent. of lead in them. Zinc paint is of no earthly use itself.

11,288. The evidence placed before this Committee is diametrically opposed?—Diametrically opposed to my own experience?

(Dr. Collis.) Yes.

11,289. (Mr. Sutherland.) Your preference for lead is not only for its permanence but for the quality of the work which you can do with it?—Yes.

11,290. Your particular work and that of most of the gentlemen who have been before us here is marked by a high quality of workmanship, and you are of opinion that you could not get such work, which also implies permanence, with zinc paints?—I think not.

11,291. And you think that the public would prefer the cost of the regulations being added to the cost of the work done with lead paint to having an inferior article like zinc paint?—That is so, and it would save the trouble of having the house turned out half a dozen times instead of once in ten years.

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11,292. (Chairman.) Half a dozen? Your estimate has gone up. You said just now three or four times as much painting would be required with zinc as compared with lead. Is not that rather an extravagant estimate?—Then say three or four times.

11,293. (Mr. Sutherland.) Do not you think that, if the regulations are enforced, you could make the foremen of your different jobs responsible for seeing them carried out?—Clearly, just as they would have to be responsible for any other part of the work.

11,294. In ordinary sand-papering there is not much dust?—Very little.

11,295. In sand-papering a wall like this between the coats, the dust would hardly be appreciable?—Yes.

11,296. It is just to take off the extreme top surface?—Yes. As a matter of fact walls like this or ceilings would not be sand-papered.

11,297. The rubbing down concentrates on the wood-work where there is going to be a fine finish?—Yes.

11,298. Could not that be done by the wet process, by ground pumice and water?—It is done in many cases, but you cannot do it where work is hurried. You want time to do it. The paint must harden. Time is a factor. But it could be done.

11,299. Two or three gentlemen have told us to-day that in Scotland you put less turps and more oil in the

paint. Do you think having more oil reduces the risk from dust?—Undoubtedly.

11,300. You think that the public and the trade would gain by these regulations rather than by the abolition of lead?—Yes.

11,301. In quality of work and permanence?—Yes.

11,302. (Chairman.) Do you think, taking into account the fact that you find it extremely difficult at this moment to make any suggestions about the removal of dust, and so on, that the regulations would be as beneficial to the men as the prohibition of lead?—I think so.

11,303. Do not say that without thinking over it. This evil exists and the figures are appalling, and you can make no recommendation for removing some of the great evils. I ask you whether you think regulations would be as beneficial to the men as the prohibition of lead?—I think that the public would suffer.

11,304. But do you think that it would be as beneficial to the men to have regulations which you say you cannot enforce, or some of which you cannot enforce, as it would be to have prohibition? You admit that you cannot think of any means of combating the evil?—No.

The witness withdrew.

Mr. R. L. ANDERSON examined.

11,305. (Chairman.) Do you attend to-day as a representative of the Association of Master House Painters in Scotland?—I do.

11,306. What is the nature of your business, and where is it carried on?—House painting and decorating, in St. Vincent Street, Glasgow.

11,307. What is the average yearly number of painters employed by your firm?—The average number is 30 to 40.

11,308. How long have you been in the painting trade?—33 years.

11,309. Have you known any cases of lead poisoning or painters' colic?—None.

11,310. Have your men had occasional days of sickness possibly due to lead?—Not to my knowledge.

11,311. Do you have a periodical medical examination of your men?—No.

11,312. Then how do you know that some of the men may not be suffering from the slower and more insidious forms of lead poisoning?—I have no report.

11,313. You do not know?—I really do not know.

11,314. I presume you know that lead poisoning frequently undermines the health, without immediate violent symptoms arising?—I believe so.

11,315. Have you ever read the Board of Trade Gazette?—No.

11,316. Have you heard that 284 deaths of painters have been definitely certified as due to lead poisoning in the last 10 years?—Yes, I believe so.

11,317. And that the mortality rate increased very largely in the first six months of this year?—Yes; I believe there have been more recently.

11,318. But you have had no cases of lead poisoning in your own business?—No cases that I have heard of.

11,319. I am not surprised to hear that at all, because in the Potteries we know of a large number of employers who have had no cases of lead poisoning at all, and all of a sudden without any warning a large crop of cases has arisen. Now, do you know that the number of deaths from lead poisoning amongst house painters is greater than in all the other industries where lead is used?—I hear you say so, but I have not statistics to compare.

11,320. In addition to this the death rates from Bright's disease and nervous diseases and consumption due to work in lead are very high?—I believe so, but it is all quite new to me.

11,321. There are also a very large number of non-fatal cases, most of which are never recorded, as they are not required to be notified to the Home Office?—I believe so. That refers, of course, to Returns made on England and Scotland.

11,322. I am speaking of the whole country?—Precisely.

11,323. I am sure you agree with me that all this sickness and death is deplorable?—It is very deplorable.

11,324. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I understand so.

11,325. Do not you think it is regrettable that this country should be behind other nations in this respect?—Yes, I think it is.

11,326. Something must be done, either by regulation or by restricting the use of lead?—I think so.

11,327. Now, have you had any personal experience with paints which contain no lead?—No, none, beyond the water paints, and they are not included in that denomination.

11,328. Have you heard that the Office of Works and others have used leadless paints with entire success for some years past?—I believe so.

11,329. No doubt you realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead?—I believe that that is so.

11,330. Are you aware of the details of those precautionary measures?—No, I do not know what they are.

11,331. Let me give you a few of them, and then you will understand what I mean. First of all, there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed?—It is quite unknown in my business in Scotland for any men to work without overalls. That is to say, a man who comes to me and asks for a job would not be permitted to start work without wearing overalls.

11,332. Do you provide the overalls yourself?—No.

11,333. Do you see that they are washed?—No.

11,334. Do you know whether they are washed every week?—If on going round my works I see a man not properly clean, I check him personally, or tell the foreman to look after him. As a rule the overalls are washed every week.

11,335. You do not know that of your own knowledge?—No.

11,336. They may have an accumulation of lead on them which would be very harmful?—It may be so.

11,337. If the Home Office introduced a rule that employers should provide overalls, and should be responsible for seeing that they were regularly washed, do you think there would be any difficulty in its being

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carried out?—There would be difficulties which seem to be overlooked. The difficulties are that we take on men on Monday morning and by Friday night they might be paid off and other men taken on. Trade fluctuates.

11,338. In a former Committee, we agreed that it was the multiplicity of small dangers added together that caused the great evil in the operations, and we looked upon the question of overalls as being one of the important things?—I do not think in Scotland there is any danger of lead-poisoning occurring through carelessness on that particular point you have mentioned of overalls, because the men are very careful. If a man is slovenly he is spoken to.

11,339. You think there would be objections to employers providing the overalls, and seeing that they were washed once a week under the supervision of the employer?—I think there would be great difficulty.

11,340. Now on the question of the provision of a meal-room, would you agree that in no case should the men be allowed to take their meals in a room where lead is used—where they come into contact with lead, either dry or mixed?—That would be impracticable outside. In my own shop no man is allowed to take his meals in the workshop. He might require to have his meals in a room that has been painted a day or two before.

11,341. The difficulty would be outside; I quite see that. Then there is the question of the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing?—It would be very difficult in our trade.

11,342. Could you provide a cloak-room so that clothing put off during working hours shall not under any circumstances remain in a room where lead is used? The men take their coats off and put them in the room where the paints are mixed or where they are working. I have seen it myself?—The customers would not allow you to run all over the house, so what are you going to do?

11,343. Then there is the question of washing accommodation. The Home Office would insist probably on levelling this industry up to other lead industries, and that would mean one basin or other utensil to every five men, supply of water both hot and cold, soap, nail-brushes, and a sufficient number of clean towels. Could you insist on those being provided?—In some cases it could not be done. I might explain, also, that in my place the foreman has instructions to see that every man who is having food at the job washes his hands. Soap is supplied and he gets cold water or hot water. I tell my foremen and my men constantly, when I am round, that they must be tidy in their work.

11,344. Now with regard to dust, provision would have to be made for the avoidance of dust. Some means would have to be devised for getting rid of any lead dust which the men might breathe. Would that be practicable in work amongst house painters?—I am prepared to say from my knowledge and experience that there is not sufficient lead dust comes off properly prepared paint to do any man any harm.

11,345. Would you go so far as to say that it did him good?—No. I would not say that it would do him any good.

11,346. Is it practicable to provide means for removing the dust caused by sand-paparing?—If it is there, it must descend to the ground in the usual form of dust. There is no way that I know of of taking it away.

11,347. Are you aware that the attention of this Committee has been called to the existence of poisonous emanations from liquid paint? Let me describe what I mean. In painting a wall with lead paint certain vapours arise from the paint which are noxious to the men who breathe them. Is there any means of carrying those away?—Simply by opening the windows.

11,348. That might mean blowing it more into a man's face?—Not sufficiently to do him any harm, in my experience.

11,349. I am not asking you whether there is any danger, but is there any means of removing the vapour,

if it is dangerous?—Only by opening the windows, as I say. I do not know of any other means.

11,350. That might make it worse?—It could not make it worse.

11,351. In addition to those regulations, a periodical medical examination, say, once a month would be insisted upon at the expense of the employer. Do you agree to that?—No. It is an expense that I should be very unwilling to bear.

11,352. Would you agree to the payment of compensation to any worker withdrawn from work by the doctor's orders on account of doubtful health?—No.

11,353. Then in your view, to sum the whole question up, would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed—not one or two that you may think would be applicable—or as an alternative that the use of lead should be prohibited?—Special rules.

11,354. Do you withdraw all that you have said about these special rules, regarding the inexpediency or the impossibility of enforcing these rules and the objection you have yourself to some of them?—Not these rules.

11,355. I am referring to these rules?—I say it is impossible to apply them.

11,356. We are told that these rules are the only rules which will mitigate the evils which the men have to encounter?—I do not agree to that.

11,357. What are we to do as a Committee?—Are we to prohibit lead?—I do not think I should, from my experience.

11,358. Are we to let the men go on suffering?—I hold that they are not suffering.

11,359. But you cannot get away from these figures?—I have not the statistics before me.

11,360. You said just now that you thought that this deplorable state of affairs should be remedied, and I ask you shall we remedy it by the prohibition of the use of lead?—No.

11,361. Shall we remedy it by these rules as I have given them to you?—No.

11,362. Shall we let the men go on suffering?—No.

11,363. Then what are we to do?—Make some conditions that can be carried out and still be sufficient.

11,364. What are they? We shall have some interesting information if you will tell us what is in your mind?—I can prove this to demonstration: I have been in business for 33 years and my father started business in 1842.

11,365. If I may say so with all respect, I do not want any evidence about your own firm?—I cannot speak of anyone else.

11,366. Would you put yourself in our position? We are here to deal with this admitted evil and you agree that something must be done?—If the conditions that I adopt in my business were carried out, these evils would be reduced to a fraction.

11,367. What are they?—The men are told to clean their overalls, and I see that it is done.

11,368. To your own knowledge does your foreman see in every case that the men have clean overalls every week?—They must be clean every Monday morning.

11,369. You know that from your own knowledge?—I know that from my own knowledge.

11,370. Is a man asked whether they have been cleaned?—No; but if they are not clean and it is noticed, he is checked.

11,371. What is done?—He has to get clean ones. If he is not a good respectable man, he is paid off.

11,372. What is the next thing?—A foreman is told that before a man eats he must wash his hands. If the man is careless there is no obligation on my part further. If he is feeling unwell the foreman sends him off work at once.

11,373. You have cases sometimes of a man being unwell?—It is reported to me at once.

11,374. You said just now that you knew of no cases?—Not of lead poisoning.

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11,375. I asked you whether you knew cases of men occasionally off for sickness. You said no?—I misunderstood you.

11,376. There are cases where men do not feel very well?—Yes; they may be out of sorts and lose a day's work. They may have a cold.

11,377. It is nothing to do with lead, you think?—Not as far as I have ever heard. My shopman has been with us for 20 years. I asked him before I came away what he did. This lead poisoning was absolutely new to me a few months ago. He said, "I come in at six and work till eight." He goes away for an hour and has breakfast and comes back at nine and works till 12. He goes away home at 12 and has dinner. He works when he returns from 1 to 5.30, and then goes home. I said, "What do you do about washing your hands?" He said, "I have plenty of soap and water and wash whenever I think necessary, and I keep my nails clean." He has been among the paint for over 20 years, mixing paint, but taking no food where the paint is. He has not lost a single day's work from illness in the 20 years.

11,378. I could take you down to the Potteries and show you hundreds of men with a similar record, and I could show you others who have had lead poisoning?—Under these conditions?

11,379. Under precisely the same conditions?—I cannot believe it.

11,380. (Dr. Collis.) Are your suggestions summarised in washing the hands and wearing clean overalls?—Yes.

11,381. And they begin and end with those two provisions?—Yes.

11,382. How do men get clean overalls?—They are washed.

11,383. Where?—At home.

11,384. How do they take them home?—In their hands or in a little bag. Many of them carry little bags. Or they take them home at the end of the week rolled up under their arms.

11,385. I suppose that the overalls must be dirty or they would not require washing?—They are dirty—yes.

11,386. And they take them home in these small bags?—Those who have bags do. Those who have not, roll them up.

11,387. How do they bring their food to the works?—In a paper parcel as a rule. A man brings a little tin with his tea.

11,388. Does the paper parcel ever by chance get into the bag?—He does not take his bag home every night. He would take it home on Saturday only. I never knew a man take his bag away every night.

11,389. Does he never bring his food back in the bag that he takes his overalls in?—He might.

11,390. Is there not possible means of contamination there?—I do not think so.

11,391. Why not?—Because the overalls do not contain much lead. If they contain any at all, it is not sufficient to do him any harm.

11,392. That is your opinion?—That is my opinion, and it is my experience. I can prove it by figures. I have had no case of lead poisoning.

11,393. Turning then to the question of figures, you say that you have no knowledge of the cause of sickness, even though only temporary, among your men?—Yes.

11,394. Do you have doctors' certificates to state what these sicknesses are due to?—No.

11,395. A man does not know what is the matter with him, as I daresay you know, unless he is specially diagnosed medically?—A man is ill and off work and if he starts work again better I ask no further questions.

11,396. So you have no knowledge at all of what the sickness may be due to?—None whatever.

11,397. It may be due to indigestion caused by food contaminated in his bag by the dust from the overalls?—It may be, but I have no knowledge of it.

11,398. You have no knowledge at all of illness among your workpeople unless there is a severe attack of lead poisoning?—I know what the symptoms of lead poisoning are—the dropping of the hands, for instance.

11,399. That is only in the most pronounced cases. That occurs after many years?—Men are ill and off

for a day or two, and then resume work, and no lead poisoning has ever been reported to me.

11,400. That may be so. The doctors are not called upon to notify to the Home Office the occurrence of these cases. They are outside the factories, so that there is no responsibility placed on the doctor to make a pronounced and definite diagnosis of the illness in these cases. As regards the amount of sickness, even though temporary, amongst your men, have you compared it with sickness amongst other men in other trades?—No, I have no knowledge of that.

11,401. So that you do not know whether it is in excess or the reverse?—I have no figures to work on.

11,402. So that it may be in excess as far as you can tell. What is the age of the oldest man that you have employed on your permanent staff?—61 or 62.

11,403. Are there many others close to that age?—Half a dozen between 45 and 50.

11,404. How many altogether are there on the permanent staff?—Between 30 and 40 on the average.

11,405. That does not give a very high average age. What happens to the old painters after they are 60? Most of us expect to live over 60 you know. It is a sort of general hopefulness that we have?—I am thinking of a number of my former foremen, that is foremen in my father's time, who have been with me till they died. An old foreman died at 74. He had been with us for 55 years.

11,406. Do you have many people die as old as that?—Half a dozen, about 60 to 65, were with me till they died. I could get the exact figures for you if necessary. I kept all the old foremen on, and most of them died at about 60 to 65.

11,407. Have any died younger?—Occasionally one or two.

11,408. You know that the average age at death of the agricultural labourer is 67?—I will take that as correct. I do not know to the contrary.

11,409. Your men, even on your own showing, hardly come to that age?—67 is a good average.

11,410. The average age of a painter is 48 to 49?—I would like to ask what is the average age of clerks. My men are healthy as far as I can gather, and they are off work very little.

11,411. But all these points are comparative. I know that it is a difficult subject, and it is a subject that can only be investigated by comparing people in other trades, the age, constitution, and the average age at death, and until we have made such an inquiry it is difficult for us to take as absolute evidence the statement you have made that there is no illness, particularly among your men. Do you follow my point?—Yes.

11,412. We wish to get all the information we can. We ask for these details, when you say that there is no illness to speak of, because only upon such an inquiry can the statement be well based?—In every business and every profession there is a certain amount of illness.

11,413. Precisely, and they want comparing?—I do not know what the comparative tables are. I have never seen them. I speak from my own experience.

11,414. Everything is comparative. A statement is no good unless there is something else to compare it with?—What you have put to me is interesting. I hear what you say, and I take it as correct, but I have no evidence to the contrary or for.

11,415. We are searching for evidence. We are bound to search the facts which witnesses give us to see how they are based?—I can only say that the majority of my men who have behaved themselves and who have done good work, and who have been good servants to me, have lived to over 60 years of age, and remained in my employment. I can only give my personal experience.

11,416. (Mr. Parsonage.) Have you had any experience of using zinc paints and leadless paints?—Very little experience of leadless paints.

11,417. You cannot speak of them with regard to either durability or quality?—Very little. I was brought up in the good old school—nothing was better than white lead.

11,418. (Mr. Gardner.) You would not like to leave it?—No, I would not like to leave it. It is good and

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Mr. R. L. ANDERSON.

[Continued.]

easily washed and durable. I have used enamel composed of zinc white. I have used it on window sashes where I wanted them to be preserved from the damp. I have found that the enamel, where it came in contact with water through the sweating of the windows along the bottom sill of the window has all peeled off, and dried up, whereas the priming coats of lead below were quite sound. From my experience and what I have been taught as the fundamentals of my trade, there is nothing better than white lead known as a preservative.

11,419. You do not think an enamel is a preservative?—No.

11,420. Not even when applied on lead?—No. It goes when it gets exposure to the weather.

11,421. Taking a door finished in flat and a door finished in enamel, which would last the longer?—The door painted in flat.

11,422. Would it last equally as long?—It would last better probably. I am speaking of outside work.

11,423. I am speaking of inside work. They use very little enamel outside, you know?—It is used outside.

11,424. Very little. You would not say that, on a door inside, the flat would last as long as the enamel?—Inside the enamel wears better. Outside the flat paint would wear better.

11,425. The paint outside would not be flat. It would be oil colour. So there is no comparison at all. We want to have things perfectly right. Will you admit that enamel lasts a lot longer inside than flat, where it is used?—Yes.

11,426. And flat is not used for outside?—Not for the finishing coat.

11,427. No. It is oil colour outside?—Yes.

11,428. (Mr. Sutherland.) With regard to the point of dust in rubbing down with sand-paper, there is not much rubbing down on walls, is there?—Very, very little.

11,429. Where would you say that the rubbing down with sand-paper concentrates? Where is it most used for?—Windows and doors—woodwork.

11,430. Where?—The woodwork of the rooms.

11,431. Where particularly?—The doors and window sashes.

11,432. The amount of dust that would arise in a room with an ordinary door is not sufficient to demand exhaust apparatus?—No.

11,433. I do not know whether you are aware of it, but the point you suggest in reference to Mr. Parsonage's query corresponds with the experience of the Dutch Commission, that where zinc white was used on window sills and ledges, it did not last as long and did not answer as well as white lead. That was ordinary zinc white with ordinary oil, and certainly where enamel was used there would be a greater protection than just oil and zinc white. So that really confirms the final conclusions of the White Lead Commission of the Dutch Government, which was a very exhaustive inquiry. Your preference for lead paint is because it is very much better as a paint?—Yes. It is the best known article.

11,434. As a paint and as a protection?—As a paint and as a protection.

11,435. You can do better brush-work with it?—Very much better.

11,436. (Mr. Parsonage.) But you say you have never tried the other, and know nothing about the other. How can you speak of the relative qualities of a thing when you admit that you have never tried it?—We have tried it.

11,437. (Mr. Sutherland.) Zinc white?—Yes, when we were compelled to put it on, and that is the impres-

sion it has made on me. We put it on ironwork in laboratories, to stand the fumes of chemicals.

11,438. What result did you get?—It stands better than lead.

11,439. In certain laboratories where certain acids are generated, it stands less than lead?—The architect specified that it should be put on. I seldom use it for the reason I have given, because I have been trained to understand that white lead is the best basis.

11,440. If lead was prohibited, and that carried with it lead compounds, all the yellows and greens and reds which we now get (like Brunswick green and variations), and all the yellow chromes and all the variations of reds would practically be annihilated?—And disappear.

11,441. Yes. Do not you think from a decorative point of view that would be a serious loss?—It would be a very serious matter for the public.

11,442. You know that there is no substitute that is at all available commercially (when I say that, I mean that can be provided at a reasonable price) for these yellows which control the greens, and for the reds?—I know of none.

11,443. You would have to content yourself with natural earths and oxides for your reds, and with zinc chrome for your yellows, which is a very poor stainer, and would make a very indifferent green?—Yes.

11,444. So from an artistic and decorative point of view it would be a loss?—A very serious loss.

11,445. (Chairman.) I suppose you agree that we could not have legislation and special rules for England without their applying to Scotland?—I see no reason why.

11,446. Do you think that English employers would welcome such an innovation? Do you think it would be fair to the English employers to prohibit the use of lead in England and not in Scotland?—It is for this Committee to say from the statistics that they get. I am not here to deal with that, if I understand your question.

11,447. (Mr. Sutherland.) The effect would be that you would not be able to come into England if we were only using zinc paints and you were using lead?—If a Scotch painter came to England he would have to conform to the conditions of England.

11,448. (Chairman.) But do you think it desirable to differentiate between Scotland and England in a general law of this kind?—Surely you do not?—From what I have seen of the figures I see no reason for any legislation whatever for Scotland, but from the figures that you have given me, I think there is good reason for very serious legislation in England.

11,449. If regulations were enforced, however stringent they were, would you prefer them to the abolition of white lead?—No.

11,450. You would prefer the abolition of white lead to those stringent regulations?—Yes. Might I ask whether you have any statistics with reference to Scotland alone?

11,451. (Dr. Collis.) No. We have figures from the Scottish Painters' Society, but we have not a return from the Registrar-General for Scotland?—All the cases from England, Scotland, and Ireland are together, I suppose?

11,451A. There are practically no Scotch cases in our figures at all, because we have not asked for them. They only represent England and Wales?—It would be a very good thing to have those tabulated. It would be a hardship to put on to Scotland certain conditions, which will be serious to the trade, which are not necessary.

(Dr. Collis.) The position would only be exactly the same as in England.

The witness withdrew.

## SIXTEENTH DAY.

Thursday, 27th July 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*).

Mr. M. HOLZAPFEL examined.

11,452. (*Chairman*.) Do you attend to-day as the representative of the North-East Paint and Oil Trades Association?—Yes.

11,453. What is your own business?—Specialities for ships, particularly ships' bottoms—composition for ships' bottoms.

11,454. Is your business confined to specialities for ships?—Almost exclusively. We are enamel manufacturers and varnish makers.

11,455. Do you grind both lead and zinc paints?—We grind zinc paints, but not lead paints.

11,456. Have you a large trade in leadless paints?—In various paints.

11,457. Are they all leadless paints?—All leadless except so far as lead is contained in oil or varnish—in the boiling of oil or varnish.

11,458. In what form do you use lead at all?—Litharge, for using with boiling oil or boiling varnish—or red-lead for boiling oil or varnish.

11,459. Do you add lead in any form in your works?—No, not to the paints.

11,460. Is your trade in enamels increasing?—Yes.

11,461. Are enamels all leadless?—Ours are all leadless.

11,462. What are they mostly built up from?—Mostly from white zinc, because it is nearly all white enamel that is used.

11,463. Why is it that you never use lead in any of your paints?—Our business has grown up without lead. Lead has been mainly the competitor against us. It is not used by us.

11,464. Have you found your experience perfectly satisfactory with paints that contain no lead?—Yes.

11,465. Has your business been a progressive one?—Largely.

11,466. And you have no inclination to revert to lead whatever?—No; but I am alluding to ship paints.

11,467. Principally for ships' bottoms?—Principally for ships' bottoms, and also the interior of ships and the sides of ships.

11,468. (*Lord Henry Bentinck*.) Would you mind describing to the Committee the process of grinding zinc paint? Is there a dust arising from the process of grinding?—Yes, certain dust arises, but that can be obviated very largely by having it in a closed vessel, and getting it into a tank in which oil is contained with the stirring arrangement, and then grinding it.

11,469. Thus, I suppose, none of the zinc dust gets into the lungs of the workers?—Very little.

11,470. Do you consider it necessary to protect the workmen against dust?—We have to protect some of our workmen against dust, because we use mercurial, copper, arsenical and other poisons in some of our compounds.

11,471. In the grinding of the pure zinc, I mean?—No.

11,472. You do not consider it necessary?—No.

11,473. You have found that zinc dust has had no ill-effect on the health of the workmen?—Not in our paints.

11,474. (*Dr. Collis*.) Do you make any other paints besides enamels?—Yes, compositions for ships' bottoms,

in which these poisons are used which I described just now, and different specialities for ships. We make a special paint for engine rooms, a special paint for the top sides, a special paint for the boot tops, a special paint for the holds, and for the decks and different things like that.

11,475. All these paints which you are mentioning are not enamels?—No. We make enamels as well as paints. I draw a distinction between the two.

11,476. And they contain no lead?—They contain no lead.

11,477. You make your paints entirely for use on ships?—No, also for land use. Enamels we make for land use—for house-painting or railway painting and so on.

11,478. But do you sell any paints which are not enamels for use on land?—Yes, but they are liquid paints, ready mixed paints, varnish paints.

11,479. For what purpose are they used?—They are used for various purposes—bridge-painting, house-painting, and also for decorative purposes.

11,480. Do you know whether they have been used much on the exteriors of houses and buildings?—No, not to a large extent.

11,481. Are you able to say whether they have been satisfactory where they have been used?—Yes, I believe so. I believe they have been satisfactory.

11,482. Your non-enamel paints, that is, the zinc paints which are not enamels, are used on board ship you say on the top sides and exposed to the weather?—Yes.

11,483. And do they stand well?—Yes, they stand all right.

11,484. Do they compare favourably, from the point of view of price, with paints which contain lead?—Yes.

11,485. What is the difference from the point of view of price?—Some of the paints are cheaper; for instance, oxide of iron paints, which we use, are cheaper than lead. Oxide of iron, as a rule, is a cheaper article than lead; and the black colour, as a rule, is cheaper than lead.

11,486. And the white colours?—For the white colours we use zinc.

11,487. How do they compare for price?—I think that they are dearer.

11,488. Do you know to what extent?—White lead is about 19*l.* per ton, zinc is generally about 22*l.* a ton. That is about the proportion.

11,489. You mean mixed paint?—No, the zinc or lead.

11,490. But I want to know as regards the paint as you send it out, because, weight for weight, zinc paint is so much bulkier than lead that it does not represent the same amount of paint, gallon for gallon?—I should say that the difference would be very slightly in favour of zinc.

11,491. Gallon for gallon?—Gallon for gallon, because zinc is so much lighter specifically.

11,492. It is not fair to quote prices by weight, but only by the gallon of paint, I think. You cannot give absolute figures?—No, I did not prepare myself to give those figures.

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[Continued.]

11,493. (*Mr. Sutherland.*) Your other painting business is quite a small side line compared with your general ship paint business, is it not?—The same paints that are used for ships are also used for houses. We manufactured these compositions originally for ships, and they have been gradually introduced for land purposes.

11,494. That is a comparatively recent development, is it not?—Yes, a more recent development.

11,495. And your enamels are a recent development?—Yes, they are a recent development.

11,496. The paint you use on ships, you say, are mixed with varnish?—Yes.

11,497. Why?—In order to make them adhesive. They are mixed with special varnishes in order to make them waterproof, and others again in order to make them soluble in sea water in a certain ratio. The varnishes are made so that they become soluble in sea water in a certain ratio. These paints have to be acted on by sea water in order to free their poisons.

11,498. I am not speaking about ships' bottoms?—I am speaking of the ship composition.

11,499. I am not concerned with that. I am speaking about the top paints. You put varnish in those?—Yes, those are made with varnish in order to make them washable.

11,500. Is that the only reason—to make them washable?—And to make them last longer—to get a certain hardness.

11,501. That implies that zinc paints have not the same permanency as lead—that without the varnish they would deteriorate, and to make the zinc paint permanent you have to add varnish to it?—Yes.

11,502. But you have not to do that with a lead paint to give it permanency?—No. Lead acts on oil differently from zinc.

11,503. That is really an admission that the lead is better as a general paint base than zinc?—Yes, that is so.

11,504. It also implies that the addition of varnish adds a considerable cost to it?—Yes.

11,505. So that the 3% per ton distinction between the two products in the raw state would not exhaust the difference in cost?—No. I am not comparing varnish paints with oil paints. When I was talking about zinc paints and lead paints, I assumed that both were made with the same base of varnish which we use.

11,506. That is so far as your own experience is concerned?—Yes.

11,507. Do you come to represent your own firm?—No; our association in Newcastle.

11,508. What association?—The Paint, Oil, and Varnish Association.

11,509. But they do not confine themselves to zinc paints, do they?—No. We have lead grinders amongst the members of the association.

11,510. You are not adverse to the use of lead, are you?—By no means.

11,511. You consider it good?—I think that lead for certain purposes is necessary, although I have fought it all my life.

11,512. You have fought it?—Fought against it.

11,513. But you think that for certain purposes it is necessary?—Yes, for certain purposes it is necessary.

11,514. (*Chairman.*) Would any serious difficulty arise if lead was prohibited?—I think so.

11,515. Can you tell us in what way?—The decorative trade, I think, would be upset altogether.

11,516. What do you mean by "upset"?—It could not adapt itself to paints which are entirely without lead.

11,517. Simply for decorative purposes you think it would not be so efficient?—I do not think that you could find a suitable substitute to do what is required in the decorative trade.

11,518. What do you mean by "what is required"?—For instance if you paint in a room and do not use lead and have not the drying action of the lead on the oil, you might have the paint wet for a week. Dust would get on and everything would get dusty, and you could not make a satisfactory job of it.

11,519. But supposing that the natural lead in zinc oxide was still allowed to be used?—Zinc oxide?

11,520. Yes. Supposing the trade were allowed to retain the natural lead which is to be found in zinc oxide?—But there is no lead in zinc oxide.

11,521. Yes, there is, when it is made by the direct method?—Perhaps 1 per cent.

11,522. More than that—sometimes up to 4 per cent.?—We have never found 4 per cent. in our white zinc—never. We have found, perhaps, up to 2 per cent. at the most.

11,523. What zinc white do you use—German, Dutch, or English?—I think we use mostly the Belgian and American.

11,524. Would not that natural percentage, between 1 and 4 per cent., be sufficient to act as a drier?—No.

11,525. What percentage do you consider would be necessary to act as a drier?—I should say 10 to 15 per cent. of lead in the paint to make it act as a drier, at least.

11,526. Have you used manganese driers?—Yes, I have used manganese driers.

11,527. Are they as efficient as lead?—Yes, for certain purposes they are.

11,528. Do you think that it would be absolutely impossible, if this Committee prohibited the use of lead, to find a substitute for lead as a drier?—No, it would not be absolutely impossible. I could not say that.

11,529. Supposing that the Committee reviewed the position, and they found that the health of the workpeople was so much affected by the use of lead that it became absolutely necessary to make a prohibition, do not you think that the painting world would find substitutes for lead and go on comfortably?—I think that the whole of our system of decorative painting would have to be changed in that case.

11,530. Would that be very harmful?—I should say so.

11,531. In what way?—You could not possibly, for inside work, obtain an article to satisfy the requirements of the trade which would dry sufficiently quickly unless you used lead.

11,532. Your evidence now is diametrically opposed to that of the majority of the master house-painters we have examined, because they have generally agreed that, for inside painting, zinc would be quite sufficient. Not necessarily zinc oxide, perhaps zinc sulphide, or lithopone. I am speaking of non-poisonous paints generally. I am not confining myself to zinc oxide. Do you mean to say that there is no non-poisonous paint on the market that will do for internal work?—It is going a little too far to say that.

11,533. Have you any great experience in house-painting?—I have had a good deal of experience, because we supply house-painters also, and I have come continually against lead paints.

11,534. Have you had experience yourself, direct, with regard to house-painting?—No, not personally.

11,535. You are speaking now from the inference you have drawn from the people who have bought your paints?—Yes, I have the experience of our researches.

11,536. But have you had any practical experience of the painting of houses inside and outside?—Not beyond that I get my houses painted regularly, and look after them and see how it is done.

11,537. What houses?—My own dwelling-houses and my offices.

11,538. But not otherwise?—Not otherwise.

11,539. You are speaking generally now from what you have heard from master house-painters?—We have made very far-reaching researches in reference to all these questions, because we keep a large staff of chemists, and we experiment in reference to all these questions, and have done so for years.

11,540. (*Mr. Sutherland.*) We have no native sources of supply of zinc?—No, I believe not.

11,541. So that, if white lead was prohibited, the painting trade and the paint manufacturers would be entirely dependent on supplies from foreign countries for its continuance?—Yes.

11,542. Do not you think that that would be a serious matter for the paint grinders and paint manufacturers?—Yes. May I speak a moment without a

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[Continued.]

question? I have been asked, "Is it possible to do away with lead?" Of course, in a case like that nothing is impossible. You can always adapt yourself within a certain radius, within a certain efficiency. I do not see why it should be contemplated to dispense with lead.

11,543. I am not asking about that?—That seems to be the inference from the question.

(*Chairman.*) It is contemplated.

11,544. (*Mr. Sutherland.*) In case of the contingency arising of white lead being prohibited, we should be dependent entirely on outside sources for the supply of a material which represents a very important trade?—Yes. May I make an observation? Very many ships use red lead for inside painting. Every four years a survey is held, and during these surveys the paint has generally to be removed to examine the surface of the iron or steel. The removal of the paint is done by hammering. The holds of the ship are one mass of lead dust then, and the men are working dry after day in this mass of dust. I think if a restriction is intended for the use of lead, that would be a case where restriction should be imposed. It is not in the application, but in the removal where the danger is, because those men, if they had to do that continually, would very quickly suffer from lead poisoning, but fortunately for them they are not always doing this work. Sometimes they work outside, and underneath the ship's bottom, and so they have sufficient variation of work to be somewhat protected against lead poisoning. In many cases, or in most cases, there is a chance of the lead working out of the system, before fresh doses of poisoning set in.

11,545. (*Chairman.*) What have you come to tell us specially to-day?—I had three headings on which I offered to give evidence. I had the heading of "The effect of applying oils and varnishes containing lead compounds, and the removal of these coatings." Then I had "The mixing of lead paints and their application on board ship." Then I wanted to speak on the perishable nature of lead paints and the removal of lead paints by mechanical means. Those are points which I have more particularly under my observation.

11,546. (*Mr. Sutherland.*) What is the first?—"The effect of applying oils and varnishes containing lead compounds, and the removal of these coatings."

11,547. (*Chairman.*) I do not think that that is germane to this inquiry?—Very well.

11,548. The point of this Committee is to inquire what remedies can be introduced to mitigate the evils which ensue from painting houses and other things with lead paint.

11,549. (*Lord Henry Bentinck.*) Perhaps you were going to speak of the evils attendant upon that?—I should like to speak upon that. I consider that most of the lead poisoning that we have to contend with is in the sand-papery of coats of lead that have been applied, in order to prepare for the next coat. An enormous amount of dust is created through that, and that is partly inhaled and partly swallowed.

11,550. (*Chairman.*) We have been told that the quantity of dust generated from sand-papery in some cases is very small. Would you say, generally speaking, that that is not so?—No; it cannot be so. You have a comparatively rough surface before you commence sand-papery, and after the sand-papery is done, you have an absolutely smooth surface. I should say by sand-papery you remove 25 per cent. of the surface.

11,551. (*Mr. Sutherland.*) Are you referring to ships?—No; I am speaking generally there. I think that sand-papery of lead paint should be prohibited, and you should use pumice stone and give sufficient time to dry, so that the wet process can be used.

11,552. (*Chairman.*) Would any harm be done to the surface if you insisted on it all being rubbed down in a wet state?—No, I do not think so, not if the coat has sufficient time to dry.

11,553. (*Lord Henry Bentinck.*) That would increase the cost?—It would increase the cost and increase the time. It is not a very pleasant thing to contemplate.

11,554. (*Chairman.*) Do you think it possible to introduce any contrivance in the shape of an exhaust draught to remove the dust that is generated?—I do not think it is.

11,555. I am afraid to ask these questions, because from what you have told me you have had no direct experience in house-painting, and so on?—No, I am not a house painter; I am a manufacturer.

11,556. But could you speak positively as to the feasibility of abandoning all dry rubbing down?—Yes.

11,557. You think that it is quite possible?—Yes, quite possible.

11,558. But more expensive?—It would be more expensive. It takes a longer time. If it is rubbed down in the wet, time must be allowed for it to dry.

11,559. Have you any idea what extra expense would be incurred?—I could not give an estimate of that.

11,560. What length of time would you have to give?—You will have to give another 24 hours for each coat.

11,561. Is it practicable to give an additional 24 hours for each coat?—I see no reason why not. You have to submit to the painter so much longer.

11,562. (*Lord Henry Bentinck.*) Whether you prohibit lead or whether you add to the time, you are putting a burden on the customer, are you not?—Yes; you are increasing the cost in any case.

11,563. Then there is very little difference, whichever you do, I should think?—Perhaps so.

11,564. (*Chairman.*) It might prolong the painting of the house two or three weeks. Is that a desirable thing?—Not two or three weeks. If you put on four coats that will be about the most that a house will take. If you gave each coat an extra 24 hours to dry, it would not be three weeks.

11,565. But you do not paint the whole of the house simultaneously?—No.

11,566. You take room by room. If you had a delay of 24 hours in one room, and a delay of 24 hours in the next, would not you prolong the painting time indefinitely?—That is a matter of arrangement of the work.

11,567. Is not that a practical difficulty?—I should say that four or five days would be the minimum amount of delay, but you can spin it out as much as you like if you do not arrange your work properly.

11,568. Is there any other subject you would like to speak on?—One suggestion that I should like to make is this; in house-painting where leads are used, a large amount of poisoning will no doubt obtain through the finger nails and absorption.

11,569. Do you think so?—Yes, I think so.

11,570. You are entirely mistaken on that point?—I think it is bound to be absorbed.

11,571. No, it is not. You ask Sir Thomas Oliver of your town, and he will tell you that that is not correct?—Well, I spoke to him some time ago—it may be two years ago—and at that time he was under the impression that absorption would take place.

11,572. (*Mr. Sutherland.*) You were going to say something about mixing paint. Do you mean with regard to the mitigation of the perils of lead poisoning?—That is what I wanted to refer to.

11,573. To reducing the danger of lead poisoning?—Yes. Red lead, for instance, is mixed in a dry state. You cannot keep red lead moist. You must keep it dry, because it hardens the oil. On board ship they are very careless. They have a barrel of red lead. They take it out with a trowel, or whatever they have, and throw it into a bucket, and pour a little oil over it, and dust continually arises while they mix it. That is a source of danger which perhaps may not come within the scope of this inquiry. But it certainly exists.

11,574. Is not there a red lead that is supplied moist?—No; you cannot have it.

11,575. I thought there was. I do not know the maker, but I understood so?—I never heard of one.

11,576. (*Lord Henry Bentinck.*) I am not quite clear where your paints are applied?—Are they applied in the open air? I do not mean only to ships; I know all about those. Are they applied to public buildings in Newcastle and to iron?—Yes.

11,577. Stations?—Tramway posts and railway stations.



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[Continued.]

11,578. Inside railway stations?—Yes, inside railway stations.

11,579. Do they stand the action of sulphuric acid?—Yes.

11,580. What is the atmosphere of Newcastle like?—Well, pretty thick.

11,581. Sulphurous?—Yes.

11,582. You find that it does not suffer from the action of the bad atmosphere of a railway station, for instance?—No, I cannot say it does. We have not painted a railway station at Newcastle, so I cannot speak from experience there.

11,583. You have painted railway stations?—Yes, but not at Newcastle. We supply to railway companies, but I cannot say what station it is used for.

11,584. Are your paints largely used in Newcastle for outside work?—Fairly largely.

11,585. Do they last as well as other paints?—Yes, I think so.

11,586. Your only fear about zinc paints, then, is for the inside decoration?—Yes.

11,587. Because of its drying property?—Yes.

11,588. Do you think if you were given two years' time, you could invent something which would make it dry?—I do not know.

11,589. Your scientific persons, I should think, could manage that?—My chemists have worked on this now for many many years, upwards of twenty years some of them, and none of them has thought it would be possible to do away with lead paints.

11,590. (Chairman.) They must be very much behind the times?—I do not know, that ours are behind the times.

11,591. The Office of Works for the last four years have used leadless paints for decoration and everything, for inside and outside work, from Buckingham Palace down to a prison. Now, if they can do it, why cannot your chemists do it?—I do not know what they have done. Does the question of colour come in at all.

11,592. No, it is not a question of colour?—Or of preparation?

11,593. No. You say your chemists have tried for many years to find a substitute for lead and have not found it. I tell you the Office of Works have not only found one, but are very pleased with it in every form, both with regard to its efficiency and cheapness?—I am glad to hear it.

11,594. Do not you think that that ought to weigh very much with us?—Yes. In that case we must be behind the times.

11,595. (Lord Henry Bentinck.) You can get any gradation of colour and quickness of drying in enamels?—Yes.

11,596. It is only when people want a dull surface that the difficulty would come in?—Yes. You can make enamels without any lead at all.

11,597-8. And they have the quick-drying qualities of the lead paint. The hardship would arise when anybody wanted a dull surface?—Yes.

11,599. (Mr. Fell.) Have you ever used or supplied any paints for carriage work?—No, never.

11,600. Not for tramways?—We supplied some to the Newcastle Tramways Company for enamelling the cars.

11,601. That is all enamel, not paint?—That is enamel not paint. All our enamels are free of lead.

11,602. Have you had any difficulty in producing certain colours with zinc? Take chromes, for instance?—We have only a comparatively small range of colours in our business, and those colours have all been adapted without lead. We have never tried some of these very fine gradations where lead paints may be needed. We only supply certain standard colours of paints quite outside of that.

11,603. Have you done that because there has been a difficulty?—We made up our minds from the start that we would not go into these very fine gradations, because the atmosphere in Newcastle is not sufficiently clear as a rule. You would not be able to see them. The light is not good enough. So we have confined ourselves to standard colours. If anyone wants to grade colour we leave that to other manufacturers to supply.

11,604. (Mr. Mason.) Can you give us any idea as to what colours cannot be produced without the use of lead?—No, that I cannot do. I cannot go through the range. There are hundreds and hundreds of colours that are made. Some are made with lead; some are made without lead. I am sorry I cannot answer that.

11,605. (Mr. Parsonage.) Have you any personal knowledge of the time it takes for zinc paint to dry on interior work?—No. I never apply the paints myself, so I cannot speak from personal experience of applying them.

11,606. What do you speak from with regard to its taking a week to dry?—I am speaking from the reports which I received with reference to the different paints.

11,607. Different zinc paints that have been used?—Paints with varnish can be made to dry within an hour, if you like, but as you make the varnish dry quicker you do it at the expense of the lasting properties. You can make a white zinc dry in any time you like by adding varnish to it, and you can make a varnish dry within an hour if you want to, but you do it at the expense of the lasting property. If you want to have a lasting paint you must have a considerable amount of oil in the paint. The lead acts on the oil much more rapidly than the zinc. With lead you get a very much more quickly drying material than if you use zinc.

11,608. (Chairman.) The Office of Works in their formula use linseed oil and turpentine. They have given evidence here to the effect that that formula has proved just as efficient both with regard to durability and finish as a former formula they used which contained lead?—But I am speaking about the drying now. With regard to cost, I quite agree, it would not be higher. Zinc is so much more voluminous and spreads further.

11,609. What do you say to the evidence we have received? What is your explanation of what I have just told you?—I say it is a physical impossibility that two paints, one mixed with lead and another, the same mixture, mixed with zinc, can dry equally quickly.

11,610. Do not you think that the Office of Works would have brought that forward as a very strong objection to the use of their formula, if they had proved to themselves that the drying property is so inefficient that it takes considerably longer time to paint with the different paints?—That I cannot answer.

11,611. (Mr. Sutherland.) Do you know the Office of Works formula?—No.

11,612. If varnish enters largely into it, that would really sustain your point?—Yes, that may account for it.

11,613. (Lord Henry Bentinck.) In other words, the lasting quality of the paint as used by the Office of Works cannot be as great as other paints made without varnish?—You will get no end of contradiction on this. You cannot get two men to mix paints alike, and everybody's idea of what a paint ought to be is different.

11,614. (Dr. Collis.) May I on this point read the answer of Mr. Patterson, of the Office of Works? "It was soon discovered that when zinc oxide was mixed with refined boiled linseed oil with the usual thinners and a trace of litharge and borate of manganese driers, such paints dry quite well." There is no reference to any varnish there?—You have litharge. You have lead.

(Dr. Collis.) But that amount of litharge requisite for driers, it is not proposed to remove. There is no mention of any varnish in that answer of Mr. Patterson.

11,615. (Mr. Gardner.) You told us that the paint you manufacture is largely a leadless paint?—Yes.

11,616. And largely used for shipwork?—Yes.

11,617. And it is quite satisfactory?—Yes.

11,618. There is no more severe test of paint than painting on board ship. I suppose you agree to that?—That may be.

11,619. You supply paint for the skin of a vessel?—Yes.

11,620. Is that an oxide of iron paint or zinc?—For inside use it is oxide of iron paint.

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Mr. M. HOLZAPFEL.

[Continued.]

11,621. Where do you use the zinc paints on board?—Mainly in the engine room and for deck work.

11,622. They are zinc paints?—They are zinc paints.

11,623. A zinc paint in an engine room must stand a severe test?—No, I do not think the engine room is at all a severe test. I think the severe test is in those parts of the vessel which are exposed to the weather. They are exposed to sunshine when they go south and then to cooling.

11,624. It is a severe test for zinc paints on the bulwarks and deckhouses to be exposed to the sea air, the action of sea water and the sun?—Yes.

11,625. It stands quite satisfactorily?—I must draw a distinction there. It stands quite satisfactorily, but a ship is generally painted once a year if not oftener. It is supposed to stand six or eight months.

11,626. You would not get the same amount of action in the inside of a house or the outside of a house

as you get in a ship?—You cannot get such a severe test.

11,627. One year on a vessel would be equal to half a dozen years in an ordinary place?—I cannot say how it would compare, but the test is severe.

11,628. Take the inside of an engine room. You get strong heat and steam?—No, not steam in an engine room.

11,629. I have seen a tramp steamer engine-room full of steam, and you have the sun beating down?—It lasts three to four years. It is washed down.

11,630. It is a severe test?—In an engine room it is not so severe—not much more than in a house. There the difference is very slight.

11,631. Your paints have been very satisfactory so far?—Yes.

11,632. You have had no complaints?—No.

The witness withdrew.

Mr. A. W. WILLIS examined.

11,633. (Chairman.) Do you attend here to-day as a representative of the London Colour, Paint, Oil, and Varnish Trades' Association?—Yes.

11,634. Do I understand that at a meeting held at the Cannon Street Hotel on the 19th July, authority was conferred on you and other gentlemen representing the London Association to speak generally in the name also of the Hull Paint and Colour Manufacturers' Association?—Yes.

11,635. The Liverpool and District Paint, Colour, and Varnish Manufacturers' Association, and the Scottish Oil, Colour, Paint, and Varnish Trades' Association, as well as your own Association?—Yes.

11,636. Was a similar authority also conveyed by letter from the North East Paint and Oil Trades' Association?—Yes.

11,637. I understand that you are instructed to speak, in the first instance, regarding the amount of capital invested in the manufacture of paint, colour, oil, and varnish?—Yes. It is estimated that a capital of nearly ten millions is employed in the industry throughout the country.

11,638. Can you tell me what proportion of that capital is essentially confined to the manufacture of paints having a white-lead basis?—It is impossible.

11,639. To what extent would the employment of that capital be affected by an increased demand for zinc or other non-poisonous paints as contrasted with lead paints?—It would certainly increase the demand for zinc paints, because, in white, that is the only alternative.

11,640. My question goes further than that. To what extent would the employment of that capital be affected by an increased demand for zinc or other non-poisonous paints as contrasted with lead paints?—It is thought that if zinc were used instead of white lead and the lead products are to go with the white lead, then it would upset the manufacture of colours, and there would not be as many varieties of colour made. It would be impossible to make such a variety of colours, and consequently there would be less employment. Work would be reduced in volume.

11,641. Would it not be possible to utilise the same machinery and plant generally in grinding zinc or other non-poisonous paints?—I prefer that Dr. Crow should answer that. I am not a technical man.

11,642. Very well. Can you give me figures showing the extent to which you, as a grinder and manufacturer of paints, not concerned in the actual production of white lead, would be affected by a general change from lead to non-poisonous paints?—I am not in a position to answer that question.

11,643. Now, I understand that you wish to speak with regard to the cost of meeting the requirements of the Home Office in regard to Special Rules?—Yes. Of recent years there has been investigation made, and new regulations have been formed, which have put all grinders of white lead to considerable expense,

and in some instances I understand that the expenditure has run into thousands of pounds.

11,644. I understand that that expense has been incurred in introducing appliances to protect the workpeople?—Yes, to protect the workpeople, with beneficial results. I have figures in favour of it here.

11,645. The results have been beneficial to the workmen?—Yes, beneficial to the workmen.

11,646. Have you found the adoption of such precautions has resulted in a considerable decrease in the risk of lead poisoning?—Yes; the official figures say so. In white-lead works the average for ten years up to 1909 was 129.5 cases with 3.1 deaths; in 1910 only 34 cases with one death. In paint grinders the average for the ten years was 42.2 with 0.7 deaths. Last year there were only 17 reported cases with one death. That speaks very strongly in favour of the effect of regulations to benefit the workmen.

11,647. What deduction do you wish the Committee to make from your statement that you have made great expenditure in protecting the health of the workpeople in the use of lead?—In the first place the benefit of regulations, and in the second place that we look upon it as an industry that should be represented before your Committee, not only for its size but because they have always been ready to conform to any requirements which would benefit the working-man.

11,648. Do I understand you to mean that, because you have complied with the Home Office request that you should introduce adequate protection for the workpeople, you have thereby reduced the number of cases by approximately two-thirds, and that that ought to be borne in mind in any regulations the Home Office make in dealing with the subject of this inquiry of ours?—No, I do not suggest that.

11,649. Then what is the point?—I put it here that the fact that we are an important industry forms a claim for the fullest consideration of the case from our point of view.

11,650. Then, because you are a large industry, you want this Committee to take that into consideration in any action they may take in limiting or prohibiting the use of lead, is that the point?—That is the point.

11,651. We shall take that into consideration. I understand that you are instructed to speak in regard to the suitability of white lead and other white pigments for general decorative purposes?—Yes.

11,652. What do you wish to say on that?—The paint grinders wish to say that in their experience white zinc is not as suitable, especially for outdoor work, and is not as reliable as white lead. It will not wear as well. It will perish sooner, especially in this country, where, taking London, it is estimated that there is sulphur corresponding to 600,000 tons of sulphuric acid discharged into the air in one year. That has a marked effect upon zinc paint. I happen to have some boards here that were exposed in Hull, where the atmosphere is very similar to that of London. This was there for

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[Continued.]

three years. Here is genuine white lead, here is genuine white zinc paint, and here is a mixture of white lead and zinc, and they are all reduced with the same thinnings (*producing some specimens*)?—It happened to me in my office. It has been there now for over six months.

11,653. (*Mr. Sutherland.*) How long was it exposed?—For three years.

11,654. (*Lord Henry Bentinck.*) Would you explain it a little more. The white-lead paint apparently has worn off altogether?—No; that is good. It is discoloured by the air. The white zinc has perished to a very great extent. *This is the mixture of the two.*

11,655. How much lead?—Two-thirds lead to one-third zinc.

(*Chairman.*) I do not think that this proves anything, because we do not know how you may have mixed them. We have against that testimony the evidence of the Office of Works, who have used zinc paints for the last four years both for inside and outside, and have found them satisfactory. We could not judge whether that was a fair experiment unless we knew exactly the formula of each paint.

11,656-7. (*Mr. Gardner.*) You did not treat the zinc in any special manner?—No; we used ground zinc.

11,658. (*Mr. Sutherland.*) And you used the same medium?—The same medium.

11,659. (*Chairman.*) There are a number of non-poisonous substitutes for white lead at present on the market?—Yes.

11,660. Have you made exhaustive trials of any of them?—Yes, in addition to zinc oxide, we have tried zinc sulphide. Zinc sulphide is no use for exterior work. It changes colour in the sunlight.

11,661. The Office of Works have succeeded in obtaining a formula, which is perfectly satisfactory. How do you account for the fact that you have never heard of it. Are they not great buyers of paint?—The Office of Works, I presume, are large buyers.

11,662. One of the largest buyers, I suppose?—No, by no means.

11,663. Not one of the largest?—Oh, dear no. I should put the Admiralty down as the largest buyer.

11,664. But the Office of Works are very large buyers?—Yes.

11,665. And should not their conclusions be received with great respect?—I do not know the conditions under which the experiments were made.

11,666. It is not experiment. It is actual work in their buildings. In their evidence they said that they had painted Buckingham Palace, the Government buildings, and small offices, and so on, and for four years this formula has been used with satisfactory results. Is not that a very important piece of evidence for us to consider?—Yes, it would appear so. It is impossible to judge without knowing further the way in which it was used.

11,667. It was used in the ordinary way, and they used it instead of white lead, and they found it as a substitute for white lead eminently satisfactory both with regard to durability and with regard to its cost. I think that you might mention that to your society and see what they have to say about it?—Yes, I will report it.

11,668. Has your society ever made any strenuous attempts to find a substitute for lead for use in paint?—We are always doing that.

11,669. But are you wishful to find a substitute?—Yes.

11,690. If you found a substitute for lead, would not your objection as to imperilling the capital of your industry come into play?—The whole trade grinds a large quantity of zinc.

11,671. I understand that one of your main points to-day is to ask us to consider the fact that you have invested a large amount of capital in the lead industry, and that you have been careful to observe the Home Office rules and regulations. You wish us to bear that in mind?—Yes.

11,672. Then you say that you have made very great experiments to find a substitute for lead. If you did find a substitute for lead, would not the point arise that

you would be injuring your own capital?—Yes. I should not accept on behalf of the trade the evidence of the Office of Works.

11,673. I did not ask you that. Please do not deal with that. You say that you have tried to find a substitute for lead for some considerable time?—Yes.

11,674. If you succeeded in finding a substitute for lead, would not you by your own act be imperilling your own capital that is invested in the industry?—No, because speaking as a grinder only, and not as a lead corroder, it would not make a great difference to the grinders whether they ground white lead or a substitute.

11,675. But I am asking you to speak for your association. You have made a statement to us that you want the Committee to take into consideration the fact that you have invested an immense amount of capital in this business?—Yes.

11,676. You say, "We have carried out the Home Office rules; we have been the means of greatly mitigating the evil of lead-poisoning in this industry; do not forget it; do not imperil our capital." That is what you have asked us, is it not?—No.

11,677. Then please state what you did mean?—It was a justification for appearing before you to represent our side of the case, particularly with regard to lead products, which is the strongest point with us.

11,678. But what is the deduction we are to make? I do not understand your point?—We have the two in combination, not only white lead but lead products.

11,679. May I ask you this: Do you mind, as an industry, from the capital point of view, whether lead is prohibited in the house-painting trade?—No.

11,680. Your association are not manufacturers of white lead?—No, we are not manufacturers of white lead.

11,681. But you represent manufacturers?—No, grinders.

11,682. They are two distinct industries?—Lead corrodors form the other section of the trade. We represent the houses who buy their dry lead and grind it. We are none of us corrodors.

11,683. (*Lord Henry Bentinck.*) To your association then, it is a matter of utter indifference whether white lead is prohibited or not?—Yes, from that point of view.

11,684. (*Mr. Gardner.*) You are interested in lead compounds for tinting purposes?—I am only speaking now of white lead, not lead products.

11,685. (*Chairman.*) Why do you draw special attention to the immense amount of capital you have invested in the business?—As a justification for appearing before you.

11,686. To give evidence?—Yes, to give evidence.

11,687. And only on that account?—Yes, that is it.

11,688. Then I quite agree. That is most proper?—With reference to the suitability of white lead and other pigments for general decorative purposes, with a view to correcting or confirming their own opinion as to the relative cost, body, covering power, and durability of white lead as compared with zinc white and other substitutes, representatives of the Paint Manufacturers' Associations have made inquiries of certain representative decorators and coach-builders in different quarters of the kingdom, and here is a summary of the 350 replies received. May I read those to you?

11,689. I do not think I can take this unless I have the names of the firms?—The names are all here.

11,690. We have heard a great many of these gentlemen?—Since we started this we found that you had had several painters before you.

11,691. Do I understand this to be a summary that you have made of the letters?—A summary of the replies.

11,692. We must consider very carefully whether that shall be put in as evidence. I do not know whether there is any precedent for evidence being tendered by proxy. I have never heard of evidence being accepted in this form, because there is no opportunity for cross-examination. I am much obliged to you for the trouble you have taken in getting this evidence. You will leave the replies with us?—Yes.

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[Continued.]

11,693. (*Dr. Collis.*) I do not understand which years you quoted with reference to lead poisoning in the paint and colour industry?—1900 to 1909 inclusive.

11,694. You know when the regulations came into force?—I am not quite sure.

11,695. In 1907, in January. In 1909 there were 39 cases with two deaths?—Yes.

11,696. That is the only year of the whole 10 years that you have chosen in which there are two deaths?—It does not follow that they were contracted that year.

11,697. I am taking your figures. There are only four years of the whole 10 which are higher than that?

(*Chairman.*) It is not very material.

11,698. (*Dr. Collis.*) No, it is not very material; but, having regard to the expensive appliances which you have installed, we expect a greater reduction in the future. We are not blaming the paint and colour manufacturers for a moment?—I am only drawing your attention to the facts. In 1908, the year after the introduction, the cases were reduced to 25.

11,699. In 10 years there were 422 cases?—Yes.

11,700. We expect a reduction to follow. Forty-two is the average for the whole 10 years, and in 1909, the last year of the 10 which you have, the number is 39; 1909 also happens to be the only year of the whole series in which there are two deaths?—Lead poisoning is cumulative.

11,701. Why should there be a rise up to 39 cases?—In all these things there are variations. Some of these cases may have been recurrent cases.

11,702. Sufficient time has not elapsed, since the bringing in of the regulations, to give you or ourselves an opportunity of seeing the value of them?—To bring the cases down to 17 from an average of 42 is significant.

11,703. (*Chairman.*) Among house-painters, the average yearly number of reported cases is 197.3 and 38.3 deaths, and in 1910 there were 232 reported cases and 35 deaths?—Yes.

11,704. They have gone up?—Yes; showing considerable room for regulation and education of the boy at school. He should be taught that when he is handling lead or lead products he has to be careful of lead poisoning, and regulations should be exhibited in workshops. We think that those would be very valuable means of educating the men, even if they were not always carried out.

11,705. How would you propose to get rid of the dangers arising from the dust that is generated in rubbing down, and dust and splashes in other operations?—There is no dry white lead used by painters, speaking broadly.

11,706. How would you propose to get rid of the dust that is generated in dry rubbing down?—By the use of respirators.

11,707. Have you ever known a respirator that would do?—Mr. Carson is prepared to show you a respirator which has been used.

11,708. But supposing that the men would not wear the respirators?—I think that they should be subject to a fine; I think that that would soon make them use them, especially when it was pointed out to them that it was for their own benefit.

11,709. (*Dr. Collis.*) You have referred to the money which has been expended by the paint and colour trade in setting up the appliances for carrying out the Home Office regulations?—Yes.

11,710. Those appliances have to be maintained, have they not?—Yes.

11,711. And they cost money for maintenance?—Yes.

11,712. Exhaust fans have to be kept running, and they have to be kept painted to preserve the fan?—Yes.

11,713. Medical examination has to be paid for?—Yes.

11,714. Although you have expended a large amount of capital, you still have considerable expenses in maintaining the regulations?—Certainly.

11,715. Which you would avoid if you were not grinding lead paints?—I think that we should still use them to prevent certain dust getting absorbed by the worker.

11,716. We should not object to your using them, of course, but my point is that the Home Office regulations would not call upon you to continue to spend money in that direction. You would not have the regulations as at present drawn, so there would be a saving as far as the legal requirements go?—Yes, in the upkeep.

11,717. So that although you had to spend money in the past, if there was a prohibition of lead you would actually be saved something?—Yes. We do not look on that as very important.

11,718. No, but since you raise the question of the money expended, it is a point that, I presume, has also to be taken into consideration, is it not?—Yes.

11,719. Do you wish to speak yourself in respect of respirators, or do you leave that to Mr. Carson?—I leave that to Mr. Carson.

11,720. (*Mr. Sutherland.*) Do you know the paint formula of the Office of Works?—No, I have no knowledge of it.

11,721. You have never tendered?—No, not direct, since they have had a new formula out.

11,722. Do not you think it an extraordinary thing that the manager of a department in the Office of Works should have solved this question of substitutes satisfactorily?—Yes, I do.

11,723. When paint manufacturers have been striving for a long while to find a satisfactory substitute, do not you think it an extraordinary thing that the Office of Works should have succeeded where the manufacturers have not?—Yes. I do think it most extraordinary that they should have found out what other painters have been unable to find out.

(*Chairman.*) Sir Henry Tanner encouraged them for years. They have been experimenting for 12 or more years, and were most zealous and determined, and they have achieved this result.

11,724. (*Mr. Sutherland.*) Do not you think that any firm who found an effective substitute for white lead would readily scrap all their machinery and make this substitute, if it was as good as white lead as a paint base?—Yes, if it was as good under all circumstances, they certainly would.

11,725. Would not they make a great fortune out of it?—No doubt they would.

11,726. So that the point that the Chairman was seeking to bring out would be answered by that reply?—Yes.

11,727. Any firm that could find a basic substitute for white lead that would give all the qualities of white lead, would make an immense fortune?—Yes.

11,728. You do not know of any such substitute?—No, we have not found one yet.

11,729. You would not say that zinc white, good basic material that it is, has the qualities of white lead?—No; the trade maintain that it has not.

11,730. It needs to be fortified by the addition of varnish?—That improves it, but that will not do under all circumstances.

11,731. But for outside work?—It helps.

11,732. With special oils?—It would not be equal in our opinion to white lead then for outside work.

11,733. So that there is a very marked difference between the two as a base for paint?—Yes.

11,734. You know that a large number of paints that the Office of Works specify are proprietary paints. You would not compare those with a base paint like a white lead paint. It would not be fair, would it?—No, I should say not. I do not know what they contain.

11,735. Two or three well-known firms have been before us and said they supply the Office of Works and make their paints according to the Office of Works formula, but you would not accept that as a basic paint like you would accept white lead and linseed oil?—No.

11,736. It is a special formula to which are added special things to give it the lasting qualities which they claim for it?—Yes.

11,737. (*Mr. Fell.*) Does your association prepare paints for coaches, tramcars, and motor cars, and that sort of thing?—Yes.

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[Continued.]

11,738. Have they experienced any difficulty in preparing certain colours?—Dr. Crow will deal with that.

11,739. (*Mr. Gardner.*) As paint grinders, when you put out new material on the market, such as some of the water-paints, you do not expect a painter to use them as he would ordinary white-lead paint. You would expect him to use special precautions and prepare them in a special manner before he puts them on a wall or uses them in a room?—Yes, he has to follow out the instructions usually given with the particular article.

11,740. But when zinc is issued, you do not issue any special instructions?—No. Zinc is usually supplied like white lead, in a stiff paste, and the painter mixes it up to his own requirements. It is only when it is mixed specially, ready for use, and sold under a proprietary name that it comes under a different category.

11,741. The painter in getting zinc gets it like white lead and uses it as white lead. He gets no warning: "This is not white lead, and you must prepare it in a special manner in order to get a satisfactory result?"—A painter should know the difference between white lead and white zinc, and he mixes the paint according to the work that it is for. If it is for inside work, he mixes it in one way; if it is for outside work, he mixes it in another way.

11,742. But how could a painter know, if he has had no experience of zinc, the difference between white lead and zinc when preparing it for use. No intuition would teach him how to do it. He must learn how to use the material?—The master painter is the man who teaches him.

The witness withdrew.

Mr. K. K. CARSON examined.

11,749. (*Chairman.*) Do you attend to-day as a representative of the London Colour, Paint, Oil, and Varnish Trades' Association?—I do.

11,750. Have you the same authority as Mr. Willis to represent certain provincial associations as well as your own?—I have.

11,751. I understand you are instructed to speak mainly in regard to precautions which may be taken for mitigating the evils of lead poisoning?—Yes.

11,752. In the first place, do you advocate the supply of ready-mixed paint to painters?—I think that it would be a distinct advantage if the painters were to buy their white-lead paint in a ready mixed form, but if they will not do that, I think it would be very advisable that they should employ one man specially for mixing, and not allow all their staff of painters to mix separately and then take the paint to their jobs. I think that that is a great source of danger.

11,753. Do I understand that you consider the mixing of paint by painters themselves to be a dangerous operation?—I do, unless they keep themselves clean.

11,754. Do you consider the handling of dry white lead, without proper precaution, to be a grave source of danger?—I should say certainly with painters, and there is no necessity at all for them to be supplied with it.

11,755. Do you advocate, then, the prohibition of the sale of dry white lead?—Absolutely.

11,756. Do you consider that the wearing of overalls by painters should be made compulsory?—Certainly.

11,757. And that the overalls should be washed periodically?—At least once a week if the men are in regular employment. If they are jobbing men, the overalls ought not to be used for more than seven or eight days.

11,758. And they should certainly be removed during meals?—That I consider is a very essential point.

11,759. This would of course involve the provision of a suitable place to deposit the overalls?—They can usually hang them up, I think, where they are working; they would be quite safe. There is generally a room that is idle.

11,743. But the master painter does not know any better than the workmen, when he gets a new material. He has been accustomed to white lead all his life, and unless he is told by the grinder or the manufacturer: "This is a new material and it requires special treatment," how is he going to give it that special treatment?—But he has not had the new material yet. White-zinc paint is not a new article. It has been before the public and been used by painters for very very many years. It is not a new article.

11,744. No, it is not a new article, but it is quite a different article from white lead, and I suppose you will take it from me that not 50 per cent. of painters use it?—Very likely not, especially the lower-class painter. The high-class painters would all know the value of zinc, and how to mix it, because they would want it for special decorative work.

11,745. Do you sell much bleached boiled oil to painters?—Nothing in comparison with dark boiled oil.

11,746. Do not you think that you could do a much larger trade by recommending it for use with zinc?—My firm always do recommend it.

11,747. I have been making inquiry among a number of master painters, and 75 per cent. of them have never heard of bleached boiled oil; it never is inquired for and they do not know what it is used for. I am speaking of large firms. I think that the grinders should go into that question a little bit, and recommend it for use with zinc?—We recommend the use of bleached boiled oil in our printed instructions.

11,748. When you send it out for use?—Yes.

11,760. In a room where lead is used?—It would not matter at all if the paint were dry.

11,761. What about the dust?—There is no dust from lead after it has been put on.

11,762. But I am referring to the droppings on the floor that are kicked up?—That would not hurt at all.

11,763. Why not?—It is all mixed with oil, and it oxidises the same as on the wall. No dust can possibly come from lead which has once been mixed with oil.

11,764. Except when it is dried up?—When it has dried up, it is not powder.

11,765. (*Lord Henry Bentinck.*) What is the object of washing one's hands then?—They eat with dirty hands very often, and they absorb it through the mouth.

11,766. They do not absorb it in a wet state, but in a dry state?—They can absorb it if it is mixed in oil or if it is in dry powder, equally.

11,767. (*Chairman.*) I understand you to say that you advocate overalls being hung up at night in the rooms where they have been at work?—Not at night. I think they ought to have a proper room for the purpose—but while they are taking their food, I mean. They may be away on a job.

11,768. Would you advocate a rule prohibiting overalls being left in any room where work is being done?—Certainly, over night.

11,769. Or in the daytime?—It depends on how long the work has been done.

11,770. Would it not be better to prohibit it altogether?—I quite agree. You cannot be too careful, I admit.

11,771. Do you consider it essential that the employer should always provide his painters with a supply of water for washing?—Most essential—and and soap.

11,772. And hot water?—Cold, preferably.

11,773. Why is not hot water better?—Hot water tends to open up the pores rather than cold.

11,774. You do not put that forward seriously as an objection?—No; it has been said to me by men who have experience.

11,775. Is it not more reasonable to say that without hot water you cannot clean your hands properly?

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—Yes, to a certain extent, I think it is, but I have had that put to me. I think it does not very much matter either one way or the other.

11,776. You advocate also a supply of soap and towels?—Certainly; that is very essential.

11,777. A regulated number of towels, I suppose?—Yes, certainly.

11,778. Do you consider that a certain time should be allowed to the men for washing purposes before each meal time?—I do.

11,779. Out of the employer's time?—Certainly.

11,780. You recognise that the breathing of lead dust in the process of dry rubbing-down is a serious danger?—I certainly think it is.

11,781. What precautions do you recommend in regard to this danger?—The use of a suitable respirator, in my opinion, or prohibition altogether. This is a form of respirator that we have used for some 60 years or at least 40 years (*producing the same*).

11,782. To take your alternative suggestion first, could you prohibit dry rubbing-down altogether?—I see no reason why not. There is a lot of prejudice in the trade against it, I admit.

11,783. Do you believe in trade prejudice?—To a certain extent. I believe it is essential to dry rub down new work but not old work.

11,784. Would you prohibit it entirely?—If you prohibit it, they can do nothing else but use the wet process. I certainly think it should be prohibited, but I think that that respirator would practically answer very nearly the same purpose as prohibition.

11,785. (*Lord Henry Bentinck*.) Is it used by the paint-grinders?—By the men who pug, who put the dry white lead to the oil. The grinders do not use it. It is not necessary.

11,786. (*Mr. Sutherland*.) Is that respirator efficient?—Absolutely. I may tell you that for the last 40 years we have only had one case of lead poisoning that I know of. It was lead colic rather.

11,787. (*Chairman*.) How long would you like to wear that respirator yourself?—I have worn it for an hour or two at a time very often.

11,788. Do you like it?—No, I do not like it.

11,789. I have never seen one that anybody would like to wear?—There are some that are ordinary plain canvas or linen bags which are very efficient.

11,790. The best I have ever seen is a piece of wet sponge worn across the mouth and nostrils?—That would be useful. There are lots of different forms.

11,791. The evidence we have had in other Committees proves that there is no respirator that a man will wear?—They have to wear them. You must make the master-man responsible in the first place.

11,792. But suppose the men will not do it?—I would sack them; that is all.

11,793. I want you to take a kindlier view than that. If the State allows you to use a dangerous element like lead, you must protect the men and you must not greatly inconvenience them in protecting them. If you do greatly inconvenience them, you must not talk about sacking them?—I do not consider that it is a great inconvenience. It might not be very comfortable for them, but they are not wearing them all day long. It is only for a short time.

11,794. How many hours a day would a man wear a respirator?—Not once a week in the ordinary way. He is not dry rubbing-down all the time.

11,795. Would you have a time limit, that it should not exceed so many hours a week?—I should not think that necessary.

11,796. I want you to put forward something practicable?—I see what you mean. He has to finish his job, and it depends upon how long the dry rubbing-down will take.

11,797. Can you speak with any authority on the time that a man would occupy in dry rubbing-down?—No.

11,798. I cannot pursue that point then. Do you advocate a regulation forbidding the smoking or chewing of tobacco while working with white lead?—I think that that is a great source of danger. The men have dirty hands and take a cigarette up full of lead,

or they chew tobacco, and they will absorb a certain amount of lead.

11,799. Do you consider that the periodical medical examination of painters is desirable?—I think it is essential.

11,800. And that the employer should bear the cost of it?—Certainly.

11,801. You have outlined a number of very useful precautions which might be taken. Do you consider that these would remove the danger of lead poisoning?—I think that they would reduce it at least 75 per cent. if they were properly carried out.

11,802. Would it be possible to carry them out?—I see no reason why not.

11,803. Have you thought them all out from beginning to end?—I can see no real difficulty. You always get opposition at first.

11,804. But how would you be sure that the rules were being enforced?—You would have medical inspection so many given times a year. That would be one thing.

11,805. Let us take the medical inspection first. Supposing the Home Office were to say that they were to be examined once a month?—I do not think that they would need to be examined once a month.

11,806. You are not a doctor?—No.

11,807. Do not you think that the Home Office would have to have them examined at the same periods that they adopt in other industries?—I do not think that the painter would have the same risk as a man would have in our own business.

11,808. But the incidence of lead poisoning amongst house painters is greater than in all the other lead industries put together; so the Home Office would never agree to have less stringent rules than in other industries?—But our industries are dealing with lead, more or less in a powdered form, whereas the house painter never touches it in a powdered form. The painters' trade is not nearly so dangerous, I should say, as lead grinding.

11,809. There are more deaths per year among house-painters?—Because there is more carelessness.

11,810. I should think the Home Office would not be inclined to introduce, and I do not suppose this Committee would be inclined to recommend, less stringent rules in the house-painting trade than obtain in the other lead industries?—I see your point.

11,811. I want to know, first of all, how you propose to enforce the medical examination once a month of painters all over the country?—I think that once a month is rather more often than necessary.

11,812. Would you answer the question?—They could have the men summoned at given times and the doctor could go there.

11,813. Have you thought it out in a practical way? Men scattered all over the country might be miles away from a certifying surgeon. There would be the expense of the man's journey if he was in some country district in the North and had to go to Sheffield, say, to be examined?—When men are away on jobs it would be a rather difficult matter.

11,814. Are they not very frequently away on jobs?—Yes, very frequently.

11,815. Then do not you see practical difficulty in the way?—Say, on Saturday, when they are paid, or on Monday, they could easily come up in a group or a body. It would be an extra expense to the master-men, slightly, but I think they would willingly go to that expense rather than have cases of lead poisoning.

11,816. With regard to washing, for instance, how would the Home Office know that soap and towels and all the other things are always there for the men?—They could have a few inspectors to go round occasionally.

11,817. How many inspectors do you think would be required to have any practical effect?—There are 230,000 painters, roughly.

11,818. How many jobs are there in operation at the same time that would have to be inspected?—It is very difficult to say.

11,819. If you had to come up and give a report to the Home Office on this, how many inspectors do you think you would say would be wanted?—I think you

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could get through very well with about 50. You see once you take the point up and you find flagrant cases, you make people frightened and they will not continue. They will be much more careful. You have only to drop on to people a few times. That is my own personal idea.

11,820. Have you any idea what it would cost the State?—None whatever.

11,821. It would cost a large sum every year, with travelling expenses?—You would probably be able to reduce the cost afterwards when you found that things were working well.

11,822. But you know what human nature is. If the pressure is removed we forget all about the pain, and if you removed the pressure of the factory inspectors there would be chaos?—I think that a little teaching and a little moral persuasion would go a very long way with these people.

11,823. Do you seriously think you could inspect a great range of man scattered on jobs all over the country?—No, but what I do feel is that if the greater number of those men were examined at the shops and various painting places over so often, you could tell if they were in a fit state to work in lead or use lead. Some men are far more prone to lead poisoning than others. Some can stand it a great many years and others cannot stand it at all.

11,824. You have admitted that the great evil in this industry is the dust?—Yes.

11,825. How would you ensure any rule being carried out by which the workmen would wear respirators and so avoid the dust?—I think that the employer would certainly see that a thing like that was carried out. It ought to be his duty to see to that.

11,826. But how could he do it? If he is situated in a town, how could he see that his scattered men carried out these regulations?—You would put the onus on the foreman on the job. That is what I would do.

11,827. Would you suggest that the foreman should report to the employer every week as to how the men have behaved themselves?—Yes, he would report any violation of the rules.

11,828. And should that be reported to the Home Office?—That is a matter for the Home Office.

11,829. I do not want any vague evidence?—I think that would be a very good suggestion, if there are any violations of the rules.

11,830. (*Lord Henry Bentinck*.) I suppose your men are more or less in your own hands—concentrated?—Yes, they are concentrated.

11,831. You cannot speak with much authority as to the possibility of enforcing these regulations when the employment is very much scattered?—No. One could not give the same surveillance quite, I suppose, but still you could make your foreman responsible for your orders being carried out, and for rules and regulations being carried out if they are the law.

11,832. (*Chairman*.) I notice in your proof you say that, in collecting statistics, some distinction should be made between first attacks of lead poisoning and repeated cases?—Yes. It occurs to us that a large number of the reported cases are recurrent.

11,833. This is already done by the Medical Inspectors of the Home Office?—As it is cumulative it might go on for five or ten or twenty years. That is the trouble.

11,834. The present system is that if a man is attacked and he suffers another attack within 12 months, it is not put down as two cases?—But if it occurs in 15 months it is put down as two cases.

11,835. If he gets lead poisoning three times at intervals of more than a year, it is put down as three cases?—I think that the man ought to have a cross put against him. He should be ear-marked, and if he is subject to lead poisoning to that extent, he should find another mode of employment, because it is those particular men that add to the death-roll in the trade. There is no question about that.

11,836. (*Lord Henry Bentinck*.) It is not their fault?—It is not their fault, but they are not fit subjects for the work.

11,837. (*Chairman*.) You would agree that if a man is injured to that extent, he should be compensated by the employers?—That is a matter for the Government.

11,838. But should the employer be asked to compensate?—I would not express an opinion on that.

11,839. Do you consider that the chipping off of lead paints is dangerous, for example, in the holds and peaks of ships?—Yes, certainly, when they hammer.

11,840. What would you suggest to remove the danger?—Using a detergent or pickling. It would not hurt on iron at all.

11,841. Should the chipping off of old lead paint on ironwork be forbidden?—It would not matter much if it were in the open, outside, and if they wore respirators of some kind, but in a close hold it ought to be prohibited.

11,842. You speak here to-day on behalf of your association?—Yes.

11,843. I should like to inform you that the large preponderance of employers who have been before us have stated that such rules as you have put forward very fairly would be impossible to carry out?—Yes, I know.

11,844. And they have gone further and many of them said they would prefer prohibition to enforcement of such rules?—They always do kick a lot. We said, first of all when these regulations came to us, that we could not carry them out; it would be impossible; but we find we have to do it.

11,845. I only said that in contradistinction to the evidence which you put forward?—I know there is a great deal of talk; they cannot do this and they cannot do the other.

11,846. I put that statement forward in view of the evidence and the replies, referred to by Mr. Willis, from this large number of firms. In examination and cross-examination they have finally admitted—or most of them—that they prefer prohibition to the infliction of rules, because they would find it impossible to carry the regulations out. I dare say that a large number of these gentlemen who have written statements would hold a similar view if they came before us and were cross-examined?—I cannot speak as to that.

11,847. Would it not be possible to utilise the same machinery and plant in grinding zinc or other non-poisonous paint which you now use for lead?—The same machinery could be used.

11,848. (*Lord Henry Bentinck*.) Do you advocate a monthly medical examination of the men?—I do not advocate it monthly; I advocate the examination of the men. The Chairman suggested monthly.

11,849. If a workman was found to be suffering from lead poisoning, he would be liable to lose his job?—Not until it was a recurrent case, I think.

11,850. If he was found to be suffering from lead poisoning, do you think that the employer would renew his engagement if he recovered?—Certainly I think so, as they have done before.

11,851. He is insured, and if he is liable to be a charge to the employer, is he likely to be employed?—I should say so, but really I cannot answer for employers.

11,852. (*Dr. Collis*.) In reference to a point I did not quite understand in the answer you have just given, you said that men should be ear-marked when they had an illness?—Yes.

11,853. If a man is ear-marked, you say he should not come back into the trade?—Only if he is ear-marked many times; that is to say, if it is really serious. It is a matter for the doctor to say if he is a fit subject to continue to use lead or not; it ought to be left to the doctor. Because he has had a small attack of lead colic, there is not necessarily great danger.

11,854. You said serious cases?—If it keeps on recurring, he has no right to continue to work in lead.

11,855. You have shown us a respirator?—Yes.

11,856. Have you ever worn it and done work?—Yes, certainly.

11,857. Much work?—Yes.

11,858. For how long?—At least two or three hours.

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11,859. Were you a bit out of breath before the end of the time?—No, I have not been seriously inconvenienced.

11,860. Did someone else put it on after you had worn it?—No. We always keep our own "muzzles," as we call them.

11,861. You have one for each man?—Yes.

11,862. If a man has a bad cold or an attack of influenza, and is away for a week or ten days, as must happen, what happens to the respirator meanwhile?—It is locked up in a certain place, I believe. My foremen control all that sort of thing.

11,863. When he comes back, what then?—It is given to him.

11,864. He re-infects himself with influenza, or whatever it is?—They always change their wools.

11,865. But that does not disinfect the velvet or the respirator itself at all?—I do not know whether we use formalin or not.

11,866. I should condemn the respirator. It holds residual air, and there is the danger of infection—two of the chief things that are said against respirators. I daresay this stops dust; but to be a satisfactory respirator it must be capable of being disinfected, and it must not impede breathing?—I do not think it will impede breathing.

11,867. I had it on for about five minutes, and it did?—You are not working.

11,868. No, except with my brains, I hope. You do not remember the first introduction of these respirators?—No, they have been in use for 60 years.

11,869. Have you had trouble in getting your men to wear them?—Not a bit.

11,870. Do they use them regularly?—Yes.

11,871. Not intermittently?—They only use them when they are on lead.

11,872. Are they on lead continuously?—Certain men are off and on continuously.

11,873. They do not work for half an hour on and two hours off?—Not necessarily. They might work for two hours and have the rest of the day off.

11,874. Usually they work straight ahead?—Yes.

11,875. It is a fairly long piece of work?—Yes; on making inquiries I find we allow our men to periodically remove their respirators and breathe in the open air.

11,876. We are given to understand that the dry process of rubbing down paint in houses is short and intermittent employment?—That is a matter for the decorator more, is it not?

11,877. Even if you have respirators in factories under the eye of the master and foreman, and possibly the factory inspector, who may catch them, how are you going to make painters wear them for similar short and intermittent jobs; the man may be 20 miles off in a private house with no master present and no foreman present, and it being a private house, which is an Englishman's castle, no inspector can enter?—It is very difficult.

11,878. Do not you think that it would be practically impossible to inspect under the circumstances?—It would be impossible in that case, but a painter would look after his own interest.

11,879. You have some knowledge of men?—I have.

11,880. Knowing human nature is what it is, do not you think it is impossible? You are not makers of dry white lead, but buyers?—Yes, buyers.

11,881. Is all that you use made in England?—Not all.

11,882. Have you any idea of the amount that is not made in England and the amount which is?—Do you mean of what we use or of what is used generally?

11,883. Taking yourselves and the trade as a whole?—I could not tell you.

11,884. It is rather necessary to know, because it has been suggested that the non-use of white lead might throw people out of employment in England?—It undoubtedly would.

11,885. So it is necessary, therefore, to know the proportion that is imported from abroad and the amount that is made at home?—There are probably some figures to guide one in that respect.

11,886. But you are not in a position to say?—No.

11,887. What foreign white lead you buy, you buy dry?—Yes.

11,888. If it could not be bought dry?—It might come straight in and go through a dealer.

11,889. (Mr. Sutherland.) You think that the lead industry, and what follows on it, is of sufficient value to bear the restrictions which the Home Office might put upon it both with regard to the decorator and the paint manufacturer?—I think so.

11,890. You perhaps do not know that most painters come in at the very outside once a month. That is part of their working rules. They are seldom longer away from home, so the operative painter could go to the medical officer once a month and be examined. That would not present the difficulty that you thought of?—No.

11,891. Do you think that the operative painter could be got to wear that respirator?—I would not say that particular form.

11,892. You have no idea of the amount of time occupied in rubbing down on a job?—I have no idea.

11,893. Many painters would go for two or three weeks without doing dry rubbing down?—I should think so.

11,894. Even if they were compelled to wear a respirator, which would only be needed in special cases, it would not be a great hardship?—In my opinion, no.

11,895. (Chairman.) You seem to minimise the risk of dust causing the dangers that the men are confronted with. How do you account for the deplorable prevalence of lead poisoning?—Dirty hands and absorbing lead through the mouth. Eating and smoking with dirty hands, to my mind, are the greatest dangers.

11,896. (Mr. Kinggate.) I notice that you lay great stress, as a great many do, on the dirtiness of the painter or the man who uses the lead. I would like to know what knowledge you have of the ordinary coach-maker's shop with regard to that?—I have no knowledge of coachpainters' shops.

11,897. You only speak from hearsay?—I am not talking particularly of coach-painting, but of general painting.

11,898. What is your knowledge with regard to general painting?—The men, as I see them, very often are covered with much more lead on their hands than they should have.

11,899. Do you know that they do not wash when they have meals?—A great number of them do not wash.

11,900. You know that that is so?—Yes.

11,901. With regard to medical examination of the workers, how many times would you think that a man should be certified as suffering from lead before he should be compelled to leave his trade?—That is a question that I do not think I am in a position to answer. I am not a medical man. I think a medical man should decide a point like that.

11,902. You have said that a man should not be allowed to continue to work at his industry if he has recurrent lead poisoning?—Yes, in other words if he is endangering his health permanently.

11,903. But does not working in lead endanger the health of every man?—A great number of people never suffer at all from it.

11,904. How do you know?—I have been in and around lead for the last 24 years myself, and have never suffered at all.

11,905. I have been in it for more than 35 years, so I know something about it. Perhaps it might be news to you that there are hundreds of cases that are never reported. Men are periodically off, but not certified as suffering from lead poisoning. If you had strict medical examination, and these men were examined, they would be found every time to be suffering from lead. How many times should they be certified before being discharged from their employment?—It entirely depends, in our opinion, on the condition of the men.

11,906. If a man's health is impaired, which it is by the use of lead, what would you say? What would you do with the workman?—(No answer was given.)



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11,907. (*Chairman.*) (To the witness.) Would you rather have the question postponed for Dr. Crow?—Yes.

11,908. (*Mr. Kinggate.*) You say you would not allow them to work at their industry, so what should be done with them? They may have been apprenticed and their fathers may have paid a heavy premium?—If they are going to suffer they should get some other employment. It would be wise.

11,909. (*Chairman.*) Do not you think that if they have been injured to that extent, they should be compensated by the people who have injured them?—That is a matter for the State to decide. I would not like to express an opinion on that.

11,910. (*Mr. Robins.*) Is it your opinion that the painter of to-day is far more intelligent and healthier in his habits than 20 years ago?—Yes, emphatically yes.

11,911. Then how do you account for the greater number of cases of lead poisoning during the time that he has been more intelligent and more cleanly?—There are more painters now, I take it, than there were 20 years ago. You may get more cases, but are the percentages higher?

11,912. The percentages are higher than they were 20 years ago notwithstanding the extra intelligence of the man and his extra cleanliness?—It does not always follow that because a man is intelligent he is clean, but I should have thought that they were cleaner than they were. Cases were probably not so carefully reported 20 years ago as they are to-day.

11,913. I am sorry you have the impression that you have expressed of the working-man. You have no knowledge at all, I presume, of painters in a coach-making shop?—No.

(*Mr. Robins.*) I can guarantee that, taking any paint shop you like where a painter has been painting, no doctor would certify any man in the shop as entirely free from the influences of lead poisoning in his system. You can generally tell, if the men are standing outside without their aprons which are the painters.

11,914. (*Mr. Parsonage.*) What personal knowledge have you of house-painters, when you say they do not wash their hands before meals?—I do not say they all do not wash their hands, but a number do not.

11,915. What percentage do you know of painters who do not take the trouble to wash their hands?—I could not give you any percentage; it is impossible.

11,916. Is it not a slander on the workmen to make a statement like that without being able to give some authority for it?—I think it is quite a known thing that the washing arrangements are not carried out as they ought to be in every case. I do not say that most of the men do not wash; they certainly do.

11,917. Would you say that the workmen, where washing accommodation is provided, refuse to wash their hands?—No, I do not say that.

11,918. Would you blame the employer for not providing proper accommodation for washing?—The employer certainly should provide proper accommodation.

11,919. Do you think that he does at the present time, and allows a reasonable time for the workman to wash his hands?—No doubt a great number of employers do.

11,920. Would you blame the employer equally with the men for their not being cleanly?—I think that every employer ought to look after his men.

11,921. You are employed in lead works, and you say you have had no lead poisoning although you have been in it for 24 years?—Yes.

11,922. Have you handled the lead?—Not in recent years.

11,923. Do you ascribe your immunity from lead poisoning to your own personal cleanliness?—No.

11,924. Do you admit that even the most cleanly man can still take lead poisoning?—Certainly.

11,925. Then cleanliness is not the main point?—I still beg to differ.

11,926. With regard to these regulations, would not the employer be equally ready to evade the regulations as the workman, seeing that it was to his interest to evade them in order to get the work done?—I see no reason why.

11,927. You would put the penalties on the employer?—I think he ought to see that any regulations are carried out.

11,928. What effect would you expect these regulations to have on the trade with regard to the quantity of painting work done?—I do not think it would alter the quantity in any way.

11,929. (*Mr. Gardner.*) As one preventive of lead poisoning you advocate ready mixed paints?—Yes.

11,930. Do you think that the fumes arising from the mixing of paints are a cause of lead poisoning?—No.

11,931. Then what is the cause?—They get the lead on their hands, and in work they may stroke their mouths and absorb a certain amount of lead through the mouth. That is my only point. They should keep their hands as clean as possible.

11,932. A man mixes paint on a job in small quantities. He does not get his hands dirty?—If they use due care they need not do it.

11,933. Would it be practicable to mix all paints in a workshop? Each coat must be treated in a different fashion?—I admit that.

11,934. If there is no danger except that of getting dirty hands?—Cleanliness to my mind is the great thing.

11,935. You advocate the supply of water and towels and soap?—Yes.

11,936. If a man does not wash his hands it is because he does not get facilities?—Very often.

11,937. Very often it is very difficult for employers to provide these. On one job there will be 20 men and on others only three. Some may last a week and some only a few hours. Is it not most difficult to carry out regulations?—I think they can always arrange to have water and towels and soap on a job. We have a lot of difficulties in business, but we usually surmount them.

11,938. You are different because your men are gathered under one roof and not scattered about?—In nearly every place where there is a painting job there is water laid on.

11,939. Not always?—In nearly all. There is usually a pump or something to which to take a bucket.

11,940. With regard to the chipping off of scale, do you think that it would be practicable to scale the paint off the skin of a ship with a solvent?—Do you mean outside or inside?

11,941. Inside?—I think so, certainly.

11,942. How are you going to protect the deck underneath?—That is the great difficulty with a pickling solvent. You could use a spirit solvent which would not hurt the deck in any way.

11,943. If I want to scale the 'tween-deck of a ship, how am I going to protect the decks underneath if I use a solvent?—If you used a spirit solvent you would not require to. If you used a pickling solvent it would be perhaps difficult.

11,944. You have to clean off the skin?—Yes.

11,945. These are some of the practical difficulties. Chipping is bad?—Chipping is bad, most decidedly. You come back really to the use of a respirator. You can stop this danger.

The witness withdrew.

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11,946. (*Chairman.*) Are you Examiner in paints, colours, oils, and varnishes at the Technological

Department of the City and Guilds of London Institute?—Yes.

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[Continued.]

11,947. Do you attend to-day as a representative of the London Colour, Paint, Oil, and Varnish Trades Association?—Yes.

11,948. Have you the same authority as Mr. Willis to represent certain provincial associations as well as your own?—Yes.

11,949. I understand that you are prepared to speak specially in regard to the manufacture of yellows, greens, and reds?—And also the lead contents of driers, oils, and varnishes.

11,950. Do you maintain that the use of lead compounds in relatively small proportions is essential in such paints—yellows, greens, and reds?—In some proportion.

11,951. That is to say, in relatively small proportions?—In some cases, I think, in large proportions.

11,952. What proportion of lead compounds do you consider necessary in yellows?—Well, sometimes a high percentage is required. In some of the colours that are used for lining in the coach trade, where just one single line of colour is required on another, as a general rule a chromate of lead is employed in those cases, in which the percentage of lead metal would be from 60 to 80.

11,953. Is that lining a very small part of the painting of a coach, an infinitesimal part really?—It is infinitesimal, but for beauty it is necessary.

11,954. Have you anything else to suggest about yellows?—With regard to zinc yellows, a zinc yellow would hardly be suitable for lining purposes, because it has not sufficient opacity. Its staining power is only equal to a lead chrome that is reduced to a fifth of its strength by an adulterant.

11,955. You were telling us about the proportion of lead compounds in yellow paint, and you told us the amount of lead contained in the yellow paint that is used for lining. In what other yellow paints is it used?—For ordinary yellow chrome paints, mixed kinds, say 10 to 20 per cent.

11,956. Is the painting of the lines on a coach with yellow paint essential?—It is a matter of taste, I suppose. Some people like yellow, and some other colours.

11,957. Now you are going to tell us the effect of painting the lines with non-poisonous paint, are you not?—Yes. Zinc chromate would not answer, because it has only one-fifth of the opacity of a corresponding lead chromate.

11,958. What effect would that have on the coach?—It would be an inadequate colouring, that is all.

11,959. It would not be sufficiently strong, you mean?—It would not be sufficiently strong.

11,960. The line would not be?—The line would not be.

11,961. It would be a faint yellow line instead of a strong one?—Yes, transparent I would rather say.

11,962. Has nothing been found to mix with the lead chromate to make an effectual and lasting line and equally opaque?—A lead chromate is very strong, and even a 50 per cent. strength one might perhaps cover sufficiently well, but I know of no other colour except cadmium yellow, and that is excluded by the price.

11,963. Is there any danger to the workmen in painting the lines?—I should say not.

11,964. Is there any scraping down beforehand?—No.

11,965. Or any sand-papery?—The coach would have to be prepared for that, as for any other colour, but there would be no special preparation.

11,966. So that the workmen who put on the yellow lines would not run any risk with regard to dust?—None whatever.

11,967. Have you anything to say about preparing the paints?—That is done in our works under supervision. They are always ground in fine mills.

11,968. (Mr. Sutherland.) The paint is generally supplied in a tube, is it not?—It is generally supplied in a tube.

11,969. And the man just squeezes out what he wants?—Yes. It may possibly be supplied in larger packages.

11,970. (Chairman.) What proportion would the paint in the yellow line be to the paint on the whole of the coach?—That is rather a poser. I would say a thousandth part of the area, as a shot. It is really too minute to estimate.

11,971. Have you given me all the proportions of lead compounds that you consider necessary in yellows?—Yes, I think so. I think you asked me if I had anything else to say about yellows. The only other point I was going to impress upon you was that yellows made from chromates of lead possess every possible variety of shade from an extremely pale lemon down almost to a red, and there is no other basis on which similar colours could be made at present with the same opacity.

11,972. Could not zinc chromate be used equally well instead of lead chromate?—No, it certainly could not, only under special circumstances.

11,973. What are those special circumstances?—Occasionally as a distemper, for instance, a zinc chromate is of value; that is to say, not in oil but water colour.

11,974. (Mr. Gardner.) Do you mean for scene painting?—Yes.

11,975. Size colour?—Yes.

11,976. (Chairman.) Is it a question of the cost of zinc chromate?—Yes, it is, to a large extent.

11,977. In other respects would it be equally efficient?—No. You can get no zinc chromate that has the opacity of lead chromate of a corresponding shade.

11,978. I believe you have some exhibits of these yellows?—I have an exhibit to show you the staining power, the colouring power, of a zinc chrome compared with a lead chrome (*producing a specimen*). There is the pure zinc chrome. At this end it has 20 parts of zinc to one of lead chromate. Here is a similar one done with a lead chromate. That is a lead of similar appearance reduced. The cost of the two respectively is 36s. manufacturing cost for the zinc, and 9s. for the lead.

11,979. But if it is so infinitesimal in amount, the increased cost would be equally infinitesimal, would it not?—Yes, but for a pure yellow paint the difference is enormous. These are only to show you that this chrome, which is only one-fifth pure, is as strong as the genuine pure zinc chrome.

11,980. For what are these yellow chromates used?—For yellow paints, generally, for decoration. In that case they are not very often entirely genuine. In answer to a previous question, I stated that a good yellow for a yellow paint contained from 10 to 20 per cent. of lead. The remainder is chrome, as chromic acid, and barytes, or something of the kind.

11,981. If lead was prohibited in all paints, and the prohibition applied equally to yellow paints, it would simply mean that instead of getting that effect you would get that (*indicating two exhibits*)?—Yes.

11,982. (Mr. Sutherland.) What is the cost?—The cost of the lead chromate and the zinc chromate is practically the same, but a lead chromate can be reduced to a fifth of its strength, and yet have the same staining or covering power as the zinc chromate.

11,983. (Chairman.) Do I understand that the lead chromate is four-fifths cheaper?—Yes, as a paint.

11,984. The net price would be four-fifths lower than the zinc chromate?—It would be one-fifth of the zinc chromate.

11,985. (Mr. Sutherland.) You have just told us that the lead chromate and the zinc chromate are identical in cost to begin with, but that the lead chromate has five times the staining power of the zinc chromate?—Yes.

11,986. And it gives you a greater variety of shades?—Yes. I will put in some other chromate shades (*producing some further specimens*).

11,987. Are those all lead chromates?—They are all lead chromates.

11,988. Is that the only shade you can get from zinc?—Something very near that.

11,989. (Chairman.) Cannot you get a variety of other shades with zinc?—Not many—very few. They are within a very small range of tints.

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11,990. What would be the comparison between the tints with lead and with zinc?—To speak roughly, there would really be only one tint for the zinc chrome. The variation of colour in manufacture of zinc chromate is so very little that it is practically all one tint.

11,991. (*Mr. Sutherland.*) What is the proportion of one to the other?—One to 10 in the second instance, and 1 to 20 in the third.

11,992. You practically get down to a pure cream?—Yes.

11,993. (*Chairman.*) What is the average amount of lead in the chromates?—Anything from 60 to 80 per cent.

11,994. I suppose in using lead for painting a coach or carriage, or anything of the sort, there would of necessity be dry rubbing down?—In between coats, I understand, they must have it on account of the nibs.

11,995. Is not that a highly dangerous operation with a large percentage of lead in the paint?—I hardly think so. The dry cutting down is, as far as I understand it, confined to the removal of the slight inequalities on the surface. It is not intended to absolutely cut half the coating away the same as the wet cutting down. It is only to remove a nib or two.

11,996. I suppose a certain amount of dust is generated?—Possibly there might be a little.

11,997. Could you suggest any means by which that dust could be done away with, for instance, by exhaust draught?—No. I do not know whether it could, but I would like to put in a statement from the Chairman of the Health Department as to the toxicity of lead chromate and lead carbonate. Lead chromate is not so poisonous as lead carbonate according to this.

11,998. How much soluble lead would there be in 6 per cent. of lead in a lead chromate?—Soluble in what menstruum?

11,999. A quarter per cent. hydrochloric acid?—Possibly it might dissolve a little, but I think so very dilute hydrochloric acid has hardly any action on lead chromate. I might mention the work of K. Beck and P. Stegmüller.

12,000. What is the purport of the statement of the Chairman of the Health Department to which you refer?—The object was to ascertain for the German Government, I understand, whether the colours used in the manufacture of toys were harmful to children who sucked them, and to see whether the chromates and sulphates of lead which are used were equally as dangerous or less dangerous than white lead.

12,001. What result have they arrived at?—They give the milligrammes of lead that go into solution in dilute hydrochloric acid.

12,002. That is the point that I was asking you about. (*A document was handed to the Committee.*) You have nothing else to say about that?—No, nothing more about chromes.

12,003. With regard to greens, most of these are made up of a yellow colour to which varying proportions of Prussian blue are added, are they not?—That is the general method.

12,004. Would all that you have to say about zinc chromate and lead chromate for yellow colours apply equally to the manufacture of greens?—Yes, practically.

12,005. What are the exceptions?—Green is a much more widely used colour than yellow, and is generally sold in a rather more reduced condition. The percentages of lead in greens, on account of the blue that is added, are reduced compared with the percentages of lead in yellows.

12,006. What amount of lead would you consider necessary to make a complete green colour?—Some of the best greens contain about 20 per cent. to 25 per cent.

12,007. I think you may take it from me that the Home Office would not agree under any circumstances to allow any paint with such a high proportion of lead in it, if there is any risk of generating an appreciable amount of dust, unless precautions are introduced to get rid of that dust?—That is for them to deal with.

12,008. Do you think it would be possible to introduce precautions to get rid of the dust?—That

would be in cutting down. The danger from dust is infinitesimal.

12,009. I have been informed in reply to an inquiry that there would probably be 18 per cent. of soluble lead in a lead chromate, which you say contains over 60 to 80 per cent. of total lead?—Well, I do not know the strength of the acid used, and I have never tried to experiment. The same remarks with regard to price apply to greens as apply to yellows, and I have some exhibits here of the greens.

12,010. Would the same remarks apply with regard to zinc chromates in green colours as the remarks you have made about yellows?—Yes.

12,011. Do they precisely agree?—Not quite, but very nearly.

12,012. What is the difference due to?—The difference is due to the addition of the blue.

12,013. What proportion of lead would you use in a lead chromate for green colour?—The usual commercial greens that are used for paints average from 3 to 5 per cent.

12,014. (*Mr. Sutherland.*) Ordinary Brunswick green?—Ordinary Brunswick green, commercial qualities.

12,015. If a decorator ordered a hundredweight of Brunswick green of the best quality?—A suitable quality to cover in one coat would contain 5 per cent. of lead metal.

12,016. (*Mr. Gardner.*) The same thing applies to your chrome. You gave us 60 to 80 per cent?—But that is not as you put it on the market. In the market chrome paints, the quantity would be from 10 to 20, as I said. Chinese blue is an extremely strong colour, and therefore you do not require such a percentage of colouring matter. You must take that into consideration. I have a pure zinc green here made with zinc yellow and Chinese blue, and a similar green made with chrome yellow and Chinese blue to get them as near as possible for staining colour. One cost 5s. and the other cost 10s.

12,017. (*Chairman.*) Which cost 5s.?—The one made with pure zinc. A similar green can be made with lead chrome costing 10s.

12,018. (*Mr. Sutherland.*) That is bare manufacturing cost?—Yes, that is bare manufacturing cost.

12,019. Lead chromate would probably yield at least 14 to 18 per cent. of soluble lead in the 60 to 80 per cent. of which you spoke?—It depends entirely on the concentration of the hydrochloric acid. Very dilute hydrochloric acid will hardly act on it at all.

12,020. We are talking about the test which the Home Office has accepted in other industries, which is known as the Thorpe test. It has existed for years, and you probably know it?—Yes.

12,021. That is the commercial chrome the proportion of chromate of lead is enormously reduced?—It is only 10 to 20 per cent.

(*Mr. Sutherland.*) Then it would come under 5 per cent. with the Home Office test of solubility.

12,022. (*Chairman.*) With regard to the cost of the lead chromates as compared with the cost of the zinc chromates, I understand that the lead costs 10s. as against 5s.?—Yes.

12,023. Would that apply to all the chromates?—Yes. That would be about the relative cost.

12,024. Now with regard to reds, why do you say that the use of a small proportion of lead compound is essential?—There are some red colours that we cannot get without more than a small percentage—something like 90 per cent.

12,025. In what form do you use the lead?—Orange or red lead is used.

12,026. We have had evidence to the effect that it is easy to dispense with lead in making red colours?—I am afraid that that evidence was not given by a colour maker. We have reds that have no lead in them. I have exhibits of an aniline dye made with lead and of one without. If you hold them up to the light you will see the reason why lead is necessary (*producing two specimens*). The lead is just to give opacity, and to get some of the shades that are asked for. It is impossible without a considerable percentage of oxide of lead.

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12,027. What are the relative prices of the lead chromate and the zinc chromate in reds?—We do not use any chromates in reds, because an orange lead, as it is called, an oxide of lead, or a red lead, answers the purpose just as well at less than half the price.

12,028. Are these reds which you speak of very important colours?—Yes; they are used largely by agricultural implement makers, and for wagons and post office vans, motor-cars, and so on, and signals. They all contain a large percentage. The post office reds mostly contain lead oxide.

12,029. In your opinion would it be impossible to substitute some other ingredients for lead?—It would with our present knowledge. You could not get the same colours.

12,030. But could not you get colours that would be quite good enough?—That depends on the customers' requirements.

12,031. Supposing that he could only get certain colours, he would have to be satisfied?—Supposing he were a manufacturer of agricultural implements, for those they use large quantities of red colour, and the basis of the red colour is lead. If he wanted a certain red and could not get it in England, he would buy American undoubtedly.

12,032. But would the question of the colouring of agricultural implements be an important feature for this purpose?—I am afraid it is a very important feature.

12,033. Why?—We could not carry on business unless we supplied what our customers wanted.

12,034. But would it be important from the point of view of the purchasers of the agricultural implement?—I think so, or they would not be so particular about our supplying exactly the same shade every time.

12,035. Is there at the present moment a large importation of foreign agricultural implements?—I do not know that it is very large. It is considerable, but I could not say how large.

12,036. You are afraid that, if lead is prohibited in red paints, it might seriously affect trade in England by inviting competition from abroad?—Yes, I should say so.

12,037. Do I understand you to mean that the competition would come in in the shape of the agricultural implements themselves, or from the fact that Americans would send in the paints to be applied?—The Americans would send in the goods if the paint was not allowed to be applied in this country. American paints would be under the same laws as the British paints, I take it. Americans, by the way, are particularly good at making everything that they turn out look very smart, and the smartness would be enhanced.

12,038. Are there any other uses that you can think of for red paint?—They do not occur to me at the moment.

12,039. I understand you consider that a small proportion of lead compounds is absolutely indispensable in making driers for paints, boiled oils and varnishes?—Yes.

12,040. Why do you make this statement?—From experience.

12,041. Are not manganese borate and manganese linoleate largely used as driers?—Yes.

12,042. We have been told that these manganese driers are more efficient than lead driers?—I have seen that statement in advertisements too.

12,043. But have you any practical experience?—Manganese linoleate and borate dry very well in warm weather, but they cannot be relied upon to dry in the autumn and winter and spring in the English climate.

12,044. Have you made trials of these manganese driers?—Thousands. We make them ourselves.

12,045. Even if you find the use of lead in driers to be desirable, what proportion of lead would be introduced in the form of driers into the paint?—Do you mean into a ready mixed paint, mixed up in oil and turpentine, and the usual thinners?

12,046. Yes?—That depends entirely on the pigment used. Some are very bad driers and some are very

good. A black paint, for instance, would require very much more drier than white lead.

12,047. If, then, it should be decided to restrict the amount of lead in paints to not more than five per cent. of the dried material of the paint, would not that allow an ample margin for the use of such driers as you recommend?—Yes, quite so, as a drier.

12,048. Do you wish to speak of the difficulties which you believe would arise in making alterations in the standards of various paints, colours, oils and varnishes?—It would naturally cause tremendous difficulty.

12,049. What difficulty do you refer to?—We should have to alter all our tint cards, and get them reprinted.

12,050. That is not a very serious thing?—It is good for the printing trade, but is very difficult for us.

12,051. The first difficulty you put to us is the expense which would be incurred in printing your advertisement sheets of colours?—Yes.

12,052. What other difficulties are there from your point of view?—A good many of the shades would be altered with zinc, and it would be a gamble as to which shade we should use. We should have to find out what the customers required.

12,053. But if you had exemption, say, for two years before lead was absolutely prohibited, would not that be sufficient time to enable you to set your house in order, so to speak?—It would assist, of course.

12,054. After two years would not most of these difficulties be removed?—We could not prepare the same colours as we had before.

12,055. But the difficulties that would ensue in consequence of the change that had taken place, would disappear practically after two years, I suppose?—The internal difficulties no doubt would disappear, but the cost of the colours would be very much greater. We could not get the same greens at the same price, and we could not get the yellows at the same price.

12,056. The purchasers of these new colours, I understand you to mean, would have to pay a higher price?—Yes.

12,057. These purchasers would be absolved, if lead was prohibited, from a very great deal of expense incidental to the carrying out of the special rules which the Home Office would issue, so that in the long run there probably would not be much difference to them?—I was thinking—if you do not mind my saying so—that, if paints are increased in price very much, the demand for them will diminish, and in consequence there will be less work for those who make them and those who use them, and the labour employed will be less.

12,058. The Office of Works have a formula which they say is quite satisfactory?—I have not seen that formula.

12,059. They have given evidence of it before us?—I have not heard of any independent authority saying that their statements were correct.

12,060. But they use the paints. They demonstrated the practicability of their position by using leadless paints entirely?—Have they no leads in their driers?

12,061. Not exceeding 5 per cent.?—That is a very different matter.

12,062. Supposing that this Committee agreed on prohibition, in preference to a stringent code of rules which would be very expensive to the industry, and were to allow up to 5 per cent. of soluble lead in all paints, would not that be a very good solution of this very grave question?—It would only be a partial solution. I do not say that any perfect solution is possible.

12,063. You see the difficulties that we are in?—Yes.

12,064. We have to report to the Home Secretary, and the Home Secretary has to put our recommendations before Parliament as to what means can be introduced to greatly mitigate, if not entirely remove, the dangers incidental to the house-painting trade?—I did not come prepared with evidence about that.

12,065. (*Dr. Collis.*) What would be the respective values of a gallon of white lead paint and a gallon of

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[Continued.]

white zinc paint (I do not mean after thinning down) made ready for use as issued by yourselves, one the oxide of zinc, and the other the sulphide of zinc, and also lithopone?—I should think that the gallon of zinc paint would cost a third more than the lead at present market rates.

12,066. I have put to you three forms?—I am not aware of zinc sulphide being used. I have not seen pure zinc sulphide used.

12,067. Could you tell me on this point whether it would be possible to fortify the colours obtained with zinc chrome, with lead chrome up to 5 per cent. solubility?—It would depend on the tint.

12,068. What is the effect on the tint of mixing lead chrome with zinc chrome?—If you had a very pale lead chrome, the zinc chrome is somewhat soluble in water, and has an effect on the lead chrome and changes its colour slightly.

12,069. There is decomposition and change of colour?—Slight change of colour with the very palest quality. Where the colour descends more into the yellow from the primrose, this effect would not be visible.

12,070. It would only be visible with the pale yellow colours?—Yes.

12,071. The pale colours you can already obtain with 5 per cent. soluble lead chrome?—Yes.

12,072. So we have only to consider the strong chromes?—Yes.

12,073. It has been suggested that 20 per cent. of lead chrome roughly represents 5 per cent. of solubility. How much extra zinc chrome would have to be added to keep the dense colours?—If you added the remaining 80 per cent. of zinc chrome you would get the same strength, then, as with a 36 per cent. lead chrome.

12,074. By using this amount of lead chrome, then, you would reduce the cost to an appreciable extent of a paint, the main part of the pigment of which was zinc chrome?—You would not reduce the cost, because the materials that you would use in a lead chrome paint containing, say, 20 per cent. of chrome would not be nearly so costly as the zinc chrome replacing it.

12,075. But more than 20 per cent. of the pigment would be replaced by the cheap pigment, would it not?—I do not follow you.

12,076. If you are allowed a 5 per cent. solubility in your pigment, it is not necessary to use in that pigment pure zinc chrome. To the extent of 5 per cent. solubility, which is practically 20 per cent. lead chromate, you can use lead, and only as regards the remaining amount is it necessary to use zinc chrome?—I do not follow why it should be necessary at all to use the zinc chromate.

12,077. You said that you cannot get the colour with only 20 per cent. of lead chromate?—You cannot get the best colour.

12,078. Can you obtain the other qualities?—You mean the opacity?

12,079. The staining power—by adding zinc chromate?—You would get the equivalent of a lead chromate containing 36 per cent. of lead chrome. If you added the whole of the remaining 80 per cent. zinc chrome as a constituent of the colour, you would only add a fifth of its value as lead chrome, and you would only get 36 per cent.

12,080. Thirty-six per cent. of opacity and staining power, and you want to get much higher?—Yes.

12,081. You would not get what you wanted?—No.

12,082. To what colours would that apply?—It would only be applicable to the lining colours.

12,083. Those lining colours are almost innocuous in their use?—Yes.

12,084. So that, with 5 per cent. solubility, you can obtain practically all the necessary colours except just these few that you mention. Am I right in understanding you to say that?—Yes, practically, that is so. I would not say it is universally so. There might be some tints in which some of the darker lead chromes are not so strong as others. The darker lead chromes have not as much opacity as the pale ones, and it might not be possible in those cases.

12,085. But it would be possible to obtain the majority of them?—The pale ones, undoubtedly.

12,086. Certainly, and the deeper colours are practically only required for lining?—Yes. Only those that you require for lining would be excluded.

12,087. That is the practical position?—Yes, that is probably the position.

12,088. So that you say from your technical knowledge that as regards these colours required for lining, if you have to supply them, you will have to have an exemption from such a suggestion as the limitation of lead to 5 per cent. solubility?—Yes.

12,089. And if you had that exemption for those purposes, you could practically produce all the tints and colours that you produce to-day?—Yes; if we are allowed the limit that you suggest, which brings it to about 20 per cent. of lead chromate.

12,090. On this matter you only speak subject to careful analysis of the lead chromate with regard to solubility. If that is the solubility of lead chromate, that is your opinion as a technical expert?—Yes, provided the percentage of soluble lead is as you represent it.

12,091. Exactly. I had better ask about reds. How far is it possible to obtain the requisite reds with oxide of iron?—You cannot get the tints.

12,092. You could not get the tints, even if you fortified with oxide of lead?—No. The vermilion-colour reds are of a delicate tint, and the least proportion of a brown in them, as in the oxide, destroys the delicacy of the colour.

12,093. You cannot get the brilliancy with iron?—No; there is no oxide of iron that I am acquainted with that will help you in that.

12,094. Aniline dyes, you say, do not give the requisite opacity?—No, they do not give the requisite opacity.

12,095. Could you get the opacity with aniline dyes if they were fortified with lead oxide?—That is how it is usually obtained in the trade. That is the usual way of getting it.

12,096. You use the anilines associated with the lead oxide?—Yes.

12,097. What is the smallest proportion, then, of lead oxide that you can strike your colours with?—That is almost impossible to say.

12,098. It varies with different ones?—Yes, it varies. If you had 2 per cent. of aniline dye, you would want more red lead to produce the opacity than you would if you had 5 per cent. of aniline dye, because the aniline dye itself has some slight opacity.

12,099. If you were limited to 5 per cent. solubility, so that you had to increase the amount of aniline dye as far as possible, still adding the lead to give you opacity, would you be able to produce colours of commercial value?—No, you would not. It would not do.

12,100. It only leaves you with 5 per cent. when dealing with litharge?—Yes.

12,101. How many tints would it be impossible to obtain?—Here is one that it would be impossible to obtain. Here is one with the lead and one without (*producing some specimens*).

12,102. Is it impossible to obtain either?—It is impossible to obtain *this*. You would not get the shade and the opacity.

12,103. Would the thing fail with the brighter reds?—Yes.

12,104. With the darker reds would you succeed?—Yes, with the darker reds, but it would be more expensive.

12,105. Your point is that these brighter shades are used on agricultural implements?—Yes, and motor-cars.

12,106. Agricultural implements, I think, would be the most important?—Yes.

12,107. If the requisite colours could not be produced, the foreigner might get an advantage?—He would get a pull, undoubtedly.

12,108. Do you think that is a sufficiently strong reason for our holding our hands in regulating the industry?—You would be handicapping the English makers.

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[Continued.]

12,109. How far can vermilionettes be used?—These anilines are vermilionettes.

12,110. Vermilion itself is more expensive still?—Yes, and just as poisonous, I take it.

12,111. No; it is not, curiously enough. It is too expensive to use, I suppose?—Yes.

12,112. (Mr. Sutherland.) What is the present market price of vermilion?—About 2s. 8d. or 2s. 9d. a pound.

12,113. As against what for vermilionettes?—Anything from 3d. to 6d.

12,114. Do you think, in view of what you have told us with regard to these tints, that it would assist if the law of the land were that only 5 per cent. soluble lead should be present in paint, and if, where it was shown, as you are pointing out to us to-day, that certain of these tints cannot be obtained without a higher percentage of lead, there should be exemption, always presuming that the workpeople are guarded in their use?—Would that entail any responsibility on the manufacturer for selling them to the right people?

12,115. It would entail upon the manufacturer giving the name to the authorities of the person to whom these paints were sold, so that we could watch them in their use?—That would be rather awkward, I think. They are often sold to colour merchants who re-sell them retail to users.

12,116. We should have to follow them to the colour merchant?—There would be a lot of following-up required.

12,117. But we should have only a small amount of material to follow up?—I hope not. At present a large quantity of vermilionettes is sold with a much higher percentage of lead than you are speaking of.

12,118. That is so, and we should have to follow that. That would be quite different from following up the users of white paint, and every other form of paint?—I do not think it would be workable in practice. I do not see how it could be done.

12,119. (Chairman.) That would be for the Home Office to decide, would it not?—Yes.

12,120. (Dr. Collis.) Would it give you such latitude that you think that the trade would not be interfered with from your point of view? The user would have to get permission to use such paint?—I am afraid it would not be practicable.

12,121. (Chairman.) This is an alternative to special rules?—Should we be prohibited from selling these colours abroad? You are not looking after the foreigner?

12,122. No. This is not an international inquiry. This is a very important point, because it would practically mean that the users of lead paint would be exempt from all these tiresome regulations, and the object of this Committee is to simplify matters as much as possible, and if it were laid down that no one was to use more than 5 per cent. of lead except on certain occasions, and on those occasions the permission of the Home Secretary must be obtained, you would have the thing simplified?—Yes.

12,123. The same thing obtains to-day in the spirit trade. No one may sell spirits without a permit. The permit may go through a dozen hands?—Speaking for my own firm, I would rather have that than be stopped from making them altogether.

12,124. That is the point?—I am speaking entirely for my own firm. I am not at liberty to speak for the association on that point.

12,125. You might put that to your association, because it seems to be the simplest solution. Then you could confine the dangerous operations to a very small area, and the rules would only apply to those instead of to all the work. Instead of having to have all your men medically examined, the only people who would have to be medically examined would be just the few men who handled these things?—I see the advantage.

12,126. You would narrow it down to a few tints?—I follow. For my own part, I have been a zinc advocate for many years as far as possible, but I am sorry to say that I have not been able to agree to some of the statements made.

12,127. (Mr. Sutherland.) As representing the decorating trade, I would like to know how far the limitation of lead, such as has been indicated in the questions put to you, would curtail your range of colours?—With the limitation to 20 per cent. of chromate of lead in the yellows, it would not limit the range, provided allowance was made for the fine colours which have to be genuine for lining, and purposes of that kind—what we call artists' colours, and so on.

12,128. They do not come under the terms of our reference, I think. They are applied at a later stage, and there is no dry rubbing-down on the yellow itself, so that it does not affect it?—With regard to the yellows, it would not seriously limit the range of shades.

12,129. (Chairman.) I think that on the principle you agree with us. In your mind it is a question of making some practical suggestion that can be carried out?—If a practical suggestion can be made which will give us the same range of colours as before, very well.

12,130. (Mr. Sutherland.) We shall hear about that from your association. Another point arising out of the questions of Dr. Collis, which arose out of the testimony of a witness the other day, is this: can zinc sulphide by itself be used as a paint without the addition of sulphate of barium?—It can be used, but zinc sulphide by itself is more expensive to make, up to the present, than zinc sulphide in company with sulphate of barium.

12,131. Has it a good covering power?—It has a good covering power. Unfortunately, like most of the sulphides, it is oxidised and converted into soluble salts when exposed to the air and damp.

12,132. (Dr. Collis.) Lithopone is thrown down in solution. The paint referred to, which you are speaking of, is a mixture of zinc sulphide and barium sulphate not so thrown down in solution?—Practically there is not much difference whether it is thrown down or not. As long as it is in intimate mixture, and then afterwards is heated in a furnace, that gives the body to it. Zinc sulphide, though suitable indoors, is unsuitable out of doors, on account of its being oxidised to zinc sulphate, which is dissolved out by rain.

12,133. (Mr. Mason.) Zinc is obtained entirely from abroad, is it not?—Yes, I believe that is so entirely.

12,134. Is there an open market for it, or is it in the hands of a trust?—I understand a powerful combine has control of almost the whole of the zinc oxide output.

12,135. Do you suppose that when the powerful competitor, lead, is removed from the field, zinc will increase in value?—It seems natural, with a very powerful combine like the Zinc Oxide combination, as there are no zinc mines to speak of in this country, and as zinc oxide is chiefly made direct from the ore, in distinction to white lead, which is made from blue lead.

12,136. (Dr. Collis.) It is made from the ore?—Yes, but I have not explained it quite clearly. You do not follow me. I am afraid that we should be rather in a cleft stick with regard to it. They may raise the price and we could not avoid it. There is certainly that fear, I think.

12,137. (Mr. Sutherland.) We have no natural resources of our own?—No. Some mines might be discovered later on, and be bought up by anybody who was quick enough to see them before the Zinc combination saw them, but he would have to get up very early in the morning to do that.

12,138. Is it a very huge combination?—Yes; it embraces the whole of the Continent and America.

12,139. (Dr. Collis.) Does it embrace all the makers of spelter?—I do not know that it does. I cannot speak with accuracy on that point, but I know that it is a very large combination indeed.

12,140. There seems to be no reason against making zinc white with spelter, and it is so made by the indirect method?—Yes.

12,141. Unless all the spelter manufacturers are within that combine, the combine do not hold the world?—Those that I know about are in the combine.

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12,142. Broken Hill is not in the combine?—No, not yet.

12,143. And that is one of the biggest zinc mines in the world?—We do not know how long it is going to be so.

12,144. But as it is to-day, I mean. We are making zinc from Broken Hill ore in England to-day. Unless the combine can buy all the zinc in the world, it is an open market?—I should not think that the proposition is a possible one. I should fancy not.

12,145. I might just as well buy all the lead mines and increase the price of white lead. The thing is purely imaginary?—Such a thing might happen.

12,146. (Mr. Mason.) As a practical proposition, do not the prices of lead and zinc vary together?—Not always.

12,147. (Mr. Kinggate.) With regard to the opacity of yellows, you were speaking of the picking out on carriages and fine lining. Could not the difficulty be obviated by going over twice?—Yes.

12,148. With white lead it is the same. It has to be done over twice. There is no opacity in white lead?—I would not like to say that there is no opacity in white lead.

12,149. But not sufficient for picking out. If you had a blue ground, for instance, and you had a picking out line upon that, with white lead you would have to go over it twice?—Yes.

12,150. The same thing would follow with zinc chrome?—Yes.

12,151. You would get opacity by two coats?—Five.

12,152. For a simple line?—I could not say for certain, because I have not tried it, but I know that the opacity of lead chrome is five times as great as that of zinc chrome.

12,153. I am not speaking of the body. I should have thought two coats would be quite sufficient for lining?—I have not made the experiment.

12,154. Now, speaking of the cost of vermilion and ordinary reds, what would be the difference in cost in painting a motor-car?—I do not know.

12,155. It would be very small indeed?—I do not know how much they use.

12,156. Say 3 lbs. of vermilion to paint a motor-car entirely?—You would not get the same shade.

12,157. I am only speaking of cost now. When you come to consider the price of a motor-car, the difference between the ordinary reds and vermilion is exceedingly little, with regard to price?—If only 4 lbs. were used it would be only 8s. difference, or something like that.

12,158. It is not really prohibitive. It would not make much difference in the value of a 1,000l. motor-car?—No.

12,159. (Mr. Sutherland.) It would make a difference on a farmer's cart?—Yes.

12,160. (Mr. Kinggate.) They use ordinary red?—Then there are agricultural implements.

12,161. You spoke of the smartness of the American vehicle. Do you say that the American vehicle is smarter than the English?—I was not referring to motor-cars, but to the general smartness of everything that the Americans do. I was speaking of agricultural implements.

12,162. I thought you were speaking of motor-cars, and speaking generally?—No. I was not making a reflection on the English.

(Mr. Kinggate.) I understood you to say that they were smarter in regard to getting up, but I should have to contest the point that the motor-car from America is smarter than the English made one.

12,163. (Mr. Robins.) In the course of your evidence you were dealing with yellows made from zinc. Only within recent years has yellow been made from zinc, I believe?—I have made it for 30 years.

12,164. At the present time the demand is not much?—No, it is not much.

12,165. Would you consider that the making of yellow from zinc is in the experimental stages, or has it come to the end of the rope?—Nothing has come to the end of the rope, as far as that goes, but general knowledge as to the manufacture of zinc chromes is fairly accurate now.

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12,166. Is there an improvement on what there was thirty years ago?—Very little improvement.

12,167. But there is a little?—I should not think so. There may be an improvement with regard to cheapening, but there is no improvement in the body or the colour of the tints.

12,168. You do not think it is possible that, with further research, there will be improvement?—I could not say that. It is impossible to say in science what improvements may happen.

12,169. Have you a knowledge of carriage painting?—No, I am not a coach maker.

12,170. What led you up to the remark that, in painting a carriage yellow, there would be a very small amount of dust from the sand-papery?—I do not think that I made the statement.

12,171. (Chairman.) I understood you to say that?—The dust in laying on, do you mean?

12,172. (Mr. Robins.) In sand-papery?—I did not speak of sand-papery.

12,173. There would be no dust in laying on, because the colour would be liquid?—Yes, that is the point.

12,174. (Chairman.) I asked you whether, in the operation of painting with a yellow chrome, there would be much dust in sand-papery?—I think I said that it did not matter which colour was put on, whether it was a chrome or not. That did not enter into the question. The dust would be the same whatever colour was used.

12,175. I suppose that there is a considerable amount of dust in sand-papery?—I do not know; I have no experience.

12,176. (Mr. Robins.) Not knowing anything about the coach trade, you spoke specially of the lining colours. The quantities of lining colour that would be required on a carriage, if it was picked out with a broad line and a fine line, would range from about 4 to 8 ounces on any carriage. To-day not one out of 50 carriages or motor-cars is picked out with fine lines. With regard to zinc white, if a man is lining white (and I have come in contact with a good many men) he prefers zinc white to line with instead of lead. If you use lead for picking out and fine lining, the picking out line always has to be done twice. If you use lead you always have to add a very small proportion of ultramarine blue. If you pick out a fine line with zinc white, you have to do it twice just the same, and you add a little ultramarine blue at the same time; so you have the same relative value. There is another advantage, and that is that the white lead stands high above the surface. I say that zinc white is far superior from my own experience.

12,177. (Mr. Parsonage.) One question with regard to the suggestion that has been made once or twice to-day with regard to the cornering of zinc, all of it belonging to a foreign combine. Were you referring to the Zinc Corporation?—I would not like to say the Zinc Corporation.

(Mr. Parsonage.) That is a British Company, and the main place where they get the ore they treat is Broken Hill, Australia. I know that this is put forward as a strong argument, but I do not think there is anything in it. I think it is a bogey that zinc could be cornered in that way, because the most powerful corporation dealing with zinc at the present time is a British Corporation.

12,178. (Mr. Gardner.) What proportion of lead is there in patent driers?—Some specifications call for white lead alone with manganese salts. It runs up to 70 or 80 per cent.

12,179. The ordinary commercial stuff?—With those it goes down very low sometimes.

12,180. As ordinary painters, we are dealing with the ordinary commercial stuff, and it is a very low proportion?—Yes, 5 or 10 per cent., or something of the kind.

12,181. I take it that the position of paint manufacturers is that they are not quite so much interested in the grinding of white lead (the, would require to grind something), but in the question of tints. You hold that if lead compounds were done away with, you would require to reorganise your whole works

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and machinery?—The present machinery would be available.

12,182. Then it is simply a question of adapting that?—Yes, organisation.

The witness withdrew.

Mr. J. SCOTT examined.

12,184. (Chairman.) Do you attend to-day as a representative of the Association of Master House Painters in Scotland?—Yes.

12,185. What is the nature of your business and where is it carried on?—House painter, 249, West George Street, Glasgow.

12,186. What is the average yearly number of painters employed by your firm?—80 or 90.

12,187. How long have you been in the painting trade, approximately?—I have been connected with it all my life, practically.

12,188. Have you known any cases of lead poisoning or painter's colic?—I used to hear about them a lot when I was a boy, but the only case that I have known was that of a man who works lead in the shop. He was off 2 or 3 days. That is about 20 years ago. I have never heard anything of them since.

12,189. Have your men had occasional days of sickness possibly due to lead?—Only one man, and he is not a painter.

12,190. Do you have a periodical medical examination of your men?—No.

12,191. If you have no such examination by a doctor, is it not possible that some of the men may be suffering from the slower and more insidious forms of lead poisoning?—I do not think it is probable.

12,192. But it is possible?—Everything is possible.

12,193. You know, I presume, that lead poisoning frequently undermines the health without immediate violent symptoms arising?—I presume so.

12,194. So it is quite possible that some of your men may have been away for what has been thought ordinary sickness, when it may have been incipient lead poisoning?—Honestly, I do not think so.

12,195. Now the incidence of lead poisoning is published month by month by the Board of Trade. Do you see the "Labour Gazette" issued by the Board of Trade?—I cannot say that I have read it.

12,196. Have you heard that 284 deaths of painters have been definitely certified as due to lead poisoning in the last 10 years?—I have heard so.

12,197. And that the increase in the death rate from lead poisoning among the painters in the first six months of this year is considerable?—I suppose that is so.

12,198. I understand that you have had no lead poisoning in your works at all?—None—unless you take that man who was off for half a week.

12,199. Are you aware that in the Potteries a large number of the works have never had any case of lead poisoning whatever?—I do not know anything whatever about the Potteries.

12,200. Are you aware that the cases of lead poisoning in the house-painting trade are more numerous than in all the other industries put together where lead is used?—Unless you have statistics, I do not know it.

12,201. You may take it from me that that is the case. In addition to that, the death rate from Bright's disease and nervous diseases and consumption due to work in lead are very high?—I did not know that.

12,202. There are also a very large number of non-fatal cases most of which are never recorded, as they are not required to be notified to the Home Office. Are you aware of that?—Really, I do not know of that.

12,203. I am sure you agree with me that all this sickness and death is deplorable?—Certainly. All sickness and death is deplorable.

12,204. Do you know that this deplorable evil has attracted the most careful attention in most foreign countries?—Yes, I know that.

12,183. You think that the percentage of soluble lead, which is in all these stainers, with the exception of the bright reds, is a very small quantity?—It is not very great. Of course, there are exceptions.

12,205. I suppose you agree that something must be done—taking these figures as correct—either by regulation or by prohibition, to meet the evil?—There is an undoubted evil, and I think that regulation might mitigate it.

12,206. Now, have you had any personal experience of paints containing no lead?—Yes.

12,207. How long ago is it since you made any serious experiments?—I have seen them within the last week.

12,208. Have you used leadless paints very much in your business?—Yes, but we stopped using them alone. Latterly we have mixed them with lead.

12,209. When did you last, on a large scale, use leadless paints in your business?—Without a lead basis?

12,210. Yes?—We have not done it for 20 or 25 years.

12,211. Have you found the leadless paints satisfactory?—No.

12,212. Then your experience of the unsatisfactory condition of leadless paints was 20 years ago?—No. I examined some last week.

12,213. But you said your own personal experience of the use of these paints, on a large scale, was 20 years ago?—Yes, on a large scale, but not on a small scale.

12,214. What sort of work have you done, on a small scale, recently?—We have tried some green-houses and we have tried a ceiling with lithopone, and tried it outside.

12,215. By your own workmen?—No, not by our own workmen.

12,216. What have you had done by your own workmen?—Nothing of any great extent.

12,217. Then your own personal experience with leadless paints was 20 years ago?—Yes, on any practical scale, unfortified by lead.

12,218. The Office of Works and others have told us that they have used leadless paints with entire success for some years?—I cannot say anything about that.

12,219. The Office of Works have made very zealous experiments and trials for the last 10 years, and, at last, after a great many failures, they have hit upon a formula which they introduced four years ago, which has proved entirely satisfactory. Do not you think it would have been very much better if some of the large employers of labour in Scotland had done the same thing, and had gone on experimenting until they had found something?—At Hartwood Asylum, 10 years ago, we did a room entirely with Durresco, and gave it a coat of varnish, and it is standing, but when you come again to use that material you will find a very different state of matters. Many things which do at one time when you come to repeatedly work upon them form a bad basis.

12,220. But you have not been very zealous in making your attempts to find leadless paints?—No, I cannot say that I have been zealous.

12,221. My point is that the Office of Works have, and they have been successful, and perhaps if you had been a little more zealous you might have been equally successful?—I could easily be successful the first time.

12,222. But the last four years they have been successful all the time and are perfectly satisfied?—I have one that has done for 10 years, but it will not do repeatedly.

12,223. They have got a formula which is entirely satisfactory after repeated trials?—It has only stood four years. You want 20 years.

12,224. You think 20 years?—I would not say that. If you took a thing and, two years after that,



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submitted it to a repainting, and, when it was actually hard again, submitted it to repainting, you would see what was going to be its use for general purposes.

12,225. You have told us that you have not made any really serious attempts to find leadless paints yourself for a considerable number of years, and yet you come here to tell us to-day that lead paints are absolutely essential?—I believe so.

12,226. Although you have not made any trials to find a substitute?—No. We are only painters, not manufacturers.

12,227. But you have not attempted to find a substitute in all these years?—No, we have not.

12,228. If the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workmen handle lead. That you understand, do you not?—Yes.

12,229. Are you aware of the details of these precautionary measures?—No, I could not say that I am.

12,230. First of all there is the provision of overalls, which are to be found by the employer, who is responsible for seeing that they are regularly washed?—They are found at the present time by the men, and they are properly washed.

12,231. Would you agree to the provision which I have just put to you?—I would not.

12,232. Secondly comes the provisions of a meal-room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used. Is that possible in all cases?—I think so.

12,233. You think that in all cases the men could have their meals in a separate room?—That would be a standing rule and must not be broken. If it were the rule it would have to be kept.

12,234. Could you see that that rule was enforced?—I believe that I could if it were the law.

12,235. Then a provision of a proper place to keep the overalls, where they will not contaminate food or outdoor clothing. Would that be possible?—I should think so.

12,236. Where are the overalls kept to-day when they are not being used?—Anywhere about the job.

12,237. And so they are in places where they could contaminate food?—No, I do not think so.

12,238. But if they are left all over the job they must collect a great deal of dust, and dust is the serious evil that has to be contended with?—I do not think that they would collect more dust, there, than a man walking along the street in them would collect on them.

12,239. I am speaking of lead dust?—They will not collect lead dust.

12,240. I have seen men with clean overalls, and seen them wipe their hands on them, and they have splashes on them, and all those splashes dry and come to dust?—I think it would be whiting.

12,241. But I am speaking of paint, not whiting?—Painters use whiting.

12,242. But I am speaking of paint. I will not labour the point, because you do not admit, I understand, that any dust of any sort is collected on the overalls if they are left about the job?—Not if they are properly put aside on a shelf or in a press or something of the sort.

12,243. Are they always put aside on a shelf or in a press?—They are usually put in the best place.

12,244. Do you know for yourself that they put them in a press?—Yes, sometimes.

12,245. Do your foremen report that that is the practice?—No.

12,246. Then how do you know?—I go about myself on the jobs.

12,247. You have seen them always put away very nicely?—I cannot say I have seen them put away very nicely, but they are usually put in the cleanest place. There is no lead dust in the paint-shop.

12,248. Is there none?—No.

12,249. Are they always kept in the paint-shop? Are they not kept sometimes in the room where the men are working?—Yes.

12,250. They would collect dust in that case, would they not?—I do not think it would be lead dust.

12,251. But that is the very dust that is impregnating the room. There is the rubbing down; would not the dust collect on the overalls then?—It is not often you will see lead dust about a room from the rubbing-down.

12,252. Then as to the introduction of proper washing accommodation; one basin or other utensil to every five men, supply of water both hot and cold, soap, nail-brushes, and a sufficient number of clean towels. Could you ensure that such a provision was carried out?—With regard to one basin to every five men, would it not be better to have a provision that every man should have proper facilities? I would not like to have to refuse a job because there was only one basin and the men had to wait their turn. Suppose I was away 10 miles and there was only one basin in the house?

12,253. The rule would be not less than one basin or other utensil for every five men, and you would have to obey it. There is no question of being 10 miles away. Could you always provide hot water?—We should have to do it, if it was not there.

12,254. But if it was not there, what would you do?—You would take sticks and make a fire.

12,255. Then provision would have to be made for the avoidance of dust; some means would have to be devised for getting rid of any dust which the men might breathe. Could you ensure that provision being carried out?—Yes, lead dust.

12,256. How would you, for instance, arrange to collect the dust in dry rubbing-down with sand-paper?—There is practically no dust generated.

12,257. I know there is dust?—In exceptional cases there may be dust.

12,258. I have seen the work done myself and you cannot rub down a dry wall without generating dust. I want to know how that dust is to be collected?—I would not object at all to the prohibiting of dry rubbing-down on old work.

12,259. Would you object to the prohibition of dry rubbing-down altogether?—Yes.

12,260. How are you to collect the dust that is generated where dry rubbing-down is allowed?—If there was dust perceptible to the naked eye, I should object to dry rubbing-down, but in the majority of cases, from the way in which the paint is put on in Scotland, with a coat of white paint, the dust is practically collected in the sand-paper.

12,261. But we are not dealing with Scotland only. How is this Committee to deal with cases where there is a considerable amount of dust created by the sand-papering process. Is it not impossible to devise any scheme?—I can only say that if dust is perceptible, it should not be allowed.

12,262. But I can tell you that there is a large amount of dust in sand-papering in England, and I ask you can you suggest any means for getting rid of that dust?—Could the men wear respirators?

12,263. Have you ever seen one that is comfortable to wear?—No.

12,264. Then could you insist on that?—If we had to.

12,265. This Committee is formed to decide whether the Home Office should allow in future the use of a very dangerous element, namely, lead; and, if permission is given for the continued use of it, to devise some precautions to relieve the men from the evils which ensue; and I ask you what do you suggest as a remedy for removing the dust which is generated by sand-papering a surface?—There is really none.

12,266. I must really ask you to answer the question, otherwise I shall not go on with my examination?—Very well, then; use respirators.

12,267. But you cannot expect a man to wear an uncomfortable respirator. Supposing that the Home Office do not agree to a respirator, is there any other means that you can suggest of removing the dust?—I have heard some people speak of electric fans.

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12,268. But can you suggest anything yourself?—Really I cannot.

12,269. I did not expect that you could, but I wanted to get an answer. Then, in addition to this, a periodical medical examination, say once a month, would be insisted upon, at the expense of the employer. Have you any objection to that?—I think it is pretty often. I do not see much need of it once a month.

12,270. Lead poisoning amongst house-painters is more prevalent than in the whole of the other lead industries put together. The rule in the potting industry is that each person employed in lead has to be medically examined once a month. The Home Office is not likely to go back on that and make a longer period for an industry where the prevalence of lead poisoning is even higher. So I ask you whether you would agree to such a provision as I have cited?—I would not if I could help it.

12,271. But supposing it was the law of the land, would you object to it?—I would object, if I could; but if it was the law of the land, I would need to obey it.

12,272. Would you object if the medical examination was going to be of great value to the workpeople?—No. If I thought that, I would not object for a moment.

12,273. I was sure that was in your mind; that is why I pressed for an answer. Then with regard to paying compensation to any worker withdrawn from work on the certifying surgeon's orders on account of doubtful health, would you agree to that?—Yes.

12,274. But this is in doubtful cases where a man has not contracted lead poisoning, but who, the doctor thinks, is likely to. Would you be prepared to give compensation if he were suspended in such circumstances?—If the man contracted it in the course of his employment, certainly.

12,275. Suppose he has not contracted lead poisoning actually, but the doctor thinks he may get it if he is allowed to continue in the work?—What would you pay him—half wages?

12,276. Yes. Would you agree?—[No answer.]

12,277. Taking all these things into consideration, would you prefer that your industry should be regulated by special rules such as I have foreshadowed, being quite sure that they could all be carried out, the employer being responsible for their being carried out? Or would you prefer that lead should be prohibited?—I would rather answer that question in this way; I would rather say that I believe, in the interest of our trade and the public, it would be better that the regulations were there than that lead was done away with.

12,278. Would you agree to seeing, in all cases, that these regulations were carried out, and to becoming responsible for them, and, if they are not carried out, standing the penalty?—Yes; if they were the law I should have to; but I should object very strongly to some of them.

12,279. Would it be possible to carry them out?—Some of them could be carried out.

12,280. The Home Office look upon the question of removing the dust as one of the most essential things. How would you get away from your answer that you do not think there is any possible means of doing it?—If that is imperative I must say that I think respirators would be about the only thing, and the men would have to use them for all the time.

12,281. I do not think that that would be accepted. If your employers would come forward and make suggestions for the total removal of all the evils, that might be considered as an alternative to prohibition; but if you cannot come forward with such recommendations to us, the Committee must seriously consider whether lead will not have to be prohibited?—Do you suggest that our association should debate on this question and send up their opinion in writing?

12,282. If the evidence is going to be anything like what they have given during these last two days, it will not be of any use, because no one has had any practical suggestion to make about the removal of dust. I would rather ask the individual members, but I think we have taken all the evidence from the employers that we can get?—You put it like this: you are either to abolish dry rubbing-down altogether or you are to do away with lead. Is that the form that it takes?

12,283. I would go further than that, and I would say that you have, in every case where the Home Office considers there is danger to the workmen's health and life by being engaged in various processes in this industry, to provide a reasonable and a practicable precaution which we are satisfied can be carried out. If you cannot do that, then it is a question whether we shall not have to prohibit the use of lead. Unless you can do that, it is no use coming here like some gentlemen who have said it is quite easy. We must have a demonstration of how it is to be done?—But really I do not see any real practical difficulty in anything but this dry rubbing-down.

12,284. I see difficulty in this—that I cannot see how you can enforce the regulations to the satisfaction of the Home Office. Your individual promise is sufficient, but in a large number of cases the individual promise would not satisfy the Department?—I think you have an organisation that would see those things carried out.

12,285. No, we have not?—I think that the workmen have.

12,286. I do not think that the workmen have?—You can do very little outside the rules but what it is reported here.

(Chairman.) You would want an army of inspectors to enforce the rules which are essential for protecting the workmen in this industry, and even then I do not think that you would cover one-hundredth part of the ground.

12,287. (Mr. Sutherland.) In the normal way of rubbing-down, there is no dust?—If you get a very reedy bit of wood, which may be once in a hundred times or once in a thousand times, you might in the first coat get dust; but otherwise there is none.

(Chairman.) It may be so in Scotland, but it is not so in England.

12,288. (Mr. Sutherland.) You object to providing overalls because the men already provide them?—I do.

12,289. You would not take on a man in your shop unless he came with overalls?—I would presume, when I took him on, that he had overalls, and if he did not appear in overalls I do not think the men would let him on the job.

12,290. (Mr. Gardner.) I suppose that you are rather astonished to hear of the prevalence of this evil of lead poisoning?—Yes.

12,291. And that painters are subject to Bright's disease, consumption, and nervous troubles more than men in other trades?—I have known lads who were threatened with consumption and who attributed their cure to being made house-painters, because of the outside work it gave them.

12,292. But the returns show us that there is more phthisis in our trade than in any other trade, and that the average age of our men is some eight years lower than the average age of adults throughout the kingdom, so that it is necessary that something should be done?—I think if you did anything to give them work in the winter time you would save twenty lives from natural decay to one you would save by preventing lead poisoning.

12,293. That would mean forwarding a recommendation to the Home Secretary to have all the Government work done in the winter season?—If you will.

The witness withdrew.

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Mr. J. R. DONALD.

[Continued.]

Mr. J. R. DONALD examined.

12,294. (Chairman.) You attend to-day as a representative of the Association of Master House Painters in Scotland?—That is so.

12,295. What is the nature of your business and where is it carried on?—House Painter, 622, Eglinton Street, Glasgow.

12,296. What is the average yearly number of painters employed by your firm?—About 20.

12,297. How long have you been in the painting trade?—40 years.

12,298. Have you known any cases of lead poisoning or painter's colic?—Yes, but nothing of any importance; very very few.

12,299. Have your men had occasional days of sickness, possibly due to lead?—Not to my knowledge.

12,300. Do you have a periodical medical examination of your men?—No.

12,301. Then how do you know that some of them may not be suffering from the slower and more insidious forms of lead poisoning?—There has never been any indication in any way from doctors or anyone else, and no signs of it, to my knowledge.

12,302. You know, I presume, that lead poisoning frequently undermines the health, without immediate violent symptoms arising?—Yes.

12,303. So it is quite possible that they may have suffered from lead poisoning without your knowledge?—I do not think so. It could not be much, at any rate, if anything.

12,304. Do you ever read the "Board of Trade Labour Gazette"?—No.

12,305. Do you know that 284 deaths of painters have been definitely certified as due to lead poisoning in the last 10 years?—No, I did not know that.

12,306. Or that the increase of lead poisoning in the first six months of this year has been very considerable?—No, I was not aware of that. I hoped that it was decreasing; I did not know that it was increasing.

12,307. You have had no cases in your business at all, to your knowledge?—Not in my employment, no; I have never had such a thing.

12,308. Do you know that some of the Potteries are in the same satisfactory position, and that some of the potteries have been quite immune from lead poisoning cases, while their next door neighbours have had a crop of cases?—I did not know that, but I know in the Potteries they sometimes suffer from lead poisoning.

12,309. Do you know that the figures of lead poisoning in the house-painting trade exceed those of all other trades put together?—No, I did not know that.

12,310. And, in addition to this, the death rates from Bright's disease and nervous diseases, due to work in lead, are very high?—I was not aware of that.

12,311. And that there are also a very large number of non-fatal cases most of which are never recorded because the Home Office do not require them to be notified?—No, I was not aware of that.

12,312. I am sure you will agree with me that all this sickness and death is very deplorable?—It is; there is no doubt about that.

12,313. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—I am aware of that.

12,314. Do not you agree that something must be done, either by regulation or by the prohibition of lead, to meet this evil?—Yes, it would be much better if something were done.

12,315. Have you any personal knowledge of paints which contain no lead?—Some of our pigments contain no lead.

12,316. Have you had any general experience in using paints which contain no lead?—Yes; we always use them.

12,317. On a large scale?—I do not know what you might call a large scale. We use them in proportion to the number of men we have. Sometimes a demand may take place for a great amount of white lead or a non-poisonous paint.

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12,318. How much of the work you perform is done with white lead?—It is a difficult question to answer. We will go through 4 or 5 tons a year.

12,319. How does that compare with the amount you use of leadless paints?—That is much smaller.

12,320. How much?—25 per cent.

12,321. Do you mean that 25 per cent., or a quarter of your work, is done with non-lead paints?—That is about it. I could not say exactly.

12,322. (Mr. Gardner.) Are you including Duresco with non-lead paints?—It is a non-lead paint.

(Mr. Sutherland.) But it is a water paint, not an oil paint.

12,323. (Chairman.) Have you found the non-lead paints satisfactory?—Non-lead paint will never fill the place of white lead paint, in my opinion.\*

12,324. In what way is it inferior?—Want of durability for one thing, and want of covering power for another.

12,325. Is non-lead paint cheaper or dearer?—I think if anything, zinc white is dearer. In fact, I know that it is dearer. The circumstances arise where you have to use it. That is why I use it.

12,326. You never use it if you can help it?—Sometimes it is specified.

12,327. If it is not specified then you would use lead paint, as a matter of course?—Yes; lead is the basis of our business practically.

12,328. You have not found the leadless paint satisfactory?—Not when it is compared with white lead for durability.

12,329. Do you know that the Office of Works have a formula for leadless paints, which they have used for the last four years with very excellent results? They have experimented for many years and after many reverses they have succeeded in obtaining a formula which they say now is first-rate?—I do not know their formula. Have they tried it in the Glasgow atmosphere?

12,330. I understand that they have tried it all over the country?—The Glasgow atmosphere is very severe on anything of that kind.

12,331. Now I want you to realise that, if the free use of lead is allowed to continue, the Home Office will have to insist on the observance of precautionary measures of the same kind as those which are observed in other employments where the workers handle lead. Are you aware of the details of these precautionary measures?—I have heard them spoken about, but I do not know them exactly.

12,332. Let me give you a few of them. First of all there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed?—The men supply their own overalls in Glasgow.

12,333. Would you have any objection to supplying them yourself, and seeing that they were properly washed every week?—I do not know. If it was compulsory, I should have to do it, but I am afraid it would be a very peculiar job. You might supply a man with a new suit of overalls on Monday morning, and he might leave you on Monday night. What are you going to do in that case? There is some consideration necessary there.

12,334. Then with regard to meal-rooms, is it possible always to provide that men working in lead should have a separate room in which to take their meals?—That is also a very difficult problem, I am afraid. They generally take their meals in an empty room in the house.

\* Since giving my evidence I have made very careful inquiry into the manufacturing of paints and pigments in London, and I am now convinced that white lead can be done without. I desire to add this footnote to my evidence, because my opinion has been changed in consequence of the practical results with leadless paints which have come under my notice in the last few days, and have confirmed the small but successful experiments carried out last year by my sons and myself in Glasgow.

(Signed) JOHN R. DONALD,  
31.7.1911.

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Mr. J. R. DONALD.

[Continued.]

12,335. They cannot always take their meals in an empty room in the house, can they?—Yes, they can if it is empty; sometimes, of course, houses are occupied while they are being painted.

12,336. There are occasions when it would be absolutely impossible to provide a separate room?—You could not in some cases.

12,337. Now, next, the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing. Is that always possible?—Yes, that is pretty well done as it is. There is not a place set apart for it, but the men are pretty careful in that way themselves.

12,338. Could you always provide a separate room for the men to keep their outdoor clothing while they are at work?—No; that would be almost impossible unless some arrangement was made.

12,339. Now the introduction of proper washing accommodation; one basin or other utensil to every five men, supply of water, both hot and cold, soap, nail-brushes, and a sufficient number of clean towels. Is that always possible?—I am afraid that that would also be difficult. There is always soap supplied to every job. There is no question about that.

12,340. And sometimes the men provide their own pocket-handkerchiefs to wipe their hands on?—I have seen them do that.

12,341. One of the most important provisions is with regard to the avoidance of dust. Some means would have to be devised for getting rid of any dust which the men might breathe. Do you think it is practicable to devise any such system?—Dust arising from what?

12,342. Dust arising from sand-papering?—I would not like to say that there is no dust, but there is very little. It is impossible for dust to rise from sand-papering.

12,343. It would save your time if I told you that in England there is a considerable amount of dust, and we have to deal with the trade throughout the United Kingdom. Now I ask you, as a practical man, is it possible, where dust is generated in the process of sand-papering, to devise any means by which it can be carried away?—Most of the grit that comes off sticks to the face of the sand-paper.

12,344. Kindly answer the question. Making the assumption that what I have put to you is the case, can you suggest any means by which the dust can be removed?—No, not at present.

12,345. Then medical examination. A periodical medical examination, say once a month, would be insisted upon at the expense of the employer. Would you agree to that?—I should require to obey it, if it

was put into force, but I do not know how even the men would take it themselves.

12,346. Would it not be very difficult to carry out?—Yes, because men might for months never be near the shop. They might be out of the town altogether. There are many things to be considered there.

12,347. I quite agree. I am not putting this forward by any means on the assumption that it is easy to do?—There would be difficulty in carrying it out.

12,348. Would you agree to pay compensation to any workers withdrawn from work by the doctor's orders on account of doubtful health? That is to say, supposing the doctor examined a man and said to him, "You are very poorly to-day. I suspend you for a month. You have not lead poisoning, but if you are not careful you will get it"; would you pay that man compensation up to two or three months?—No, I do not think so.

12,349. I am going to put this one last point to you. This Committee has been established to deal with what you have agreed is a very deplorable evil?—Yes, that is right enough.

12,350. We have, as practical men, two alternatives. The first and simplest is to agree to prohibit the use of lead in the industry altogether. The second is to provide precautions to deal with every incident of danger which arises in house-painting operations. Now if the employers come to us and give us very definite and very precise suggestions for the removal of these various evils, then this Committee will very carefully consider them, provided that the employers can concurrently show us that these rules can be carried out—not merely that the rules can be established, but that they can be established and carried out. Now, I ask you, as a practical man, whether you think it is possible under the circumstances to carry out these rules which I have suggested in their entirety?—That would require very careful consideration, at any rate.

12,351. Would you prefer such a code of rules, with all the expense and trouble and irritation which attach to it, or the abolition of lead?—I think the regulation. It would be detrimental to the trade to stop the use of lead entirely. It would be a very serious matter, that, for us.\*

12,352. Do you think you could show us that every incident in house-painting operations which involves danger can be removed?—They could be lessened.

12,353. But I am talking about removal?—I could not guarantee removal.

12,354. If you cannot put forward practical suggestions to us for the removal of these evils, you will not be surprised if the Committee make up their minds to prohibit lead?—I suppose that is the alternative.

\* See, however, the witness's footnote to 12,323.

The witness withdrew.

## SEVENTEENTH DAY.

Wednesday, 1st November 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

LORD HENRY BENTINOK, M.P.

Mr. E. L. COLLIS, M.B.

Mr. A. L. C. FELL.

Mr. C. L. MASON.

Mr. C. KINGGATE.

Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary*).

Mr. W. ROBINS (a member of the Committee) examined.

12,355. (*Chairman*.) Have you been making practical test with zinc white and white lead for lining purposes?—Yes.

12,356. Do you produce comparative test boards?—Yes.

12,357. What conclusions do you draw from the tests?—I draw the conclusion from the tests that zinc

white is much easier to handle in the pencil to put a line on, and that with regard to wear it is better; it retains its colour, and further, that the varnish on the surface damages the appearance of the zinc white less than it does white lead.

12,358. Have you had any practical experience of its durability?—I have had practical experience of

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Mr. W. ROBIN.

[Continued.]

durability with regard to a car that had been standing in sulphurous fumes; the work which was done with white lead had gone yellow, and that with zinc white had retained its colour.

12,359. Do you know of your own personal knowledge how long the test has been made of zinc white in these lines?—I have used it on and off now for over two years.

12,360. Have you made careful observation of the vehicles which have been painted with this zinc white?—Yes, and it is satisfactory. It retains its colour on the fine lines of motor cars. The specimen marked "P" is pure white lead; the other has a small portion of blue in to retain its colour on account of the varnish.

12,361. (Mr. Fell.) How long had that car been standing in the sulphurous fumes?—It was standing in the shop only about a week, and it altered its colour.

12,362. You have had no experience with zinc white out in the open air, have you?—Only with regard to cars being painted with zinc white, grey, and so on,

from zinc white, the base of the colour being zinc white.

12,363. How long had those been out in service?—I have seen cars out twelve months, and not alter colour. I have had cars painted myself with greys made from zinc white as a base.

12,364. (Chairman.) Are you confining your evidence to the lines?—No, the general appearance of the colour. With regard to the colour of the lines, I have seen cars in zinc white that have been good two years after.

12,365. With these narrow lines?—With these narrow lines.

12,366. (Mr. Fell.) There is no difficulty in applying them?—No, there is no difficulty in applying them. They are lighter in pencil. They work better.

12,367. Is that one coat or two coats?—With both of those, any painter is obliged to use two coats if he lines with white, whether white lead or zinc white. Those are both applied with two coats as an ordinary painter would do. Neither white lead or zinc white will be solid with one coat.

Mr. WILFRED READMAN (104, Bramshot Avenue, Charlton, S.E.) examined.

12,368. (Chairman.) Are you the foreman painter at the London County Council Tramways Car Repair Depot at Charlton?—Yes.

12,369. How long have you held that position?—Since July 1908.

12,370. What experience have you had in painting?—My experience in the painting trade dates back from leaving school in the year 1892, when I was apprenticed to my father, who is still in the business at Stockton-on-Tees as a painter and sign writer.

12,371. Will you give details of your experience from your apprenticeship to 1908?—During the latter years of my apprenticeship, I worked for the trade as a writer to Messrs. Burrell and Wilkinson, coachbuilders, also of Stockton: I left Stockton in 1900 and commenced for Messrs. Maple & Co., London, on general painting and sign writing. I returned to Stockton in the spring of 1903, and again worked for my father. In the following June I took up my position as foreman painter to the London United Tramways, Chiswick. Here I dealt with 340 electric tramcars, and 10 horse cars annually, together with motor cars and tower wagons. I left the London United Tramways in December 1907, and commenced for the Wallpaper Manufacturers, Limited, of Darwen, Lancashire, as a representative for their enamels and paints department. I left their employ in June 1908, and commenced, as stated above, for the London County Council.

12,372. What number of vehicles do you deal with in the London County Council Car Depot?—The number has increased to 1,397 electric cars for 1911, 81 horse cars, 20 carriages and broughams, 8 motor cars, 5 steam lorries, and 7 petrol lorries.

12,373. Will you describe the process of annual renovation of electric cars?—The car is thoroughly washed down and smoothed with pumice stone and water, all bad parts are touched in with paint, and filled with stopper.

12,374. What material has been in general use for stopping?—The stopper until recently has been made as follows: dry white lead, gold size, and turpentine.

12,375. How is that rubbed down?—This in all cases has been smoothed down with pumice stone and water.

12,376. What is the next process?—The light-coloured parts of cars are given two coats of cream; the waist panels are glazed with lake body colour. Gold lines, transfers, &c., are saved where good, bad parts repaired, lining, &c., is also made complete.

12,377. Is the whole of the outside of the car then given a coat of finishing body varnish?—Yes.

12,378. Is anything done to the roof?—The outside roof is given one coat of paint made up from white lead.

12,379. What is done to the insides?—The insides of most cars are washed and re-varnished; floors,

platforms, staircases, &c., being given one coat of lead colour.

12,380. What are the exceptions?—The only exceptions to this are subway cars, which are painted inside.

12,381. Is any dry rubbing down done?—In the whole of the processes there is little or no sandpapering of work in a dry state.

12,382. What experiments have been made with non-lead paints?—Experiments dating from March of this year up to the present time have been conducted, zinc white having been used in place of white lead.

12,383. What has been the result of those experiments?—These experiments show that, generally speaking, the former material can be satisfactorily employed; so far, at all events, as a paint pigment is concerned, experience has been too short to form a definite opinion.

12,384. Does that answer relate to paints only, or to stopping material also?—Zinc white is used altogether for stopper.

12,385. Now, will you tell us how you deal with new work?—All outside work on car body is given one coat of white lead paint before moulding headings, rails, panels, &c., are fixed. When these are fixed, the portions of car to be coloured Midland red receive four coats of priming.

12,386. Of what does the priming consist?—It is made up from white lead, vegetable black, and driers thinned out with turpentine and a little linseed oil.

12,387. Does the filling come next?—Yes, five coats.

12,388. Of what is the filling made?—It is made from slate filling powder, white lead, gold size, and turpentine.

12,389. How is the filled surface rubbed down?—With pumice stone and water.

12,390. What finishing coats are given?—Two coats of lead colour tinted with Indian red. Then three coats of Midland red, one coat of Midland red varnish colour, one coat undercoating body varnish, lined and lettered gold, one coat undercoating body varnish, and two coats finishing body varnish.

12,391. How are the window frames treated?—The frameworks of drop and sliding lights are filled with patent wood filler, and given one coat undercoating body varnish, and two coats finishing body varnish.

12,392. How is the interior of the car finished?—The whole of the interior of the car, as well as all seats, are filled with patent wood filler and given three coats of hard drying body varnish.

12,393. Portions of your cars are finished in light colours; how are those treated?—The outside upper portion of car, which is finished cream colour, is given one coat of lead colour, one coat of white and three coats of cream colour, is lined and varnished, one coat

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MR. WILFRED READMAN.

[Continued.]

undercoating body varnish, two coats finishing body varnish.

12,394. How do you paint the outsides of dashes and staircase stringers?—Two coats of lead colour, three coats Midland red, one coat Midland red varnish colour, lined and gilded one coat of undercoating body varnish, and one coat of finishing body varnish.

12,395. How do you treat car floors and similar parts?—Car floor, platform, insides of dashes, staircase treads and risers, and steps are given three coats of lead colour.

12,396. With what is the roof painted?—Outside roof is given four coats of white lead paint.

12,397. How is the roofing canvas bedded?—With a thick paste of white lead on roof boards, which have previously received two coats of lead colour.

12,398. How is this work done?—This thick paste of white lead is spread with a stiff brush and palette knife on the roof boards, and the canvas is drawn tight over and pressed down with a piece of wood, so that the lead is pressed through the texture of the canvas forming one solid mass.

12,399. You have told us that there is no sandpapering of priming coats?—No; the four coats of priming lead colour are put on in the usual way, and are not sandpapered or smoothed in any way.

12,400. Nor of filling coats?—The filling up is also applied without any sandpapering of coats.

12,401. When is the stopping applied?—The pinholes are stopped after the application of the first coat of filling.

12,402. Is the fifth or last coat of filling faced down?—When the fifth coat is dry, the whole is faced down with pumice stone and water, and when dry given one coat of lead colour.

12,403. Is that coat of lead colour also rubbed down wet?—This coat is also faced down with pumice stone and water and given another coat of lead colour.

12,404. Is the second coat lead colour again treated similarly?—No; this is sandpapered before the first coat of Midland red is put on.

12,405. Why do you use sandpaper on this coat?—The reason for using sandpaper as against pumice stone and water is that it is quicker, and also that many of the parts can be got at more easily with flexible sandpaper than would be the case with pumice stone.

12,406. Are the coats of Midland red sandpapered?—No; the coats of Midland red, being made of finely ground colour, do not require to be smoothed between coats.

12,407. How is the work finally prepared for varnishing?—Previous to the first coat of varnish being put on, the work must be sponged down with water and dried off with a chamois leather—this allows the varnish to take more freely.

12,408. Is the first varnish coat flatted?—Yes. When this first coat of varnish is dry, it is flatted down with pumice dust, and a piece of cloth or felt in water.

12,409. And, similarly, for later coats of varnish?—The lining and gilding is then done, and a second coat of undercoating body varnish given. This and the following coat of body varnish is flatted before the final coat completes the car.

12,410. By whom is the mixing done?—All colour, stopper, &c., is mixed by the colourman so that none of the other employees do any mixing whatever.

12,411. Do you consider that this reduces the danger?—This takes away a lot of the danger of mixing by hand.

12,412. Have you found any special difficulties with zinc white?—In our experiments with zinc white we have found some difficulty in getting a lemon yellow to take the place of lemon chrome.

12,413. For what purpose do you use lemon chrome?—Lemon chrome? Lemon chrome is used to tint the white to a cream colour; cream colour we find to stand the atmosphere of London much better than any other light colour; it cleans up well, and is not discoloured by repeated application of varnish.

12,414. Can you not use lemon chrome in this way with zinc white?—Yes; several cars have had the whole of the light colour painted out with cream colour

made up from zinc white, lemon chrome and raw sienna, and these have been checked and are being carefully watched. We have also painted eight or ten new roof covers entirely with cream colour made of zinc white.

12,415. Is this satisfactory?—Some of these have come in with cars for renovation after being in service about two months, and they show no signs of alteration of colour, though of course this length of time is insufficient to prove anything.

12,416. Such a paint would contain less than 5 per cent. of lead material, would it not?—It would contain less than 5 per cent. of lead material.

12,417. Have you seen anything of other works where leadless paints are used?—In connection with our experiments with zinc white I was instructed to visit Bradford Tramways, where zinc white has been used entirely in the place of white lead for over three years; also the Midland Railway Company of Derby, where they have used zinc white entirely for over seven years.

12,418. Do you think that white lead could be dispensed with?—I am fully convinced that white lead can be done away with entirely in a paint shop or coach body shop.

12,419. Do you consider that all coach makers could dispense with white lead?—I do consider that all coach makers could dispense with white lead.

12,420. (Lord Henry Bentinck.) Is your only objection to zinc white that it is difficult to make chrome yellow properly?—Chrome yellow is a difficulty.

12,421. Is that your only difficulty with zinc white?—That is our only difficulty.

12,422. You say it is difficult to tell whether zinc white is satisfactory after only a few months' trial. Have you only had it in use a few months?—Only from March of this year.

12,423. Why did you begin to use it in March?—Because of instructions from my higher officials.

12,424. Have you any idea why they instructed you?—No other idea than from a health point of view. We have had one or two cases of lead poisoning.

12,425. Is your percentage of sickness rather high from lead poisoning?—No; on the other hand, it is low.

12,426. Your percentage of sickness is low?—Very low.

12,427. But from lead poisoning I meant?—The percentage from lead poisoning is exceptionally low.

12,428. But, still, you have had two cases lately?—Yes.

12,429. Do you think that influenced your committee?—I take it that has influenced the committee.

12,430. (Chairman.) Have you known of many lead-poisoning cases?—I have this particular case in mind, and one since. I have been very fortunate in not seeing many. The only authentic instance of lead poisoning which has come immediately under my notice is that of a brush hand who was attacked in January of this year at the Central Repair Works of the London County Council at Charlton. This man was employed to my knowledge for nearly three years on inside work of cars, namely, mostly washing down and varnishing. The only lead that he used was on outside roofs, floors, and platforms.

12,431. Was he a careful man?—I always found him clean and careful in his habits, and was more than surprised when I heard that he was attacked with lead poisoning. He recovered about two months ago, and is at present at work, but outside the painting department.

12,432. Have you had any other cases of lead poisoning?—Yes, one case since. In this particular case a man, aged about 33, was employed in the paint shop of the London County Council at the Central Car Repair Works, Charlton, and must only have had a slight attack, as after five weeks' absence from work he resumed his employment as a painter in the above shop, conditionally as per the London County Council medical officer's report.

12,433. How many men are employed in your department?—One hundred and forty-nine total.

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[Continued.]

12,484. Do they all come into contact with lead?—Yes, unless you except the labourers who do the sweeping of the shop.

12,485. No doubt the working conditions at your place are admirable?—The working conditions in the London County Council paint shop are good in every way. The heating and ventilating is effected by means of steam heaters, each equipped with a motor-driven fan capable of displacing 2,000 cubic feet of air per minute. These draw their supply of fresh air from outside the building and deliver it either heated or cooled as required, at about 2 feet from floor level. There are 18 of these heaters which have a total capacity of 36,000 cubic feet of air per minute. This combined capacity is sufficient to change the whole of the air in the paint shop three times every hour.

12,486. What temperature do you maintain in winter?—The shop is heated and maintained at a temperature of 60 degrees Fahrenheit during the winter months.

12,487. What lavatory accommodation have you?—The shop is equipped with wash basins, hot and cold water, and each man employed in the painting is supplied with a nail-brush. Clean towels are renewed daily.

12,488. How often are the floors cleansed, and by what method?—The paint shop floor is swilled down with water daily to prevent dust.

12,489. Are you prepared to put in a schedule showing the amount of each kind of paint used?—Yes.

12,440. (Mr. Mason.) What would you replace white lead with for bedding roofs?—I would replace it with a mixture of zinc white and, say, an oxide of some sort.

12,441. Have you ever tried any such material?—I have not actually tried it. I have seen it in use.

12,442. And, as far as you know, successfully?—As far as I know, successfully.

12,443. Where was that?—At Derby, at the Midland Railway Company's works.

12,444. What would you use for bedding lights?—We do not actually use any white lead in bedding lights in any case.

12,445. What do you use?—Rubber. Light frames are simply varnished before the glass is fixed in. In all cases a coat of paint also is applied; it may be either zinc or white lead.

12,446. Surely you do not find this keeps out the weather?—Yes. If you paint the rebate before the glass is put in, with rubber, it keeps the weather out.

12,447. That is wet when you put the glass in?—Not necessarily.

12,448. For jointing what do you use?—For jointing at present we use white lead. I do not see anything against using zinc white in the place of white lead for that or for canvas, as I mentioned previously.

12,449. Of that you have no personal experience?—No personal experience.

12,450. (Chairman.) Have you seen any cars or carriages dealt with in that way?—I have seen the joints prepared for fixing with zinc white in place of white lead, or this mixture which I mentioned, which is zinc.

12,451. Where have you seen that?—At the Midland Railway Company's works.

12,452. (Mr. Mason.) You have seen it done successfully, as far as you know?—Yes, as far as I know. I was told that they could not notice the difference as regards the work standing.

12,453. (Dr. Collis.) I would like to ask you, with regard to the re-painting of coach-work, why is the painted surface of coach-work renovated? Is it because the paint has all worn away, and you have to re-paint, or for what reason?—If it is not worn away by cleaning down, renovation, viz., touching up and re-varnishing will keep it in such a state that it never does get actually very bad.

12,454. So that the pigment of which the paint itself is made is not so important as the covering material and the varnish with which it is protected. Is that so?—That, practically is the case. Much of the work is not coated with white lead, and would not be

in any case coated with it. The varnish is really the most important.

12,455. So that, whatever may be the respective values of white-lead and zinc-white paints in other branches of the painting trade, in the coach-painting trade it is not important, because it is the varnish which is the life of the paint that is put on?—Yes.

12,456. So that, with regard to the coach-painting trade, would you be able to say that you are the more convinced that white lead may be replaced by other pigments?—Yes, quite so, because white lead is used to a great extent only for the foundation of work.

12,457. And that foundation, you think, could be replaced by other pigments?—Yes, it could in those instances I have mentioned.

12,458. With regard to the difficulty of obtaining colours, when you use lead chrome to make the lemon colour what is the usual proportion of lead chrome then used, if you are mixing it with white-lead paint?—I could not say offhand, but for 1 cwt. of lead (I am giving the approximate amount), say, between 7 and 14 lbs.

12,459. That would be a pale lemon?—Yes, a pale lemon. That varies. The strength of the yellow varies, so that I could not give the actual weight; 4 lbs. in some particular case it might be. It depends altogether on the strength of the staining.

12,460. Have you any experience at all of the way in which dust can be removed locally in factories?—I have not had experience with any plant of that description.

12,461. You cannot say whether you think it would be possible to remove any dust which is caused in rubbing down various parts?—No, I have not had experience with any machinery or anything of that sort.

12,462. (Mr. Mason.) Do I understand that you never burn off your coaches at all, or trumcars?—It is very seldom that a job is burnt off. The dash plates occasionally, where damaged, are burnt off. We have been experimenting with a paint remover, but not altogether satisfactorily. We find the blow-lamp is quicker and more effective than the paint remover.

12,463. Do you find that by applying or continuing to apply new coats on the top of old ones the paint stands perfectly satisfactorily?—Perfectly satisfactorily.

12,464. How often do you paint?—Once a year. Do you mean paint the whole coach right through, or renovation?

12,465. How often do they come into the paint shop?—They come into the paint shop once a year.

12,466. (Chairman.) To be renovated?—To be renovated.

12,467. (Mr. Kinggate.) With regard to the fixing of mouldings, they are put on with white lead, I presume?—They are put on with white lead.

12,468. You said they received a coat of lead colour before the mouldings were fixed. They are generally fixed with white lead?—Yes, a thin coat. The mouldings are fixed, and put on wet with the lead.

12,469. There has been no experiment with regard to other compounds used for that purpose?—No; I have not experimented in jointing at all.

12,470. You would attribute the immunity from sickness in the works to excellent ventilation, and other things in connection with cleanliness?—I would. The men may have worked in a variety of shops that I have no knowledge of, and the lead poisoning may have been contracted before they came under my notice.

12,471. You would agree that there is general lowering of the vitality of men working in lead, apart from serious cases of lead poisoning?—Yes.

12,472. Men have very frequently illness not attributed to lead poisoning, but which is caused by that?—Yes.

12,473. The appearance of the painter would tell you that he is suffering from something of the kind?—Yes.

12,474. It would be a great benefit to the health of the workers if you could possibly abolish the use of lead?—It would, I agree.

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[Continued.]

12,475. You, as a practical man, think it is possible to be done?—I do believe it could be done away with in our particular trade.

12,476. The most important point is keeping the vehicle well varnished?—It is, undoubtedly.

12,477. It is more important even than the pigment?—It is, undoubtedly.

12,478. (Mr. Robins.) In your answer to Mr. Mason, you said you would apply coats of paint over the old surface?—I do not quite understand.

12,479. Did you mean to infer that you would not remove the old paint before you applied new?—No, I would not if the surface of the paint was good, which it usually is, in my particular experience.

12,480. It is more frequent that you touch up and varnish rather than re-paint?—Yes, it being an annual business.

12,481. But in all cases of re-painting you do not remove all the old paint?—No.

12,482. In the case of a perished article you would?—Yes, a perished article.

12,483. That would be done by rubbing down wet, I presume?—No. I should put the blow-lamp on and burn that off.

12,484. Could not another method be applied instead of the blow-lamp?—I have tried paint removers and they are slow in comparison. If you want to remove about three coats of paint without filling up anything underneath, a paint remover does it quite well; but if you have many coats of filling up, and such like, and the coating is pretty nearly one-sixteenth-inch thick, the paint remover is too slow. It takes a lot of soaking.

12,485. I take it that it is a question of cost against the health of the worker?—I do not see anything that is unhealthy in burning off.

12,486. The fumes are unhealthy?—They may be, but it is for such a very short time that a blowlamp is used, and not regularly day after day, as with other work.

12,487. What you burn off produces dust in a very few hours?—No doubt there is a little dust, but we do not allow it to remain. It is taken up as soon as it is scraped off.

12,488. But there is a little?—There is a little.

12,489. (Dr. Collis.) The reason why you renovate your cars every year is, I believe, because you are under statutory obligation to do so?—That is the reason.

12,490. In your experience, do other people who paint coaches and who are not under such an obliga-

tion allow a longer period to elapse before their carriages and cars are renovated?—Yes.

12,491. And do you think that with them the question of the pigment of the paint would be more important than it is to you?—I think it would be more important.

12,492. Have you had much experience in an ordinary coach-building shop?—Yes, in coach-building generally, but, being a writer more than a coach-painter, I have not been working on the coach-work.

12,493. Not when it has first come in?—No, not on the actual coach-painting so much as sign writing and writing on coaches, and fine work, and so on.

12,494. Are you able to express an opinion as to how far coaches and carriages come in with the paint pigment itself destroyed before they are renovated?—The outer surface indicates whether it should be painted again or not. I quite agree that the better pigment underneath would certainly last longer than if there were an inferior thing put under the varnish.

12,495. In your experience, carriages and cars come in to be re-painted with the pigment of the paint below the varnish itself wasted and destroyed in some cases?—Yes, right down to the bare wood in many cases.

12,496. Have you used zinc white for writing and fine lining at all?—I have used it for both.

12,497. Do you find any difference in applying it over white lead?—It is slightly different in use, but it is equal to white lead. In lettering two coats of a well-ground zinc are quite satisfactory.

12,498. Could it be applied as easily and freely by a man used to working with lead as by a man used to working with zinc paints?—I do not see any difference.

12,499. (Chairman.) You said that white lead could be dispensed with in the coach-building trade?—Yes.

12,500. I suppose, with regard to operations of which you have had no actual personal experience, you base that answer on what you have seen at other large works such as the Midland Railway Company's works at Derby?—Yes.

12,501. Entirely?—Yes.

12,502. That would apply to the fixing of mouldings and to the bedding of canvas?—Yes.

12,503. Do you find zinc white takes longer to mix and prepare?—I do not find any difference between that and white lead.

The witness withdrew.

Mr. WILLIAM AWCOCK (278, Hertford Road, Lower Edmonton), examined.

12,504. Are you one of the representatives giving evidence on behalf of the United Kingdom Society of Coachmakers?—Yes.

12,505. What practical experience have you had in the coach-painting trade?—During 44 years.

12,506. Have you worked at railway coach and tramcar painting, or only at carriages and motor-cars?—Only at carriage and motor-car painting.

12,507. Have you known many cases of lead-poisoning amongst coach-painter?—Yes. I know five that I should say were special cases. I know plenty of others, ordinary cases, that come under daily notice.

12,508. You know of five special cases and a great many others, not severe cases. Is that what you mean?—Yes, men who are affected by lead.

12,509. How many other cases do you know?—I should say, speaking from experience, probably at least a hundred.

12,510. Covering what period would that be?—Forty-four years.

12,511. Have you had any personal experience of the ill-effects of lead?—No, it has not affected me.

12,512. But in your opinion this lead poisoning evil is very extensive in your trade?—Yes; I think it more or less affects 50 per cent. in the coach-painting trade.

12,513. That is a very bold statement. Have you any facts to give us on that?—I want to explain that in this way: The men are affected by the use of paint; they simply go home and take a dose of castor oil or something of that kind, and keep plodding on, you see.

12,514. But on what do you base that statement that 50 per cent. of the men are affected by the lead?—Nearly every man that I know has been affected by the use of lead paint. His health has been affected in various ways.

12,515. But we must have facts. Have you anything to show the Committee that that statement is correct?—No. It is only my opinion.

12,516. On what have you formed that opinion?—Merely on personal experience in the paint shop.

12,517. By your general observation?—Yes, by general observation.

12,518. How many men have you worked with in the different shops you have worked in?—I could not tell you. I have been in about 34 shops.

12,519. Can you give us approximately what number of men you have worked with?—An average, I should say, of 15 in each shop.

12,520. Do you tell the Committee that out of those 15 men at least seven of them have, to your certain knowledge, been affected?—In my opinion they have been.



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[Continued.]

12,521. Have they made any personal complaint to you about it?—No. You simply see it in daily contact with them, and you take no notice of it as far as that goes. A man has been working with dry white lead stopping and so on, and feels queer: he goes home; he is not very well; he comes back again after a day off, and goes on. He may not be engaged on that same work for some little time.

12,522. Are you prepared to answer questions with regard to each of the processes in detail?—Yes.

12,523. First, as regards the body-makers, are they exposed to any risk?—Undoubtedly.

12,524. Does the carriage-maker come into contact with lead?—Yes. Every piece of ironwork that he puts on the carriage he has to lead.

12,525. When the carriage-maker has completed the work of fitting-up, is the article ready to pass into the painter's hands?—When the carriage-maker has done—yes.

12,526. The first coats of paint applied are termed priming coats, are they not?—Yes.

12,527. How many coats are generally applied?—About four coats of lead colour.

12,528. Does the priming contain lead?—Yes; it is lead.

12,529. Is sandpapering done between successive priming coats?—Generally.

12,530. In what shop is this generally done?—In nearly the whole of the trade.

12,531. Is it done in the body-maker's shop?—Some of it is done in the body-maker's shop. If a body is ready you send the painter up to give it a coat of lead colour. It is not the general practice to strain lead. Lead contains skin. When a painter goes up again to give it another coat he runs a piece of paper over it to make it smooth, and it also gives a better grip to the next coat put on.

12,532. So that the body-makers and carriage-makers are frequently exposed to dust made by the painter?—Undoubtedly. He is standing at the side of the bench.

12,533. Do you regard the breathing of this dust as one of the most serious dangers of the industry?—Undoubtedly.

12,534. Can it be replaced by a wet rubbing process?—Not in that case.

12,535. Why not?—Because of the thinness of the colour that is put on. You would probably be rubbing through to the wood. By the dry process of sandpapering if you touch the wood it has no ill effects, but water would cause the grain to rise and spoil the panel.

12,536. Is it generally possible to use any form of local exhaust apparatus to remove the dust?—I do not think so, but that is more a question for an engineer.

12,537. Then how is this danger to be overcome?—By finding a substitute in place of white lead. That is the only thing that I can suggest.

12,538. Is the next process what is generally known as filling?—Yes.

12,539. About how many coats are put on?—About five. If it has a very rough grain like ash you give it an extra coat.

12,540. Does the filling material contain lead?—It ought not to. Some do and some do not. With patent filling, a kind of slate material; there is no necessity to put lead in.

12,541. There is no rubbing down between the successive coats of filling, is there?—Just previously to putting on the last coat of filling, you very often pass a piece of sand-paper over it to remove any odd piece of material that may be hanging about the panel.

12,542. Is stopping generally done after the last coat of filling has been applied?—Yes.

12,543. What is the stopping material made of?—Dry white lead and gold size.

12,544. By whom is the stopping material mixed?—In the place where I am now by the foreman. It is very often mixed by the man who has to use it.

12,545.—Do you consider that the mixing of white lead and gold size is attended by danger?—Yes, because it has to be mixed on a stone. You put it in

a heap; a man stands over it and beats it and naturally dust is rising up all the time.

12,546. How is the rubbing down done after the application of the filling coats?—By pumice stone and water.

12,547. Is it ever done dry, for example, with sand-paper?—No. You would not get a proper surface if you did.

12,548. What is the extent of the danger in the rubbing down after the application of the filling and stopping?—Simply this: the water is charged with the paint that you are rubbing off the panels. You may get an inch of stuff at the bottom of your pail which is simply a mixture of pumice stone and lead filling.

12,549. In what way is there any danger in that?—Only that the man is being smothered in it. He may be using that and his hands are practically clean to all appearances, but the water is charged with lead and he may sit down and have his lunch without washing.

12,550. He gets water charged with lead splashed on his clothes?—On his hands.

12,551. And he rubs his hands on his clothes?—Yes; and he may rub it on to his food.

12,552. Does he ever wash his hands in this dirty water?—Oh, yes; he thinks nothing of that.

12,553. Why does he not wash his hands with clean water in the lavatory?—A lavatory is not always provided.

12,554. Do you know any cases where men have used this lead water to wash their hands when lavatories were provided?—No, I do not. You see the lavatory may be all right enough, but it may be in the paint-shop.

12,555. But do men use this lead water because there is no other accommodation for washing their hands?—If a man is in the body shop, he may have a long way to go to get to the paint-shop, where he has lavatory provided for him.

12,556. Does not the man know the risk he runs in washing his hands in such water?—I daresay he does, but I think familiarity breeds contempt, very often.

12,557. I hope the men will wake up to the seriousness of the position and help us if rules are provided to obviate all these dangers. Are the wheels and the carriage underwork treated differently from the body?—Yes.

12,558. In what way?—They have three coats of oil lead colour, and then they generally have two coats of Presto lead colour; that is dry white lead discoloured with a little vegetable black and mixed in gold size and turps. The work is then sandpapered.

12,559. Does this produce dust of a poisonous nature?—Yes; that is the worst part we have to deal with. It is only just bound, you see. There is a sufficient amount of gold size put in it to bind the colour which the men have to sandpaper down.

12,560. Is it necessary to sandpaper in every instance by this process?—There is no other way.

12,561. This, then, is also an extremely dangerous process?—Yes. A liquid filling that we used to use in a shop I worked at, Valentine's wood filling, was put on with a wet rag. We got it from America.

12,562. Is it impossible to use wet methods of rubbing down in this work?—Yes, I think it is. You could not rub wheels down in that way.

12,563. It is impossible owing to the prevalence of curved surfaces?—Yes. There is hardly a straight piece of wood in a wheel.

12,564. Is it practicable to apply local exhaust ventilation generally?—I do not think so.

12,565. After the rubbing down of the filling has been completed, what is the next operation?—Coating with a lead colour; in some cases two coats, but generally one. Then it is faced again with pumice stone and water.

12,566. Is the work then ready to be painted the desired finishing colour?—Yes. It is then ready for the ground, or whatever is put on.

12,567. Is the carriage then ready for varnishing?—Yes, after the proper colour is on.

12,568. Do your answers apply equally to carriage-building and to the manufacture of motor-car bodies?—Exactly the same.

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[Continued.]

12,569. Do you consider that the introduction of motor-cars has had any effect on the dangers of the employment?—No, I do not think it has.

12,570. Do you mean to say that the motor-cars have simply taken the place of carriages?—That is it.

12,571. Can you tell us anything with regard to fixing canvas or moleskin on the roofs of closed vehicles?—Different shops have different methods. In some cases they use japan and white lead mixed.

12,572. Is that a dangerous process?—You only get it on your hands; that is all. I do not look upon it as particularly dangerous in the case of roofs.

12,573. Have you anything special to say with regard to tram-car and railway work?—I have never had any experience.

12,574. Are there any other processes in coach-painting which involve the formation of a spray or vapour of thin particles of paint?—No, I do not know of any.

12,575. You have now told us all the operations in which there is serious risk of lead-poisoning in coach-building work. Is it, in your opinion, impossible to remove these dangers except by prohibiting or closely restricting the use of lead?—I do not think it is possible to get rid of the danger, unless you get rid of the lead entirely.

12,576. Now, there are no doubt many processes in which the workman cannot avoid getting his hands soiled with the material he is using?—In every process he is bound to get his hands soiled.

12,577. Is adequate washing accommodation provided by most employers?—That is a question I could not answer.

12,578. What is your own experience in the shops you have worked in?—In my own experience I have been very fairly treated, and I should say yes.

12,579. Are nail-brushes and hot water available as a rule?—No, not hot water.

12,580. Do you think hot water very important?—Yes, it is, but it is not provided. We usually use horse-hair in the place of nail brushes; the painter prefers it; it gets the dirt off a good deal better than a nail-brush.

12,581. Is time allowed to the men for washing before leaving off work for meals?—No. I have known cases where men have been discharged or threatened with discharge, for washing their hands. I will give you an instance in the case of the London County Council. A body-maker was found washing his hands after using white lead, and although they were supposed to have the time, he was threatened with being discharged if he was found doing it again. A complaint was sent to Mr. Fell, and Mr. Fell had notices put up in the shops stating that men were to be allowed to wash their hands immediately after the use of white lead.

12,582. Is the food often kept and eaten in the workrooms where lead is being used?—Yes.

12,583. Are meal-rooms provided in any cases to your knowledge?—I know of one, Hooper's, in Chelsea, but I do not know of any others.

12,583a. You say that you have worked in 34 shops?—Yes, and I have never found one that did it.

12,584. In the whole of the 34 that you have been employed in, you have not found one where they provided a mess-room?—No.

12,585. Are the Committee to understand that in all those cases it has been imperative for the men to have their food in some part of the place where they come in contact with lead dust, or to go outside?—Yes. In our case we go to the smith's shop, but that is about the only place in the shop that is free from lead. Otherwise, you have to go outside.

12,586. Do the men have the use of a cloak-room?—No. You hang your clothes up where you are working.

12,587. Do you mean that the men hang their clothes up in the room where they work?—Yes.

12,588. Do the painters wear overalls while at work?—No.

12,589. Do I understand that all the dust that they come in contact with settles on their daily clothes?—Yes, and they take it home with them.

12,590. Can you tell us what are the usual hours of work for coach-painters?—It varies in different shops from 53 to 54 hours a week. Fifty-four is usual.

12,591. Do you think that a restriction of the hours of work in lead processes would have a good effect?—Yes, I do. I am always in favour of the restriction of hours.

12,592. Speaking not from the point of view of pleasure, but from the point of view of health, do you think that it would be a good thing?—Yes, I do.

12,593. Have you noticed any alteration in the hours of employment as the result of the development of the motor-car industry?—There is a slight shortage in the motor-car hours. They, generally work 53, whereas in the coach-makers' shops they work about 55.

12,594. Has not a good deal of overtime been introduced since motor-cars came into being?—Yes, undoubtedly.

12,595. Would you say that overtime has been very marked in most of the shops you have been working in?—No, not in my own experience. I know that it has been very much so in other large factories. I know a man who worked every Sunday for twelve months, and then he wanted a Sunday off, and he got discharged because they wanted him at the shop on Sunday.

12,596. (Dr. Collins.) You say that you have had knowledge of a considerable number of men who have had illness due to lead, in the course of your experience. Could you say, speaking generally, whether these men were the most careful, or the least careful, of the men who were working with you as regards personal cleanliness?—This is what I referred to in the first instance. A case of a man came under my notice when I was an apprentice. He was not careful in any way. His name happened to be "Painter," and he suffered from dropped hands and paralysis generally, which were caused by lead poisoning.

12,597. But, taking it as a general thing, do you think that the men who have been very careful with regard to personal cleanliness have still suffered at all from the effects of lead?—I find it in both cases, but I think that men are, if anything, more careful now than when I first came into the trade.

12,598. But you do not think that this additional care has removed the tendency to illness?—No, I do not.

12,599. I suppose it has been your bad fortune to work with men addicted to alcohol. Could you say, from your experience, whether they have shown any greater tendency to be ill than other men have done?—I have not noticed any difference.

12,600. Lead-poisoning, then, seems to attack all and sundry without regard to care in diet or care in cleanliness?—Yes, it does.

12,601. (Mr. Fell.) You have told us a good deal about the dangers of white lead. Have you had any experience with zinc white, or anything of the sort?—I have used zinc white.

12,602. Did you find any difficulty in the application of zinc white?—No.

12,603. None at all?—It is a better colour.

12,604. For the same number of coats do you get as good an effect?—Yes.

12,605. And you find there is no difficulty in application?—No; I find no difficulty whatever.

12,606. Do men take to it as easily as they do to white lead?—Yes, and the working of a colour depends on the way in which it is mixed. A good man mixing colours knows exactly what is going to be done with them, and therefore he would not have any difficulty in applying them.

12,607. There is no more difficulty in mixing zinc paint than there is in mixing lead paint, you think?—No.

12,608. Do you know anything about the lasting properties of zinc paint?—No.

12,609. You do not know whether it lasts as long as lead paint?—No.

12,610. You get carriages and so on sent back to your shop for renovation, do you not?—Yes. It is

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[Continued.]

very seldom that you get a carriage that is painted white. White, as a rule, is simply a matter of picking-out and finè lining. In that case I have found zinc white keep its colour much better than white lead, which always discolours in a very little time. If I gave a panel a coat of white lead now and another coat next week, the first coat would be already discoloured.

12,611. But, apart from discoloration, what is the lasting property of zinc paint?—My experience is only confined to white-picking outlines. They last equally with white lead.

12,612. Do you find a greater tendency to powder with zinc white than with white-lead paint?—My experience, as I said before, only lies in the application of a picking-out line. I could not go any further than that.

12,613. (Mr. Mason.) To what class of shop do your answers apply?—Motor shops and coach shops.

12,614. Of a better and higher class, do I understand?—Yes.

12,615. From the early part of your evidence, I gathered that painters are frequently in the habit of having a day off owing to the effects of white lead?—Yes.

12,616. How much time would an average painter lose in the course of a year?—It would be rather difficult to say. He may lose four or five days.

12,617. That would not be a very frequent loss of time?—He has a day off, and very often he will not tell you what he is away for.

12,618. But how many days does he lose in a year?—I should say an average of five. It may be four or five days.

12,619. I gathered from the early part of your evidence that a painter frequently has a day off?—I call it frequent.

12,620. Five days in a year?—Yes. You are asking me for an average, you see. One man may have a great many days off, and another man may be like myself and go the whole year through without. In striking an average like that, you may have one man who is affected by colic or something of that sort pretty frequently, and you may have another man, or two men, not affected at all. Therefore the average may not amount to much when you come to strike it.

12,621. How would this loss of time compare with that in other trades, blacksmiths, for instance?—I could not tell you. I am talking of the time that a man is off when he feels ill. I am not talking of the time he is off when he is making a holiday. A man may be away with nothing the matter with him. He simply has a day or two off.

12,622. But can you classify the days he has off in any way?—Only by when he comes back and says he has been queer or not well.

12,623. (Chairman.) We want to know whether the absences from ill-health in your industry amongst the men are more frequent than they are in other industries which are not dangerous trades?—The absence of men from the paint shop is undoubtedly more frequent, in my observation, than in any other branch of industry.

12,624. (Mr. Mason.) You have no figures, I take it, to back that up?—I have no figures. If I had known I was coming here, I would have taken observations the last year or two.

12,625. How long have you been in your present shop?—Six years.

12,626. Could you give us any figures with reference to that?—Yes.

12,627. Would these men who came back, having suffered from sickness, claim compensation?—No, not always. I have a case of a man named Byrne who belonged to our union. Two years ago he was coating a chassis ready for the show. It was a bit rough on the sides. It was stopped up. Some quick-lead colour was put on, and the stopping put on the top. He sand-papered it. After working at it he went home ill, and was away about a fortnight, but he made no claim. He came back still ill. He still complained of his chest. He left the job, and he died about nine months ago. He never got over it. I do not know whether that case was ever reported as a case of lead poisoning,

but undoubtedly it was working on that chassis that killed him.

12,628. Then I judge from what you say that there are a great many more cases of lead poisoning not reported than there are cases actually reported?—That is my opinion.

12,629. Now to what, as the result of your experience, do you attribute this alarming increase in lead poisoning?—Simply to the floating dust of the lead from the method in which it is used.

12,630. Is there any difference now in regard to the floating dust or the method in which lead is used from the time when you first started lead painting?—No; it is the same old method.

12,631. The increase in lead poisoning has been enormous in the last 10 years?—There may be an increase in the use, but there is no difference in the method.

12,632. If you increase the use of lead you must in like manner increase the number of painters?—You may do so, but very often it happens that you may be increasing the use of a material in a shop without necessarily increasing the number of painters who use it. So much depends on the demand that the customer makes for a certain class of goods which necessitates the use of certain materials which otherwise might not be used at all.

12,633. Do you suggest that now a man applies more white lead in the course of a year than he did 20 years ago?—I would suggest that he applies more dry white lead than he used to. At one time the bulk of the coach-painting was oil colour always, but now you have to get your work done quickly; people are in a hurry to-day; the employer is in a hurry, and very often the man is in a hurry, with the result that he uses more presto colour, more dusty colour, than he used under the old system of coach-painting.

12,634. More presto is used now than 20 years ago, you think?—Yes, more than I have ever known before. At one time it was looked on as a crime to use presto colour on a panel, but they do it now.

12,635. It was practically unknown in those days?—A painter would refuse to do it. He would say it would not last, but it is used now. I have seen now carriages painted with presto colour, but when I first went to the trade it was all oil colour. It is the increase of quicker methods of working that has caused the increase in the use of presto, and the consequential increase in the dust.

12,636. Do you put it down, as Mr. Fell suggests to me, to general speeding up?—Yes. It is general speeding up very much, and the worker suffers.

12,637. (Mr. Robins.) And the work suffers?—Yes.

12,638. (Mr. Mason.) You were speaking of white lead in a bucket of water. Do I understand from you that white lead is highly soluble in water?—What I said was this: that in rubbing down, the white lead is mixed with the filling that is put on the body, and as soon as ever a man begins to rub down, he is rubbing down white lead and filling, and it mixes in the water, of course, at once. Therefore, if a man is a little bit careless, he may have half a pailful of white lead and filling, and by the time he has done rubbing he is fairly floating in it.

12,639. How many buckets of water would he use in rubbing down?—It would be according to the size of the body.

12,640. Take the average small body, even a small two seater?—He would want four at least.

12,641. Do you tell me that he does not empty the bottom of the bucket out at all when he takes his second bucketful?—But does he go for the second?

12,642. How can he get it, if he does not go for it?—He will do with the first very often.

12,643. You said a minute ago four buckets?—I say the man needs four, and should use four, but I do not say he does it.

12,644. How do you suggest, if the working painter does that sort of thing, anything that any employer can do will do anything for his good?—I do not think his employer troubles his head as long as he gets the job done.

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[Continued.]

12,645. (*Chairman.*) Mr. Mason means, if that is an illustration of the carelessness of the men, what guarantee can this Committee have that the men will be more careful in observing other rules which are introduced for their benefit?—I think that you might do a great deal by educating the men, more than has been done, to the danger of lead, by a better system of factory inspection.

12,646. (*Mr. Mason.*) Your evidence rather shows that the men are more careless than we had imagined here?—I say that in certain cases it is so. You asked how many pails of water a man should use, and I told you that sometimes there is difficulty in procuring water. A man has to go a distance for it, and, rather than go a distance for it, he will put up with what he ought not to do. Water is not always available in every part of the factory.

12,647. (*Mr. Kinggate.*) I think that what you intended to convey by your statement, about 50 per cent. being ill through the use of lead, was that all who work in lead are more or less affected by its use, and that it generally lowers the vitality of the men?—Yes.

12,648. And many of them, though they are never off from work, will suffer from the effects of lead?—Yes; that is my opinion when I say 50 per cent.

12,649. Many men continually suffer from lead, but never lose a day's work?—No. They feel ill.

12,650. They continually purge themselves in order to keep at work?—Yes, with castor oil, and so on.

12,651. Therefore, any statistics as to the average number of days lost by painters would not in any way convey the full effect of the use of lead?—No, I do not think they would.

12,652. I think you said that washing facilities were generally provided, but is that so?—It has been so lately. I do not say it has always been the case, but lately they have been pretty fair with regard to that in paint shops. It has generally been after the factory inspector has had a look round and has ordered it.

12,653. This improvement, speaking with regard to London, is of quite recent date?—Yes.

12,654. It is quite usual in big West End shops for men to have only a pail to wash in?—Yes, and towels are not provided.

12,655. I have been in large shops in the West End, and they have had no provision for washing of any description?—Soap is generally provided now, and washing bowls sometimes, and towels more frequently than they used to be. Generally speaking, in an ordinary wheelwright's shop the employer provides soap, and the men use their leathers for washing their hands, and the pails which they use in their work. In that case as a rule, someone goes and gets a pail of clean water when they wash at one o'clock, but in between times they might use the water they use in their work. At meal-times they would get clean water.

12,656. There are no meal-room facilities, or facilities for keeping clothes apart from where they are working, generally speaking, in coachmakers' shops in London?—I have never found it the case yet.

12,657. In your experience, has it been a usual thing to put canvas on roofs with japan without the use of lead?—Yes.

12,658. Do you think it possible to put it on with japan without the use of lead?—Yes.

12,659. Is it durable?—Yes, but it has to rest a bit. The canvas is of rather a coarse nature, and lead helps to fill up some of the grain of the canvas, and that is why it is introduced. White lead thickens the japan a bit, and helps to make a more solid surface under the canvas. When we had leather we only used japan, and never anything else. Some shops use an ordinary trimmers' paste, and that is equally good.

12,660. The putting on of leather on a brougham is by paste?—Yes.

12,661. With regard to the causes of death, you said that at any rate two recent deaths in London have taken place from lead, and the certificate has not stated that it has been the cause of death?—Yes.

12,662. Were the men two personal acquaintances of yours?—Yes. Gerald Byrne, whom I mentioned,

was one, and J. Shapley was the other. He suffered from lead and went blind.

12,663. He died from hæmorrhage of the brain?—Yes. He had 50*l.* from our union, and he died shortly after; in fact, in about a week after he had the money.

12,664. The medical certificate did not state directly that it was caused by lead?—No.

12,665. It gave the cause of death as hæmorrhage of the brain in the case of Shapley?—Yes.

12,666. The other was heart disease?—Shapley always said it was the lead that made him ill, and undoubtedly whenever he used it he was ill. If he was sandpapering a little body all over, he would always go home ill.

12,667. The Board of Trade Returns in the "Labour Gazette" do not in any way convey the evil effect of lead, you think?—I do not think so.

12,668. Men are continually suffering from lead where no report is made, and there are a number of deaths from white lead which are not attributed to white lead?—No; simply because they are not caused directly by lead poisoning. A man has been suffering for some time previously with other symptoms, perhaps.

12,669. The reason why you cannot speak with regard to the permanency or durability of the substitute for white lead is because the employers have not allowed you to use that material?—No, they have not provided it. It may be a question of cost.

12,670. The object of lead is to stop up the pores of wood in the first instance?—Yes.

12,671. Could other methods be adopted for that purpose apart from lead?—Yes; you have to adopt other methods when you have a varnished car. The filling will bite on that equally as well as it will with lead.

12,672.—Why is lead generally used with filling?—There is no reason at all.

12,673. Does it give a better surface when it is rubbed down?—No.

12,674. Is it not harder?—No. If I use patent filling, as it is sent in from Harland's, I get an equally good surface. I think that lead has a tendency to rot—I mean it has a more rotten feeling under the stone when you are rubbing it.

12,675. You think that filling can be used without lead?—Yes.

12,676. The general view is that lead is required?—The manufacturer of the patent filling tells you what I say—that it can be done without lead.

12,677. But it is your experience that it can be done?—Yes; I have used filling without lead with equally good results.

12,678. (*Mr. Robins.*) How many days, in your experience as a painter, would pass without at some time during the day painters complaining of feeling ill, putting aside the four or five days away of which you have spoken?—There is always someone feeling ill.

12,679. With that experience, do you consider that the painter of to-day is far more intelligent, cleaner, and better in his methods altogether than the painter of 15 or 20 years ago?—Yes.

12,680. And yet to-day we find that he is still complaining day by day in the workshops of his health and of his feeling bad?—That is because of the increased quantity of presto lead that is used.

12,681. That is daily experience?—Yes. In a shop of 15 or 20 men someone is sure to say he does not feel well, and if you find out what the men have been doing, you will probably find that they have been using presto lead or something of a dusty nature.

12,682. Although it might happen that none of those men would absent themselves from work for a month or two or three months, they would be suffering day by day?—The men using this presto generally are men whose wages are low. The painter's labourer and the brush hand in some cases are using this presto stuff, and they cannot afford to lose time. As long as they can potter along they will do so.

12,683. You attribute this, then, to the use of white lead?—Yes, I attribute it to the use of lead.

12,684. With regard to men rubbing down and being dirty in their habits, would not this be the

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[Continued.]

exception rather than the rule?—Yes. It is not everybody who does rubbing down. As a rule, you have a special class of men who take that, and our work is divided and subdivided. One man fills up, another man rubs down, another man puts on the best coats, and another finishes, but in all cases they come into contact with lead.

12,685. My experience of the painter's labourer, and it is a long experience, is that he is far cleaner to-day and is more careful about the water that he washes in?—Yes, he is more careful.

12,686. Where there is a dirty man, he is pulled up about it?—He would get the sack.

12,687. Then what you say about washing in the dirty water in the bucket is the exception rather than the rule?—Yes. In dealing with deaths, I have had occasion lately to go through the deaths of the members of our union in 40 years, dividing them up into body-makers, painters, and so on. I find that the painters have the shortest lives and the smiths live longest.

12,688. (Dr. Collis.) Will you put in a table of those statistics?—Yes; I will send it on to the Secretary.\*

\* See Appendix XIV.

The witness withdraws.

Mr. T. R. ATKINS examined.

12,689. (Chairman.) Do you attend to-day to give us information regarding a new paint material?—Yes.

12,690. Are you the inventor of it?—It was invented by me in conjunction with a chemist named Mr. Wynne, with whom I am now associated in the manufacture of the paint as a business concern. He is a Cambridge graduate in science. After leaving college he was connected with the Lithopone Works in Germany.

12,691. What is the composition of the paint?—Oxide of antimony, practically.

12,692. Is it to be used as a substitute for white lead?—Yes.

12,693. What is its covering power as compared with white lead?—It is far greater than white lead. I have brought down a small board on which I have black lines painted, and one coat of the stuff applied on the top of the black. Any gentleman who has had practical experience will realise that white lead will not obliterate quite in the same way with one coat. (The witness produced a small board.)

12,694. Was it mixed to the same consistency as an ordinary coat of white lead?—Yes; otherwise it would not have been a test. It was mixed half and half linseed oil and turpentine, with no patent driers. If you put a lot of driers in, you are working on driers to a certain extent.

12,695. Can it then be used to give body or covering power to zinc white?—Yes; it will amalgamate very well indeed with zinc. I am hoping to get it a little bit better, because it is not really a very good white yet. That is one difficulty with my stuff. It will not compare with zinc white for inside use, for drawing-rooms, for instance, but mixed with zinc white you get the covering power plus the purity of white.

12,696. Can you get a perfect white, then?—Yes, you can get a perfect white.

12,697. What knowledge have you as to its durability?—I have here a board (producing same) that was painted in February of last year. That was before I had my stuff quite as good a colour as it is now. It is exactly the same pigment. That was painted with one coat on a piece of plain board, and exposed on the gate of my temporary works up to the end of November, and it had sun and rain and everything on it.

12,698. That is not considered by experts to be anything like a sufficient time to test its durability?—An expert would be able to see whether that showed any signs of shivers or shakes or anything of the kind. It was very roughly done.

12,699. Does it adhere readily?—Yes; if any gentleman will scrape it a little bit, he will see the wonderful adhesiveness of it.

12,700. (Mr. Mason.) Is this board varnished?—No, only one coat of the stuff, and no varnish at all—just one coat with linseed oil and turpentine in combination. The board was about the place before it was painted. I painted it as a test board. It was handy, and so we used it.

12,701. How does your paint compare with white lead for price?—That is rather a commercial point as to what we shall charge for it later on, but our idea is to make it for about 1l. or 30s. a ton under the price

of dry white lead. We shall only apply it to wholesale men, that is to say, paint grinders. We shall in no case sell it to the actual consumer, so that we shall not be cutting into the trade in any way.

12,702. Have you satisfied yourself as to the non-poisonous character of your paint?—Yes; there is no question about that. I have inquired of a great many experts about it.

12,703. Have you had it tested to be quite sure that there is no lead in it?—There is a certain ore that we may be using in some cases that has a small percentage of lead which we cannot get out. In our process we get rid of nearly all the lead. If we use an ore with some antimony and some lead in it, we do not get rid of quite all. We might have 1 or 2 per cent., but as a matter of fact my colleague, Mr. Wynne, does not think of using any more of the ore in which there is any lead.

12,704. Can you demonstrate beyond question to this Committee that in no case would the amount of lead exceed 1 or 2 per cent.?—I can absolutely guarantee that we shall not send it out if it goes beyond that. We are making a point of that.

12,705. Has your paint been tried by firms in the trade?—Yes, by eight or ten of the good firms.

12,706. When did they begin to use it?—They have tested it in their works in a small way, and have had a few pounds of it.

12,707. Only in an experimental way?—Only in an experimental way. We do not supply the trade at present. When we start supplying the trade we must do it in a large way.

12,708. Have these firms that have made these experiments written any satisfactory testimonials?—I have one letter only; that is from Hills, of Manchester.

12,709. Who are they?—They are a firm in the paint trade who do a very large paint trade. They say: "Dear sirs, With reference to the samples of 'antimony white tested by our late Mr. Hill some months ago, we find that in addition to the exceptional covering power and good body, the metal and wooden panels show no deterioration in the chemically-laden atmosphere with which we are surrounded. We consider the pigment highly suitable for many purposes such as constructional iron, coal trucks, &c." You would not call that a high-class trade. They are very large users of paint stuffs for heavy work.

12,710. Messrs. Hill's testimony is that it is very good for rough work?—Yes; that is the chief work for which they require it.

12,711. Have you any evidence to give us that it has been used for more highly finished work?—I have not.

12,712. Have you any testimony from any other firm?—No, I have not. Most of the other firms do very high-class work. I might read out the list of the people who have tried it.

12,713. It does not matter about the list of people who have tried it. We want people who have found it suitable?—All these firms have said: "We think you have a big future in this, Mr. Atkins, and directly you have got it on the market we shall be

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[Continued.]

" prepared to give you an order. We cannot say more than that."

12,714. Have you that in writing?—No, I have not, but that is what they have said.

12,715. Are you now embarking considerable capital in the manufacture of this new paint?—Yes. My colleagues and I have spent in our experiments about 3,000*l.*, and now we are making a fairly large company of it.

12,716. Are you proposing to erect large works?—Yes; in fact we have the plans out. Everything is ready.

12,717. Have you made a series of experiments yourselves to show clearly, without question, that this paint of yours will be suitable for every kind of work?—Yes; we are absolutely certain of that.

12,718. Suitable for coach-building?—Yes.

12,719. And motor-car bodies highly finished?—Yes.

12,720. House-painting inside and out?—Yes. If the colour is not quite suitable for the house decorator who wants to do a very highly-finished drawing-room pure white, he will body up with this stuff, and he will finish off with one coat, as he does now, with zinc white. You never find a first-class decorator finish off with white lead in a drawing-room job. He will always put his zinc white on the top as the last coat.

12,721. Are you erecting the works in England?—Yes, down the river.

12,722. On the Thames?—Yes.

12,723. You think that you have found a substitute that the trade has been looking for for many years?—I do honestly think so. I have put in three years' hard work on it.

12,724. (*Dr. Collis.*) Is the material from which you make the antimony oxide all imported?—Some of it occurs in England, but what we get from Cornwall is not specially good stuff. We are not anxious to use it if we can help it. We shall get the greater part of it from Australia.

12,725. You mentioned that some of the ores give you a product which contains a small percentage of lead?—Yes.

12,726. Is there a difference between the antimony oxide with that small percentage of lead and the pure antimony oxide without it, with regard to its covering property?—No. We should not be able to detect any difference with 2 per cent. without chemical inquiry.

12,727. (*Chairman.*) Have you patented this?—No. It is a secret process.

12,728. (*Dr. Collis.*) We have been told that a zinc pigment prepared from ores containing a small proportion of lead is better than a pigment prepared by the indirect method?—Clearly so, because with every ounce of lead in zinc you must have a better body. Zinc has practically no body. From the point of view of the decorator it has not any body at all, really.

12,729. (*Chairman.*) That is rather contradicting what we have had in evidence?—I have had thirty years' experience of selling paint all round England, and from Belfast to the Channel Islands.

12,730. (*Dr. Collis.*) The point is that in covering property it does not gain by the small percentage of lead?—No; it weakens it if anything; it does not gain.

12,731. What is the colour of antimony sulphide?—I do not know. I am not a chemist.

12,732. Is it a white or black?—In its native state it is grey.

12,733. It is an important point?—I am not a scientific man. I am only the selling man. I know very little indeed about chemistry. My part of the experiment consisted of shovelling on the ore and working like a navvy and shovelling on coke for days at a time.

12,734. Lead carbonate is white, and lead sulphide is black. One of the objections to lead carbonate as a paint is that when exposed to sulphur fumes it discolours?—Yes.

12,735-6. Zinc oxide is white, and zinc sulphide is white. Would not antimony show any greater tendency to discolour than the zinc oxide?—No. Antimony is not affected by sulphur fumes in the same way that lead is. We claim that for our stuff.

(*Dr. Collis.*) That answers the question, though you have no chemical knowledge.

12,737. (*Mr. Mason.*) How does your price of 30*s.* a ton less than lead work out, having regard to covering power?—We consider that our covering power is better than that of lead. We are only taking price for price. We are not going into whether it would be cheaper to do a job with one or the other. A man is going to pay 30*s.* a ton less for ours.

12,738. If I buy 30*s.* worth of your stuff, can I do more painting with it than I can with 30*s.* worth of white lead, or *vice versa*?—You could do infinitely more with mine.

12,739. (*Chairman.*) I understand it is cheaper, and goes farther?—That is so.

12,740. (*Mr. Mason.*) Do you sell it as a paint itself, or to mix with other paints?—Ours is a pure raw material which will be sold to paint manufacturers, as we call them. We shall not grind it or do anything but sell it as a raw material. They will grind it at their own mills.

12,741. What do you suggest they should do with it when they have bought it?—You are asking a delicate question now. They will do what they are prompted to do. I will answer that in this way: my stuff will take as much sulphate of barium or barytes as white lead. A man who wants to make a cheap paint can put his barytes into it exactly in the same way as he can with dry white lead.

12,742. It is not a substitute for barytes?—No. Barytes will adulterate my stuff as it will the other. In France they are using a lot of antimony in the Chantillon process. It is whiter than mine. By a special process they are throwing the antimony fumes that they get together with barytes in solution practically in the same way as they do in making lithophone with the zinc. They get a very nice white stuff, but it has not anything like my covering power, because the barytes has rather killed it. I have tested it. The paint manufacturer does not want an article already adulterated. He knows how to adulterate if he wants to, and it is not for me to tell him.

12,743. (*Chairman.*) What is the purport of your evidence given to this Committee?—I take it rather that I am in the position of being able to suggest a solution if white lead is considered to be in any way detrimental. I am coming in as a man who has something that he claims to be the only solution of the difficulty.

12,744. You mean to say that you claim that antimony will take the place of white lead?—I claim that it will absolutely take the place of white lead.

12,745. By mixing it with zinc oxide?—If they want a perfectly pure colour. The colour on the board that I have produced to you will not do for all work, but if they want a perfectly pure colour they can get it in that way. There are many cases where some other colour than a perfectly pure one would be good enough.

12,746. (*Mr. Robins.*) How many coats has this board had?—One coat.

12,747. (*Mr. Kinggate.*) Would there be any poisonous effect to the workman from using antimony?—No, not at all. It is practically non-poisonous. I do not mean to say that a man could make a meal off it.

12,748. (*Mr. Robins.*) It is free from lead entirely?—Yes. I should like one of you gentlemen, if you would, to use a penknife on that board, and it will give you a little idea of its adhesiveness.

The witness withdrew.

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Mr. R. J. CORNETT.

[Continued.]

Mr. R. J. CORNETT (550, Manchester Road, Bolton) examined.

12,749. (*Chairman.*) Are you one of the representatives giving evidence on behalf of the United Kingdom Society of Coachmakers?—Yes, I am.

12,750. What practical experience have you had in the coach-painting trade?—I have been in the trade since 1876. As an apprentice, I served my time.

12,751. Have you worked at railway coach and tramcar painting, or only at carriages and motor-cars?—Both private carriages and tramcars.

12,752. Have you known many cases of lead poisoning among coach painters?—Yes, many, very many.

12,753. Can you give us any idea of the numbers?—I know personally a matter of about six cases in Bolton, and they resulted in death in two cases, and the men having to leave the trade altogether in the other cases.

12,754. Is that eight cases in all?—Six cases I would say.

12,755. Any others?—There are others, but not of coach painters that I have known.

12,756. Are those six cases the only ones that you have come in contact with?—There are many that I have known to be cases of lead poisoning through being an official of the United Kingdom Society of Coachmakers, from death certificates that have come in, but I am speaking now of cases I have known from my own personal observation. In fact I have been affected by it myself. I have practically left the trade owing to the effects of lead. I have tried to get into another business. I am not very much better now, but rather better. I know of a case of a body-maker who had to leave a very good berth. He was a tramcar builder earning good wages, and worked for Messrs. Holden & Co. of Bolton. He had to leave the trade although he was earning very decent wages for that district—anything from 2*l.* 5*s.* to 2*l.* 10*s.*, and up to 3*l.* a week sometimes. He had repeated attacks of this, and the doctor told him ultimately that he must leave the trade entirely.

12,757. I think that is enough about that case. In all only six cases have come under your personal observation?—Yes.

12,758. During the 34 years you have been in the trade?—No, I am not going to say that only six have come under my personal observation. I can give my father.

12,759. What period would these six cases that you have mentioned cover?—Within the last 20 years I should say.

12,760. Are you at work in a coach painting establishment now?—No, I am not.

12,761. Why did you leave?—I left because the lead was taking so much effect on me. I left that trade to commence working in textile machine works at Bolton, with the object of getting away from the lead and its effects. It would have killed me if I had stayed in the confined air of coach-making. I believe the atmosphere is poison.

12,762. Did any of the other men you were in contact with ever show signs of ill-health from being in lead?—Coach painters only do you mean?

12,763. Coach painters only?—I would not like to go further than the six that I know of. There are others.

12,764. How many coach painters do you think you have come in contact with during your connection with the trade, taking the men who have had to handle lead paint?—I should say 70 or 80 different men.

12,765. Out of 70 or 80 different men that you have come into contact with, six have suffered from severe lead poisoning?—They have had to leave the trade, and two deaths have occurred out of those six.

12,766. Are you prepared to answer questions regarding each of the processes in detail?—Yes, pretty much. I can take different cases.

12,767. First as regards body-makers. Are they exposed to any risk?—Yes.

12,768. Does the carriage-maker come in contact with lead?—Yes.

12,769. Does he use white lead all the time he is putting the parts together?—Yes, the body-maker and carriage-maker generally do.

12,770. When the carriage-maker has completed the work of fitting up, is the vehicle ready to pass into the painter's hands?—Yes.

12,771. The first coats of paint applied are termed priming coats, are they not?—Yes.

12,771*a*. How many coats are generally put on for priming?—Three or four.

12,772. Does the priming contain lead?—Yes, always.

12,773. Is it practically all lead?—It is practically all lead, especially the first two coats.

12,774. Is sand-papery done between successive priming coats?—Yes, on all occasions.

12,775. In what shop is this generally done?—Generally in the paint shop.

12,776. Is it ever done in the body-makers' shop?—Yes, it is occasionally done in the body-makers' shop, between the first and second coats. It is frequently done, in fact.

12,777. So that the body-makers and carriage-makers are frequently exposed to dust made by the painter?—They are.

12,778. Do you regard the breathing of this dust as one of the most serious dangers of the industry?—Yes.

12,779. Can the sand-papery be replaced by a wet-rubbing process?—No, hardly; it could not.

12,780. Why not?—Because there is such a small surface or such a small quantity on the first coat that it would be almost ridiculous to wet so near the timber. It would tend to raise the grain.

12,781. Is it generally possible to use any form of local exhaust apparatus to remove the dust?—I believe it would be.

12,782. Do you from your own personal knowledge know of any form of local exhaust apparatus to remove the dust generated in these processes?—I do not know of any process in use in a paint shop.

12,783. But you say that you think it is possible to invent something to remove the dust?—Yes.

12,784. What causes you to say that?—I have seen dust-removing processes working in mills, taking the cotton dust away, and I think that the same means could be adopted in the paint shops as are adopted there.

12,785. Would not that be a very costly operation? Probably you cannot answer that question?—No, I cannot.

12,786. Is the next process what is generally known as filling?—Yes.

12,787. How many coats are generally put on for filling?—I used to use seven.

12,788. Does the filling material contain lead?—Yes, about one quarter of the amount of slate powder.

12,789. There is no rubbing down between the successive coats of filling?—No, I do not know that there is.

12,790. Is stopping generally done after the last coat of filling has been applied?—Stopping is very often done before the first coat of filling is put on. The nail holes are stopped with white lead mixed with gold size, and any perforation, or any scratches, or anything like that, stopping is again used after the rubbing down.

12,791. By whom is the stopping material mixed?—Generally by the painter; I would say by the painter.

12,792. Do you consider that the mixing of white lead and gold size is attended by danger?—Yes, I do.

12,793. Why?—Because you have to use dry white lead, and there is dust arising from it. You have to beat this stuff up, take all the lumps out of the white lead, and the consequence is that a certain amount of the powder arises from the stone where the powder is beaten up.

12,794. It would be possible in that case to have exhaust apparatus, would it not?—Yes, it would.

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Mr. R. J. CORNETT.

[Continued.]

12,795. How is the rubbing down done after the application of the filling coats?—It is done with pumice stone and water, or with a prepared stone that there is.

12,796. Is it ever done dry with sand-paper, for example?—Yes. I have used what we term a sand-paper filling, made up solely of white lead, gold size, and turpentine, and a little lamp black put in. Entirely a dry process is used in some places I believe to-day.

12,797. But very rarely, I believe?—Rarely, now, but it is used.

12,798. What is the extent of the danger in the rubbing down after the application of filling and stopping?—Very considerable. During the time that I was rubbing down, if I may say so, we used to put a mask over our faces, over the nose and mouth, and after a person had rubbed a large surface you would see a black line completely round *here*, the eyes would be filled, and you would see it all about the neck. Dry rubbing is very dangerous, in my opinion.

12,799. Does that answer apply to bodies only?—No; the under-carriage and the wheels are treated in the same manner; in fact, I might almost say that there is, if anything, more danger with the under-carriage, because all the rubbing that is done on the under-carriage, and the wheels, is all dry rubbing—no wet rubbing.

12,800. I suppose that this dust is of a poisonous nature?—Yes, undoubtedly.

12,801. Is it impossible to use wet methods of rubbing down in this work?—It would not do. It would be too costly altogether to the employer. It is too lengthy.

12,802. After the rubbing down of the filling has been completed, what is the next operation?—Generally a couple of coats of lead colour.

12,803. Is the work then ready to be painted in the desired finishing colour?—Yes, after that.

12,804. Is the carriage then ready for varnishing?—Yes, after the finishing colours are put on.

12,805. Do your answers apply equally to carriage-building and to the manufacture of motor-car bodies?—Yes.

12,806. Can you tell us anything in regard to the fixing of canvas or moleskin on the roofs of closed vehicles?—There is great danger there. As a matter of fact, in Sheffield, I believe, they use no less than 75 lbs. of lead to cover the top of a car. It is a very dangerous process. The trimmers are sometimes affected, because they are called on the scene to stretch the canvas.

12,807. Have you anything special to say with regard to tramcars and railway work?—I consider that that is more dangerous than private carriages.

12,808. Why?—Because there is the interior work of these vehicles that has to be dealt with. The consequence is that the men during the time that they are painting inside are inhaling all the foul gases and the poisoned atmosphere. It is very dangerous.

12,809. Have you any reason to believe that there is danger from the smell or fumes arising from white lead paint?—Yes, I believe that there is great danger arising from that.

12,810. What makes you think that?—As a matter of fact my father was a foreman painter, and I saw the effects of it myself. He had no occasion whatever to handle paint; he had men to mix the paint; nevertheless it was in the shop that he was working in, or in his office, and there was no reason whatever (he was there 23 years) why he should touch paint, but he died from the effects of lead poisoning. Cerebral hæmorrhage, I think, set in at the finish. He had kidney disease, and the doctor certified that it was owing to lead. When I was an apprentice boy, I was set to paint my employer's office. I was only about 15 at the time. I could not tell what had come over me during the time I was painting the roof. I was practically drunk. I fell off the ladder from the effects of the smell of the paint. I have felt the effects of it when I have been inside a room where lead colours were being used. I believe that if you intend to allow lead to go on it would be wise to have it entirely isolated—that is, the priming coats—from the other departments altogether. That would tend to protect to some extent the other men's health.

12,811. Have you felt distinct ill-effects from the smell of the paint where there has been no possibility of your coming into contact with any lead dust?—Yes, I have.

12,812. Since the instance you gave us of, when you were 15 years of age?—Yes. I have it in my system now, and feel the ill-effects every time I use lead.

12,813. You have told us that, but I want to know whether you have had any ill-effects from the smell of paint where there has been no possibility of your coming into contact with lead dust?—Yes, I have.

12,814. Have you had those ill-effects frequently?—Yes.

12,815. Now you have told us of the operations in which there is serious risk of lead poisoning in coach-building work. Is it, in your opinion, possible, to remove these dangers except by prohibiting or closely restricting the use of lead?—I do not think that it is possible to remove the danger unless white lead is done away with altogether.

12,816. Now there are many processes in which the workman cannot avoid getting his hands soiled with the material he is using, I suppose?—Yes.

12,817. Is adequate washing accommodation provided by most of the employers?—In many cases it is.

12,818. Is it invariably the case?—Yes. It is the men's own fault if they do not get it, but I do not say that in every case it is provided for them. I cannot say that.

12,819. Are nail-brushes and hot water always available?—No; in many places they are not available.

12,820. Neither?—Neither.

12,821. Do you know of any places where hot water is available?—Yes, I know where it is available. It is in the car shed at Bolton, and also in one of the employer's places there.

12,822. Is it frequently the case that the men use hot water?—No, it is more often cold water.

12,823. Is time allowed to the men for washing before leaving off work for meals?—In most places it is.

12,824. Is food often kept and eaten in the work-rooms, where lead paint is being used?—Yes.

12,825. Are meal rooms provided in any of the factories that you know of?—No, not generally provided.

12,826. Do you know of any where a mess room is provided equipped with suitable seats and tables, and properly warmed in winter?—Only in the railway works.

12,827. Do the men have the use of a cloak-room?—Yes, some of them.

12,828. Do you know of many cases where the men have to put their ordinary clothes in the rooms in which they are working?—I should say that in most cases in the smaller shops that takes place.

12,829. Do the coach-painters wear overalls while at work?—Generally not; they have aprons.

12,830. How are they kept clean?—It is very rarely that the aprons are changed, except when replaced with new ones.

12,831. Do the men take them home to be washed from time to time?—The painters do not; the body-makers do each week, and the carriage-maker does.

12,832. When you say that the aprons are seldom cleaned, you mean to say that the workmen wear these dirty aprons for long periods together?—Yes. The painters' aprons are generally of a black glazed material.

12,833. Is there not some danger of dust arising from a dirty overall, and might not this dust be easily breathed?—Yes, there is danger from that.\*

\* With reference to questions 12,829-12,833, the witness sent the following note, under date 13th December 1911:—

"Coach painters do not as a rule wear overalls, one reason being that they are usually made of a coarse dust-carrying material with a 'nap' on. Many coach painters have two aprons of black glazed calico or linen. One is used for preparatory work, the other for finishing work. The reason for this is, in the finishing processes it is of the utmost importance they should be clean and that the air should be disturbed as little as possible; loose or flabby garments, such as jackets or overalls would disturb any dust there might be about more than tight-fitting garments."

(Signed) ROBT. J. CORNETT.



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[Continued.]

12,834. Can you tell us what are the usual hours of work for coach-painters?—Generally 53 per week.

12,835. Do you know of many cases where overtime is worked amongst coach-painters?—Yes; in the summer time it is done in most private shops.

12,836. Is the overtime very excessive?—In some cases three to four hours per night.

12,837. Would it be desirable to have periodical medical examination of workmen by a surgeon with powers to suspend from employment in lead processes?—No, I do not think it would be desirable.

12,838. Why?—Well I do not think it would be quite fair to the men, and it would neither prevent or cure lead poisoning.

12,839. What would the medical practitioners find out?—They might find that there was some lead in their system. That is all that they could find out, as a general rule. I must say this on behalf of my fellow workmen: it would not be fair to them, I think.

12,840. Would it be advantageous to the men if they were medically examined from time to time?—Compulsorily?

12,841. Yes?—I do not think that it would. The men know when they feel the effects of lead.

12,842. But might it not have the effect of stopping what might prove to be a serious case of lead poisoning if it was checked in time?—I do not think that a medical man could check any case of lead poisoning if the man had to continue at the trade.

12,843. No, but if the man was medically examined, and the certifying surgeon said that a continuance in lead work would be detrimental to his health, would it not be better for the man that he should be stopped from working in the industry?—He would have to stop working at the trade altogether if he was compulsorily examined and the Government Medical Officer said that he was to, but it would be unfair to the man.

12,844. Do you think that it would be fairer to the man to let him go on heaping up the evil?—A man has to earn his livelihood, and he has given the whole of his time to a trade. We have to take those risks. It is unfortunate that we have to, but nevertheless there it is.

12,845. Have you had any experience of the use of coach painting materials which are entirely free from lead?—Yes, I have.

12,846. What are they?—They are the oxides. There is the yellow ochre. That was largely used in the old days. They do not do it now. Then there are the red oxides and zinc whites.

12,847. Have you had any practical experience in the application of these substitutes for lead?—Yes.

12,848. What has been the result?—Latterly I have gone into the zinc white, and my first experience was somewhat of a failure. I got some zinc white and mixed it with raw oil, and put it on some doors. I find to-day that it is all powdering off—washing off when it gets wet. But since then I have had some samples that I asked for sent to me by Griffith's of Liverpool. "Fordite" is the name of the stuff.

12,849. We have heard of that?—It is excellent stuff. (Witness produced samples.) That is white lead exposed to the effects of sulphuretted hydrogen. That is red lead. This is zinc white exposed to exactly the same conditions (producing some samples).

12,850. What practical experience have you had in applying that zinc white to work?—I have been at it for the last five years.

12,851. But I mean applying this particular paint? Not this particular one, but I have been testing different things. This I have had in hand within the last 18 months (producing another sample).

12,852. What have you been painting with that paint?—I have been painting some window sashes outside, and doors. I have been trying that specially.

12,853. As a private experiment?—Yes.

12,854. And has it proved to be a success?—Yes, it has proved to be a success.

12,855. What other instances can you give us of the use of non-lead paints?—I have used ochres for bodying up with—yellow ochre, and I have used them when we

have been getting dark grounds up. I have used both the ochre and the Indian red.

12,856. For what colours have the ochre and Indian red been used?—The ochre has been used largely when we have been getting a yellow or a green ground. The Indian red has been used for getting browns.

12,857. Have you given any lengthy trials to ochre and to zinc oxides?—Yes, for the last seven or eight years I have been trying these.

12,858. With what results?—Very good results.

12,859. Have they all been as good as lead?—Yes.

12,860. With regard to durability and colour, how do you find it?—I want to be cautious about the durability. The zinc oxide has not been exposed outside sufficiently for me to say absolutely that it is as good as lead. I would like to give it further exposure before I could say that. Most painters are very conservative about lead.

12,861. (Mr. Fell.) Have you used these leadless paints on any tramcar work or ordinary carriage-work?—Yes, I have used them, but not on tramcars or carriages.

12,862. Have you found them quite satisfactory?—Yes, so far as durability is concerned.

12,863. For what length of time have you had the leadless paints in use?—I have only had them for about the last eighteen months.

12,864. Have you, during the last eighteen months, painted any carriages or tramcars with that paint?—No, I am not allowed to. The employers will not get it.

12,865. You have not had any experience of it in the ordinary course of work?—No.

12,866. Have you seen any "Fordite" on carriages or tramcars about the country?—Yes, I have, and it has turned out very well. It has only been exposed about two years.

12,867. But that would be sufficient, I take it, to test it?—It seems to have stood very well.

12,868. It was paint covered with varnish?—Yes, it was paint covered with varnish.

12,869. Is it necessary on this under-carriage work and wheel work to rub down between coats?—Yes, it is.

12,870. Is not the paint finely ground enough to make it unnecessary to rub down?—No. A coach-painter has to keep the brush marks out, and that is the only way he can do so, by rubbing between each coat. You must have a smooth surface, or it is a bad job.

12,871. (Mr. Mason.) You have just told us that of the 70 men you have known, six have either died or left the trade, so badly have they been affected?—Yes.

12,872. Is that experience borne out in your capacity as an official of the society, that 10 per cent. of the men are affected to this extent?—Yes, it is. It is more than 10 per cent. according to my experience as an official of the society.

12,873. 10 per cent. are so badly affected that they either die or have to leave the trade?—Yes.

12,874. (Mr. Kinggate.) I take it that the number of cases you have cited are severe ones—the six?—Undoubtedly.

12,875. That does not mean that you do not know of many other cases of white lead poisoning that are of a minor nature?—Oh, dear no.

12,876. You take it that the use of lead generally has a tendency to lower the vitality of the worker, and that practically everyone working in lead is more or less affected?—Yes.

12,877. Some are much more subject to it than others?—Yes.

12,878. The Chairman asked you with regard to compulsory examination of workmen. Is it not a fact that many firms now, especially since the Compensation Act came into force, insist upon a man being examined before they will employ him?—I believe that the Manchester Corporation have done this, and most of the railway companies, I believe, do it now.

12,879. Is it a fact that there were three deaths of our members in the Manchester Corporation's employ?—Yes.

12,880. And since then a very strict examination of the men before they are employed has taken place?—I believe so.

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Mr. R. J. CORNETT.

[Continued.]

12,881. Would not that be a reason for the objection to medical examination on the part of the men?—Yes, I believe it would.

12,882. They would object because they would not stand a chance, if they were at all affected by lead, of getting employment?—That is so.

12,883. You know, as an old member of the executive, that years ago every medical certificate came before the executive, and we had many cases of statements of deaths of members, which we knew were in some degree attributable to lead, but which were not so stated on the certificate?—That is so; in most cases that occurred, with the painters especially.

12,884. I think you have a certificate of one of our members who dropped down dead in Manchester a little while ago?—Yes, that was a Stockport man. He dropped down dead in the street in Manchester, and this is the coroner's certificate. (*The certificate was handed to the Committee.*)

12,885. I take it that the use of lead in the first instance is really for stopping up the suction of the wood, or the grain of the wood?—That is the idea. The idea is to stop the suction of the timber.

12,886. As long as the suction of the timber can be prevented, that is quite sufficient as far as painting is concerned?—That is quite sufficient.

12,887. It is not so much a question then of its durability when it is varnished?—No; if it came to durability, I should say that the filling, speaking roughly, would be sooner affected than lead as far as that goes.

12,888. If anything can be found for the purpose of priming coats it would have nothing to do with the standing of the coats when it is well covered with varnish?—None whatever, providing a good vehicle, such as linseed oil, is used for priming coats.

12,889. You say that you have used zinc white outside that has powdered. That has not been varnished, I presume?—It has not.

12,890. You think that if it was varnished that would preserve it?—It would; I am satisfied that this "Fordite" would stand without any varnish.

12,891. (*Mr. Robins.*) Has it been your experience that men often complain of feeling ill during working hours in the shop?—Yes, frequently. They have a headache. I have felt myself as though there were something boring into my brain. This has not been when I have been sand-papering; but when I was inhaling the fumes of the paint in the paint-room.

12,892. Do you think that overtime is detrimental to the health of a painter?—I do.

12,893. Do you think that overtime should be abolished by Act of Parliament in paint shops?—Yes. I would go the full length and abolish all overtime.

12,894. (*Mr. Mason.*) Can you give me any idea why lead poisoning should have increased so much during the last few years?—The only reason I can give for that is that the men are massed together more than they formerly were, and the probability is that the cubic air space that the men have now is less than they had in old shops. Then you get such a mass of work going through the process of painting in large shops which you did not formerly, in the earlier days, in the small shops.

12,895. Now Mr. Kinggate asked you about medical examination previous to employment, and you stated that the railway companies now examined men before employing them, but you did not mean to state, did you, that that was consequent on lead poisoning, but that railway companies have, of your own knowledge, examined men for years and years and years before lead poisoning was talked of?—Yes, I believe they have examined men. Nevertheless it would be somewhat hard upon the men, I think, to make it compulsory.

12,896. I only want to correct the impression that railway companies and others have recently instituted medical examination on account of lead poisoning?—I think, latterly, that the medical examination is of a much severer nature than it formerly was. It was just simply passing a chap. I had to undergo medical examination myself as a boy before I could work in a cotton mill. They simply looked at your teeth then. I have lost all my teeth since through my trade.

12,897. The stricter medical examination is possibly only consequential on the Workmen's Compensation Act, and not on lead poisoning alone?—Yes, that may be so.

12,898. (*Mr. Kinggate.*) Would not they be more likely to look for lead poisoning now, seeing that it is one of those things which come under the Compensation Act, and which in other times they would have passed over?—Yes, and a good medical man would probably be able to trace it easily in a man's system.

12,899. (*Mr. Robins.*) Of recent years, seeing that the method of painting has been altered from oil colour to quick colour—presto—would you think that that has had anything to do with the increase of lead poisoning among painters?—I daresay that that has had something to do with it, but where lead has been used anywhere, I could tell whether it is slow or quick. The smell of the room is sufficient for me to trace it. And then with the quick colour there is a tendency on the part of the men to soften the stuff that has dried on their hands with some vehicle. For quick colour some use turps, and that may affect them—I do not know—I would not like to say that it does.

12,900. You have a greater amount of sand-papering with quick colours?—Yes.

12,901. Causing dust?—Yes, causing dust.

The witness withdrew.

## EIGHTEENTH DAY.

Wednesday, 8th November 1911.

### PRESENT:

SIR ERNEST F. G. HATCH, Bart. (*Chairman*).

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary*).

Mr. G. D. PATTERSON (H.M. Office of Works) recalled.

12,902. (*Chairman.*) The Committee are anxious to put to you a few additional questions regarding the specification for paints supplied to the Office of Works. In your table, of which members have copies, you state

the proportion of oil, driers, and varnish, taken altogether. Can you state the proportions of each?—I cannot well disclose the proportions used by individual manufacturers, as they are the firms' secrets. The

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Mr. G. D. PATTERSON.

[Continued.]

Office of Works leave the sub-divisions somewhat to the discretion of the firms tendering, but the answer to question 1110 in my previous examination gives the approximate quantities of these. I was asked, "What proportions have you found to answer best?" and I replied: "In the tests carried out for external paints, one part of varnish to three of oil were found to give the best results with zinc oxide, while for iron oxide and other dark paints one of varnish to two of oil were found best for a protective gloss paint"; that is to say, consistently with the cost, because that is the limitation.

12,903. Do I understand that you do not specify definite proportions of oil and varnish and driers separately?—We do not. We wanted carefully to guard ourselves from the position that we were instructing the manufacturers. We wanted to leave manufacturers as far as possible with a free hand. We wanted to gain the benefit of any experience they might have had. Our specification was given as a general one, and not as a definite something to which everybody must toe the line to a fraction.

12,904. But as long as the total is in accordance with the specification, each paint manufacturer who tenders is free to use whatever proportions of varnish and driers he has found to be best?—Yes, if we find it satisfactory on trial.

12,905. Is it usual to have a substantial proportion of varnish in your paints?—Yes.

12,906. And this is of material use in securing durability?—Undoubtedly. The paints stand better when they have a proportion of good varnish. We think their life is increased, as well as their appearance improved, by the addition of good copal varnish.

12,907. Varnish is a somewhat costly ingredient, is it not?—Yes, if good.

12,908. But do not you find that, even with varnish added, zinc paints are more costly than lead paints?—No.

12,909. You have compared the zinc varnish paints with lead paints free from varnish?—Some of the lead paints we have had, have had varnish in them and some have not. I find for the same cost that the zinc paint with varnish is as good in withstanding weather conditions, better in appearance, and more permanent in tint than the lead paints.

12,910. I understand that you have asked for quotations for lead paints to confirm your view as to the relative cost. Will you please read the relative quotations without mentioning names?—Yes. One firm to whom I wrote say: "We are in receipt of your favour of the 18th instant. We beg to advise you that the price of our lead and zinc base paints is the same in their respective brands." That is No. 1 firm. No. 2 write: "In reply to your inquiry as to the relative costs of paints made with zinc oxide and white lead bases respectively, we beg to say that the difference in the cost per gallon would be practically nil, on the assumption that the respective covering powers are approximately alike. Assuming a 21-lbs. per gallon zinc paint an equivalent of a 28-lbs. per gallon lead paint would bring the cost to practically the same value." As a matter of fact we get them, if we want them, for the same price. In the case of another firm, the third, they say: "We have pleasure in quoting for similar paint to our zinc, but made with a white lead base. You will notice that this works out slightly more expensive than zinc." The difference is as between 7s. and 7s. 6d. in this case.

12,911. Now, I understand that you prefer not to disclose the names of these three firms?—I would prefer not. It might be said (not that I have any diffidence other than this) that we were advertising or condemning, as the case might be.

12,912. Can you give the Committee a very positive assurance that these three firms are of the very highest class?—Yes.

12,913. (Mr. Rice.) Are the quotations of recent date?—The date of the first is the 18th May this year; the date of the second is the 23rd May 1911; the date of the third is the 23rd May 1911.

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12,914. I am not quite clear with regard to the third quotation—7s. and 7s. 6d. Which is the 7s. 6d.—the lead or the zinc?—The white lead comes out at 7s. 6d. as against 7s. 0½d. net for zinc.

12,915. (Chairman.) It has been suggested that your specification is drastic in regard to the use of pure zinc and the like?—It is no more stringent than the specification for pure or "genuine white lead" would be, we think, and if you admit a certain percentage of other ingredients, it is just as easy to allow as large a percentage of baryta, gypsum, silica, or whiting in a zinc as in a lead paint.

12,916. Do you use flattening paints?—Only occasionally. Our specification is for a glossy paint.

12,917. Do you know if zinc paints are practicable for a flat finish?—Yes; zinc paints are supplied in three grades generally—flat, egg-shell, and full gloss paint. If required flat they can very well be got so by grinding in turps and oil, instead of exclusively in oil, and if they have the ordinary paste, that is to say, if a painter wants to mix up a flattening and he only has the ground paste, in zinc he can at least adopt the expedient of breaking it up with turps, and then allowing it to stand overnight and skimming the excess of oil off it, and so in that way getting a flat. But if a manufacturer was making it, he would do as is done to a very large extent indeed; he would simply break it up in part oil and part turps. If it is broken up in all oil, the chances are that he will get about an egg-shell gloss.

12,918. Statements were made by a witness before this Committee as to the want of durability of paint work done without lead at Canterbury Post Office. Have you made inquiries regarding this?—Yes.

12,919. It was stated that the work had to be redone within a year. Is that the case?—No. It was not repainted until it was fully due in accordance with the Board's rules, that new work shall be repainted in two or three years after completion; that is to say, we find new work shrinks, and from a variety of causes which I need not particularise, it needs to be gone over in the second or third year at most—to be thoroughly stopped, and, when shrinkages, &c., have taken place, to be gone over and repainted.

12,920. Does that apply equally to lead paints as to zinc paints?—Yes.

12,921. When was the first painting done at Canterbury?—The contract was done at three periods. The sorting office portion was done in November 1906; that is, the painting of it was done about November 1906. The public office portion was done in March 1908.

12,922. You said three portions. You have given us two. Have you any other?—The third, the intervening portion, must have come between. The building contract had to suit the postal work, and I have given the extremes, the beginning and the finishing.

12,923. When was it repainted?—The order for repainting was given in August 1910, and as a matter of fact it was actually done in January 1911.

12,924. How long then had elapsed from the first painting?—In the case of the sorting office just over four years, and the rest of the building 2½ years.

12,925. Was any report made at the time of repainting as to the condition of the old work?—Yes; it was examined by the architect, who reported that the state of the old paint was quite as good as could be expected after three years' wear, and the repainting was done because of the Board's order that new work should be always repainted in three years at least.

12,926. Now, Mr. Patterson, do you still adhere to the statement made before the Committee when you were last here in March, to the effect that zinc paint can replace lead paint without loss of quality or increase of cost?—So far as our experience goes, and with the same exception as I then mentioned, I do.

12,927. You referred in your last examination to the exception in regard to greens?—Yes.

12,928. What proportion of lead do you think necessary in the case of those colours?—I think I stated 10 per cent. In the present state of our knowledge, I should like to be free to use 10 per cent. of lead in greens, but fresh colour materials are being

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placed on the market at frequent intervals, and the difficulty of getting leadless greens may disappear. In my former evidence I referred only to the wide future before aniline colours. That forecast has been since supported by the introduction of an aniline green which I have not yet had time to consider, but which is said to be eminently suitable for use with any zinc base paints, and so may come in as a substitute for the chromates of lead.

12,929. Have you had experience with paints under trying conditions?—Yes.

12,930. Such as in warm, moist atmospheres?—Yes, in the greenhouses at Kew.

12,931. How does lead compare with zinc?—Both are, I regret to say, equally unsatisfactory.

12,932. Do I understand you to say that you found the zinc no better and no worse than the lead paints?—There does not seem to be anything to choose. That is exactly the position. Both zinc and lead fail completely under certain conditions.

12,933. Have you any third alternative?—I am trying various other paints, but as yet I have not pushed my experiments far enough to be able to speak of results, for I have only been at Kew some three months.

12,934. With regard to the length of your experience with leadless paint, several witnesses have suggested that the four years during which the Office of Works have used such paints is insufficient as a test. What do you say with regard to this?—Well, I would stretch that four years to between five and six specifically. As you will remember, I told you in my previous evidence that some of our experiments have gone on for nine years. I can speak personally to between five and six years' experience with definite watching, and what I should call scientific precision in the matter. A paint that stands well for five to six years I think needs little defence.

12,935. Would you say the result was quite as good as with lead paints?—Yes; not that I have not found failures in both. I wish that to be perfectly understood. I can put my hand on failures of both schools, but when I know the conditions and ingredients, and have had them under my own eye, and can testify that each has had equal chances, I find them, especially under these trying conditions at Kew, practically equal.

12,936. Now it is no doubt easier for the Office of Works to make experiments than for outside firms?—I do not see why, quite. We are not in the position of outside firms, but I suggest to you that we are in a similar position to, say, the Admiralty, the War Office, and the large shipping and railway companies, who paint their ships with a particular paint, and send them out for a three years' round. With regard to their railway carriages, they paint a set of coaches with different paints, and when they come in at the end of one, two, three, or four years, they examine them. They have similar opportunities, therefore, to ours for judging.

12,937. But, however that may be, when such paints are on the market, is it equally easy for any painter in a large or small way of business and doing any class of work to succeed with them?—Yes, I do not see why he should not.

12,938. But may the Committee take it, then, that in respect of substitutes for white lead paint, you are in no better position than the ordinary house-painting firm would be. I would add this rider to my question: would you say that smaller employers would be subject to a keener criticism of results?—No; on the other hand, I was just thinking that they would be exempt from certain things that come to us. For instance, if a man in charge of a Government building has a particular office or offices done with certain paint, he makes his records, and he has to keep under observation (I do it at least annually) the result of that painting. He has particularly to make an examination of it, whether he will or no, at the end of four years, for repainting. He should be able to, and does, observe the state of it, and if there has been any failure, it is brought home to him in a very definite way. But a small house painter who is called in to give an estimate, or to do paint work, however it may be, does the work, and if it looks satisfactory, he gets paid for it,

and the probabilities are that he may never see that building again, and has no further interest in it. I mean he does not go back to make an estimate for repainting possibly, and he does not know how that paint has succeeded or otherwise; so in a sense he is freer than we are.

12,939. Then would you state very positively that the small employer, the ordinary house-painting firm, would be in no sense at a disadvantage in comparison to the Office of Works?—I do not think so. I think he would be able to get his paints, just as we do, ready mixed by ordering.

12,940. I want to ask you one other question with regard to the greens. Suppose the Committee restricted the use of lead to 5 per cent. of soluble lead, with an exemption, we will say, for two years, would it not be possible to comply with such a condition in that time in respect of green colours?—That would entirely depend on the march of events, and the substitutes that might come upon the market in the meantime. It is quite possible that in less time a good substitute might be found for it, but it is quite possible that it might not. Greens and yellows are now being made up with the aniline colour that I mentioned, and we are hoping to achieve success in that direction.

12,941. Five per cent. of soluble lead would allow much more than 5 per cent. of lead chromate, as this is largely insoluble?—If you take the soluble lead only, this 5 per cent. would allow from 7 per cent. to 8 per cent. of lead chromate.

12,942. (Mr. Sutherland.) In speaking for the Office of Works, may we take it that you speak for all the painting operations of the department or for a section only?—Well, I am sent here to represent the Office of Works, and I speak for those who have sent me.

12,943. Then your testimony given in March really is applicable to all the operations carried on by the Office of Works generally?—To the Office of Works painting.

12,944. Since you were here, you have submitted to the Committee a table showing the analysis of your zinc oxide paints, and also one of your lead paints?—I do not remember submitting it. I suggest that that wants qualifying. You speak of an analysis of our lead paints. These are lead paints that were put for trial on the Patent Office roof, not to any formula of ours.

12,945. I am going to ask you about them. They were subjected to tests on the iron plates on the roof of the Patent Office?—Yes.

12,946. Has a disparity in the results in these two sets of experiments, as reported in your exhibit, struck you?—Yes. I have not the particulars of those tests; in fact I did not bring them, or I should have been glad to go more fully into them.

12,947. In the report on zinc oxide paints which consist of five stone colours and four whites, only one is reported good and eight reported fair?—Yes.

12,948. In the report on white lead paints (and for the purposes of comparison we can only take the stone colours, of which there are five) there are four returned as good and one as bad?—Yes.

12,949. How do you account for that?—I cannot account for it. I should say that Sir Henry Tanner had these experiments made with the lead paints that were sent in by a variety of firms, and I came on to the scene only after they had been put on and judged at various periods by giving a series of marks to the various plates, and not knowing whose they were. A committee of three of us went round and assessed these.

12,950. In the zinc oxide tests, you made experiments in four cases with white paints, all of which were reported upon as fair?—Yes.

12,951. But you made no test of white lead by itself?—The stone colours are so near that you would not get more than 2 or 3 per cent. of colouring material, so that you may take the stone colours as equivalent to white.

12,952. I will deal with the percentage afterwards. Why did you submit zinc oxide to four tests and not genuine white lead? I did not make any tests at all, as I have already explained, at the Patent Office.

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12,953. But these are put in as tests by the Office of Works?—I have already explained that I did not make these tests. I was on a committee which judged of the results afterwards, and I had nothing whatever to do with the choosing. I think practically all-comers' paints were put on, and at so many prices that it is a very large subject. I am sorry that I am not prepared to go further into it. If I had known that questions were going to be asked on this I should have gone into it more fully.

12,954. You recognise from this that you have not made, or at all events you have not made to this Committee, any return of tests made with genuine white lead by itself?—Let me be clear. I do not wish to speak for the Patent Office, but such tests have been made elsewhere.

12,955. But they were Office of Works' tests, carried out in the Patent Office, and we must deal with them as such?—Yes. I was going to say that the tests I am speaking of are the tests I think I spoke of previously when I was here, viz., those carried out in the Savings Bank.

12,956. But we have not particulars of those before us. Excepting the general reports, you have no analyses or particulars or anything of the kind?—The analyses are the same for the zincs as those that have been submitted to you, and the same brand of paint, but with a lead base, was put on one of the blocks of the Savings Bank for comparison at the same time, and of that I can speak definitely.

12,957. Do not you think it would have been better to have established the relative value as a paint of the two compounds—pure zinc oxide and genuine white lead—by submitting them both to a common test?—That is exactly what we did at the Savings Bank. And lest there should be any doubt upon it, whenever we find a case of difficulty, as at Kew, we are actually doing that. We are not cutting the moorings entirely. We have had one side of the same house done with zinc and the other side of the slope done with lead, and we are not confining them to one maker. We have had as many as five makers' paints put on one house, subject to one temperature right through the house.

12,958. In submitting the lead paints to a test, as shown in your exhibit, and restricting ourselves to the five stone colours, are the Committee to understand that the Office of Works mixed these paints themselves?—Only in the case of the samples named as Mowlem's.

12,959. There are none named as Mowlem's here. They are all under numbers?—Then they would be the paints that were sent by the different firms.

12,960. You will see from your own analysis that none of these stone colours can be accepted as a test of good lead paint. You would not accept as a good lead paint mixtures which contain an average of 20 per cent. of other matter apart from vehicles, and one of which has in it no lead whatever—only barytes—whilst the other four represent a percentage of 54 per cent. of lead?—According to our specification, you will see in the zinc paints we allow as much as 10 per cent. of what you call impurity, and it is a very controversial point as to whether some of these things are impurities, and do you notice that the paint with barytes and no lead has stood as well as those which are almost pure lead?

12,961. Yes, I know, but this is an inquiry as to the use of white lead in building operations, not as to the use of impurities?—Yes.

12,962. I am dealing with the respective stability of white lead as against zinc oxide, and in that case I submit that the question concerns pure materials and not mixtures. Here is a paint returned as stone colour in which there is no white lead whatever. It is under the analysis of lead paints—7.19 oxide of iron, 52.06 per cent. of barium sulphate and chalk, and 38 per cent. of vehicle. It cannot possibly be an analysis of lead paint when there is no lead in it?—It has been sent to us as lead paint or it would not be under that head, and you notice it has stood as well as lead. These paints that were put on were from all comers, and they were labelled. They were not supplied to any specification of ours; but every

caller who chose to come and say: "We should be glad to have our paint tried; will you put it on?" had his paint put on, and it was with a view of getting at possibly the relation of the result ultimately that analyses in all cases were made of these particular paints to enable us to arrive at something like a conclusion.

12,963. I take it that these are proprietary paints?—They are proprietary paints generally.

12,964. If the Office of Works wished to test the comparative stability of lead and zinc, why did they not proceed on the usual lines of mixing their own paint from pure materials on definitely recorded formula, using only genuine white lead and pure zinc oxide?—We are doing that now and have been doing it, as in the case of the Savings Bank—not mixing our own because we have no mills, but getting makers to do it for us.

12,965. On this formula?—Yes.

12,966. Have you submitted your formula?—Not of lead.

12,967. Only of zinc?—Only of zinc.

12,968. Would not that have been a more scientific way of arriving at definite conclusions?—It would have been a scientific way of arriving at definite conclusions. We have, however, to deal with lead paints as they are presented on the market, and we take the various makers as they come to us.

12,969. Yes, but do you think that your evidence is sufficient for this Committee to make so great a change upon as would be involved in the prohibition of white lead?—Yes, according to our experience.

12,970. Do you think it gives us any basis whatever to form a conclusion upon?—Apart from these experiments at the Savings Bank I do not care to speak, but of them I have no doubt.

12,971. But you are the representative of the Office of Works?—I am, and my evidence-in-chief, I think, has not touched, so far, the paint records of the Patent Office. They are put in with a view to giving all the information, but the gentleman who started these experiments is dead, and I have had to take them up and try to piece them together for your information, as I have done quite impartially. The very fact that some of them tell one way and some the other shows that they have been taken in quite an indiscriminate way, and had I known that I was to be asked anything very particular about the Patent Office, I am afraid I should have had to say, as I have said already, that I only know in part what was done at the Patent Office.

12,972. Then you do not buy this varnish and paint, and you do not mix the paint yourselves?—We do not buy our own varnish direct or manufacture it. We get it through a contractor. In fact, we buy all our materials through contractors, excepting in the manufactured paints, where we go direct to the firms.

12,973. I understand that, when you were here before, you said you bought about 5,000*l.* worth of paint and spent about 18,000*l.* in wages?—Yes; that is through contractors.

12,974. Do not you employ the men at all?—We do not employ anybody except through contractors. We employ day-work men through contractors and measured-work men through contractors.

12,975. They are really Government employees, are they not?—In the sense that they do work for the Government.

12,976. Strictly under your instructions?—But in the sense that they are employed through a contractor, they are contractor's men.

12,977. They have to comply with your conditions?—Yes. The contractor has to conform to his specification and the conditions of the contract, and the men under him work accordingly.

12,978. Do you realise that the Chairman is putting your results at the Office of Works to all the witnesses, master painters and others, as conclusive of the question that white lead can be dispensed with?—Well, I am simply here to give my evidence of the results of our inquiries, and, so far as we are concerned, we speak as we find.

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12,979. You have not submitted to us a single case of a test of genuine white lead?—I am not here as an advocate of either one or the other.

12,980. No, but you are here to compare the merits of the two?—I am here to compare the merits of what we have been using for many years, that is lead paint, with the substitutes which we have been trying of late years in order to get at an equivalent which shall be non-poisonous.

12,981. You are here advocating the use of non-poisonous paint?—Yes, I am here, at any rate, advocating, or rather not as advocating—I must withdraw that—but as giving you the result of our experiments in that direction.

12,982. I submit that your experiments have not been at all scientific, and they have practically no value to be taken by the Committee and acted upon?—That is a matter of opinion.

(Chairman.) That is a matter for the Committee to determine.

12,983. (Mr. Sutherland.) The Office of Works, according to you, take all and sundry paints that come, and submit them to tests like this. If you refer to the procedure of the Dutch Committee, it was very scientific. They formulated a series of tables of lead and oil and drier and boiled oil and varnish in some cases, and turpentine, and the same with their zincs, and they submitted a series of these to definite tests, and they took the results from them. That is a scientific way of proceeding. But this is analysis of paints picked up on the market indiscriminately?—Yes.

12,984. Anybody who wanted to send paint in to you, could send it in and have it tested?—He could have it put on to the Patent Office roof if he sent it to my predecessor, and it was tested.

12,985. But I am only dealing with the Office of Works?—Exactly.

12,986. You do not appear to have made any experiments, as experiments apart from actual work on wood or plaster. All these tests are on iron plates?—The fact is we have been having tests on wood and plaster for many years, and most of our experiments at the Savings Bank were on iron, wood, and plaster, on a large scale.

12,987. But we have no returns made of them?—You may have no tabular returns, but to say that we have no tests on wood or plaster is not according to fact.

12,987a. So far as this Committee has knowledge, it is not so?

(Chairman.) I understood the witness to say that the results of his experiments applied to all kinds of work.

12,988. (Mr. Rice.) Would it clear the point up if you submitted tables of the more recent tests that you have made on wood, plaster, and iron with white lead and with zinc—relative tests? You do not seem to care to back up these tables?—I am not here as an advocate of tables which I had not the compiling of, and which I cannot speak personally for; I prefer to speak from my own experience.

12,989. (Mr. Sutherland.) The Office of Works is still using lead, is it not?—Yes. I myself, as I have already told you, have had lead put on one side of a house.

12,990. But you are using it in your daily contracts?—I should say we are using lead on occasion, but generally we are using zinc.

12,991. Do you know that something like five tons of lead have gone to the following places this year:—British Museum, the Horse Guards, Victoria and Albert Museum, Church Street, Islington, King Edward VII. Buildings, Tower of London, Regent's Park Savings Bank, Somerset House, Chelsea Hospital, Buckingham Palace, St. James's Palace, Royal Mews, Natural History Museum, Hyde Park Store Yard, G.P.O., Houses of Parliament, Hercules Buildings, Customs House, Greenwich Park and Customs House Post Office, and Kensington Palace?—No. I am not at all surprised that large quantities of lead are supplied and used for a variety of purposes, and I stated when

here last that we were using lead for wood and iron primings.

12,992. The Menai Suspension Bridge is painted by the Office of Works?—It was in charge of the Office of Works years ago. I cannot say whether it is now.

12,993. Are you speaking for the Office of Works, or only a section?—I am speaking for the Office of Works altogether so far as I know, but obviously this is only a small part of one's duty, and I am not acquainted with everything, except in a general way.

12,994. But the Chairman has been putting, very much on your evidence, to all the painters and other witnesses, that you have solved the question of leadless paints. Now here, in the London area, you have five tons of lead, or over, used since April; and on the Menai Bridge, painted since April, you have used another five tons, which represents a very considerable amount of paint. Ten tons makes a big hole in the 5,000l. worth of painting? Yes, but is it fair for you to assume that every atom of white lead that has been sent to these depôts is used in paint? Is that what you mean the Committee to assume? And if even it were all used in paint, does it exceed the estimate I gave you of what we used?

12,995. Yes, white lead paints; paste white lead that has been sent to the order of the Office of Works?—Yes, but white lead paste is not the same thing as white lead paint.

12,996. But it has been sent for painting purposes with the oils and the turps, and the driers and the colours?—You know, probably, without my reminding you, that white lead is used for a variety of purposes.

12,997. As what?—For fillings, stoppings, plumbers and gasfitters use it for joints, and a variety of purposes of that kind. Both white and red lead are used for those purposes, and not always for paint mixing.

12,998. But you could not use five tons for stopping if you stopped all London?—No; but you could use it for the other purposes I have named.

12,999. Here are places which are quoted by the Chairman, on your evidence, I presume. Buckingham Palace is submitted as a place and St. James's Palace, but you are using lead there, and the Menai Bridge was painted in May and you used five tons of white lead paint on that. Does it not weaken your evidence, as advocating leadless paints, when the Committee are in possession of the information that this quantity of lead paint has been used—five tons on one job and five tons spread over the others that I have put to you, and those cannot exhaust the painting done?—You appear to have got it all in. I do not know but that it does exhaust it, but even then you may say, "Have not you lead in your depôt." I say, "Yes, we have."

13,000. But these amounts have been supplied this year?—Yes; and to-day I have told you that we are not banning white lead in the sense that it does not come into the yard and is not used for any purpose. What I have told you is that the bulk of the paints now used by us are zinc. I have already told you that, finding as I have found at Kew, that no paint under certain conditions there on certain houses has stood, I have started using in the same house lead and zinc, and as many as five makes of paint in one house. We have not cut the moorings, if that is what you mean.

13,001. (Chairman.) No. What Mr. Sutherland means is this: If you have established the fact that leadless paints are so efficacious, why do you use lead now in these buildings?—I think largely because of the men's experience, which you cannot cut except by drastic and prohibitive means. You will not get rid of a man's experience or of white lead till you prohibit its use.

13,002. But are you prepared to-day to state that in the future, if the Committee determine that white lead should be prohibited, you will accept that with full confidence that your work would not suffer in consequence?—With the exceptions I have named.

13,003. (Mr. Sutherland.) I will ask you this final question: Why did you use white lead after your own experience, according to your own testimony, on the Menai Bridge where you would have had a suitable

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opportunity of demonstrating the value of leadless paint: Why use it on such a large contract as that?—I have no knowledge of the contract and circumstances in question, and so I cannot say.

13,004. We may take it that your evidence does not apply, then, to Office of Works' operations?—You may take it that it does.

13,005. No, we cannot?—If you are going to judge that it does not from one particular contract I can show that it does from a considerable number.

(Mr. Sutherland.) No; I am sorry. There are a lot of good paints besides white lead, I agree, as I have submitted to the Committee all through; but no material will take the place of white lead in its adaptability and service, for outside painting at all events. The Office of Works agrees with me evidently, because in an exposed position like the Menai Bridge they have painted it all over from end to end with white lead, although they had the formula of these other paints in their possession.

13,006. (Mr. Rice.) You mentioned, Mr. Patterson, in conversation before you commenced your evidence, that you were asked concerning certain evidence tendered here with regard to the post office at Canterbury?—I was asked to give the facts.

13,007. Do you know what evidence was given?—I have not the letter here, but the statement, I understood, was generally made that zinc paint had been used there with very unsatisfactory results.

13,008. By a witness here?—By a witness here.

13,009. Who asked you with regard to that?—I was asked what were the facts concerning the Canterbury Post Office, and I appear here to give the facts as I have had them from the architect in charge of the building.

13,010. Who asked you to give those facts?—The Secretary of the Committee wrote to me saying there was a contradiction in the evidence, and I was asked the facts, and how this was reconciled with my evidence.

13,011. Mr. Wiltshier or another witness said that the zinc paint at Canterbury Post Office was not satisfactory. You say that, in accordance with the custom of the department, the work was repainted, and not because the paint was defective?—Yes.

13,012. Your evidence is now against that of Mr. Wiltshier?—Yes.

13,013. Now I do not quite understand the addition of 10 per cent. You said this morning that you would add 10 per cent. of white lead to zinc-prepared paints?—No; excuse me.

13,014. Would you tell me in what way the 10 per cent. addition was used, because I do not understand?—I was asked how much lead I would stipulate for in zinc paints, and I said up to 10 per cent.

13,015. Up to 10 per cent. in greens?—Yes.

13,016. That does not in any way vary from your former evidence?—It is in agreement with my former evidence.

13,017. You were asked at Question 1088: "I want to get this quite clearly. Do I understand that you have purely zinc paints now which are perfectly satisfactory in all colours for interior work?" Your reply was: "Yes, with a few exceptions in damp situations and dark colours." The next question was: "Are they equal to the lead paints they have displaced?" Your answer is: "Yes, with the above exceptions, and these we find can be overcome by the addition of a little lead." Next question: "What added quantity of lead do you suggest?" Your reply is: "For stability something like 5 per cent." Do I understand that this remains, or do you wish to alter the 5 per cent. to 10 per cent.?—There is an addition to the 5 per cent. If you look at the specification you have there, you will find lead compounds six and eight. I think you have eight and then two. The 10 per cent. roughly was got at in this way, that you would want something like 7 or 8 per cent. of lead chromates or lead compounds to produce your greens, and I wanted two or three which roughly made up the 10 per cent.

13,018. This table is to be increased by what?—Up to 10 per cent. I stated 10 per cent. in my evidence

with regard to greens, if you will be good enough to look.

13,019. The term "dark" would cover greens, I take it?—Yes, both greens and browns.

13,020. You want 10 per cent. instead of 5?—Five for browns and other dark colours we found good, but I wanted also something like seven or eight for greens made from lead chromates. When you have lead compounds in, you have not so much of white lead. But 10 per cent. as a total would cover the necessity.

13,021. I take it that that is in addition to the 5 per cent. already added?—I think you may take it that 10 per cent. as a total would cover the necessity.

13,022. Five per cent. for ordinary paints and five additional for greens?—Yes. You would want 10, I think, really for greens in the present state of our knowledge.

13,023. It is perfectly clear that it is 5 per cent. for ordinary paint?—For ordinary whites and other paints where lead chromates are not necessary.

13,024. Yes, and an added 5 per cent. at least where they are necessary?—Yes, an added 5 per cent. at least, and 10 per cent. as a total.

13,025. (Lord Henry Bentinck.) Is this large amount of white lead ordered lately to be accounted for by the fact that you do use a certain percentage of white lead in your paint?—I do not think so. I think it is to be accounted for largely because of the men's experience of lead, and they continue to use it for the purposes I have named. They have not yet become accustomed to the newer zinc paints.

13,026. Who orders these large amounts of white lead?—The various clerks of works who are dealing with the work in the various districts for small works done by day work.

13,027. Then, as far as I can make out, your evidence that zinc white was largely used, is rather broken into by this statement of yours. If the clerk of works orders what he likes, what do you know about it?—The clerks of works are instructed to use zinc paints and do it generally.

13,028. But then they may not?—They are not prohibited from ordering lead. There is no prohibition up to the present. I think the factor that counts most is that men's experience in lead is held to. We all hold to our experience doggedly, and I suggest that both with regard to practical painters and others we are not ready to go on to a new material. I find occasionally men ask their foreman for such-and-such materials as they are running out. They are asked "What do you want it for?" They say so-and-so. "But why are not you using zinc paint?" "We have always been used to order lead, that is the reason we are ordering it."

13,029. It is a very incomplete arrangement?—I am afraid it is, but you see how it comes about—that unless there is a definite stand taken it is human to say: "We have always ordered so-and-so and we want the supply replenished."

13,030. I understood you used nothing but zinc paints?—We are dealing now with lead paste rather than lead paints, and we are using lead paste for a good many things besides paint. My previous evidence also made it clear that we were using lead paints on wood and iron for primings.

13,031. For what other things—stopping, for instance?—For stopping, and filling in painting, and for joints in plumbing, gasfitting, and engineering. It has a variety of uses.

13,032. (Chairman.) Would you like to make inquiries about this statement that Mr. Sutherland has made, and report to the Committee?—I accept the gentleman's statement. I suppose he has verified it.

13,033. (Dr. Collis.) I understand that there is no legal requirement that you should use nothing whatever but zinc, and that consequently you have continued to use lead paint to a certain extent as in the past; but can you inform the Committee the extent to which lead paints are used to-day, and non-lead paints; that is to say, what proportion of the paint now used by the Office of Works contains lead and what proportion does not contain lead, as compared with the amount used, say, 10 years ago?—I cannot.

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[Continued.]

13,034. Would it be possible to ascertain that?—I can try.

13,035. (*Lord Henry Bentinck.*) You can tell us how much paint has been used in the last few months, and how much lead you have used in proportion to that paint?—Yes.

13,036. (*Dr. Collis.*) And compare it with the proportion 10 years ago—the Admiralty gave us such a statement not necessarily the total amounts, but the proportion of non-lead paints used to-day and the proportion of non-lead paints used about 10 years ago. Now, with your very large experience of the use of non-lead paints, particularly of zinc oxide, there is one point I would like to ask you. In the use of paint containing zinc, have you ever known any of the men complain in any way at all with regard to anything in connection with their general health?—No.

13,037. It might have occurred without you knowing it, but you have not known of any complaints?—No.

13,038. Have you, on the contrary, known any of the men say that they noticed any difference which was beneficial to their health?—No.

13,039. The question of the painting of the Menai Bridge has been brought up. I believe the Menai Bridge is painted about every three or four years. Are you aware that on every occasion on which that bridge has been painted there has always been an outbreak of lead poisoning there?—I am not aware of that.

13,040. My attention was called to that last week by the inspector in that district. I asked that particularly because it is painting in the open air, you see?—Yes.

13,041. (*Mr. Parsonage.*) With regard to the using of this large quantity of lead, you say that a certain proportion of it is used for other purposes than painting?—Yes.

13,042. You would not use lead filling or lead stopping if you were finishing a work with leadless paint or zinc paint, would you? We have tried in that also, as in other things, to do without white lead, and we have had a variety of ingredients with japanners' gold size—and we find them quite effective. It is not because we cannot do without lead for some things that it is used, but rather it continues to be used because of experience.

13,043. You see it would be useless to do away with the use of white lead if you must have white lead for stopping?—Exactly; and more harm, I take it, comes to men in rubbing down work with the consequent dust, if it is done dry, than in the actual putting on of the paint. That is why I conducted a considerable number of experiments in the matter of fillers with a view to obviating that. At the Savings Bank we dispensed with lead in that connection.

13,044. Lead is dispensed with now to a very great extent for filling purposes by painters who use nothing else but white lead for paint, so that even the painters who use white lead and who do not believe in leadless paint believe in using non-poisonous filling?—Yes, when they are so ordered.

13,045. And they find that it applies equally well?—Yes.

13,046. So that cannot be the reason why all this quantity of lead should be used?—I suggest that as one of the things for which it is used as well as for ordinary paint.

13,047. There is a question of the experience of the workmen. The best work done under the Office of Works is specified to be done with white lead. The most experienced workmen then are the men who cannot use the leadless paint and are more used to working with lead. The interior of Buckingham Palace is done with lead. Lead is specified for that, and the best class of workmen are on that work. We are told that the men have not had experience with the leadless paints?—Those are a series of statements and deductions with which I cannot agree. I think that the statement was made when I was here before, or rather the question was asked: "Why has Buckingham Palace been done in lead paint?" I asked about it, and it was one of those things one could not get a very satisfactory answer to. It was not a question of either lead or

zinc, but of inviting certain firms to give a price for the palace decoration. The question of lead as against zinc had not come into the matter. I have since made formal inquiries into the matter and am informed that zinc paints are generally used at this Palace and not lead.

13,048. But the same thing obtains up to the present time. If a specification is prepared for work to be done with leadless paint, you should not permit the clerk of works to allow the contractor to substitute lead for it?—He ought not to and I am informed does not.

13,049. But you say it is allowed, so the specification is valueless?—I have not said we allow a specification to be ignored. I will make a note of your question.

13,050. I understood you to say that you had not such control over the clerk of works that if the contractor preferred something else he would be allowed to substitute it?—Excuse me; I did not say so. Do you mean that if a clerk of works orders zinc paint and the contractor likes to send in lead, he will not have control over him to make him send it back?

13,051. The clerk of works does not prepare the specification, does he? But when the firm are invited to tender, the specification is sent specifying leadless paint. How can the clerk of works allow them to substitute lead for it?—If that was the specification issued, obviously the clerk of works' duty would be to see that it was carried out.

13,052. Does the Office of Works at the present time specify for work to be done with white lead paint?—That is a question that I will transmit and get the explanation of if possible—as to why lead paints are specified in connection with Buckingham Palace.

13,053. I am not confining it to Buckingham Palace alone, but the impression left on my mind by your answer is that the best work cannot be done with leadless paints. It follows that they get a better finish with lead paints, and that is the reason why leadless paints cannot be used. You speak of the men being able to use the different materials according to their experience?—My own experience is that they can get a better result with zinc than they can with lead as most of the best enamels are in zinc. You are speaking of the internal work of Buckingham Palace.

13,053a. Yes, internal work, and yet for the best work they stipulate white lead. I cannot understand it and am informed it is not true.

13,054. (*Chairman to the witness.*) We will call you again. Perhaps you can tell us what the particular orders are which the Office of Works give in connection with the use of paint. Is there a distinct understanding throughout the system that only zinc paints shall be used?—There has been a circular issued stating that zinc paints only are to be used, and I think in the last contract that concluded a few months ago it was further stipulated that wherever lead had been used in the past zinc was to be substituted.

13,055. (*Lord Henry Bentinck.*) When was this?—The early part of this year.

13,056. Have many places been painted since then?—That was for the London district only.

13,057. (*Chairman.*) Since then you have had five tons of lead in the various public offices, so that the orders have not been carried out?—It would appear so.

13,058. You will make the investigation, because it is very important?—I will raise these points.

13,059. (*Mr. Sutherland.*) Could this Committee have copies of different specifications issued during the last 12 months? You would have printed copies of specifications, would you not, for your painting operations?—Do you refer to the London contracts or to the specifications that are issued for the painting of new buildings.

13,059a. The specifications that you issue to contractors for painting operations in the London area.

13,060. (*Mr. Rice.*) We only want the portion of the specification relating to painting. It would be very useful if we could have that?—The specification appears as part of a large document—what we call a schedule—dominating the extent of the London area, and the painters' specification would come under that. The



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schedule, of which I have handed in a copy, will, I think, be found to be part of that document.

13,061. There are large buildings as well, besides those under the triennial contracts?—The new buildings come under a different category. Each architect draws up his specification. The architect is the almighty power.

13,062. You will see whether he continues to specify white lead, and why?—I have a schedule of new works, and so far as my knowledge goes, all the architects follow the line of the instruction that has been given.

13,063. (Mr. Sutherland.) We cannot take it that the Office of Works has decided to do away with lead paints, and use only leadless paints?—You may take it that an instruction has been issued to that effect.

13,064. But when was it issued?—I have not a copy of it, and I am sorry I cannot carry these dates in my mind.

13,065. (Chairman.) Will you bring that information next time?—Yes.

13,066. (Lord Henry Bentinck.) Who issues the instructions?—The secretary and principal architect.

13,067. What control has he got? Does he examine all the specifications and the orders and the bills?—He is like the heads of other Government departments. When he issues a general instruction, he expects to have it carried out.

13,068. He does not expect to have it carried out at all, sometimes?—Always.

13,069. (Chairman.) Who authorised the architect to issue this order?—Sir Henry Tanner, I think you will find, issued the instruction on his own initiative, and from the results of experiments that he had had carried out.

13,070. Then he would be extremely annoyed, would he not, to find that his instructions had not been carried out?—Well, I shall be seeing him shortly, and I will put before him what has passed here, and the observations made and the deductions from them.

13,071. (Mr. Mason.) The question of 5 per cent. added lead has been spoken of in the Committee on several occasions. Am I to understand that that 5 per cent. is actually added, as you add sugar to tea, or is it 5 per cent. impurity?—Five per cent. of impurity; 5 per cent. of genuine white lead, do you mean?

13,072. No. What I ask you is this; is the 5 per cent. added by hand or is it 5 per cent. of impurity in the zinc ore?—You will remember from the last evidence, if you will be good enough to look over it, that in some cases 5 per cent. of lead had been added

for a definite purpose, and it was suggested that if that 5 per cent. of lead salts were allowed, it would also allow direct made zinc to come in, and so have the tendency of getting cheaper quotations as well as allowing this element of lead. It would not shut everybody out except those who had a distinct and pure standard of zinc. It was made, I think, with a double purpose.

13,073. So I understood. It would still, then, be necessary in the case of large buyers to add the lead at their own works in their own paint-mixing room?—Not if they had already 5 per cent. in the zinc.

13,074. If they chose to buy zinc from one firm and lead from another?—If they were buying it merely without any guarantee or without any standard, I can quite conceive that looseness would come in, if that is what you mean. Do I follow you?

13,075. You do not suggest that one should buy zinc with the added 5 per cent. of lead?—No. What I suggest is that I want liberty either to buy zinc with 5 per cent. of lead, or if I buy pure zinc, to add 5 per cent. of lead.

13,076. The Committee is faced, then, with rather a difficulty, inasmuch as somebody might by accident or otherwise add more than 5 per cent. of lead?—Obviously. An accident need not stop at 5 per cent. of lead, nor 15.

13,077. With 5 per cent. of impurity already in the zinc, it would not be necessary to add anything other than for the browns and the greens?—I do not want to say that lead would be an impurity in zinc paint. With 5 per cent. of lead salts, lead sulphate or white lead, you would not need, according to our experience, to add other lead except in greens.

13,078. Further lead?—Further lead.

13,079. (Mr. Sutherland.) Except for staining purposes?—Except for colouring purposes—exactly—for example, lead chromates.

13,080. (Mr. Mason.) I take it that all your figures are open to all the other Government departments, such as the War Office, the Admiralty, and so on?—That I could not say. We do pass a great deal of information mutually between each department, and so far as I know there are no secrets between us. It is a matter of courtesy to have intercommunication.

13,081. It seems curious that the other departments have not availed themselves of this valuable information and gone in for zinc instead of lead?—Some people may think it valuable, and some people may not.

The witness withdrew.

Mr. R. W. EDGINTON, M.D. examined.

13,082. (Chairman.) Are you the certifying surgeon for North Birmingham?—Yes.

13,083. Have you seen a considerable number of cases of lead poisoning?—Yes; I have seen, from January 1909 until the present time, 106 cases.

13,084. How many of those were house painters?—Of these there were 11 house painters; seven up to June and four since.

13,085. That is 11 house painters in all since January 1909?—Yes.

13,086. How many of those have been reported to the Home Office?—Three.

13,087. Then the other eight were not reported at all?—No.

13,088. Why was that?—Because they occurred in painting operations and not in factories.

13,089. If you alone have seen eight non-reported cases, would you say that there must be a very large number in the whole city not reported?—Undoubtedly, there must be.

13,090. Will you give us some details regarding the house painters whom you have examined for lead poisoning?—I have a list of them here with the names, date of examination, and the symptoms. Would you wish me to read it?

13,091. No. You might put it in, please. (The list was handed to the Committee.) Were these 11 cases

that you examined all severe cases of lead poisoning?—No; many of them were very mild.

13,092. Do you tabulate a case as lead poisoning when only one symptom, such as colic, is present?—No. I require always to have it confirmed by some secondary symptom.

13,093. You have also examined a number of coach painters suffering from the effects of lead?—Yes, 18 in all since January 1909.

13,094. How many of these cases were reported to the Home Office?—I should say that all of them would be reported.

13,095. What do you consider the most prevalent cause of lead poisoning?—I think that dust impregnated with lead is the commonest cause of lead poisoning.

13,096. Has not the wet process largely taken the place of sand-papering in the coach building trade?—Yes, almost entirely, for body painting, but not for the painting of chassis or wheels of motor cars.

13,097. Have you seen this work done with an exhaust draught to remove the dust?—Yes.

13,098. Is that system quite efficient?—I do not consider that it is quite efficient. I think that the pull of the fan is too low down in the exhaust hood, so that a considerable quantity of dust might float about

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[Continued.]

on the level of the man's face for a certain time before it sank low enough to come within the pull of the fan.

13,099. Is that in consequence of the nature of the work—the wheels and so on?—No; I should say that it was in consequence of the faulty construction of the hood.

13,100. But do you think that it would be possible to have a hood so constructed as to collect all the dust?—No, I do not.

13,101. Then is there no reliable way of preventing lead poisoning, except by the use of non-poisonous substitutes for lead?—I consider that that is the only safe way.

13,102. (*Lord Henry Bentinck.*) Have you ever thought out a system of regulation for painters?—Do you mean for house painters?

13,103. Yes, and also for coach painters?—No, I cannot say that I have ever thought out a system of regulation, and I should say that it would be difficult to apply.

13,104. Cannot you suggest any regulations?—In the case of house painters it would be almost impossible, because they are working away from their workshops at houses where they could not possibly be regulated or inspected in any way whatever.

13,105. (*Dr. Collis.*) Would you say of the house painters who come to you, that they are more cleanly or less cleanly than their fellow workers, from your experience of that class of workmen?—No, I should not say that they were any different.

13,106. You do not think that the mere insistence on cleanliness in their work preserves them from the possibility of lead poisoning?—No, I do not. I think that house painters working away from their workshops in various houses, many of them empty houses, would have great difficulty in cleaning themselves. They would find it almost impossible to cleanse their hands thoroughly before taking food. There would be no conveniences for that.

13,107. But those that have come to you with symptoms of lead poisoning have appeared to you to be a reasonably respectable class of men, and not men who are careless or drinkers, for instance, or are they?—No, I should not say that they are.

13,108. So that probably, even if you very much increased their conveniences for washing, you would still not entirely remove the possibility of their getting affected?—No, I think not.

13,109. (*Mr. Sutherland.*) You do not discourage habits of cleanliness, doctor, do you?—Oh, dear no.

(*Mr. Sutherland.*) Dr. Collis seemed to attach no importance to it, from his question.

(*Dr. Collis.*) That is not correct.

13,110. (*Mr. Sutherland, to the witness.*) What is your opinion as to the general appearance and health of painters who have come under your notice, apart from specific lead poisoning? Have they been healthy men?—I have only seen those who have been affected with lead poisoning, and, as you know, lead poisoning is a most insidious disease which very often renders a man in ill-health for some considerable time before he breaks down, and those who come to me are not good specimens to express an opinion upon.

13,111. Do not you see painters in other than cases of lead poisoning?—No.

13,112. But you think there is great value in a man being personally clean in his habits?—Certainly.

13,113. And that it would minimise the risk?—It would minimise the risk.

13,114. We had a witness here who said that Birmingham was "honeycombed" with lead poisoning. Do you accept that statement?—It is only honeycombed to the extent that you see in my district, because I think I may say that I do three-fourths of Birmingham.

13,115. But the witness who gave this evidence implied that almost every other man you met was touched with lead poisoning?—That is ridiculous.

(*Mr. Sutherland.*) I thought it was an over-statement, but he was very positive.

(*Mr. Parsonage.*) There are many cases where the insurance company admit the liability without their going to the certifying surgeon.

13,116. (*Dr. Collis.*) It is a fact, is it not, that the cases with which you become acquainted are those men who come to you for certificates, so that they may obtain the benefit under the Workmen's Compensation Act?—Yes.

13,117. They come to you as a certifying surgeon for a large district of Birmingham?—Yes.

13,118. It is possible that there may be other men who may fall sick, but to whom the occupier may pay compensation without their having obtained your certificate?—Yes, that is so.

13,119. So that though the list you put in represents for a large area of Birmingham, those who obtain certificates, there may be others over and beyond those?—Yes, certainly.

13,120. (*Chairman.*) That would account for your answer to my question—that there must be a large number of other cases in the whole city?—Yes.

13,121. (*Mr. Fell.*) You said that you had had 106 cases, out of which some were coach painters and 11 house painters. Who were the other people in your 106? To what classes do they belong?—If you would look at this list of trades in which I have had cases of lead poisoning, then I think that will answer the question.

13,122. Have you had any cases of coach makers, apart from coach painters, before you?—No.

Dr. COLLIS in the Chair.

13,123. (*Mr. Mason.*) It has frequently been mentioned here that men who are suffering from lead poisoning implore the doctor not to put that on his certificate. Have you had much experience of that?—My experience is quite the other way; they implore you to put it on their certificate, so that they may get compensation.

13,124. (*Dr. Collis.*) That is all they come to you for?—That is all they come to me for. Many of them implore me when I cannot comply with the request.

13,125. That is in the nature of your office?—Yes.

13,126. (*Mr. Mason.*) I do not quite know whether you have private practice as well?—No, none at all.

13,127. (*Mr. Kinggate.*) I take it that men who come to you come solely for the purpose of obtaining compensation?—Yes.

13,128. That is their only object. Of course, you would recognise that they are generally severe cases?—No; on the other hand, I consider that very often they are extremely mild cases.

13,129. They might be suffering from something else that you find which is not lead?—That is so occasionally. I have often had to refuse certificates.

13,130. They themselves have attributed it to lead, but it has not been so?—Yes; they are very ready to do that.

13,131. But there would be a number of those who are reported who would be suffering from lead, who would not attempt to obtain compensation?—I have no doubt there are, but I have no knowledge of them at all; there must be such, of course.

13,132. You would admit, I think, that working in lead, especially in lead dust, must be injurious to the general health of the worker?—Undoubtedly.

13,133. We have it brought to our notice sometimes (*Mr. Mason* asked the question) that some men have asked medical men not to state definitely that it was lead poisoning, from the fear of discharge from their employment?—That has certainly never come before me. As I said just now, I am rather struck with the eagerness with which they wish to be considered to be suffering from lead poisoning.

13,134. You have not heard at all of work in Birmingham where the employers have refused to employ men suffering from lead poisoning?—No.

13,135. (*Mr. Robins.*) You were mentioning with regard to carriages, that there was no dust contracted by working on the bodies, as I understood, but it was all done by the wet process?—I said that the wet process was much more general now than it used to be. I am not prepared to say that it is universal, but so far as I know it is.

13,136. Body work is not free from dust?—I said that the wet process of rubbing down is much more

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[Continued.]

usual now than it was a few years ago. I am speaking of bodies, but I am not prepared to say that it is universal, although it is so, as far as my knowledge goes. You see what I mean. There may be a small coach builder in some part of Birmingham who now uses the dry process in rubbing down, but all the coach builders that I go to, and know of, use the wet process.

13,137. But the greater part of the rubbing down is exactly the same process that has been in use now for 40 years, and where the dust comes in is between the priming coats and lead colour filling up, but rubbing down wet has always been done the same for a longer number of years than I have lived. The mode of operation has not been altered in any way whatever?—But has it not been altered lately.

13,138. No. I speak as a painter?—Very well.

13,139. Do you think that very excessive working on overtime has been partly the cause of men being afflicted with lead poisoning?—Do you mean that extra work with the dust makes a man more liable to poisoning from lead?

13,140. The excessive overtime that men work in the coach trade these last few years?—The only answer I can give to that is, that the longer a man works in lead, the more likely he is to get lead poisoning, and if his time is made longer, he must in that time be more liable to get lead poisoning.

13,141. Do you believe that it will be beneficial to the painter if overtime is abolished by Act of Parliament?—That is a very big question for me to answer. I do not know that I can answer that. All I can say is, that if a man works for a longer time in a dangerous process, he is certainly more liable to suffer from that dangerous process than if he works for a shorter time.

13,142. Do you think that his vitality would be lowered by these excessive hours?—I do not think it would affect that.

13,143. His vitality would not be lowered by excessive hours in a paint shop?—No, I do not think that would affect him. Lead poisoning is a question of idiosyncrasy to a large extent. Some men may work in lead all their lives, and all the hours of their lives, and not become affected with lead. On the other hand, you may put a susceptible person into a lead process, and in a very few weeks he will become affected by lead.

13,144. With regard to the question of lead poisoning and the vitality of the men, can you explain how it is that a painter, when he has been working a day in a paint shop, as a coach painter, feels so different when he has been out in the air for an hour after he has left the workshop. Does not that show that his vitality has been lowered? If it does not I do not know what it does show?—He is breathing a poisonous air all the time; that is all.

13,145. In the shop, then, his vitality must have been lowered?—Not at all; it does not affect it.

13,146. Is he in the same state of health as he is an hour after he has left the shop?—I am not speaking of state of health at all. The more he is poisoned, the worse for his health. When he enters the room he comes in fresh.

13,147. (Lord Henry Bentinck.) His vitality is lowered, is it not? He gets worse and worse from the poison. "Vitality being lowered" is such an indefinite phrase.

13,148. (Dr. Collis.) Perhaps you have different ideas of what is meant by vitality?—It is an indefinite phrase altogether. It means very little. The man gets worse and worse from the poisoning.

13,149. (Mr. Robins.) It is only different degrees of poisoning?—It is only different degrees of poisoning.

The witness withdrew.

Mr. H. AUSTIN examined.

13,166. (Chairman.) You are one of the witnesses selected to give evidence on behalf of the Society of Motor Manufacturers and Traders?—Yes.

13,150. But there is poisoning all the while?—That is the point.

13,151. (Mr. Gardner.) Your answer to the chairman's question seemed to deal more with the coach painters as to the air being impregnated with lead dust. What is the cause of poisoning in the case of the house painter?—I think there are two causes of poisoning in the case of the house painter: first of all from the fumes which are undoubtedly given off from a freshly painted lead surface, and secondly from the want of cleanliness which may convey a certain amount of lead into the system with the food that he takes from his hands.

13,152. Is lead carried into the air with the volatile spirit in the paint—in the fumes?—I am sure it is.

13,153. With regard to cleanliness, you have already admitted to Dr. Collis that on the whole the painter is as clean as his neighbour?—Yes, but that does not say that he is clean.

13,154. No, certainly not. You said that in many cases he could not get facilities for keeping clean on jobs?—Yes.

13,155. It all points to the necessity for adequate accommodation and for the supply of hot and cold water, and facilities being provided for cleaning before taking meals?—Supposing he is painting away at somebody's house. I cannot see how you are going to regulate somebody's private house. If the facilities could be given, it would be all the better.

13,156. People will not allow a painter into the kitchen or lavatory to get hot water, but if such a regulation was laid down they would have to?—It would be interfering with the rights of private people very much.

(Mr. Gardner.) But whenever you make a regulation you are interfering with the rights of somebody?

13,157. (Chairman.) Turning to coach painting, do you know whether any attempts have been made at the works that you visit to do anything to change from lead paints to other paints?—Yes. I was at the Wolsley Motor Car Works on Friday, inquiring into the matter. I have a letter from them which says, "Dear Sir,—Referring to your visit to the works, I have pleasure in informing you that we do not use any kind of lead paint whatever in the painting of our chassis at these works."

13,158. Do you know if they had any reason for that, such as illness of their workpeople?—They had several cases of lead poisoning amongst the painters of chassis and wheels, and in a conversation I had with the manager, he said he was going to do away with lead paint altogether, so as to get rid of these cases.

13,159. (Mr. Gardner.) You do not know what kind of paint he is using at present?—No.

Sir ERNEST F. G. HATCH, Bart, resumed the Chair.

13,160. (Mr. Mason.) Do you know of any reason why cases of lead poisoning should have increased to such an extent within the last few years?—I think that the Compensation Act has done that.

13,161. You think that?—Yes.

13,162. Has there been a great increase in Birmingham within the last few months, during the hot weather?—I can tell you exactly the number of cases. From what period would you like me to begin?

13,163. I only wanted a general answer as to whether the hot weather showed any increase?—Would the number of cases I had this year do?

13,164. Yes. That would do quite well?—57 cases this year.

13,165. Have those been mostly in the second half of the 10 months (January—October)?—Yes, I should say they have.

13,167. Are you a carriage and motor body maker?—Yes.

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Mr. H. AUSTIN.

[Continued.]

13,168. What length of experience have you had in the trade personally?—About 12 years.

13,169. How many men do you employ?—In carriage work it would average probably 150.

13,170. Do they all come in contact with lead?—No, I should not think so. The workshop we have is all under one roof, and the painters are not separated from the carriage builders, so that possibly they might come in contact in extreme cases.

13,171. Therefore all the men employed work in the same shops where the lead painting takes place?—Yes. They are more or less removed.

13,172. Although they are not actually in contact with lead, they breathe the air which has been contaminated?—They might.

13,173. Have you known many cases of lead poisoning?—Very few—practically none—and only minor cases.

13,174. Do you know that in the coach-building industry there have been 767 cases of lead poisoning recorded by the Home Office in the 11 years 1900-1910?—I have heard of that, but I am not personally aware of it, because I have had no experience with ordinary carriage building.

13,175. Of these, 47 have been fatal?—I do not remember the number.

13,176. There has been no apparent reduction in the rate of attack, seeing that the average yearly number of lead poisoning cases from 1900 to 1907 was 66½, while in 1908 there were 70 cases, in 1909 there were 95 cases, and in 1910 there were 70 cases?—That number would correspond probably with the increase in carriage building which has been taking place in England. It is proportionate.

13,177. As there has been no reduction in the average cases reported each year, I am sure you recognise that something must be done to remove the evil?—Yes, I think that something should be done.

13,178. Are you aware that of 376 cases of lead poisoning reported in the five years 1905 to 1909, 46 arose from motor car works?—No, I am not aware of that. I have practically no knowledge of lead poisoning cases.

13,179. Out of 697 cases reported in the 10 years 1900-1909, 297 arose in the ordinary coach and carriage building works of the country?—I was not aware of that, either.

13,180. Have you, as a society, taken any steps to test the merits of the different substitutes on the market?—I am not aware of any. I have not heard of any being taken.

13,181. Or to institute any inquiry as to the precautions necessary to combat the evil which exists in many branches of the industry?—I am not aware of any. I have not been on any committee connected with that kind of work.

13,182. Have you tried substitutes for white lead in your painting work?—No, none.

13,183. Do you think that it would be possible to prohibit or greatly restrict the use of lead without inflicting a hardship on your industry?—Well, as we deal with it, it would cause some difficulty. I mean to say, that it would be a hardship in that we have no difficulty to remove, and white lead is certainly advantageous as we use it.

13,184. Have you any other objections to raise why white lead should not be prohibited?—None. I have had no difficulty with it. I have seen no serious illness from it in work that I have controlled.

13,185. Are you thinking of foreign competition as a serious possible evil?—At the present time the English carriage-building industry is passing through a peculiar stage. Some years ago the motor car portion suffered considerably from foreign competition; people bought foreign makes. To-day I believe the leading carriage builders in England could export carriages into places like France, for instance, pay the duty, and then undersell the best makers there.

13,186. Would the possible restriction or prohibition of the use of lead be detrimental, having regard to foreign competition?—Well, it might in this way. If the use of substitutes detracted from the finish or from the durability of the painting that is

done in England, then I think it would be a serious matter, because to-day English carriages, as shown at various exhibitions, are considered to be better finished than foreign carriages. The painting is considered to be better finished, and the varnish is considered to be better finished, than in foreign carriages. That may not be only from the point of view of the finishing coats, but from the point of view of the ground coats, which are largely formed from white lead. It would be a great pity to destroy the view of foreigners that English carriage painting and English carriage building are really well done.

13,187. Do you think that there would be any increase in cost if lead was prohibited?—I do not think so. I do not think it is of any value in that respect.

13,188. Would you agree that if a substitute could be found for white lead, the use of the latter should be prohibited?—I think so. I think that there is always danger from the use of white lead.

13,189. Do you know that for the past six years the Midland Railway Company have used no lead in their carriage and wagon works?—I was not aware of that. I have heard that the substitute is really not entirely a substitute. I have not gone into the matter at all, because I am not interested in it, but I am told that it is not really a good substitute.

13,190. I do not want you to speak of things that you do not know yourself?—No, it is not really proper evidence.

13,191. We know that the Midland Railway Company's carriage and wagon paint has no lead in it?—Probably some of the other white lead substitutes are not what they might be.

13,192. Are you aware that they are entirely satisfied with the results obtained with a mixture of zinc and baryta?—No, I am not aware of that. Perhaps their work is not subjected to exactly the same conditions as motor carriage work.

13,193. We have also had similar evidence from a representative of the Bradford Corporation Tramways Department. Are you aware that white lead is no longer in use at the Daimler Motor Works in Coventry?—I am told so. I know the head of the carriage building department there.

13,194. And that the Wolsley Motor Company use no lead on the chassis?—I think that that must be a mistake, because if they paint the chassis they must paint it in the same way as they paint the body work.

13,195. I am putting to you the evidence that we have had?—That is speaking possibly of one or two coats that they give a chassis before they send it out.

13,196. The Wolsley Company state in a letter which I saw to-day: "We beg to inform you that we use no lead whatever in painting our chassis"?—That is quite possible. If that were made a regulation it would be very easy to comply with it.

13,197. Do you hold that white lead is the most perfect substance that can be used?—No. But from experience it is the most convenient at the present time.

13,198. What do you mean by the most convenient?—It complies with the conditions as we know them, better than any substitute—better than anything else that I know of.

13,199. But do you hold that white lead is the most perfect ingredient that can be used in paint for your industry?—I can only speak from practice. I would not say that my knowledge of the subject of substitutes would warrant my saying that it is absolutely necessary.

13,200. You are open to conviction that a substitute might be found equally good?—Quite.

13,201. How does your work compare with the Daimler motor bodies?—Exactly the same.

13,202. They are one of the largest firms in the industry, are they not?—I should think they are the largest.

13,203. Do they turn out work of the highest finish?—Yes, I think so.

13,204. The buyers of Daimler cars are of about the same class as the customers of your own or other leading coach body firms, and they would demand the

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same finish, would they not?—Yes, just the same, I should think.

13,205. Now, the witness representing the Daimler Company told us that they are entirely satisfied with the substitute they are using for all purposes for which white lead is commonly used in coach building works?—He ought to know. He is an experienced man, and they have been using a substitute for a considerable time. He told me so. Perhaps he may be speaking prematurely in regard to results that may only be apparent in three or four years' time.

13,206. The Daimler Company have used no white lead for two years, and they have had no complaints from customers?—I should not think that two years was long enough.

13,207. They claim that their paint work is thoroughly durable, and that it is, in fact, a little more economical than when they were using white lead. Do those considerations dispose you to modify your views at all?—Well, I have considered the point before, and I think that probably two years is not sufficient time to form a complete judgment.

13,208. You have told us that they are one of the largest firms?—Yes, but I do not know that their carriage building department at the present time is any larger than ours, as far as that goes.

13,209. But they are a firm of very considerable importance?—Yes, they are a firm of very considerable importance—much larger than any other carriage builders in England that I know of.

13,210. Do not you think that it would be extremely risky for them to introduce a substitute which might prove to be detrimental to their work?—Yes, but I have had a good deal of experience of innovations that come home to roost long after two years. They use a great deal of metal panelling.

13,211. If they introduced a substitute which proved detrimental to their work, would that not be likely to very seriously jeopardise the good name of their firm?—Yes, but perhaps they have not arrived at the date when the difficulty is apparent.

13,212. Is it likely that a great firm like that, with probably a very large amount of capital, would embark on a venture of this description without being pretty sure that it would be successful?—I think it is quite possible.

13,213. You think that they would run such a risk?—I do not think that they would knowingly do so, but they might make an innovation like that with every faith in the result, and they might be disappointed. As I say, they use a great deal of metal work in their body work, and white lead is not altogether a good thing to put on aluminium.

13,214. Do they use more metal work than any other motor car body builders do?—Most chassis builders doing their own work put much more metal work than others. A good deal more goes into ours, for instance, than an ordinary coach builder uses. We have a mechanical side, and we naturally tend in that direction.

13,215. I suppose that the Daimler Company use a good deal of wood too—in the Limousines, for instance?—It is partly wood and partly metal. They use wood and metal on the same carriage for panelling.

13,216. Do the Daimler Company use more metal on the bodies than you do?—Not on the individual body—perhaps not so much. I think that we do it more than most other firms do.

13,217. Do you think that the dangers attending lead painting can be practically eliminated by regulating the various processes?—Yes, I think they can—in fact, I am sure they can. We have had no serious case of lead poisoning in a factory that I have controlled.

13,218. Have you had any cases recently?—No, not recently that I am aware of.

13,219. Have you had any in the last two years?—They have not come under my notice.

13,220. Would you be surprised to know that you have had two cases in the last two years?—Not serious cases.

13,221. Yes. They were reported to the Home Office?—They have not been reported to me, and anything serious comes under my notice.

13,222 3. (Dr. Collis.) One was a case of extensor paralysis of the right hand?—Was that on the carriage side? Are you thinking of the case of a man in the automatic section where he was poisoned from the oil?

(Dr. Collis.) He was a mixer. He mixed all the paints for himself and others.

13,224. (Chairman.) I have told you that there have been 46 cases of lead poisoning in the motor industry in the last five years?—Yes.

13,225. Now, supposing that you put the case conversely, and that of the users of motor cars 46 had been poisoned in the last five years, do you not think that there would have been a great outcry for the abolition of lead?—Do you mean poisoned by the mere use of the motor car?

13,226. Supposing that it was stated that amongst the users of motor cars there had been 46 cases of lead poisoning, because they used motor cars, do you not think that there would be a great outcry?—The users themselves?

13,227. Yes?—I do not know. There are a great many of them, and I question whether there would.

13,228. Taking those of us around this table, for instance, do you think that if we knew in buying a motor car that we ran the risk of contracting lead poisoning, we should not be rather chary about buying one?—A risk simply from the ordinary use of the car?

13,229. Yes?—I should think so.

13,230. Do you not think that there should be an outcry with regard to the men who mix or use the paint for the motor car, supposing that there is a risk of lead poisoning?—If you were as careless in the use of a motor car as the man who does the painting, you might not be so concerned about it.

13,231. Then do you put down the cases of lead poisoning to carelessness of the men?—Very very largely. In the shops that I control the painting has been done under rather better conditions than obtain in the ordinary carriage shop, and from what I can learn from discussion with others in the trade, the difficulties that we have are very much less than are experienced elsewhere. I can only say that the conditions under which the men work with us are better than they are in the case of some other people.

13,232. Are you prepared to answer questions regarding the various processes in detail?—No, I have not studied that lately.

13,233. Are you a strong advocate of adequate washing accommodation being provided for the men?—Yes.

13,234. Also a proper proportion of basins to the number of men employed?—Yes; they should be kept clean.

13,235. Should hot water as well as cold water be laid on?—Yes. I do not know that there is any advantage in it for white lead particularly, but I certainly think that adequate accommodation should be provided.

13,236. But do you think that hot water should always be provided?—I think so, because in cold weather the men would be more likely to wash themselves if hot water was provided than they would if they only had cold water.

13,237. Do you think that clean towels should be supplied regularly?—Yes.

13,238. And soap and nail brushes always available?—Yes.

13,239. And that time should be allowed to the men for washing before leaving off work, and before meals?—I do not think that matters a bit.

13,240. But would you agree to it?—If regulations were made I would agree to them, but I do not think it matters.

13,241. Do you provide a mess-room for the men to take their food in?—Yes.

13,242. Is this mess-room kept clean and equipped with suitable seats and tables, and properly warmed in winter?—Yes.

13,243. Is provision made for storage of food brought by the workers so that it need not be taken into the working room?—Yes.

13,244. Do you provide overalls for the men?—Never.

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13,245. But do you not see the necessity for the wearing of overalls?—I quite agree that everyone should be compelled to do it. There is no question about it.

13,246. Should the masters provide overalls for the men?—I should object on principle, not because of the expense of doing it, but because of the difficulty attending the provision of such things for workpeople.

13,247. Would you agree to a regulation requiring you to see that the overalls were properly washed once a week?—If the regulation was made, certainly—if it was usual in the trade.

13,248. Would you agree to provide a cupboard for the storage of overalls when not in use?—I provide cupboards for all the painters now.

13,249. For their ordinary day clothes as well as for their overalls?—For whatever the painter uses. Possibly the cupboards that we use would not be suitable from a medical standpoint for the clothes, because all our cupboards are made with wire netting faces to them, to prevent the storage of greasy clothes and things of that kind.

13,250. The whole point is this—that the Home Office have enacted provisions in other industries where lead is used to protect the workmen's clothes from coming into contact with lead dust. Would you agree to the enacting of such a provision?—Yes.

13,251. Have you impervious washable floors in your painting shops?—Blue brick floors.

13,252. Are they cleaned down wet?—Regularly.

13,253. How often are they cleaned?—Every week.

13,254. Would you agree to having them cleaned every day?—Do you mean washed down every day?

13,255. Yes, washed down every day?—I do not know that there would be any great difficulty in connection with that at all, if it was introduced.

13,256. What are the usual hours worked by your painters per week?—51.

13,257. Do they frequently have to work overtime?—Yes.

13,258. I suppose that a great deal of overtime has arisen in the last few years in the case of motor car body builders?—Yes; more so in the paint shop probably than in the other departments. That is the last operation, and it is the last operation generally that involves overtime.

13,259. Would you agree to a strict limitation of the hours of employment, say to 48 hours per week, as has been recommended in potteries?—I should not agree with a very good grace.

13,260. The medical evidence before the Potteries Committee stated very clearly that it was most important that the men should not be allowed to work for too long hours in an industry where lead dust was generated?—It is quite impossible to say whether 48 or 51 should be the hours.

13,261. The fewer the hours are the better?—The difficulty is with the combined factory, one part running shorter hours than another.

13,262. I do not say that there is no difficulty, but the Home Office might wish to level up this industry to that of the Potteries, and would you agree?—It would be extremely awkward. The men would object very very strongly. They would object as much as the masters.

13,263. Would they object to 48 hours if they got the same wages as they do to-day for 51?—I believe that they would.

13,264. Are you quite sure?—If you offered them 48 hours instead of the time that they work now, with the overtime, they would object strongly if the rate was the same. Most painting is done by piecework, and the men could not earn enough in the time. It is not a question of the hours, but of the amount of money a man earns.

13,265. You understand that this Committee is bound to take notice of the recommendations of a former committee on a similar industry?—Yes.

13,266. Both the employers and the employed, and the independent members of that committee recommend unanimously that the hours of labour should be limited to 48 per week?—I think that if the conditions were the same, naturally the working hours should be

the same, but where the conditions are entirely different, then, perhaps, some modifications of those conclusions should be made.

13,267. The conditions that this Committee have to weigh are the same, inasmuch as both sets of men are engaged in industries where there is a great deal of dust generated?—Yes, but in one case it might be possible to reduce the difficulties, and in the other case it might not. I think that the difficulties at present connected with coach building could be very largely reduced.

13,268. The difficulties connected with the pottery industry were met one by one, and as far as human ingenuity could devise, were met satisfactorily. Now we should hope, if lead was continued to be used in your industry, to have conditions similar to those which were recommended by the committee on the pottery industry, including a reduction of working hours?—I hope that you will not do that, at any rate.

13,269. Do you have a periodical medical examination of your workers?—No; they will not agree to it at all.

13,270. Do you know that if lead is allowed to continue to be used, that will be one of the very first conditions that the Home Office will impose?—If they made the regulation, we would agree to it. I have not the slightest objection to it.

13,271. Do you think that the cost of such a system should be borne by the employers?—I do not think it matters a bit.

13,272. Together with compensation for any workers suspended by the doctor on account of doubtful health?—I would not have the slightest objection, as long as it was made general.

13,273. I suppose that it would be fairly costly to carry out these regulations and recommendations?—I do not think so necessarily. The difficulties that we have connected with the use of lead are so small, as a matter of fact, that I believe any reasonable regulation could be complied with without a lot of expense, as far as I am aware of what the intention of the Committee is.

13,274. The Committee have not made up their minds yet. You agree, do you not, that one of the most serious incidents of danger in your trade is the inhaling of lead dust?—Yes.

13,275. I have not taken you through the various processes, because you ask me not to, but can you tell us in what way you could really get rid of the lead dust in your industry?—By some apparatus or some method, you mean?

13,276. Will you tell us whether you think that it is possible in every case where lead dust is generated to have an exhaust fan to carry away the dust?—I think it is quite possible.

13,277. Would it not be a very costly operation?—Not for taking away the main portion.

13,278. Take for instance the wheels. How would you arrange to have a fan to take away the dust?—I should paint the wheels in a case, and have an exhauster from the case. It is not a difficult matter at all. So far as motor cars are concerned, the wheels are to a very large extent changing. If the present practice continues, it is quite possible that they will be mostly metal wheels, not painted at all, but simply enamelled. They are very largely so in our works at the present time.

13,279. Do you state deliberately on behalf of your firm that you prefer a system of regulations such as I have foreshadowed to the prohibition of lead or a restriction to 5 per cent. solubility?—It is rather difficult to answer that, because I have not used substitutes, and I do not know how far I could use them. I might find them very difficult. Apart from the hours of labour, I do not think the restrictions that you have mentioned would be difficult or expensive to comply with. The idea that I have heard suggested of a workman working with an apparatus round his head, and that sort of thing, is impossible, but I do not think that the restrictions which have been outlined or proposed would be difficult or expensive to comply with.

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13,280. I should like to tell you that the installation of exhaust apparatus throughout your industry would be very expensive?—I can only speak from my own knowledge. I do not know how far you intend to go. A body builder uses lead, and would it be necessary to have a restriction with regard to him? He has a little pot of lead, and he puts a little lead on the joints.

13,281. Any man using any quantity of lead, however small, would be considered by the Home Office working in a dangerous trade, and so he would come under the regulations with regard to medical examination, the wearing of overalls, &c. In addition, I think that the Committee might recommend, although I do not know their views, that some exhaust apparatus should be devised by which all the dust generated should be carried away from the worker so that there was no possibility of his breathing the dust at all?—If you limit it to the dust generated, that is different. In the cases that I am speaking of they are using lead already mixed with oil. I do not think that where dust is generated in the painting of a motor carriage as we practise it to-day, any exhaust apparatus that is necessary would be such a very expensive matter, unless you have views entirely outside what I think is necessary, and I cannot possibly imagine what they could be.

13,282. The most simple forms, as long as they were effective in their operation, would be those that we should recommend?—With regard to the painting, we might find that a regulation as to the dust might be an advantage. Dust flying about a paint shop gets on to the finished painted bodies all ready for the varnish coat and spoils the finish. We try to eliminate that, not for the sake of the workmen, but for the sake of the work.

13,283. (*Lord Henry Bentinck.*) You do not use exhaust apparatus?—No, it is very awkward to use any kind of draught in a paint shop, because it pulls in the dust or generates a cloud of dust.

13,284. (*Chairman.*) You rather hesitated to answer the question, so I will not press it, as to whether you prefer a code of regulations such as I have foreshadowed, or the prohibition of the use of lead?—I do not know which would be the cheaper or the better at the finish.

13,285. (*Lord Henry Bentinck.*) Your shop is an up-to-date modern one, is it not?—Yes.

13,286. It is not really a fair test when you come to think of all the small shops there are nowadays?—No, and it is rather hard for a shop that is well up to date to be troubled with regulations that are made for the smaller shop that is not up to date, the regulations not being necessary for the larger and better conducted shop.

13,287. Do your men suffer generally in health at all?—No, we are rather careful about that. We do not like to see our men ill, and it is always a trouble if they are away from their work. They might be good and necessary men.

13,288. They do not lose much time?—No, very little.

13,289. (*Dr. Collis.*) How often do you recommend that your motor bodies should be renovated after they have been turned out by you?—It is impossible to say. We try to get customers to touch up and re-varnish once in two years. We really advise it once a year, but we do not find that anybody takes any notice of that.

13,290. Do you find by that time that the pigment that you have placed upon the body is destroyed, or is it the varnish which is used to cover it which is then getting worn away?—Generally the varnish, but in cases of metal bodies, particularly aluminium, it may be the first coat that has not been a good one.

13,291. The question of the pigment used in the original paint is not so important as the question of varnish?—No.

13,292. Even assuming that there is a slight inferiority in the substitutes for lead in that class of work, it does not much matter which you use?—No, possibly not, in that case.

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13,293. In the case of a metal body, do you use terne plates at all?—Yes, occasionally, but not often. Mostly it is tin-coated steel.

13,294. What do you paint terne plates with?—In the ordinary manner, with the lead coat first.

13,295. Does the paint adhere very well?—Yes. We used to have trouble with terne plates. We do not use so many now; we only use terne occasionally. We had trouble, not because of the painting so much, but more from what we considered was the inefficient washing after the pickling of the plates. If they are not efficiently washed before they are coated with lead or tin, you are liable to get scaling of the paint; we put it down to that. Now we use mostly tin-coated steel.

13,296. You mean pure tin plates instead of zinc?—Yes. We have tin-coated steel for mudguards.

13,297. You use tin and you use lead?—Yes. We use what I have told you, owing to the scaling.

13,298. Scaling of the paint?—Scaling of the tin or zinc.

13,299. The whole thing scaled off?—The whole thing scaled off and left a rusty surface underneath.

13,300. You have not tried painting with non-lead paint?—No, I do not think we have.

13,301. Do I understand you to say that it is difficult to get the paint to adhere well to aluminium?—It is. We put black varnish on the aluminium first, and that we find most efficient.

13,302. The Daimler Company seem to get their covering on all right?—Perhaps they use black varnish as we do as a first coat, but not many people know it. We used a lead coat first, but it set up an oxidising action, particularly where we used brass screws.

13,303. The representative of the Daimler Motor Company said that they use the American method of painting. Now, you mentioned that you had had practically no experience at all of lead poisoning; indeed, I believe that in your answer to the form which was circulated by the Employers' Association, you said that you had had no cases among your men since 1907. I have here a case that was reported from your works in August 1910?—It is strange.

13,304. The case was notified by a practitioner and confirmed by the certifying surgeon. It was stated to be a moderate case, but it must have been rather severe, as the man had extensor paralysis of the right hand?—Was he a painter?

13,305. Yes, he was a painter in your employ, but I gather from the report that he was not employed entirely on motor bodies; he was mainly painting about the factory?—Was that a case of carriage painting?

13,306. He was mixing paints for himself and others?—We have one or two painters who do work about the building, and in making a report we should not consider that they were painters. They are labourers and so on; they are not really painters. They do whitewashing and painting and that sort of thing.

13,307. This man was an old hand as a painter?—But that department is really the building department of the works.

13,308. In August of this year a painter of motor bodies in your employ immediately after having been notified to us as a case of lead poisoning was examined by a certifying surgeon, who again confirmed the case as one of moderate lead poisoning. He was a painter of motor bodies applying the first two coats and the filling?—He would probably be on the most dangerous work.

13,309. Have you no knowledge of him?—No.

13,310. You answered this form, and I should have thought your attention would have been drawn to the fact and that you would have gone into it before you came here?—It has not been brought before my notice. I do not know why, I am sure. I suppose that it was not considered serious enough.

13,311. Do you use any paint known as non-poisonous white lead?—We have tried it, but I do not know the result of the test.

13,311a. I ask you that because of what this man is said to have been employed at. Do you know the composition of that paint?—No.

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13,312. Your firm undertook at the request of the factory inspector to ascertain that?—Have they not made any report about it?

13,313. No?—Then I suppose they are still making inquiries about it, or testing it.

13,314. It would be interesting to know whether you were, perhaps without knowing it, using non-lead paint?—I know that it has been tested, but I do not see how they could arrive at a conclusion as to the use of a thing like that under several months.

13,315. I wondered whether you might be using it without knowing it and whether, that being so, you might possibly have experience of leadless paints?—I do not know.

13,316. We had precisely the same description given us, "non-poisonous white lead," by another firm. Analysis in Government laboratory showed that it was non-poisonous, but it was not lead?—Since the Committee was appointed we have made several tests, but with what result I cannot say. It is not possible to give an opinion.

13,317. You are making experiments with non-poisonous paint?—Yes. It is very difficult, because we must keep the particular car that we use it on somewhere near by so that we find out the result. That result may not be satisfactory in much hotter countries; for instance.

13,318. These cases that I have put to you show that perhaps illness may be going on among your workpeople, of which you have no knowledge?—I heard that a man was off, but I did not know that it was a serious case of lead poisoning. Now I come to think of it, I know that he was off. In the other case, as I say, the man was only a painter's labourer, and we should not consider him a painter. The regulations attaching to the workshops in which he is employed are entirely different from those with regard to a regular painter. He might do all his own mixing.

13,319. We are considering the whole question of the use of lead paints. Your present evidence is on motor bodies?—His case may be outside painting, and I have no experience of house painting or outside painting.

13,320. (Chairman.) With regard to the question that I put to you as to whether you preferred a system of regulations, or prohibition or restriction to 5 per cent. soluble lead, would it assist you at all in giving an answer if the Committee suggested that a period of two years should elapse before the prohibition of lead came into force?—I think that it would very largely assist me to arrive at a decision, because I should immediately make suitable tests.

13,321. Supposing that the Home Office issued an order that after the expiration of two years no lead was to be used, would you then prefer the prohibition or restriction of the use of lead to the regulations?—I could not say. It is difficult to answer. I would rather like to answer the question at the end of two years, after I had made tests of the substitutes which may be used at present or which may be brought out in the meantime.

13,322. You would not have an option; the regulations would come into force at once and the exemption would last for two years?—From what I know other people are doing, I prefer to have the prohibition of lead under the circumstances, as I know what prohibition might mean, but I do not know what the regulations concerning special painting shops and that kind of thing might mean. With prohibition we should be on all fours with everybody else.

13,323. (Dr. Collis.) You had this form circulated to various members of your trade?—Yes.

13,324. Some stated, like yourself, that they had no experience of lead poisoning, but on examination we found cases of which the employers had no knowledge. There were a very considerable number, although the firms said, in absolutely good faith, that they had no knowledge of ill-health from lead poisoning?—I do not know whether they would look at it in the same light as I do. It might be a serious case, or a case not sufficiently grave to take note of.

13,325. One case was definitely stated to be a moderate case, not a slight case. We have three

groups—slight, moderate, and severe?—The Government method of grouping them might make a case moderate that we should consider only slight.

13,326. They are grouped together by the certifying surgeon, who has knowledge which, at least, must be in advance of any knowledge which a non-medical occupier has as regards the general condition of the men examined?—He may not notify the firm that the case is serious.

13,327. He is not expected to. His report to us is confidential, but the fact is that you have every one of these cases entered in the general register of your factories. You are bound by law to have them there?—Whether it is a serious case or not?

13,328. Yes, whether it is a serious case or not. Now, these replies have been made to us, notwithstanding the condition of your register, and that places an extraordinary amount of doubt, we consider, on the *bona fides* of these answers, and I think you must grant that we are in a position to cast that doubt?—Certainly it would give that impression.

13,329. Occupiers have only to turn to the general register of their factories to see any case entered therein?—In discussion with other members of the Carriage Builders' Institute, we have discussed that matter very considerably at our meetings. It has been seriously considered, and the general opinion among the members is that they do not take any notice of what might be considered a moderate case of lead poisoning as a case of lead poisoning. They only take the severe cases. The general opinion is that any amount of lead poisoning takes place, and that the cases never come before the authorities at all. A man does not even knock off work. He takes certain precautions, and gets over his difficulty. He keeps on working. In plenty of cases a man is not able to knock off, and those cases would never come before the employer at all.

13,330. No, I am speaking of definitely notified cases which have been inquired into by the certifying surgeon and the inspector. I will give you a case of a man whose case was considered slight, and was so reported to us by our certifying surgeon. That man left the works, and the works had no further information with regard to him. I attended the inquest on him in September. He was engaged in the motor car industry?—What was the report on the register? Was it "slight"?

13,331. The report from the certifying surgeon at the commencement of the illness was "slight," but it ended fatally. My point is that you have no right whatever to form these opinions as to the seriousness or riot of a case; and I hold that it is your duty, as employers, when you are asked for these returns when inquiry has been made, to give the reports from your general registers; but you have deliberately not done so?—Some have not, undoubtedly.

(Dr. Collis.) It is a breach of *bona fides*.

13,332. (Mr. Fell.) You said that you saw no difficulty in applying exhaust apparatus. I suppose that you alluded to the dust arising from the work of a man who was rubbing down?—To the dry operations connected with painting.

13,333. There are two causes of dust; one the rubbing down and the other the splashing of paint on the floor, which dries and in time forms dust?—Yes, it is kicked up in walking.

13,334. You have to provide against that as well?—But that would not be provided for by exhausters, except in certain cases. It would be provided for by washing down.

13,335. If only a week even elapsed between the washing down, you would get a considerable amount of dust which was not washed down?—Certainly.

13,336. So that you really have to have some sort of general arrangement of exhaust?—Yes, or more washings down. There is a little difficulty in connection with the painting of motor carriage bodies, as at present practised at any rate. Some of the painting takes place while the body is being mounted on the chassis. It is not possible, unless you have very strong regulations and lose a considerable amount of time, to do all the painting when the body is separate from the



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chassis. It is much more convenient to do a certain proportion of it when it is only partially built. It may be during the time that it is being mounted, or during the time that the iron work is put on it. You see how difficult making any regulations about using exhausters in connection with the painting might be in the various shops.

13,336a. When the chairman was putting to you how difficult it would be to apply exhaust apparatus, I think you said that there was no practical difficulty in it?—I do not say that there is no difficulty in it, but possibly if it was a question with us of sacrificing considerable value in the painting by using a white lead substitute, as against having regulations which necessitated expense or delay or alteration of the system of painting, we might go in for the expensive apparatus, and keep up the quality of our work. It depends entirely, I think, on the class of work we should be catering for. It is impossible for anybody to answer upon this question until the regulations are made and the work is gone carefully through to see what is necessary for carrying them out. It might be very much more difficult than I am thinking at present it is likely to be. As I said before, I know to a certain extent what the regulations with regard to prohibition may mean, but I do not know what the other regulations may be. I have not seen a list of them. If I had a list before me I might form an opinion.

13,337. (Mr. Mason.) Seeing that the whole of your work goes on under one roof, and that you have had several cases of lead poisoning, it would be interesting to know whether any of those cases have affected men other than painters?—I have not heard of it. Very often a man will suffer from a complaint and not say anything about it. It is quite possible that cases may have arisen that have not been brought to the attention even of the foreman.

13,338. In answer to the chairman you stated that you have known of one or two definite cases?—I know of the case of this man who did the outside painting; that is to say, I have heard of it; and I remember one or two cases that happened in connection with the Wolsley works many years ago, when I was manager of the works.

13,339. But not in your own works?—No. Many of the men may suffer from it all the same. I do not say they do not. They are extremely dirty. I have seen them eat their food with dirty hands, with paint all over them, and never wash themselves, never brush themselves, and never wear overalls.

13,340. You said that the trade was now in a position to export bodies to France. I have been led by others to believe that there is a certain amount of importation of bodies from Belgium to England and from such places?—Yes, they have built a type of carriage body which has appealed to a certain class in England, and which has been largely advertised. It is not a serious matter—perhaps 600 or 700 carriage bodies in the year.

13,341. Then the fact that they are allowed to use lead, and that the English carriage builder is prohibited from using lead, would make little or no difference?—It might make a considerable difference. I do not know of anyone to-day who can really seriously assert that white lead can be dispensed with without detracting from the quality of the painting of a carriage body.

13,342. Do you suppose that if foreign firms were allowed to use lead, and English firms were not, it would seriously injure the English trade?—It might. It certainly would if it was going to injure the quality of the paint.

13,343. If it were possible to prevent bodies with lead paint on coming in from abroad, what would you say then to prohibition?—We would not object at all to prohibition then.

13,344. I believe that a strong effort is being made to capture the Argentine and other foreign countries; would the prohibition of lead in such a case have any detrimental effect?—It would if you were not able to obtain with the substitute a result practically equal to the result from white lead in regard to durability, because we should be in competition then

with Continental firms who were able to use white lead, while we were prohibited from doing it.

13,345. (Mr. Kinggate.) You have admitted that you have no knowledge of the use of substitutes for white lead?—Not sufficiently to give any opinion.

13,346. With regard to the Daimler Company, you think that two years is not sufficiently long to be able to know whether it can stand or not?—I do not think it is.

13,347. Have you had large experience of coach painting?—I have not done the actual coach painting myself, but we have a very large coach building department, and it is a part of the business that I pay a considerable amount of attention to.

13,348. If the base of the painting is not good, does it not show itself very quickly. For instance, if a body was painted in a very great hurry, as it frequently has to be, and is done in what we call "Presto," one coat put on the other quickly—that very soon shows itself?—Yes.

13,349. Any fault in the base will show itself in less than two years—even in 12 months?—Yes, but I am thinking particularly of carriages that are exported. The result might be very bad, but the manufacturers would not hear of it, perhaps, until after two years.

13,350. I am only asking with regard to your experience in these matters. When the base of the painting is not good, it shows itself quicker than that. You use the lead for priming coats, and mixed with your filling?—Yes.

13,351. If the base is wrong, and the colour is quick colour, "Presto," small cracks will show in less than 12 months in the ordinary way?—Yes.

13,352. Are you aware that the man who introduced the American method of painting into the Daimler Company's works is a thoroughly practical man of 25 years' experience, who has made a great study of the material that he uses?—I was not aware of that, but even then I think it is possible for him to make a mistake.

13,353. Of course, it is possible for anyone to make a mistake. What is the object of the first coat of lead, speaking specially in regard to wood?—To protect the wood.

13,354. For something more than that, is it not?—No. Beyond getting sufficient body work to hold up the colour, I do not think any painting is done except to protect the wood.

13,355. You might put anything on to protect the wood, and it would do it for any length of time, but you would see all the grain showing through?—That is merely a matter of getting sufficient surface or body so that you shall not see that. I do not think the object is anything except to protect the wood.

13,356. The object is to stop the grain of the wood, and get a good surface?—That is a matter of quality.

13,357. Is not that the main object?—I understood that the object of painting was to preserve the wood.

13,358. You might put tar on it to preserve the wood, if that was the case?—You might, and it might be a good deal better, probably.

13,359. From your knowledge of the trade you know that a very fine surface is desirable?—That is a question of quality.

13,360. That is what I am speaking of. The object of lead first of all, and the filling coats is to stop the suction and to stop the grain of the wood showing?—Yes, to form a surface.

13,361. If you can get an elastic material to hide the grain of the wood, that is an advantage, is it not?—I think so.

13,362. The object of the Daimler Motor Company is to get something that hides the grain of the wood, that is elastic in character and that is not liable to crack?—My experience is that it does not crack; it peels. Enamels all peel.

13,363. The great difficulty is that it has to have all these qualities?—I have always found enamels fill up much quicker than a paint does, but they peel. They crack at the corners.

13,364. If the base was wrong in the painting of a body, would not you think, as a practical man, that the defect must show in less than two years?—I do not know about that. You ask me as a carriage manu-

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facturer, and I give you evidence on which you might say it was perfectly safe to insist on the abolition of white lead, but I do not think two years is sufficient. It is not the practical man who comes into the question, but it is the man who sells the carriage and who gets into touch with his customers and hears their complaints. The practical man can say whether they are right or wrong, or what is the cause, but his opinion is never asked.

13,365. Take a man who in the ordinary way manages a concern as a foreman. The employer would come to him naturally to know the reason of the failure?—But if he has not the failures brought to his notice, how is he going to ask the foreman about them? If you send a car abroad, or if you use it in England, and you have no complaints about it, you assume that it is all right; but suppose that at the end of the third year it is not all right. What is the position then?

13,366. You have had many years' experience. Would it not be found out before that?—I am not altogether sure of that. It is not only a question of the use of white lead that makes the painting of a body successful or unsuccessful.

13,367. I admit that. The point is that you contend that two years is not sufficient time to know whether the method adopted by the Daimler Motor Company will stand?—Not sufficient, I think, for a Government department to make strict regulations which might seriously inconvenience the industry. That is how I look at it. I do not want to give any evidence that might be considered as definite, when I do not really think that two years is sufficient.

13,368. (Chairman.) What would you consider a proper test?—It is extremely difficult to say. In my experience I have found that in many cases it takes much longer than one would think to arrive at a definite conclusion.

13,369. But would not an ordinary owner of a motor car have it painted in three years?—I have seen cases where a motor car has been very carefully used, and even used quite considerably, where at the end of four years the paint has been in an exceedingly good condition.

13,370. But would not most motor car owners have their cars painted at the end of three years from the time they were purchased?—No, I do not think most of them would.

13,371. (Mr. Rice.) Does it not rather depend on whether they have bought at an exhibition or not?—They might have it touched up or varnished. My experience of motor car owners is that they are extremely careless about their cars, and take very little interest in them compared with what they would take in an ordinary carriage with a horse. A man likes a horse and carriage to look nice; he does not care to have his horse looking bad. He likes to have it looking spick-and-span, and the harness and the carriage as well. He would be ashamed if it were otherwise, and I do not know why he is not ashamed of the look of his motor car.

13,372. (Mr. Kinggate.) A motor car is subject to more rough work than a carriage?—Yes.

13,373. It would want varnishing every two years?—There is no question about that.

13,374. Any defect in the base would be seen?—Yes, with regard to a painter looking at it. I am thinking of metal bodies where the peeling takes place some considerable time after.

13,375. That is the action of the metal?—Partly that, and the first coats, and the fact that it is not varnished.

13,376. Is very much "Presto" used by you?—We do not use it.

13,377. You have used white lead for jointing?—Yes. We have tried glue and found it quite unsatisfactory.

13,378. Have you tried jointing paste?—No.

13,379. Do you know that some of the largest firms in England have used it, and found it satisfactory?—I was not aware of it.

13,380. With regard to the Wolseley Company, we had it stated that they are not using any lead at all in

the painting of the chassis. When that point was put to you by the chairman, you could not understand why they should paint that differently from the body?—The wheel is part of it, and surely they would paint it the same as they would the wood on the body. In the carriage-building trade it is generally considered to be the part where there is more dust made than with regard to any other part.

13,381. That is my point. The Wolseley Company have had several cases of lead poisoning. It is quite possible in the painting of the body to do all the rubbing down wet, and have no dry rubbing down of any kind, is it not. The rubbing can be done with pumice-stone instead of sand-paper?—Yes.

13,382. That is impossible with the wheels, and the Wolseley Company have adopted this plan of using no lead at all in the painting of the chassis to avoid the dust arising?—I do not see why they could not rub down a wheel under the wet process, the same as they can any part of the body work.

13,383. You must know that that is practically impossible, and it is exceedingly costly. I should think that if you were to talk about rubbing down wheels with a stone to any practical man, he would smile, to say the least?—I do not think he would. The wheel is not a very important part in this connection—I mean there is no difficulty in connection with the painting of a wheel.

(Mr. Kinggate.) But look at the trouble it would be to rub down a wheel by the wet process.

13,384. (Chairman.) You do not profess to be an expert on the processes?—No.

13,385. (Mr. Kinggate.) But you know the difficulty of rubbing down curved surfaces with stone?—Yes, but that is merely a matter of a little more expense. The wheel is probably the most important part of the carriage.

13,386. No, the panel is the most important part?—No, the wheel is the most important part—the wooden wheel—and you have to make a good job of this part of the painting of the carriage. I know enough about it to be able to say definitely and firmly that the wheel is more important than any part of the carriage, and it is one of the most neglected parts with regard to painting, and more peeling takes place there than at any other part. If you could dispense with white lead there, you could dispense with it on any other part. There is no question about it, that more difficulty occurs in connection with the painting of the wheel than in connection with any part of a carriage body. Look at any carriage or motor car particularly, and you will find, if peeling is taking place on any part, it is on the curve of the spokes, where the end grain is, and where water from the washing of the spokes has got on the inside and caused the paint to peel off.

13,387. I have been for 45 years in carriage-making shops, and I cannot agree with you?—You speak of carriage building perhaps, not motor car building.

13,388. Both?—I am certain that I am right. I have had very considerable experience of these points.

13,389. The greatest danger arises from sand-paporing?—There is no question about that.

13,390. It struck me forcibly that the Wolseley Company were doing away with lead on the chassis and wheels for the obvious reason that dust was created by the sand-paporing, and that was one of the methods of getting rid of lead poisoning in their works?—If regulations were made it would be very easy to have a special arrangement made about the sand-paporing of the wheel, but it would be extremely difficult to make arrangements with regard to the sand-paporing of the body. It is easy to paint or rub down or sand-paper a wheel in a chamber, but it would be extremely difficult to put a carriage body in a chamber, because a man could not reach it from outside. I cannot understand any firm painting the wheels of a motor car without white lead, if they say that it is necessary to have white lead on the body of the work.

13,391. (Dr. Collis.) I do not think they have said that?—The Wolseley Company say so, I understand.

(Dr. Collis.) They only say that they are doing without white lead on the chassis.

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13,392. (*Mr. Mason.*) You think perhaps that they paint the chassis with one colour and the body with another?—No. I am speaking of painting the chassis in a different manner from the body.

13,393. (*Mr. Kinggate.*) Are you aware that the Sunbeam Motor Company and the Star Engineering Company do not use any lead at all now?—I have heard so, but I am not conversant with their practice.

13,394-5. (*Mr. Robins.*) With regard to the Wolsley Company, only about two months ago orders were sent down to the paint shop that, on account of lead poisoning, leadless paints were to be used on chassis, and two months were given for experiment, so that it is only a recent occurrence?—As you know, with regard to the painting of parts like that, defects do not show perhaps for a year or more.

(*Mr. Robins.*) It is not said that the bodies can be painted with leadless paint, the same as the chassis can?

13,396. (*Chairman.*) You told us that if you had two years of grace you would prefer prohibition or restriction to 5 per cent. of soluble lead to a code of regulations such as I foreshadowed. Now, when you gave that answer, did you take into consideration first the importation of foreign-made bodies, and, secondly, the exportation of motor cars to foreign countries?—No.

13,397. Would you still adhere to your declaration with regard to prohibition in view of these two matters?—I think I would. I do not know the conditions that may be imposed.

The witness withdrew.

Mr. C. I. SMYTH examined.

13,398. (*Chairman.*) Do you attend to-day as the representative of the firm of Mander Brothers, of Wolverhampton?—Yes.

13,399. What manufactures are your firm engaged in?—They are very varied. We make a number of different articles, mostly paints, varnishes, enamels, and printing inks.

13,400. Have you for some years manufactured a leadless grey priming paint?—Yes, for the use of coach-painters.

13,401. How many years have you supplied that paint?—As far as I recollect, about five years.

13,402. How does it compare in cost with white lead paint?—It is slightly more expensive than paint made with white lead, but if it were made in quantities comparable with white lead it would be cheaper. I might say that this depends to some extent on the respective market prices of lead and zinc.

13,403. Naturally. Have you found that the demand for it among users of paint has increased since the time you introduced it?—Very little. We have had a few inquiries for it lately.

13,404. Have you had any complaints regarding the paint on the score of durability, or otherwise?—None whatever.

13,405. Have you sold a considerable quantity of this paint?—No; a small quantity.

13,406. Are you able to state quite positively that it has been a success?—I am in a position to state that we have supplied it to one very important firm of motor car builders ever since we first made it. In fact we made it for this firm originally, and they have used it ever since.

13,407. How long have they used it?—About five years. I could not give the exact time.

13,408. Is it a motor car firm of some reputation?—The Sunbeam Motor Car Company.

13,409. Have you introduced other leadless paint?—We have introduced a leadless filling, or paste which is used by coach-painters, but only recently. We have also, from time to time, made other paints, but mainly when we have been asked to do so.

13,410. What other leadless paints have you introduced?—Paints of all sorts for coach-painting, in small quantities, when we have been asked to do so by customers. We have never pushed them to any extent.

13,411. Do you think that you have succeeded in replacing white lead in paints?—As far as white paint is concerned, I consider that we have done so with great success, but with regard to other paints, some of them so far have not been successfully replaced.

13,412. What grounds have you for saying that you have been eminently successful with non-lead white paints?—I can show you two boards which have been done with zinc paint. One will show you the finish of the paint and the body, and the other will show you the durability.

13,413. But have you had any practical experience in the use of these white non-lead paints?—We do not use them ourselves.

13,414. Have you had experience with regard to selling them to users of paint?—We have had no actual

opinion from users. It is more or less experimental work, which we have been going into for several years.

13,415. Do I understand you to say that the only instances you have of its success are the boards that you produce for us to see to-day?—They are the only evidence that I can give you.

13,416. What is the composition of your leadless paints?—They are made up on a basis of zinc.

13,417. Do you find that such a paint has sufficient body and covering power?—Yes.

13,418. How did you ascertain that?—By testing them.

13,419. Simply on the boards that you present to us?—Yes.

13,420. Have you found that this non-lead paint is durable?—I have. I have a board here which will show you the durability of it. It has been exposed now for rather over two years. I might say with regard to durability that I do not consider it depends so much on the pigment, that is, as to whether it is lead or zinc, as on the medium with which the colour is combined.

13,421. Where have you exposed these boards for testing purposes?—On a wall with a south aspect in our works at Wolverhampton.

13,422. For how long were they exposed?—This board was exposed on October 19th, 1909 (*handing a board to the Committee*). The whole board was first painted with two coats of white lead. This portion *here* (*pointing*) received two additional coats of white lead.

13,423. When was it painted?—In October 1909. The top portion was painted with two coats of zinc-oxide paint. In both *this* case and *that* the paint was thinned with the same medium, that is, a mixture of linseed oil and turpentine in the proportions of two parts of linseed oil to one of turpentine. The middle partition was painted with a specially prepared zinc-oxide. The zinc-oxide itself was the same, but the medium was a different one. The white lead has become grey; the zinc-oxide has retained its colour. But in both of these cases the surface is covered with very fine cracks, which will eventually get worse and worse until the whole of the paint has disintegrated. The middle one has a perfect surface. There are no cracks whatever visible.

13,424. (*Mr. Sutherland.*) Although *this* looks dirty it has the body of lead on it?—Yes.

13,425. As a preservative it has the body of lead on it?—Yes, but it will go worse and worse.

13,426. Dirtier?—Both of the two outside ones will crack more. When cracking has once started in a paint it will gradually get worse and worse until the paint has perished completely. The durability of a paint depends entirely on its elasticity, that is its power of standing expansion and contraction which are caused by differences in temperature.

13,427. (*Chairman.*) Have you any other specimen to show us?—This is a specimen on which I have had painted two coats of best white lead and two coats of zinc-oxide paint.

13,428. When was that painted?—This was finished the day before yesterday.

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13,429. What does that show?—That shows the body and the superiority of the finish of the zinc-oxide, or rather of this particular zinc-oxide paint. It also shows superiority in colour—in whiteness.

13,430. (Dr. Collis.) Are there the same amounts on each?—Exactly the same.

13,431. Weight for weight?—Not weight for weight.

13,432. The lead would add to the weight?—Yes.

13,432a. (Mr. Sutherland.) Was the same vehicle used in each case?—No.

13,433. You have varnish in the zinc?—There is no varnish at all.

13,434. Why did you not put the same in both?—I want to prove that the permanency and durability of a paint depends to some extent on the medium. This shows that when made up with this particular medium you can get as good a body of colour as you can with ordinary white lead.

13,435. This is merely to supplement the middle piece?—Yes. We have two coats of white lead over the whole of them, so you could not form an opinion as to the body of that.

13,436. Is this two coats on bare wood?—No, on pink priming. All wood is so primed.

13,437. But what is the basis of the priming?—It is generally made with white lead.

13,438. Is that necessary?—I do not think that it is necessary, but it is usual.

13,439. (Chairman.) Is it a necessity in the first instance to coat with white lead before you apply the zinc-oxide?—Not in the least. The pink priming could be made just as easily with zinc as with white lead.

13,440. Why did you not have it so painted in this illustration?—Because there was not time to do it.

13,441. It is not what we want. If there is any lead connected with such exhibit it lessens its value?—I only decided to do this on Monday, and it could not have been done in time.

13,442. Is your experience of zinc paints which have proved as durable as lead paints only illustrated by the boards which you have shown to us?—Yes.

13,443. What is the relative cost of such paint for outside use?—Zinc paints if made with zinc-oxide are dearer, weight for weight.

13,444. As zinc-oxide is so much lighter than white lead specifically, there would be much less weight of zinc-oxide than of lead in a gallon of paint mixed ready for use, would there not?—Yes.

13,445. How then would the price of zinc-oxide and white-lead paints compare, gallon for gallon, when the paint is ready for use?—The ordinary qualities of zinc-oxide, when prepared for use, would come out almost identical in cost with white lead. If a more expensive zinc-oxide, which is lighter in gravity, were to be taken, it would actually come out a few pence per gallon less. I am assuming that pure linseed oil and pure turpentine are used for thinning in each case.

13,446. Do I understand that the original board that you painted two years ago had a coating of white lead?—Two coats of white lead.

13,447. The foundation was white lead?—Yes, the foundation was white lead.

13,448. What does that prove then?—It only proves that the white lead on the top has cracked, but the zinc white on the top has not cracked.

13,449. Does it not also show that, on the face of it, a first coat of white lead is necessary?—I have not the slightest doubt that if two years ago I had known I was going to give evidence here, and I had had the foundations done with zinc instead of lead, it would have lasted equally well.

13,450. But we are here to investigate this question, and we want evidence if possible to show whether non-lead paints are as good as the others?—Yes.

13,451. If you bring an illustration the first layer of which is lead it does not carry us much further?—The only thing is that the conditions are the same for the finishing coats.

13,452. Yes; but what we want to find if possible is a leadless paint. If you are going to have the first coat made of lead it opens up all sorts of difficulties, and I understand that the exhibits you have produced to us have this first layer of white lead?—Yes.

13,453. (Mr. Rice.) Have you or your firm a board prepared two or three years ago all painted with zinc white?—No, we have not that. I should have brought it if we had.

13,454. Have you had any difficulties with certain colours?—In replacing them with colours not containing lead?

13,455. Yes?—Those colours which contain orange and red lead, and which contain chrome yellows.

13,456. Are you acquainted with the test of solubility in dilute hydrochloric acid?—Yes.

13,457. Have you examined the solubility of lead chromate?—I have. Pure lead chromate will only dissolve in a proportion of 1 per cent. The various chrome yellows, so called, are not all pure chromate of lead. Some of them contain sulphate of lead; some of them contain white lead; and a few of them are pure chromate of lead. The tests which I have made show that pure chromate of lead has only a solubility of 1 per cent. Chrome yellow which contains lead sulphate is soluble to the extent of 15 per cent., and chrome yellow which contains white lead, 35 per cent. Orange lead is completely soluble and red lead is completely soluble.

13,458. A restriction to 5 per cent. of soluble lead would allow you to use considerably more than 5 per cent. of these lead chromates?—Certainly.

13,459. Would you be able to produce an equal range of colours if the use of lead compounds were restricted to not more than 5 per cent. of lead soluble in dilute hydrochloric acid?—I am satisfied that there would be no difficulty whatever in making a green paint to come within that standard. With regard to reds, of which the basis has hitherto been orange lead, I should want to experiment further, but I think that success in that direction is quite possible.

13,460. What grounds have you for giving this evidence with regard to these different colours?—What particular evidence do you refer to?

13,461. The statements you have made as to the colours you have described to us?—Evidence that greens, for instance, can be made without lead?

13,462. You have given us some exhibits of white. Have you any similar exhibits to give us with regard to colours?—No.

13,463. On what do you base your opinions then?—On actual work which we have done, and colours which we now make, which are free from lead.

13,464. Are they in constant use?—No. They have been made more or less during the last two or three years, and they have been exposed at our works, and have stood exceedingly well; and, moreover, with regard to greens, I see no reason why those should not be made as they are now, considering the fact that pure chromate of lead is only soluble to the extent of 1 per cent.

13,465. (Dr. Collis.) You state that you have no evidence on the durability of non-lead paints, but you tell us that you have been making and issuing a priming coat without lead to the Sunbeam Motor Company for years. Have they not said that it is suitable?—They gave us a testimonial a considerable time ago saying that it was perfectly satisfactory; but when you talk of durability you must remember that this lead priming paint is a priming paint, and there is no question of its wearing. It is simply used to stop the pores of the wood previous to putting on what is known as filling up.

13,466. I quite follow that, but the question of a non-lead priming coat is a very important one. It has already been introduced with regard to the question of the board which you have shown. The fact that the priming coat proved satisfactory to the Sunbeam Company is important?—It is important as regards coachbuilders' work, but I would distinguish entirely between coachbuilders' work and decorators' work.

13,467. How do you think it would answer if it was used for decorators' work in houses?—Perfectly well, I think.

13,468. On that point you have no actual experience?—No actual experience.

13,469. Have you sent out your non-lead paints to any other users?—Not to any extent.

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[Continued.]

13,470. You have not had repeat orders. You have had nothing more than experimental trials?—We send small quantities to coachbuilders all over the country. I could not say how much.

13,471. Do they send repeat orders?—Yes, they repeat orders.

13,472. Do they continue with non-lead paints or do they revert to lead?—I should say not, but I could not answer that question.

13,473. Perhaps you will be able when you return to submit to us the names of other firms besides the Sunbeam Company?—With pleasure.

13,474. Especially with any note of recommendation which they have made with regard to the paints used. In the early part of your evidence in chief you spoke of not succeeding in producing certain leadless paints. Did that refer to the coloured paints?—Yes.

13,475. With regard to solubility you said you think you could succeed with greens but not with reds. Reds are your difficulty?—Yes, reds are our difficulty.

13,476. Have you any idea why the Sunbeam Company use particularly a non-lead priming coat?—Yes. They had a case of lead poisoning at their works. I went down to investigate it myself at their request, and found that it was due to the dry rubbing down of the particular priming paint they were then using. It was made from white lead. I suggested that they should have one made without lead. They agreed to the suggestion, and they have used it ever since.

13,477. Do you know what they finish their bodies with?—With all sorts of different colours, and of course with varnish.

13,478. Yes, but what do they cover the grey priming coat with?—On the top of that they would use a filler.

13,479. And then a final coat?—They would then put a coat of colour on.

13,480. Would they use a leadless colour?—They would finish their cars according to the desire of their customer. They have no fixed colours for their cars.

13,481. They are usually green, are they not?—They use a number of different colours. We ourselves supply them with a dozen different colours.

13,482. They may have a lead base?—Some of them contain lead; some do not.

13,483. Some have a zinc base, tinted?—Yes.

13,484. The greens may be tinted with chrome?—Yes.

13,485. You can get the finished product with all the colours on the top of the priming coats, with paints which do not contain more than 5 per cent. of soluble lead?—Yes.

13,486. (Chairman.) When did you go to the Sunbeam Company to investigate?—About five years ago.

13,487. Have they been using leadless paints ever since?—Yes.

13,488. (Mr. Sutherland.) Would the primer do for decorators?—We could supply it in a form suitable for decorators. It is lead colour for the coachbuilder, but we could supply it in white.

13,489. Would that do?—It would do as an undercoating for decorators, but I would not at present recommend it as a finishing coat.

13,490. Would it serve exactly the same purpose as ordinary lead priming?—Exactly the same.

13,491. If that could be established it would cut away a great deal of the difficulty, because the difficulty comes in the rubbing down of the first coat with sandpaper. Do you suggest that zinc-oxide mixed with pure linseed oil and pure turpentine would give you as good a paint for outside work as lead and oil and turpentine?—I do not consider that it would be equal in body, but I consider that it would be equal in durability.

13,492. Without any varnish?—Without any varnish. Supposing that the two were thinned up in exactly the same way, with the same materials and in the same proportion, I consider that one would be just as durable as the other.

13,493. You have no demonstration of that except that board?—That is the only demonstration. It is not considered satisfactory, but to my mind it is perfectly satisfactory.

13,494. Tests have been made in connection with the National Association of Master House-Painters. You know that?—Yes.

13,495. Five panels were painted with non-poisonous paint and one with lead?—Yes.

13,496. And the lead is the only one in point of durability that has answered the test. They are all mixed in the same way as to the medium—the oil and turps?—I may tell you also that I am so convinced as to the possibility of having durable paint made of zinc that I have had my own house done with it. It has been done for two years—the whole of the outside—and it is standing splendidly.

13,497. What did you mix the paint with?—I am not prepared to say exactly what I mixed it with, but it is mixed according to the method which we think is the right one.

13,498. But could you give the Committee the information?—I am afraid not.

13,499. (Chairman.) Is it a trade secret?—Yes.

13,500. (Mr. Sutherland.) Had that had a previous painting with white lead?—Yes.

13,501. All the testimony that we have had from experts, not master painters only, but experts like yourself, has been qualified by desiring a primer of white lead?—I do not desire it in the least.

13,502. In the case of your own house the ingredients are more than oil and turpentine, are they not?—Any house now-a-days would have a grounding of white lead. I was not going to have the whole of the outside paint taken off on purpose to put zinc on as a priming.

13,503. But your paint that you put on the outside of your house has something in it more than oil and turpentine?—Yes.

13,504. It is common knowledge to the Committee that zinc paint strengthened with a varnish is a good paint. Now, would not that add to the cost of the paint?—Yes, it would.

13,505. Can you give us any idea of the cost without giving anything away that you do not wish. Would it be 10s. a hundredweight?—No; I should think 5s. a hundredweight.

13,506. You say that the durability of paint depends on its elasticity?—Yes.

13,507. Oxide of zinc mixed with oil and turpentine is not elastic?—No.

13,508. It hardens and peels and chips, or tears off?—Yes.

13,509. It needs the addition of some medium to give it the elasticity that you laid down as a sound basis?—Yes.

13,510. (Mr. Gardner.) With regard to the medium with which the middle portion of the panel is painted, if it is not varnish it is a question whether or not it is an oil which an ordinary house-painter can get. The ordinary house-painter is not going to depart from his practice of purchasing his zinc or his material in paste form. Ready-made paint, you will admit, is no use to the ordinary painter. The ready-made paint which suits one part of the article is no good for another part, and the ready-made paint that will suit one job will not suit another job?—Yes, I see your point. I think that that could be partly got over by the paint being supplied in a partly thinned form, not completely ready for use.

13,511. That would bind the painter to one firm for his material?—Not necessarily.

13,512. I want to get something which the painter could buy in the open market?—Whether we should be prepared to supply such a medium I cannot at present say.

13,513. But unless the painter can get that medium it is no use saying, "Here is a paint which is equal to white lead paint for outside work"?—I can only give you the facts as they are.

13,514. But then you see the ordinary painter is still in the same place. He says in effect that he cannot get anything effective without white lead mixed with oil and turpentine. You say that you have found something that will obviate his difficulty?—We can supply it in this form either thinned or ready for use, or partly thinned, so that it will require nothing but the addition of a little oil and turpentine.

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[Continued.]

13,515. That does not get us over the difficulty?—If other people cannot supply it that is not my fault.

13,516. (*Mr. Gardner.*) But then you say this is a trade secret. Other people could not supply it?

13,517. (*Mr. Fell.*) I understand that you are going to supply a list of the places where it has been supplied?—Yes.

13,518. (*Mr. Mason.*) Would you consider that a zinc paint containing 36 per cent. of boiled oil and varnish, the proportions of varnish and oil being one of varnish to three of oil, would cost more than white lead?—That is a matter which I should have to calculate out. I could not tell you off-hand. Another point is that it depends entirely on what kind of varnish is used; what the price of the varnish is, and what the constituents of the varnish are. Varnish may be made of rosin, which is perfectly useless for outside work.

13,519. We are told that a paint composed of those materials will stand equally well as lead, and will not cost any more?—I say that that depends entirely on the nature and the cost of the particular varnish.

13,520. (*Mr. Sutherland.*) It hangs on that, does it not?—It hangs entirely on that.

13,521. (*Mr. Mason.*) I understood you to say that the difficulty in priming that board which you showed us with a zinc primer, was that it would take longer than lead, or rather that you said that you had not had time to prime it with zinc?—It was only on Monday that

the suggestion was made that such a board should be done. We had boards ready prepared with lead priming but not with zinc.

13,522. Did I understand you to say that you supplied the Sunbeam Company with some dozen different kinds of paints, some of which contained lead?—Yes.

13,523. Do those paints contain more than the 5 per cent. solubility?—Some of them contain very much more.

13,524. (*Mr. Sutherland.*) One of the witnesses before the Coach-painting Committee said in reply to a question, "The priming is composed of what we should otherwise pass on one side practically as useless or waste. It is the refuse Japan and varnish mixed together with a little lamp black, or white, or green, or yellow, whichever is necessary to put into it, and then thinned down with turpentine." Do you think that that would make a good priming?—I think it might.

13,525. It appeals to me as the basis of a good primer?—I think it might, but one would have to be very careful with such a mixture as that. It is not a thing which I should like to recommend. Although I would not deny that it is possible to make one in that way, there would be a want of uniformity, I am afraid.

13,526. Uniformity in results?—Yes.

The witness withdrew.

## NINETEENTH DAY.

Thursday, 9th November 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.

Mr. A. GARDNER.  
Mr. J. PARSONAGE.  
E. A. R. WERNER (*Acting Secretary.*)

Mr. J. O. VAUGHAN examined.

13,527. (*Chairman.*) Do you attend as a representative of the National Association of the Master House Painters and Decorators?—I do.

13,528. What is the nature of your business?—A plumber and decorator.

13,529. Where is it carried on?—At Hereford.

13,530. How long have you been concerned with house-painting work?—Over 30 years.

13,531. What is the average yearly number of painters employed by your firm?—An average of 30 to 35.

13,532. Do they all come in contact with lead?—Yes.

13,533. Have you known any cases of lead poisoning or painter's colic?—I have never to my knowledge met it with the exception of a case that came to my knowledge a fortnight ago, when one of my workmen was away from work a week. I inquired the cause of his absence, and he told me that his doctor told him he had had a touch of painter's colic.

13,534. I am very glad to hear such a good record, but I am not surprised, because, as you are doubtless aware, in the pottery industry there are a large number of works which have been immune from lead poisoning cases for many years. The trouble is that some of the best works are not immune, and, moreover, works that have been free from lead poisoning for many years will sometimes have a succession of several cases quite unexpectedly. Now, do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act, 1906?—I do—only within the last two or three years.

13,535. Have the rates been raised at all?—In the last few years I believe they have.

13,536. Do you know the reason?—My own experience is that the Commercial Union Assurance Company have raised their rates generally, not for any specific cause, but a variety of causes, of which lead may, or may not, be one.

13,537. Have you known men who have broken down temporarily on account of lead absorption?—Only within the last fortnight. I worked as a journeyman painter myself for seven years, and never had illness.

13,538. Have your men had occasional days of sickness due to lead?—No, not to my knowledge.

13,539. Do you have a periodical medical examination of your men?—No.

13,540. Then is it not possible that some of them may be suffering from the slower and more insidious forms of lead poisoning without your knowledge?—It may be so, but I should not think there is one employer in a thousand who has been medically examined for that purpose. I am speaking now of master painters.

13,541. Do you take a prominent part in the work of the National Association of Master House Painters?—Yes. I am past President of the National Association of Master House Painters.

13,542. Has the question of the serious prevalence of lead poisoning among house painters been discussed at your meetings?—I cannot say that it has; I do not remember.

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[Continued.]

13,543. Do you know why?—We have never feared it very much.

13,544. But you must have heard of the prevalence of lead poisoning among the men who handle lead paints?—Yes, in other trades.

13,545. Have you never seen the Board of Trade returns?—Casually; not to take an interest in them. Honestly speaking, we have never felt alarmed at this question.

13,546. But have not the Board of Trade returns shown a rather lamentable amount of sickness and illness due to lead poisoning?—Not among house painters. I have never come across it very much.

13,547. So far as you are aware, your association has never realised the danger of lead poisoning to which house painters are exposed?—Not to my knowledge. I have often discussed it with members, but it has never been, to my knowledge, actually discussed, unless it is within the last 12 or 18 months.

13,548. But do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—I should not think that a large percentage, considering the number of men engaged in the house-painting trade in Great Britain.

13,549. Look at it the other way. Supposing there had been 284 people who died from living in houses that had been painted, do not you think there would have been a great outcry in the country?—Yes, I think probably there would.

13,550. Would you not see it in leading articles in the newspapers, with heavy lines?—Yes.

13,551. Would not there be a great outcry in the country?—Well, it does not take much to make an outcry.

13,552. Do not you think that people, almost with one accord, would say, "We must not have our houses painted with lead paint. We may be among the next to die in connection with it"?—Probably they might.

13,553. Do not you think the same protection and consideration and sympathy should be given to these poor men who die from contact with lead dust, as would be extended to the general public? 284 people have died within the last 10 years because of their connection with the trade?—Yes, I will admit that what you say would probably be true, but I would qualify my answer by saying (knowing a good deal of the industry) that those men have contributed to their deaths by their dirty habits.

13,554. Then do you know that the death rates from Bright's disease and nervous diseases due to work in lead are also very high?—Is Bright's disease brought about entirely by persons using lead?

13,555. No, but Bright's disease is much more prevalent amongst house painters than among any other subjects?—I would not admit that the death rates are very high.

13,556. Then how can you account for the fact that Bright's disease is much more prevalent amongst house painters than it is amongst the general public?—The doctors say that, I suppose—or do you say that?

13,557. The Registrar General says that?—All I can say is that I am surprised to hear it; but of course that is a matter of medical science. I can only express my surprise to hear it.

13,558. I want to show you the evils that result from connection with lead?—Take the average man that we see painting railway stations. You can see almost every colour of the rainbow on his coat as he works. It is not the man that will come into your house, and paint your drawing room that will get it. It is the man who daubs himself all over with paint as he uses it.

13,559. Are you sure of this statement you are making?—I am only telling you what comes under my own notice.

13,560. But how do you know that those men who get paint on their aprons and overalls suffer from lead poisoning?—Those are the type of men one would assume. They get it on their hands.

13,561. Is it only an assumption of yours?—Yes.

13,562. Then why do you state what you do not know? You must not make such statements here?—

I qualify it by saying that the only case of lead poisoning I have seen occurred a fortnight ago with the dirtiest man in our employment, a man whom we have cautioned about getting paint on his coat and hands.

13,563. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the last 10 years?—No.

13,564. Do you realise that these cases, reported voluntarily, are only a fraction of the whole; inasmuch as the Home Office has no legal right to pay for such reports, and is therefore bound to discourage reporting to some extent?—Are those reports sent by the trade societies?

13,565. No, by the medical practitioners of the country. You had not realised the state of things that I have put to you?—No.

13,566. Have you seen a copy of the "Board of Trade Labour Gazette," which was published in the middle of last month?—I never see that paper.

13,567. The table on page 187 of that issue shows a definite increase in the deaths from lead poisoning amongst painters as follows:—38 deaths in the first nine months of this year, as against 30 deaths in the first nine months of last year. So that it is an increase?—Does it always increase like that? It may be a peculiarity of one year.

13,568. I am only giving you a comparison between this year and last year?—But it may not be every year the same—a continual increase. It may be only a peculiarity of one year, as I say.

13,569. (*Dr. Collis.*) It is above the average for 10 years. It has not been steadily on the increase for 10 years, but there has been no diminution, and a diminution has been occurring in other industries with regard to lead poisoning?—I see.

13,570. (*Chairman.*) If the proportion of deaths to the attacks is the same in the painting industry as in other industries where lead is used, the total number of attacks in the house-painting must be between 9,000 and 10,000 in the 10 years?—Well, when you take those figures you want to give on the other side the number of people that are employed in the industry. It does seem alarming, but, on the other hand, many thousands of men are engaged.

13,571. It is alarming, but you think it might be minimised by the number of people occupied?—Yes; there must be hundreds of thousands of house painters in the kingdom.

(*Mr. Sutherland.*) We calculate that there are about 250,000 painters in Great Britain.

13,572. (*Chairman.*) Would you be surprised to hear that the total number of deaths amongst house painters has been for several years greater than among all other lead industries taken together?—I am very much surprised to hear it.

13,573. And that the men's society's figures are quite as bad as the Registrar General's records; yet the society takes no painters' labourers, railway men, or the like as members—only *bona fide* painters. I am sure you would agree with me that all this sickness and death is very deplorable?—I do.

13,574. Do not you know that this deplorable evil has attracted the most careful attention in many foreign countries?—In France it has.

13,575. Do not you think that it is regrettable that this country should be behind other nations in this respect?—Yes.

13,576. Are you here to answer questions in connection with the details of painting work and the processes?—I will answer any question that you put to me if I can.

13,577. I suppose you attach much importance to personal cleanliness on the part of the men?—I do. I think it is the crux of the question.

13,578. Do you consider lavatory accommodation essential?—I do.

13,579. Is it generally practicable for the men to have lavatory accommodation?—No, only of a rough and ready type. In every painter's workshop washing accommodation is provided of a type, but I should not call it all that may be desired.

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[Continued.]

13,580. For instance, is it always possible for the men to get hot water?—No, it is not, without going to some trouble.

13,581. Do you mean that they can get it at some place near where they are working? Although an employer may place every facility for them to boil the water, it is a hundred to one that they will not trouble to do it. I do not know that I have ever seen a man in a painter's workshop boil water to wash his hands.

13,582. I am not speaking of the painter's workshop, but of what happens when men are on a job?—They may go and beg a can of hot water where they may be working, but there are no other facilities generally.

13,583. You say that it would be difficult for the men to get hot water?—I do not think it would if it was compulsory.

13,584. You said just now they may go and beg for hot water. Supposing it was refused, how would they get it then?—They would not trouble to wash themselves until they got home.

13,585. So it is not always practicable to get hot water?—No, it is not.

13,586. (Mr. Rice.) I understood you to say that there is a disinclination on the part of the men to get hot water as well as difficulty?—Yes. I have seen men sitting down and eating their midday meal without washing their hands, hundreds of times—and plumbers more than painters.

13,587. (Chairman.) Then with regard to clean towels and so on, and nail brushes, are they always provided?—No—very rarely.

13,588. Supposing that we made a rule that the men were to have hot water provided, and a proper number of towels, nail brushes, soap, and so on, could they be provided?—Yes.

13,589. How would you enforce it?—I would make it compulsory for every employer or employee to provide them.

13,590. I am not speaking about the employee, but about the employer?—I would make it compulsory.

13,591. But how would you enforce it?—Most employers, if it was known, would do it.

13,592. Would tell somebody to do it?—I would make it an offence if it was not done.

13,593. How are we going to enforce such provision?—I do not see any difficulty.

13,594. But how would you suggest we should do it?—If it was an Act of Parliament, I would make it an indictable offence, and take a man before a magistrate.

13,595. But how is the Home Office to know that every painter working in country places and single rooms, in large places and so on all over the country, is going to have hot water, clean towels, soap and nail brushes provided?—The only way that appears to me possible now is to arm local policemen with authority to go to see. I would put it in the hands of the police.

13,596. (Mr. Sutherland.) You had better not suggest that?—I do suggest it—unless you pay a staff of inspectors to go about the country and make surprise visits, the same as you do under the Factory and Workshops Act.

13,597. (Chairman.) It would be impossible to provide sufficiently trained men to do the work?—Then the only person, on the spur of the moment that appeals to me as the likely man, is the sanitary inspector or the Inland Revenue officer who is knocking about in the country. He could make surprise visits. Take a man, for instance, who goes about looking after breweries.

13,598. You say there are hundreds of thousands of house painters working all over the country. Accepting that as the case, is it practicable to have those men inspected to ascertain whether they are having hot water provided for them, and that they have a proper number of towels and soap and nail brushes?—I say, if there was an Act of Parliament that it should be done, and it was known, employers themselves would see it done. I would go further than that, and make it an indictable offence if it was not.

13,599. But how are the employers to see that it is carried out?—Easily enough.

13,600. If it is so easy, tell us how?—If it was my duty to send a certain number of towels to a particular place where I had men at work, it would be the duty of the yard man every Monday morning to see that they were sent, and it would be the duty of the foreman to see that he had soap and towels and nail brushes on the premises. It may seem a peculiar regulation to make, but if it was the law of the land it would have to be carried out.

13,601. But how are the Home Office to know that it is carried out?—By finding out.

13,602. Yes, but how?—Although it would be an annoying thing, arm the police with authority. I do not see any other way out of it. I quite appreciate your difficulty.

13,603. I want you to appreciate that?—I can quite see that it would not be impossible to do it in large towns. It would be necessary to have a highly paid man under the Act of Parliament. In a place like Manchester or Liverpool you might have three or four men whose duty it would be to take a certain part and make surprise visits wherever they saw a painter's ladder or painter's steps.

13,604. Do you know how many factories and workshops there are in the country to-day that are inspected?—I do not.

13,605. There are a quarter of a million factories and workshops to be inspected every year, and only 200 factory inspectors to do it. You are going to multiply this quarter of a million indefinitely?—To take your argument, after all is said and done, it would not cost much, supposing you increased the staff of the factory inspector by an additional sub-inspector for so many districts.

13,606. This point is very important. You come up and tell us that this can be done, but the Committee will have to deliberate one of these days to see how it is to be done. I have told you the number of factories and workshops that the 200 factory inspectors have to inspect to-day. How would you suggest that the Home Office are to know for a certainty that hot water, towels, and soap, and so on, were provided for the workmen?—The only answer I can give to your question is by a system of surprise visits by someone.

13,607. But how many painters are there at work over the country approximately?—I cannot tell you. Mr. Sutherland said 250,000.

13,608. But you said just now hundreds of thousands. You did not mean that?—There are approximately between 200,000 and 300,000; so there are hundreds of thousands. There are two or three hundred thousand. I only guess it; I do not know. You said there were between 9,000 and 10,000 cases of lead poisoning, but when you compare that with the hundreds of thousands of painters there may be in the kingdom, the percentage is not so great.

13,609. Then you say hundreds of thousands? How many men do you think would be required to inspect these hundreds of thousands of painters all over the country?—Not so many. I would like to qualify what I say, so that my reply shall not appear ridiculous. I understand that England is divided for the purposes of the Factory Act into districts. The district in which I live, which embraces Herefordshire and Worcestershire, is worked by an inspector of factories and a sub-inspector of factories. That is two counties by two men. I can quite imagine that other sub-inspectors, 150l. a year men, say, could be spread out through England. If the sub-inspector was under the control of the Inspectors of Factories for the different counties, it would not be such an alarming cost after all.

13,610. How many of these hundreds of thousands of painters do you think these few sub-inspectors could inspect?—It is not the number of inspections. It is dropping on people unexpectedly. If a man came once in six months, and we never knew when he was likely to come, that would answer the purpose.

13,611. You do not seriously think it is possible, with that handful of sub-inspectors, to be certain that



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[Continued.]

this very important rule would be carried out?—Yes, if you make it a vital point.

13,612. (*Dr. Collis.*) In what way is an inspector to know where he is to go to? In regard to factories and workshops, they know the absolute place. Factories and workshops do not walk about. But how is the inspector to go into this room and that room, now in the attic, now on the ground floor, and now in the conservatory? How is a factory inspector to know when he passes the outside of a house that the gentleman is having his conservatory painted? The gentleman will certainly resent a visit to find out whether his stables or conservatory are being painted?—I admit all those difficulties.

13,613. Every single place undertaken by a painter becomes a new factory and a new workshop for the time being. Sometimes you put 10 men on a piece of work, and three days later there is only one man left to keep the place warm. Nine men are taken to start another piece of work. Every householder knows that. How is the inspector to have any means of seeing that the regulations are carried out?—My answer to that is this: I cannot assume that the master painters are going to say, "We will not comply with the order." I imagine that if you issue an order making it compulsory for every master painter to provide these facilities for the workmen, the master painters, knowing that that is the law, will comply with it.

13,614. If you see the number of prosecutions that take place every year, you will get some idea of the amount of breach of the law?—That may be through ignorance.

13,615. The Factory Act and the regulations show exactly what a man has to do. He cannot plead ignorance?—I am with you entirely.

13,616. But how can the regulations be enforced?—You are dealing with an article which to my mind, up to now, for certain purposes you have not found an alternative for. In connection with that, if I take up the point that I cannot find anything else but lead to use on the outside of a building, you want some scheme which you can enforce upon the persons using that article which cannot very well be done without. I am putting it in that way. Therefore a painter is bound to use lead from my point of view on the outside of the building.

13,617. We are not disputing that point, but how can the regulation be carried out? That is what we are asking?—I want to make a point which I do not think I have made, but perhaps I can make it later.

13,618. How can what you suggest be carried out?—I have not thought the matter out, but I have told you to the best of my ability how what I suggest can be carried out.

13,619. You see some of the difficulties?—I quite admit the difficulties that the Chairman has put. I have seen those all the way through.

13,620. (*Mr. Sutherland.*) I will mention a system that obtains in Manchester, which points to a solution something like what you suggest. The Operatives' Society have what they call a walking delegate—he has been before this Committee—Mr. Frank Lowe—and his duty is to walk about from job to job, painters jobs, to see that there is no infraction of the working rules between the employer and the man. Now, if that can be effected in a large area with one man without any Government official, I think the oversight of these jobs could be met by a Government inspector, and the force of public opinion, if prosecution occurs, would soon do what you suggest?—Yes.

13,621. (*Chairman.*) I am not satisfied. As far as I can see, it is impossible to be quite sure that the Home Office Order would be observed?—Speaking on behalf of the body that I happen to be a member of, I say that they would faithfully carry out any system.

13,622. (*Mr. Sutherland.*) You are speaking of the National Association?—Yes; they would do anything they could.

13,623. (*Chairman.*) No doubt you are saying what you believe, but the experience of the Home Office is that, with a system of inspection, people are continually found breaking the rules. To leave the industry to the haphazard inspection of a few sub-

inspectors would be impossible. Now, do your painters wear overalls?—Yes, generally.

13,624. Do you supply them?—No.

13,625. Would you object to a rule that overalls are to be provided and maintained by the employer, as is prescribed in other lead industries?—If we had to do it I do not think I should object, although I should think that it was not my duty.

13,626. Do you know how often the overalls that are in use now are washed?—Weekly. If a man came with dirty overalls I should object.

13,627. Would you be prepared to arrange for the overalls to be washed at your expense, as is done in other industries where lead is used?—Yes, certainly.

13,628. It is insisted in other industries that lead workers should not take overalls home to be washed, owing to the danger that that involves. Do you understand that?—I follow your question.

13,629. Where can the overalls be kept from day to day when men are working continuously on one job?—That would have to be arranged. Each job would be dealt with on its merits. If you drew up a regulation that they were not to be kept on the job, they would have to be kept off it somewhere or other.

13,630. Can you always provide a place for the workman to hang up his coat when there will be no risk of dust falling on it?—Yes.

13,631. Where would you do it?—In my own particular case, when we are working on a house where there are no facilities for a workshop and a mess room, we provide them. We have portable workshops and portable mess rooms.

13,632. Is that the custom of the trade?—No, it is not the custom of the trade.

13,633. I am not speaking of your plan, but of places where it is not the custom?—Putting myself in the position of a foreman painter, I can hardly imagine his going on to a job and not finding some place or other.

13,634. Other witnesses have told us that very often the men have to hang their coats in the rooms where they work?—They generally hang them in the paint shop. To be perfectly accurate, I often see my workmen's coats hanging in the place where they mix their paints. That is more from carelessness than anything else.

13,635. I know, but you would want half a dozen inspectors for your own firm to point out to the men their carelessness?—The same thing applies all over the trade.

13,636. But that is the danger?—The danger is not appreciated by the workmen.

13,637. But can you always provide a place for the workmen to hang their coats up, so as to be free from any connection with the dust?—In my own case I find no difficulty.

13,638. I accept your case, but in other cases would it always be possible?—Not always. Take the West End of London. I worked for six years there, and I know that there is no difficulty existing there, but if you asked me the same question with regard to the East End of London, I should say there would be difficulty.

13,639. But would it not be practically impossible to be sure that such a regulation was carried out?—I think it would practically.

13,640. Do you advocate also a rule regarding meal rooms, so that no man shall eat his food in the place where paint is being handled?—I do not advocate it, but no doubt it would be a very good thing to advocate. I have never done such a thing.

13,641. Do you not think it essential that the men should not be allowed to eat their food in any room where paint is being used?—I agree with you.

13,642. Can you always provide a place quite free from risk of contamination where the painter may leave his food during his working hours?—No.

13,643. All these precautions and others as well are insisted on for the mitigation of lead poisoning risks in potteries. You have told us that in some instances it would be extremely difficult faithfully to carry out special rules?—Yes, but if it was an enactment that it should be done we should do it.

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13,644. You say that, but I come back to my old original question, How are we going to be quite sure?—I can only answer the same as I answered before with regard to enforcing it.

13,645. Now there are certain other risks which the painter has to face in connection with his work; first, as regards the dry rubbing down with sandpaper. I understand that this process is indispensable?—Not so much in our trade as in other trades.

13,646. Is it generally indispensable in the trade?—I will give you my own experience.

13,647. But cannot you tell me whether dry rubbing down is indispensable or not?—It is not indispensable.

13,648. Then I understand it could be dispensed with?—I am speaking of house painters, not of coach painters. I say that pumice stone and water, if used instead of sandpaper, would turn out better work, and would not be so dangerous to the painters employed.

13,649. (Mr. Parsonsage.) But painters do not like putting their hands in water?—That is the painter's fault.

13,650. (Chairman.) Would you agree that in no instances dry rubbing down should be permitted?—It could be done without if you enforced it.

13,651. What would you say with regard to new paint after the first coat?—I would rub it down with pumice stone instead of glass-paper.

13,652. Is that possible?—Yes.

13,653. You are the first witness who has told us that?—I am assuming now that you prohibit our using glass-paper.

13,654. How long would it take for the first coat to dry?—You can make paint to dry as quickly as you like. You could use rotten stone; you could use lots of things. For the purpose of my argument I am assuming that you prohibit the use of glass-paper.

13,655. Would you get up at a meeting of your Association and tell your brother members that you would agree to the prohibition of dry rubbing down in every instance?—Yes, if you say so.

13,656. It is not a question of my opinion, but would you say it was possible to do it?—What I wish you to understand is this: that you are not absolutely compelled to use glass-paper to rub down paint at any period.

13,657. Not after the first coat?—Not after the first coat, or second, or third coat. You can use rotten stone or felt if you are compelled to do so. I am assuming that you take away glass-paper. I am not saying what you use.

13,658. I must leave this then to the other members of the Committee to ask you about. I ask you if it is possible to dispense with dry rubbing down?—I say yes.

13,659. Now I want to ask you some questions with regard to the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the back-ground of the ornamental work, has it not?—Yes.

13,660. This gives rise to splashes, which must frequently fall even on the face of the worker?—Yes, that is so.

13,661. How can you deal with the splashes which arise in this operation?—I cannot deal with it. I do not know of anything on the spur of the moment that you could do except covering a man's face up.

13,662. Do not precisely the same considerations apply to the process of stippling?—No, not to stippling.

13,663. Why?—Because the paint is already on when you stipple.

13,664. But the motion of stippling causes splashes?—There is not much splashing; there may be a little.

13,665. You could not get rid of that?—No, you could not do anything there.

13,666. Would not the stippler be likely to be splashed by the painter who was painting alongside him?—You see it is usual to paint a patch and then stipple.

13,667. I have seen them painting and stippling at the same time?—I do not think there is anything very serious in it.

13,668. But the great evil of this lead poisoning is the multiplicity of small dangers, and the small amount of lead painters may get from stippling, the small amount from something else, and the small amount they may get from eating their food with dirty hands, and all the rest of it, make up a big evil; so we have to take every operation singly?—There is not half the seriousness in the stippling that there is in putting the paint on; but it is a point.

13,669. Whatever evil there is in it, you cannot suggest a remedy?—No.

13,670. Do you have the old paint burnt off with a spirit or charcoal burner?—With spirit always—petrol.

13,671. Are there certain fumes arises from that operation?—Yes.

13,671a. How can you prevent the worker from inhaling the fumes which arise from this process?—You could prevent it, but we do not. No doubt it could be done by respirators or something of the sort, but it is not done.

13,672. Is that seriously the only suggestion you can make?—I do not make it seriously.

13,673. Other witnesses have said that it is impossible?—I do not say that.

13,674. What do you suggest?—The same precaution as they use in lead works when a man is taking lead out from the stack.

13,675. A respirator?—Yes.

13,676. It appears from your evidence, then, that there are certain indispensable processes in carrying out which, a painter must necessarily inhale some dust, spray or fumes containing lead. How are these dangers to be met?—I cannot tell you on the spur of the moment.

13,677. Is it possible to remove those dangers entirely, in any other way than by using a substitute for lead?—You may mitigate them, but you will not prevent them entirely.

13,678. Have you tried any non-poisonous substitutes for lead?—Pretty nearly everything that has been produced.

13,679. What results did you obtain?—I have never been able to find any paint yet that has not had lead for its basis that will stand outside wear, or wear on such places inside as a sash or a window.

13,679a. A representative of His Majesty's Office of Works has been before the Committee and has told us that they have been making experiments for the last 10 years, and that for the last five or six years they have been using a substitute for lead which they assert is entirely satisfactory. Does that weigh with you at all?—I should be very glad to know what it is. I do not do painting for the Office of Works.

13,680. Would you consider that if the Office of Works gave up the use of lead entirely that would have great weight with your Association?—I should think so. It would have with me personally. I would not buy lead if I could get something else as good.

13,681. If the Office of Works can abandon the use of lead?—Then other people ought to be able to do the same.

13,682. What are the usual hours worked by your painters?—Ten in the summer.

13,683. How many a week?—56½.

13,684. Would you agree to a limitation of the hours of employment say from 48 hours per week;—Yes, I would do so with pleasure.

13,685. Would your Association agree to that?—I do not know.

13,686. Paying the same wages for 48 hours as for 56½?—That alters it. Would you give me the question again?

13,687. The question is this: Would you agree to a strict limitation of the hours of employment, say to 48 hours per week, as was recommended by the Departmental Committee that sat on the pottery industry?—I cannot see that it would make very much difference to me if everyone else had to do the same, and therefore I would agree. If every other employer had to do the same, I should not object.

13,688. You have told us that you do not have a periodical examination of your workers?—Yes.

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13,689. Do you know that in other industries where lead is used, the Home Office insists on a monthly or even weekly examination by the certifying surgeon?—Yes, I know that that does exist.

13,690. Would you agree to a rule of that kind?—Certainly I would.

13,691. And to pay for the cost of it?—Yes, if it was compulsory, and everyone had to do the same.

13,692. Would you agree to pay compensation to a workman who was suspended because the certifying surgeon thought that he might contract lead poisoning if he continued in his work—paying the workman half wages during the time of his suspension?—That opens up the question of further insurance. You see we cover ourselves from everything of that sort.

13,693. No, not against that?—No, but if that was enforced we should have to cover ourselves. We should have to insure. We could not individually do it; it would be such a drain on the finances of the ordinary man in business, and the risk would be so great. I would like to answer that question by asking another.

13,694. Yes?—Do the potteries insure.

13,695. Other work is found by the employer, or he compensates the workman during the time of his suspension?—I follow.

13,696. Now you understand that if the free use of lead is allowed to continue, the Home Office will have to insist on the rigid observance of all precautionary measures in the same way as in other industries where the workers handle lead?—Yes.

13,697. And they will have to be quite sure that these rules are carried out?—Yes.

13,698. Taking all these points into consideration, would you say that you prefer that the industry should be regulated by these special rules, or that the use of lead should be prohibited or very closely restricted?—Well, if science would provide us with some other medium in place of lead, master painters would not use lead on account of the irritating conditions suggested by the Home Office.

13,699. Not suggested by the Home Office; suggested by this Committee. I must ask you to give me another answer than that. Science, I understand, according to you, has not provided a substitute?—I have not been able to find one.

13,700. Supposing that in your view a substitute has not been found, which would you prefer, regulation, or prohibition, or very close restriction?—I should say that if a substitute for lead has not been found, then for the benefit of my customers I must use lead.

13,701. But which would you prefer. I have given you an idea of what these special precautionary measures would be, and I ask you which would you prefer, that the industry should be regulated by these special rules, or that lead should be prohibited or very closely restricted?—I should prefer that lead should be regulated. I should like to give my answer. It will not take a minute. From exhaustive experiments I have made on my own property, and inside my own house, I have found a substitute for lead for all interior work that will last, with the exception of windows. I have not yet found a substitute for white lead that will stand the climate as an exterior paint on woodwork.

13,702. But that is not my point. The point is this: if the Committee agree to the prohibition of lead, all house painters will be in precisely the same position?—Yes, absolutely.

13,703. I must tell you that the majority of the house painters who have been before us in answer to the question I have put to you have said that they prefer prohibition to special rules; they have seen the question in such a comprehensive way that they have realized that it would be impossible to enforce these special rules?—I do not want you to think that what I have said has been said in a spirit of hostility. I am with you heart and soul if you can provide something else. Painters do not want to use white lead.

13,704. But it is not for us to provide that. The position of the Home Office is this: that other industries where lead is allowed to be used have come under their cognizance. Now the house-painting industry has been left alone until the present time; now, however, it is clearly imperative that they should

consider how to level this industry up with the rest?—I understand.

13,705. So it comes to this; either that special rules will have to be provided to protect the workers, or lead will have to be prohibited. You have told us, and so have most of the master painters, that there are certain dangers which workmen undergo which you cannot meet under any circumstances. You have not told us how precautionary measures can be enforced, and so when we review the evidence of the master house painters, this Committee may come to the conclusion that as you suggest no remedies for some of the evils, and as you can suggest no proper inspection for others, there may be no alternative but to recommend that lead should be prohibited?—We have never been asked to suggest anything.

(Chairman.) But you have said that regulations could not be enforced, and so also have your brother members.

13,706. (Dr. Collis.) The point after all works out to a matter of pound, shillings, and pence to the person who has his house painted?—It does.

13,707. I want to get a comparison of the cost?—If you are going to work shorter hours, and give the same pay, you will have to charge more for doing the work?—Yes.

13,708. If you have to have your men medically examined and pay the doctor, you will have to charge more for doing the work?—Yes.

13,709. If dry rubbing down is to be abolished, and the work is to stand longer to dry, it will cost more, and you will have to charge more?—That depends on circumstances.

13,710. In the majority of cases?—No. If you had only one room to paint, it might cost more. If you had 100, it would make no difference, or if you had half a dozen it would make no difference.

13,711. Does not wet rubbing down make a difference in cost?—I should not consider that a serious point at all. It is more costly, but it produces better work.

13,712. In other words, you would have to charge the person more?—Yes.

13,713. If you had to pay increased compensation again, you would have to allow for that in your charges for the work?—I am sorry to say that we do not, but we ought.

13,714. But you would have to, under the suggestion of increase of compensation that the Chairman puts before you?—The Insurance Companies' rates have been increased so much the last two or three years that we have had to pay a lot more, but I am afraid the spirit of competition has prevented us from charging our customers any more.

13,715. There comes a point when you do not work for nothing?—We try not to, but sometimes we have to.

13,716. It finally comes back on the customer's head?—I cannot say that it does not, although I do not say that it does.

13,717. Now, with regard to non-lead paint, you have not succeeded with it in every case, especially with regard to outside painting. Now let us consider the position of the man who has his house painted. I presume that the substitutes which have failed have not failed at the end of the first day, but have failed to protect the woodwork in the way that it would have been protected if painted with lead. That means repainting sooner?—In the West of England a man usually expects to paint his house once in three or four years outside; generally, let us say, once in three years. With any other paint except white lead you would have to do it once in two years, I should think.

13,718. That is for the outside woodwork?—Yes.

13,719. Now, having set up all the machinery which has been suggested, if the free use of lead is allowed to continue, would it not possibly be exactly as costly to the man who possesses the house that is painted, as painting the house once in two years instead of in three?—Yes.

13,720. When you have set up the machinery, a vital point to consider with regard to the protection of the worker is, how will you insure that the regulations are carried out? Perfect inspection is necessary to

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insure that all the regulations are accurately carried out, and what is that going to cost? So that it may be that the house owner is going to pay exactly as much, and his shoulders will have to bear as big a burden if lead continues and the regulations are put in force as if it was prohibited, and the outside of the house has to be painted oftener. In one case the worker has safety, and in the other case he has not. After all, it comes to the pounds, shillings, and pence point of view. Have you looked at it from that point of view?—There is not much in it.

13,721. Then we come back to the question of the protection of the worker pure and simple, which is insured in one case and remains a risk in the other?—I am with you. I think you are very nearly right.

13,722. Everyone would be on the same basis?—The only weak spot is the spirit of competition.

13,723. But that is keen to-day, and it will be no keener if you do not use lead?—We have in our trade what does not exist in many trades; that is the small employer. I hope that all employers would carry out anything issued from this office, but it is the small employer who cuts down the prices by competition, and the large employer naturally does not like to lose his customers, and he cuts as well, and the result is that the customer, although he ought to pay, does not.

13,724. But there would be no difference in competition in the future?—No.

13,725. You are not faced with fresh competition from abroad, for instance?—No.

13,726. There is the possibility that in the increased use of paints not containing lead human ingenuity may find a very perfect substitute. I do not say it will. Do you not think it is probable that this ingenuity is more likely to come into play when it is called upon to provide such a substitute?—I should think it would.

13,727. So that it may be that the house owner may have to paint his house more frequently to obtain the same protection for ten years, but at the end of that time human ingenuity may have brought about fresh improvements through the extra expense of finding the substitute; while if no substitute is found and the regulations are enforced he will have to bear for all time the same expense?—Up to now human ingenuity has not provided a substitute.

13,728. Human ingenuity does not produce a substitute when there is nothing to call for it and it is not necessary. Unless the thing is going to be materially cheaper it will not have a chance in the market. You will go on with what you are accustomed to, unless the new article is considerably cheaper and produces the same effects?—Yes.

13,729. (Mr. Parsonage.) You say that in the West End of London there would be no difficulty in a man having a room in which to keep his clothes?—When I worked in London that was my experience. I do not know how it is now.

13,730. Supposing you have a drawing room to do, and have to go up a ladder to it, and are not allowed to get into the house?—Could you not go into the basement?

13,731. Supposing you are not allowed?—That is probably an isolated case.

13,732. It is done regularly?—I worked for Trollope's between six and seven years, and never met a case like that.

13,733. I have met hundreds. I suppose you adhere to your answers in regard to dry rubbing down?—Do you differ with the views I expressed?

13,734. Yes, so far as concerns sufficient time being allowed for work to dry between each coat?—How about the old days of hand polishing, which painters do not do now? They used to have to do it then.

13,735. (Mr. Gardner.) How long did it stand?—It stood for years.

13,736. But before it was rubbed down, I mean?—Days, probably. I am assuming that regulation prohibits the use of glass paper, and I stick to what I say, that if that was prohibited I would use pumice stone, or rotten stone, or something which would answer the purpose.

13,737. Allowing sufficient time between each coat for the work to dry?—Yes, of course, allowing for sufficient time.

13,738. (Chairman.) Would it be practicable to allow sufficient time?—Not if you were only doing a single room.

13,739. I ask you again, then, would you recommend the prohibition of dry rubbing down?—Yes, because I would tell the customer who would not give me time that under the existing circumstances he must not complain if the work were not as smooth as it ought to be.

13,740. (Mr. Parsonage.) Dry rubbing down would be stopped, but nothing else would be substituted for it, and the work would be finished in a worse condition. That is what it means?—Yes.

13,741. (Chairman.) That would be preferable to using zinc white?—I did not say that.

13,742. That is the deduction?—I am dealing with lead, not with zinc.

13,743. (Mr. Gardner.) I understand that you have been astonished to be told to-day that there is so much lead poisoning among painters?—I have.

13,744. And that you attribute it almost wholly to the dirty habits of the workmen?—I did not say that.

13,745. I beg your pardon; I thought you did?—I said in a measure, and I illustrate it by referring to the railway painter as against the house painter.

13,746. But all these men who have suffered from lead poisoning have not been unskilled painters. I take that part of your evidence to mean that you think that untrained and unskilled workmen should not be allowed to play with paint. You probably consider the railway painter an unskilled man?—I had not that in my mind, but now you put it into my mind I will say, and I think you will agree probably, that the ranks of painters, such as railway painters, are filled up from people who have been in casual employment, soldiers, for instance. They drift into the painting trade, not through any proper apprenticeship system. They are first rough painters, engaged in painting rough structures, such as railway stations. But when I made that answer that did not influence me.

13,747. In Scotland railway painters are apprenticed?—The system of apprenticeship, as you have it in Scotland, unfortunately does not exist in England.

13,748. In Scotland the incidence of lead poisoning has not been quite so great as it has been in the southern part of the country. In Scotland lead poisoning is not so bad as in England. Of the males engaged in all industrial occupations in Scotland, the deaths from lead poisoning are one per annum in every 397,000, but painters' deaths from lead poisoning are one in less than 9,000. Is not that somewhat serious?—Yes, it is.

13,749. Then again, if the apprenticeship system is in vogue so much in our part of the country, and lead poisoning is largely due to the dirty habits of the workmen, what have the employers done to train their apprentices in habits of cleanliness, and what have they done in order to provide facilities for the men keeping themselves clean while at work. That applies to the whole country?—I know it does, but I cannot associate Scotland and England together in the painting trade.

13,750. I will take England alone. How have the master painters in England trained the apprentices in habits of cleanliness, and what facilities have they given them to keep themselves clean while at work?—As a rule we do not take apprentices in England.

13,751. (Mr. Parsonage.) That is wrong altogether. You are speaking for Hereford?—I am speaking for the West of England.

13,752. I can give you scores of towns where it exists?—I say the apprenticeship system does not exist in England to the same extent as it does in Scotland by any means.

13,753. (Mr. Gardner.) Then how is the trade recruited?—The boy is at the trade, but he is not apprenticed.

13,754. He is an apprentice, although he is not indentured?—You may call him one.

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13,755. They are not indentured in Scotland; although they are apprentices. Then again, during a number of years, there have been quite a large number of non-lead paints or distempers put upon the market which are very largely used?—Very largely: I use tons of them.

13,756. Then how can you account for the increase in the number of cases of lead poisoning if lead has been much less used?—I do not think these distempers that you are referring to or articles with a basis of zinc in them have been used in proportion to the amount of lead that is used. The proportion is not great. If you were to put the number of tons of lead consumed in this country, and the number of tons of these compounds together the proportion would not be large.

13,757. Is a zinc compound advocated largely for the painting of walls and in many cases of wood?—My own experience has taught me that it is better.

13,758. It is displacing lead?—It is. I used to buy ten tons of white lead a year, and I do not buy more than five now.

13,759. You said that white lead could not be done without?—I said I had not found that it could.

13,760. A master painter here told us that in his opinion white lead could not be done without; he went away; he made enquiry and he came back, and he sent in word that he retracted. He recanted and said that white lead could be done without. Do you not think it is a question of the master painters not having experimented and tried what could be done with the leadless paints?—I would say that not only master painters but the War Office have not. I have done a great deal of work for the War Office, and they paint their barracks with lead paint.

13,761. (*Dr. Collis*.) But that is not applicable. We are a Government Department that is considering the point now for the War Office and every other Government Department?—But this gentleman is blaming the master painters for not having found out a substitute for white lead, and I say we are not wholly to blame. Not only has the master painter not found it out, but the War Office is a sinner.

13,762. (*Chairman*.) They themselves do not paint?—No, but they specify lead. I want to point out that we are not the only sinners.

13,763. (*Mr. Gardner*.) You expect your customer to experiment for you?—No.

(*Chairman*.) That is the point.

13,764. (*Mr. Gardner*.) The War Office give you a job. Is it not the duty of master painters as an organised body to say, if they specify a certain thing which is dangerous to the workmen "You are quite wrong. This other material is very much better for the purpose, besides which it is not dangerous to the workmen"?—I do not know that other material.

13,765. You have not found it out?—I have not found it out. I am not a chemist.

13,766. Should not the employers as an organised body try to set their house in order and find out what is necessary for the purpose?—I have tried to do that, and I have discovered a material that will answer my purpose and my customers' purpose, to a certain extent, but I have not discovered anything that I can recommend for outside woodwork.

13,767. Then you are astonished at what I told you the master painter came back and said?—I do not know. The Office of Works have only experimented for four years I understand.

13,768. (*Chairman*.) Nine or ten years. They have had the substitute in use for the last five or six years?—That is what I mean. It is not a very long time. Still, if they have used it for five or six years, and are satisfied with the result, then that ought to be good enough for anybody else.

13,769. (*Mr. Gardner*.) My point is, that once the master painters began to make serious enquiry into the subject, they could find out if lead paint could be done without?—I do not see that master painters as a body should try to push a dangerous article, unless it is for the benefit of their employers. If any customer will let me use zinc on the outside of his house, I will not grumble at him, because it will want doing again in

two years. I do not mind because I shall have a job oftener.

13,770. But that is not the point. A master painter told us that white lead could not be done without, and he went away and enquired, and sent us word: "I am now convinced that lead can be done without." Does not that show that sufficient enquiry has not been made by master painters?—Probably. I will not admit it, but I will not dispute it.

13,771. With regard to polishing down work, have you ever tried sandpaper saturated with oil or with turpentine?—I have never tried it, but I have heard of it.

13,772. You have never tried it as a matter of practical experience?—No.

13,773. (*Mr. Sutherland*.) You would not attach much importance to the judgment of a man who comes in at five o'clock, and says there is no substitute for white lead, and at half-past five sends in a note to say that he has discovered one?—No.

13,774. It is sudden conversion, is it not?—Yes.

13,775. No real value can be attached to it?—No.

(*Chairman*.) He spent a week end in investigating it, and after having made enquiries, he was convinced that he had found a substitute.

13,776. (*Mr. Sutherland*.) Now you do not think that the National Association has been negligent of its duty in reference to this question?—I do not think that the house painting trade of England has appreciated the seriousness of the figures that have been produced to-day. I have not appreciated it.

13,777. The Board of Trade Returns are more interesting to statisticians than to anybody else?—The man in the street scarcely ever looks at them.

13,778. You have had the opportunity in a trade journal in the last six months of seeing the figures. I will not name the journal. How is it you have not read them?—I said in my evidence that within the last year or so I have seen the figures, but I do not consider them alarming.

13,779. Would you think the mortality statistics of mining and railways sufficient cause to abolish railway travelling or mining operations?—I do not think that that has anything to do with it. I do not think that that point applies.

13,780. The point of the question is that in the opinion of a large number of people, you have not a substitute for white lead that will give the protection that white lead gives to property?—If this committee instructed someone in their employ to carry out tests, I will undertake to say, that if you painted five pieces of wood and exposed them to the atmosphere, one painted with white lead and the others with various other materials, at the expiration of twelve months the piece of wood painted with white lead that had been exposed to the atmosphere would, if judged by practical men, be found to have stood the test far better than anything else.

13,781. You made a distinction between railway painters and painters engaged on big public works which are of a dirty nature, particularly railway stations, and the ordinary house painter?—I said that for this reason: that taking the number of deaths or the number of cases of lead poisoning, if they were divided between the ordinary house painter and the railway painter or the ship painter, it would be more accurate, before condemning the house painter, to prove that it is the house painter who gets poisoned and not the railway station painter. As a rule, you see the railway station painter as I said, with his blouse and apron smothered with paint, and I should think, although I do not know (it is only what I should imagine) that if those returns were analysed, probably there would be a very much greater percentage of poisoning cases amongst that class of painter.

(*Dr. Collis*.) They have been analysed, and it proves the contrary. We have the figures for the whole of the men's societies, and they come out worse than the Registrar-General's figures.

13,782. (*Mr. Parsonage*.) My society stipulates that they shall have served five years to the trade before they are 21 years of age. We have no railway painters, as you term them, in my society?—What society is that?

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13,783. (*Mr. Parsonage.*) The National Amalgamated Society of Painters, which probably some of your men belong to. We do not take these men in our society. They are entirely outside. I have given returns to this Committee proving the large number of deaths in my society.

13,784. (*Chairman.*) They show a heavier percentage than those supplied from outside sources?—I am very sorry to hear it.

(*Mr. Gardner.*) Out of 18 deaths only one is specified as an engine painter.

13,785. (*Mr. Sutherland.*) The dirty atmosphere of the station itself is inimical to the health of the painter, and very different from the conditions under which an ordinary house painter works. The railway painter has to work on the roof of a railway station and in dusty places?—Yes. Speaking as a practical painter, I do not dispute the figures, but they are extraordinary.

13,786. You have heard this morning that the ratio of deaths in Scotland is very much less than in England?—Yes.

13,787. And you know personally that the class of work done in Scotland will compare with the very best work done in this country?—Better.

13,788. And that the conditions of the house painter there are a good criterion of house painting of the best class?—It is a very much higher standard than in England.

13,789. But they use lead very largely there?—I do not know what they use.

13,790. They have been here, and have told us what they use. My point is this: that lead is an evil, and they use it in Scotland very largely and proportionately more than the average painter in England, and it does not produce the effect that it is said to produce in England to anything like the same extent. What is the explanation?—May I give you my opinion? In my opinion the Scotch painter is more highly trained than the English painter.

(*Mr. Parsonage.*) But the best Scotch painter does not stop in Scotland; he comes to London and gets lead poisoning. There are more Scotch painters in London than in Edinburgh or in Glasgow.

13,791. (*Mr. Sutherland.*) In the matter of ceilings and stippling, and that kind of thing, the modern water paint has very largely superseded lead paint, which is very rarely used for those purposes?—Very rarely.

13,792. You use water paints which are non-poisonous?—Yes.

13,793. Do you know the tests of the Office of Works?—No, I do not know anything about the tests of the Office of Works.

13,794. The Office of Works have never established a test of their own. They have advertised for paints to be sent in, and they have painted them on various surfaces?—I would say this: the trial that has been given is not sufficiently long for the Office of Works to come to any conclusion. Four or five years is not sufficient.

13,795. (*Dr. Collis.*) Do you wish us to make experiments?—Yes.

13,796. Are we to go on for another 10 years?—I do not say that.

13,797. (*Mr. Sutherland.*) Are you surprised to know that this year in the very area covered by the witness from the Office of Works, in London, five tons of lead were used on Office of Works work?—I should answer that by saying that I am not surprised, because I could have given evidence if I had known that this question was likely to have been asked of what the Office of Works are asking their country contractors to do to-day with regard to painting the outside of their buildings.

13,798. Would you think that the three proprietary paints which were named here yesterday by the Office of Works (good paints) would be sufficient to justify the putting aside of the use of lead in the building industry?—I should say that if the Office of Works were satisfied, every other body ought to be satisfied.

13,799. But what would you apply as the substitute?—If I, as a practical painter, knew that the Office of Works would accept a certain paint, I should

immediately procure that paint myself, I should have it analysed to see what was in it, and, if I thought that it was a paint that I could safely recommend my customers to have used, I should abandon white lead.

13,800. But these are proprietary paints put up in tins ready mixed. They are not paste paints like white lead paints?—I may say, generally, that nine master painters out of ten would agree not to use white lead if you could produce an article equal to white lead. Unless something has been produced within the last six months that I have not heard of, I will say this: that all advertised brands of paint supposed to supersede white lead have been experimented with by me and my assistants. I will tell you my test. It will not take a second. We paint a piece of wood three or four times, and we put it into a soft-water butt, which is the most severe test you can apply to any compound, and at the end of 48 hours, we take it out and test the appearance of the various articles. We have painted slips of wood a foot long, three or four inches wide all over top, bottom, sides, and everything with various makes of proprietary articles, and we have tested them by immersing them in soft water, as I have stated. Lead has always come out far and away the best. Nothing else has come out as well.

13,801. (*Lord Henry Bentinck.*) How did you mix those paints? I suppose you are aware that zinc-oxide paints ought not to be mixed in the same way as white lead paints?—What I made the tests with I bought from the manufacturer ready for use. A London firm, knowing I was making these tests, offered to send me some paint down, and I used it exactly as it was sent to me, and did not put anything into it.

13,802. You have been asked some questions about the Office of Works. A witness appeared before us and told us that he was interested in zinc-white paints, and that he had sold large quantities in the last four years for the painting of Buckingham Palace, the Home Office, the Stock Exchange, the British Museum, St. Thomas's Hospital, and other places?—You have only his evidence that it was used. It has not been proved, has it?

13,803. It was bought, and I suppose that it was not thrown into the river?—It is to the advantage of the zinc people to push their wares. They have said to me, "We have some stuff equal to lead." I have said, "Let me have some to try, and if it is I will use it." My experience is that it is not equal to lead.

13,804. Are you aware that there are some manufacturers of zinc-oxide paint who are doing a larger business every year in zinc paint?—A movement has been made in the last two or three years to induce the painter not to buy white lead, but to buy the ready-mixed paint.

13,805. What paint?—Ordinary paint. I had a man yesterday trying to convince me that it was cheaper to buy a ton of paint ready mixed than to buy a ton of white lead and mix it myself.

13,806. But that does not answer the question. I say, how do you account for the fact that the manufacturers of zinc-white paints are doing a better business every year, and that their paints are growing in popularity?—Zinc-white is being used more largely now than ever it has been used on interior work. Whatever I say about white lead as being an absolute necessity applies to exteriors only. I want the Committee to understand that.

13,807. The outside of the London Stock Exchange has been painted for some years now with a zinc-oxide paint?—I have no doubt of it. What they will find from experience is that they will have to paint their places very frequently. That will be the end of it all.

13,808. A witness, talking of the Stock Exchange, says that it has been used on the woodwork for outside over 20 years?—Inside, I daresay.

13,809. But outside?—Does he tell you how often it has been repainted?

13,810. The same paint. It has not been changed at all. Supposing that the Office of Works finally decided to abandon the use of white lead altogether, do not you think that the painting trade throughout the country ought to adopt similar measures?—I do, and I would do so myself.

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13,811. (*Mr. Sutherland.*) I traverse entirely the authority of the Office of Works on this question. Why should the painting trade be influenced by or follow the Office of Works when it has not conducted a single experiment on a scientific basis?—I assumed that they had done that.

13,812. (*Chairman.*) They have made experiments, of course?—The line that I should take up is this: I am as desirous of abandoning white lead as anyone is if it is as bad as you say it is, but on the other hand, if a customer complained to me and I had the excuse, "Well, it is used in all the Government Departments," I could say, "If they are satisfied with it, you ought to be." If it is good enough for the Office of Works after they have conducted tests it ought to be good enough for me.

13,813. (*Mr. Rice.*) You say that you have worked for seven years in London?—Yes.

13,814. As journeyman or foreman?—As journeyman.

13,815. Did you ever, in the course of your London experience, find that you had to climb up a ladder to get into a room to paint it?—Yes.

13,816. And were not allowed up the staircase or in the basement in the ordinary way?—The firm I worked with did a very good class of work, and I cannot call to mind a single case in my experience where we have not had our paint shop or our workshop or our mess room down in the basement. I am speaking now of 20 years ago.

The witness withdrew.

Mr. G. H. MORTON examined.

13,824. (*Chairman.*) Do you attend to-day as the representative of the National Federation of Building Trades?—Yes, I do.

13,825. What is the nature of your business, and where is it carried on?—Decorators and painters at Liverpool.

13,826. How long have you been concerned with house-painting work?—Over 40 years.

13,827. What is the average yearly number of painters employed by your firm?—The average number would be about 60 or 80, but a larger number of men have passed through our hands in that time. Men change.

13,828. Have you known any cases of lead poisoning or painter's colic?—Only once; that was about 20 years ago.

13,829. I am pleased to hear that your record is so good, but I am not surprised, because, as you may be aware, in the potteries there are a large number of works which are quite immune from lead poisoning cases for many years?—Yes, I am aware of that.

13,830. The trouble is that even some of the best works are not immune; and moreover, a works that has been free of lead poisoning for many years will sometimes have a succession of several cases quite unexpectedly?—Yes.

13,831. Do you insure against your liability for payment of compensation for lead poisoning under the Workmen's Compensation Act of 1906?—The ordinary insurance.

13,832. Has the rate risen lately?—It has slightly increased lately.

13,833. Have you known men who have broken down temporarily on account of lead absorption?—No.

13,834. Have your men had occasional days of sickness due to lead?—None have been reported to me.

13,835. Do you have a periodical medical examination of your men?—No.

13,836. Then I suppose men may have been ill without your knowing it?—Of course there is that possibility, certainly.

13,837. Do you take a prominent part in the work of the National Federation of Building Trades?—Yes; I have been president of the National Association of Master Painters of England and Wales.

13,838. Has the question of the serious prevalence of lead poisoning amongst house-painters been dis-

13,817. You have admitted, I think, very frankly, the difficulty of enforcing regulations for painting?—Yes.

13,818. You have made three suggestions?—On the spur of the moment, not carefully thought out.

13,819. You suggested that the sanitary inspector might supervise the work, or the police, or that the Home Office should appoint inspectors?—Yes.

13,820. Does it occur to you that it might be possible to overcome the difficulty of inspection by each employer giving notice to some central authority of the work that he has to do, so that the inspector, the policeman, the sanitary inspector, or the Home Office officer, or whoever he might be, would have the right to go to that house to see that the regulation was being carried out?—I cannot imagine that there would be any difficulty at all. People being desirous of working together for the public good would fall into line and adopt anything that any recognised authority suggested. I cannot see any difficulty.

13,821. Do you see any difficulty in the employer giving notice to a central authority that he was going to work on a given day in a certain place?—There is no difficulty.

13,822. (*Chairman.*) Supposing that he did not send the notice to the central authority?—Then I should punish him. That is the man I should punish.

13,823. Have you calculated how many inspectors you would require, when the employer has sent notice to the central authority?—No.

13,839. (*Mr. Sutherland.*) And at Derby?—Yes, during this year and last year, but not previously that I know of.

13,840. (*Chairman.*) Was the prevalence of lead poisoning among the men who handle lead paints not known before then?—The knowledge of lead poisoning I have had for a long long time.

13,841. Then why did not the masters collectively take notice of it and take action in connection with it?—I do not know. For myself it was because I thought there was very little risk in the matter, not having had many cases—only one.

13,842. Did your Association ever consider the advisability of having a medical examination made of persons employed?—No, I do not think so; not to my knowledge.

13,843. Has your Association ever taken any collective measures to discover a substitute for white lead in paints?—Not specially.

13,844. Then it does not appear to me that you have realised, as an association, the extent of the danger of lead poisoning to which the house-painter is exposed?—No, I have certainly not appreciated it. It has never come to me officially in any way. I quite appreciate the risk of lead poisoning, and I should be very glad to substitute anything for it, because a non-poisonous paint must be better than a poisonous pigment.

13,845. If you have realised the magnitude of this lead poisoning evil, why have not you brought it before your Association?—It has never been thought of.

13,846. You say that you have realised the magnitude of the evil. Why have you not brought it forward?—I do not take a very active interest in the Association. I am more interested in the artistic side, and should leave it more to the manufacturers.

13,847. It has never occurred to any other member of your Association to bring it forward?—No. I do not know what caused it to be brought forward. I think it was because of a paper being read by somebody, and the discussion following.

13,848. Do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—I have read the reports at various times.

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[Continued.]

13,849. And that the death-rates from Bright's diseases and nervous diseases, due to work in lead, are very high?—I did not know that.

13,850. Do you know that about 2,000 cases of lead poisoning in the painting trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same 10 years?—I know that cases have been reported. I was not aware of the number.

13,851. Do you realise that these cases, reported voluntarily, are only a fraction of the whole, inasmuch as the Home Office has no legal right to pay for such reports, and is therefore bound to discourage reporting to some extent?—I have not heard much about it.

13,852. Do you know that the number of deaths in the trade have increased this year as compared with last year?—No, I was not aware of that. I do not see why they should, but that is not the question I know.

13,853. There were 38 deaths in the first nine months of this year and 30 in the first nine months of last year?—I should accept that statement with considerable questioning, because we can only judge this thing from our own experience.

13,854. But why should you question it?—It is extraordinary, is it not, when I have not heard of a case amongst our own men or amongst any other men in Liverpool.

13,855. These are actual figures taken from death certificates supplied by the Registrar-General?—It shows that there is more of it than I was personally aware of.

13,856. You would not venture to question the accuracy of the figures?—No, not at all.

13,857. If the proportion of deaths to attacks is the same as in other industries where we have all cases reported, the total of attacks must be between 9,000 and 10,000 in the 10 years?—Yes.

13,858. Is not that a very alarming state of affairs?—It is a very alarming state of affairs indeed. It is very serious.

13,859. I am sure you will agree with me that all this sickness and death is very deplorable?—It is very bad indeed.

13,860. Do you know that this deplorable evil has attracted the most careful attention in many foreign countries?—Yes.

13,861. Do you not think it regrettable that this country should be behind other nations in this respect?—Certainly.

13,862. Now a great many small dangers attend the use of lead; for instance, the contamination of food by unwashed hands. Do you attach importance to personal cleanliness on the part of the men?—Yes, I think they ought to be very clean.

13,863. Do you consider that washing accommodation should be provided?—Yes.

13,864. And that hot water and soap and nail brushes and all the rest of it should be provided for the men?—Yes. The better the arrangements that are made for washing and cleanliness the better it will be.

13,865. Do you think that it is always practicable for the men to have hot water to wash in?—It is very difficult in some cases. In an empty house or outside work it would be extremely difficult.

13,866. But you see the importance of a supply of hot water to them?—Yes.

13,867. Now, supposing the Home Office issues a regulation that all painters are to be supplied with hot water, nail brushes, and towels and soap, how are the Home Office to be quite sure that that regulation will be enforced?—They would have to trust to the masters for one thing. They would have to mainly rely on the men themselves insisting upon it. A man need not work unless he has all that.

13,868. But there would be no possibility of the Home Office being quite sure that the regulations were carried out, would there?—No, I suppose not. It would be a matter of inspection, or something of the kind. The worst of a business like that of the painter is that they are scattered over such a large area. It is not like men in a factory.

13,869. Would it not require a great many inspectors to inspect the house-painters all over the country?—Some master painters want looking after no doubt. We have a fairly respectable class of trade, and naturally have not much difficulty.

13,870. Would it not be almost impracticable to provide a sufficient number of inspectors?—Yes, very nearly impracticable, I should say.

13,871. Do your painters wear overalls?—Yes.

13,872. Do you supply them?—No, they supply themselves.

13,873. Would you object to a rule that overalls are to be provided and maintained by the employer, as is prescribed in other lead industries?—Yes, I would object to anything that made more trouble for the employer. I think that he has far too much on him already in many firms. I think that the men ought to look after themselves in that respect.

13,874. Would you be prepared to arrange for the overalls to be washed at your expense, as is done in other industries where lead is used. It is insisted that lead workers in other trades shall not take overalls home to be washed owing to the danger that that involves?—I would rather give them an increase of wages, and let them find their own. Personally I think that nothing should be taken from the men's responsibility, because whatever anybody may do, inspectors, masters and anybody, is as nothing compared with what a man can do for himself. Surely his own life is of more importance to him than to anybody else.

13,875. But the men are working in a trade where a dangerous element is allowed to be used, and is it not the duty of the employer to safeguard the men in every possible way?—In the past all our men have found their own overalls.

13,876. But should not the employers be bound to safeguard their men if they are allowed to use dangerous elements?—No, I think the employer should not be bound to provide men with clothing. The men should do it themselves.

13,877. That is not what I asked. I asked: Should not the employers be bound to safeguard their men, if they are allowed to use dangerous elements, from all risks entailed in their work?—No, I do not think so.

13,878. You would not agree, then, to wash the overalls for the men?—No, I think that is the men's affair.

13,879. Where can the men keep their overalls from day to day when they are working continuously on one job?—They can leave them on the job.

13,880. Can you always provide a place for a painter to keep his coat away from the work that he is doing?—In most cases we can.

13,881. But could it be done generally throughout the country?—In many places it would be difficult, especially with regard to big outside work.

13,882. Can you always provide a place for the painter to hang up his coat where there will be no risk of dust falling upon it?—It is generally provided in the house where they are at work.

13,883. Supposing that it is only one room or a small job, can you be quite sure that the workmen will have a place for their ordinary day clothes, away from any contamination of dust created in the work?—I do not know. It ought to be done.

13,884. I am not asking about what ought to be done, but from your knowledge of the trade is it always possible?—No, it is not always possible.

13,885. Would you advocate a rule that it should be made imperative?—Yes.

13,886. Do you think that it could be carried out?—If there was a rule about it it would have to be carried out.

13,887. You said that it would be very difficult?—Yes.

13,888. How would you get over that difficulty?—You would have to have a sort of room like the builders have for outside contracts.

13,889. Something portable?—Yes.

13,890. Would it be practicable to take a portable room about with them to all jobs?—I do not think so.



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[Continued.]

13,891. Then why do you suggest it?—It would be very troublesome.

13,892. I want to know whether you think it is possible for us to be quite sure that the workman would have a place to keep his clothes, so that the clothes would not come into contact with the lead dust which is generated in his work?—It would be extremely difficult, but it could be done.

13,893. How would you do it?—It would depend on the cases. If it were an empty house the butler's pantry or something like that could be used. I have seen it done. In a tenanted house the public treat the men very badly sometimes, and will not give them a place.

13,894. What would you do in those cases?—I would make it a rule that the client should be compelled to give them a place.

13,895. Do you think that that would be popular with your customers?—I do not care whether it would be popular with them. Some customers are most cruel to the men, and do not even let them have a place for their meals. They would have to do it.

13,896. You have nothing practicable to suggest?—I have not.

13,897. You mentioned difficulties just now?—Yes; I think they would be very great indeed. It is not like a factory.

13,898. I quite appreciate the difficulties myself. Now with regard to the men's meals. Do you advocate a rule that a room should be provided for the men to have their meals free from any contact with dust?—A room in the house could generally be put on one side for that, and that is generally done.

13,899. Could you be quite sure that in the majority of cases the men would have a room in which to eat their meals apart from the work?—I do not think you could. It is sure to get mixed up with it more or less.

13,900. Now with regard to some of the actual processes, I want to ask you a few questions; first as regards dry rubbing down with sandpaper. Is this process indispensable?—No, it is not indispensable; it makes a better job. I suppose that is the idea but it is not indispensable.

13,901. Would you say as a practical master painter that it could be prohibited?—Yes; very little of it is done. The prices do not pay for it.

13,902. And after the first coat has been put on, can sufficient time be allowed in all cases, for the first coat to dry, so that it can be rubbed down with pumice stone and water?—I do not understand the question.

13,903. You have told us very plainly what your views are, and I am giving an illustration. After the first coat is put on can you say that in every case time should be given for the first coat to dry before it is rubbed down with pumice stone and water?—Time should be given, but it is not always done.

13,904. But would you say that in the future that should be the law?—I do not know how you could influence that. Circumstances are different.

13,905. But you said just now that you would agree to the prohibition of dry rubbing down, and I have given you an illustration?—There should be no dry rubbing down after the first coat. The dry rubbing down refers to old work. You say time after the first coat is put on. In that case you have an oily paint.

13,906. Would you agree to the prohibition of dry rubbing down of all work?—Yes, of new work, but you have to rub down between the coats, I think.

13,907. Is not this the most serious part of the evil?—New paint is not so hard as all that.

13,908. It must create a certain amount of dust because it is only done when it is quite hard, is it not?—No, it is not absolutely hard as a rule. It is better if it is hard, probably.

13,909. Is not there a good deal of dust generated in the dry rubbing down between coats?—There is some, but not a good deal.

13,910. Now, how do you propose to protect the workman from that dust that is generated in the operation?—Water and size might be used, but size would rather tend to make the paint crack afterwards.

13,911. I have got to the point now when the dust is actually being generated by the dry rubbing down. I want you to follow me. I want to know how that dust, whether it is large or small, is to be got away from the workman?—I suppose, if it is sandpaper, most of it will fall on the floor.

13,912. That does not answer the question?—I do not see how it could be kept away from the workmen unless they had respirators or something of the kind.

13,913. The next process is the painting of ceilings having moulded or relief designs. In doing this work the brush has to be pushed into the background of the ornamental work, has it not?—Yes.

13,914. This gives rise to certain splashes?—Yes, but if it is done properly there ought to be very little indeed.

13,915. Yes, but I want you to realise that it is the multiplicity of small dangers which builds up the big evil, and so we are bound to deal with these small evils one by one, and although you may not think that this is a very large matter, a special rule would be necessary to deal with it. I want to know how you would deal with the splashes which arise in this operation?—I do not know. You are bound to have them. I have no suggestion to offer.

13,916. And precisely the same considerations apply to the process of stippling, I take it?—Yes.

13,917. The splashes are not very large?—They are small. It depends very much on the man. Some will do a ceiling without a single splash of any kind.

13,918. But have you anything to suggest to protect the workman?—No, except using something non-poisonous.

13,919. Do you have old paint burnt off with a spirit or charcoal burner?—We use both processes.

13,920. How can you prevent the worker from inhaling the fumes which arise from this process?—You cannot possibly. It is a very disagreeable odour, but mostly oil. I should think nothing would fly about in it.

13,921. They cannot get away from it?—No, they are bound to be near it.

13,922. If it is injurious and they inhale it, it must do them harm?—Yes, I should think so.

13,923. Can you suggest anything to protect them?—No.

13,924. It appears from your evidence that there are certain indispensable processes, in carrying out which a painter must necessarily inhale some dust, spray, or fumes containing lead. How are these dangers to be met?—If you use a dangerous material you have to suffer the consequences, I suppose, or substitute something other than white lead. It points to that.

13,925. Then from your point of view you mean to say that you have nothing to suggest to remove these evils?—No.

13,926. Now, various witnesses have told us about non-poisonous substitutes for lead. Have you had any practical experience with such substitutes?—Yes.

13,927. What results have you obtained?—They have been unsatisfactory in two ways at least. They have been far more costly as a whole, and they have not been permanent.

13,928. Now the Office of Works have told us, through their representative, that they have been making experiments for the last nine years with a view to finding a substitute for white lead, and that during the last five or six years, in some instances, they have used a non-poisonous paint, which they say has given them entire satisfaction, and so much is this the case that an order has been issued by the head of the Department, although it has not been carried out, prohibiting the use of lead in any of their operations. Now, if the Office of Works eventually abandoned the use of white lead altogether would that fact weigh with you at all?—Yes, it would, no doubt; but we ourselves are trying something. I am trying something myself at the present moment. I have painted part of our place with white lead, and part with non-poisonous paint, to see whether it will last. So far it looks as if it will be all right.

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[Continued.]

13,929. What are the usual hours worked by your painters per week?—8½ hours a day—47½ hours a week.

13,930. Do you have a periodical medical examination of your workers?—No.

13,931. Do you know that in other industries where lead is used the Home Office insists on monthly or even weekly examinations by the certifying surgeon?—No, I was not aware of that, but I can quite understand it in a factory. It is a very different thing in the confined air of a factory, but our men are in the open air, and that prevents lead poisoning, no doubt.

13,932. Do you know that lead poisoning frequently undermines the health without immediately developing acute symptoms?—No, but I dare say it is so.

13,933. To bring this industry into line with other industries, in which lead is used, each man would have to be medically examined and carry a health register. He would have to see the appointed surgeon at least once a month, and the employer would have to pay the fee for the medical examination?—Yes.

13,934. Have you any objection to paying for that?—Yes. As I said at the first, I have objection to taking responsibility of the men. Let the men take their own responsibilities. I would rather pay more wages and be done with it.

13,935. The Home Office have enacted in other industries, where lead is permitted to be used, that this medical examination should take place?—It is different where you have the same number of men employed always. We have at the present moment only an eighth of the number of men we shall have in the summer, and it is extremely difficult.

13,936. I quite agree, but I am only pointing out to you the kind of regulation which will be insisted on by the Home Office if lead is continued to be used, and there is no other way of meeting the case of medical examination than that it should be done by a certifying surgeon, and I suggest that the men should carry a health register. I do not suppose you agree. Now, supposing that a man is found to be affected with lead poisoning, and is suspended by the certifying surgeon for a fortnight or a month or longer, up to three months, would you agree to the employer finding him other work or paying him half wages during the time of suspension?—No. It would be too irksome altogether. I have a respect for the medical profession, but the first thing a doctor asks is: "What is the matter with you," and the man says "lead poisoning," but many cases, no doubt, are not due to lead poisoning.

13,937. A committee that sat here for two years dealing with the pottery industry recommended unanimously the very point I am putting to you?—I should object to it most emphatically.

13,938. In the Potteries they accepted it?—It is so different. You can do it in a factory, but you cannot do it with house-painters. You would want nearly as many doctors as men.

13,939. You understand do you not, that if the free use of lead is allowed to continue in the industry, the Home Office would have to insist on the rigid observance of all the precautionary measures, in the same way as in other industries where the workers handle lead?—Yes.

13,940. This would involve an extremely complicated and elaborate code of regulations?—Yes.

13,941. Are you fully prepared to set up the necessary machinery to secure the complete observance of all the regulations relating to overalls, mess-rooms, washing accommodation, avoidance of dust, limitation of hours and all after such matters?—No. I should most emphatically object to it.

13,942. Now taking all these points into consideration would you say that you prefer that the industry should be regulated or that the use of lead should be prohibited, or very closely restricted?—The use of lead prohibited, most decidedly. It is a matter for the public. The public will get work that will only last half the time. It will have to be paid for. That is all.

13,943. (Mr. Sutherland.) The occupations of the ordinary painter are very varied are they not? Yes, very varied.

13,944. And the time spent in actual painting is not the greatest proportion of his occupation at all?—No; actual painting I should think is a third probably.

13,945. And the time spent in rubbing down paint would be an infinitesimal portion of that?—Very little.

13,946. So that in the course of a week's work a painter, speaking generally, unless he was doing some specific work, would spend very little time in rubbing down paint?—Very little.

13,947. Have you formed any estimate of it?—No, but I should think an hour or two a week, compared with the other work that he does.

13,948. I was going to put to you an hour a week, but I thought I would let you give your own answer. If a medical examiner came to you and said, "This man is showing evidence that he is likely to suffer," you could put him to washing off, such as distempering, stripping preparation, and that kind of thing without inconvenience?—Yes.

13,949. So that if a regulation was imposed by the Home Office, that would not involve a very great hardship on the master?—No.

13,950. Generally speaking, the man has facilities for getting hot water, and the buckets of water that he requires for use on the job, and a fire is always on the job?—Yes, he could get hot water. There would be fires about.

13,951. (Mr. Parsonage.) Would you expect a man to prepare, strip, wash off ceilings, and get a room ready for painting, and then leave it for another man to come in and do the painting?—It would be a little bit of an upset, but the man in charge of the job would manage it if he were told that the man was not to touch lead for a time. He would naturally put him to something else.

13,952. If he was told to keep him away from lead?—Yes.

13,953. With regard to a statement this morning with reference to men who preferred to be said to be suffering from lead poisoning, I know cases, particularly in Liverpool, where men have been prevented from getting employment because they have been suffering from lead poisoning, and instances where they have asked not to be certified as suffering from lead poisoning, because the insurance companies discriminate with regard to them?—What is the question?

13,954. The point is that instead of wishing to be put down as suffering from lead poisoning they would prefer not to be?—As regards a case of lead poisoning, I have never had a man applying to me who was affected. I have not heard of it from himself or any other source; so I have no experience personally.

13,955. We could give the name of a man and the firm that discharged him?—Probably if a man had lead poisoning he would have a recurrence? (Mr. Parsonage.) The principal insurance companies are discriminating against these men. I have had proof of that several times.

13,956. (Mr. Gardner.) If a painter is only engaged for a very small proportion of his time in rubbing down paint and coming into contact with lead, and yet the dangers of lead poisoning are so great, does not that prove that these processes must be exceedingly dangerous?—I do not know that it proves that they are. It proves that the lead itself is dangerous.

13,957. (Dr. Collis.) You have, I believe, stated that you think it would perhaps be better to regulate the amount of lead rather than to have regulation of the way in which the men are employed in using it?—I would rather have a prohibition of white lead altogether than irksome regulations.

13,958. Can you give any estimate at all of how the respective costs to the public would work out. You see there would be apparently more cost in the rubbing down process in leaving the coat to dry before you rubbed down, and there would be medical examination. You already employ your men on short hours, so that point would not come into consideration perhaps. Then there is the question of the possible increase in the compensation. They would be extra

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expenses on the head of the employer, which, I presume, would reflect on the price he would charge for his work to the person for whom he was doing it. With regard to paints not containing lead, how much oftener would external woodwork require painting, if painted with paints not containing white lead, than it would if painted with paints containing white lead?—Twice as often, speaking broadly, I should say.

13,959. Taking into consideration that that is only part of the painting of a house as a whole, and that, for other purposes apparently, paints not containing lead are available, do you think that the cost of the regulations which would raise the price of the work which you would have to charge your customer would have any relation to that double painting of this woodwork?—I do not know what the cost of the regulations would be. It would be very considerable, I should think.

13,960. It is impossible for any of us to say?—You would want an army of inspectors to start with.

13,961. So there would be some comparison—it is not a drop in the ocean—as regards the total amount you would have to charge your customer?—You mean the cost of these regulations.

13,962. Yes?—It would hardly cost double, I suppose.

13,963. It is only part of the structure which you have to consider, because for internal work and certain other work the use of paints which do not contain lead seems to be quite advantageous?—They perish so soon from what I have observed. We are trying substitutes. We have some paint now which seems to be quite as satisfactory as white lead. They call it "Dixon's White." I have painted part of our works with it, and we are watching the progress of it. It seemed to cover equally well or rather better. In that case it would cost no more. My other answer may have been an over-estimate. On the spur of the moment you may exaggerate a thing a bit.

13,964. Quite so. I am asking a very intricate point?—We have had it three or four months, and it appears to be bearing up better than white lead.

The witness withdrew.

Mr. FRANK GRIFFITHS examined.

13,972. (*Chairman.*) Do you attend to-day as the representative of the National Federation of Building Trades?—Yes.

13,973. Have you any idea of the regulations which obtain in other industries where lead is permitted to be used?—Only as to personal washing in the potteries being made compulsory.

13,974. And such things as compulsory medical examination?—Yes. That is another one.

13,975. The provision of overalls by the employer?—Yes; I am reminded of that now.

13,976. The washing of the overalls by the employers?—Yes, that is right.

13,977. The provision of exhaust draught to carry away any dust that is generated during the operation which the workmen perform?—Yes, I remember that now.

13,978. The provision of separate rooms in every instance for the men to take their meals?—I do not know that it is in existence, but it has been suggested so often that it is quite familiar.

13,979. I may tell you that, as a matter of fact, it is the law to-day in the principal industries in which lead is used. I have only foreshadowed these regulations to see whether I can shorten your examination. Then there is the medical examination of all employes?—Yes, and intending employes.

13,980. At the expense of the employer?—Yes.

13,981. And, further, if the certifying surgeon, suspends a worker because he is in delicate health, then during the suspension he should be given other work of a non-dangerous kind, or he must receive half wages during the period of his suspension, say up to three months?—Yes, I see.

13,982. I wonder whether you can answer this question (if so I shall not ask you any other question), whether you in your industry, in your particular

13,965. For external work?—For external work. I am watching to see whether it disintegrates or gives way. It is whiter than the white lead, and it covers better.

13,966. (*Mr. Sutherland.*) It is easily applied?—Yes, it is easily applied. I watched the man, and he painted half of a window with one and half with the other. I was very careful about the brush he used.

13,967. (*Dr. Collis.*) We have received certain evidence in England, and we know what is done in Austria, which seems to show that there is perfect justification for the prohibition of the use of lead paints for interiors, quite apart from anything else. Now, if similar prohibition were enforced for external painting; you would quote to your customer the extra cost of the double painting, which is claimed to be necessary, of the whole of the external woodwork. The regulations would have to be carried out for the whole of the industry?—Yes.

13,968. But you have only to consider the extra cost of the external woodwork?—There would be extra cost. It must be fairly great with regard to external work. Inside it might be very different.

13,969. Inside, very probably, we may leave the lead paints out. Consequently, as far as the general public is concerned, the difference in cost with the regulations or with a strong modification of the amount of lead for external work as well as internal, would possibly be very small?—Yes.

13,970. In one case the worker is fully protected and in the other case we cannot ensure that he would be, because of the difficulty of carrying out the regulations?—Of course it does not follow that all outside work is white lead. There are the darker colours.

(*Dr. Collis.*) If you are not using white lead you are outside the regulations, of course.

13,971. (*Mr. Sutherland.*) There are the darker colours, the greens and the blues?—Yes.

business, would prefer a system of regulations such as I have foreshadowed or the prohibition of lead, or at any rate the restriction of the use of lead to a 5 per cent. solubility limit?—That is practically total abolition of white lead.

13,983. Yes, it is practically total abolition of white lead?—I should prefer total abolition if the restrictions are at all arduous.

13,984. The restrictions are what I have suggested?—I do not know that there is anything very severe in what you suggested which makes them so that they cannot be carried out.

13,985. Let me give you a few of the difficulties which occur to me. In the first place the Home Office would have to be assured that the provisions with regard to supplying the workpeople with soap and nail brushes and hot water to wash themselves would be carried out?—Yes.

13,986. Could you be quite sure that those provisions could be carried out?—As it happens, that question is rather applicable to me, my firm doing as much plumbing in a large way as we do painting, and I do not see why the plumbing should not be hurried on in a new building. The painting is the last trade in the building. I do not see any hardship in hurrying the plumbing on and getting the hot water to work. In fact, it is a benefit to the building, and I cannot see why the sanitary accommodation for the permanent staff cannot be used for the decorators.

13,987. I must take not only your particular business, but the whole industry. Do you think it possible to provide hot water in every case, and soap and towels?—I do not think that it is impossible at all.

13,988. How would the Home Office be certain that the regulation was carried out?—Only by inspection such as we have now in other cases.

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Mr. FRANK GRIFFITHS.

[Continued.]

13,989. But there is such a vast number of painters employed all over the country that it would be practically impossible for the Home Office to provide a sufficient number of inspectors to inspect?—Do you wish a suggestion as to a means of seeing that this is carried out by the employers?

13,990. We cannot recommend, as a Committee, anything which we are not perfectly certain is practicable?—Why cannot the workmen's association take it up. In Liverpool the Union arranges with regard to all operatives in the building trade that the employers shall provide boiling water at meal times, and a proper place to have the meals in.

13,991. You could not place the carrying out of this in the hands of the operative?—In Liverpool some of the operatives have stated that the water has not been provided, or that the place for meals is not efficient, and the Master Builders' Association have taken it up.

13,992. That would not be sufficient for the Home Office. They would issue certain rules, and the employers would have to see that they were carried out. How could you be certain that they were carried out?—Only by prosecuting the employer if they were not carried out.

13,993. Who is to find out whether the employer should be prosecuted?—That opens a very wide field.

13,994. Do you think it is practicable that such a set of regulations in connection with the workpeople with regard to washing, for instance, could be carried out?—To have proper inspection the machinery would be too elaborate. In inspecting the factory you have the factory there, but out of a painter's shop every morning the men are sent to various places for weeks or even six months.

13,995. Would it not be practically impossible to ensure that the regulations would be carried out?—Yes, it is almost impossible.

13,996. Now let us take the different processes. First of all the dust generated in dry rubbing down?—Dry rubbing down should be prohibited.

13,997. Could that be done in every case?—Yes.

13,998. After the first coat has been applied, would not waiting for the first coat to dry entail a great cost. If you waited before you rubbed down with pumice stone and water would it not be a very costly operation in a considerable number of cases?—Yes.

13,999. Would it therefore be practicable to dispense with dry rubbing down in every case?—Hardly, but if it was prohibited it would be minimised to a small degree, and that would be a benefit.

14,000. You cannot prohibit unless you prohibit entirely?—That is the difficulty.

14,001. Then there are other instances where dust is generated, and there is the splashing in stippling and so on. How can you prevent splashing on the men?—You cannot prevent that. It is a personal matter for the men.

14,002. Then with regard to medical examination, would it not be extremely difficult to get the men examined?—Very. In our firm we might take 50 painters on at once and discharge 30 at the end of the week; and every week is different. You could not examine 50 men every week.

14,003. If the use of lead is permitted to continue in your industry you may be quite sure that the Home Office will insist on your industry being levelled up to the others where lead is used, and so you would have to give some assurance that the regulations would be carried into effect, that the dust would be removed, and so on. Now I ask you again, having given you an insight into what the regulations would mean, would you say now that you prefer the adoption of regulations or the prohibition of lead?—The prohibition of lead.

14,004. (Mr. Sutherland.) With regard to the difficulty of examination, a man would only be examined at stated intervals, and he would carry a certificate about with him?—That would obviate that difficulty at once.

14,005. You would not have him examined every time he was taken on?—I see; that removes the difficulty.

14,006. (Chairman.) He would have to be examined every month at least?—That gets over the difficulty.

14,007. (Mr. Sutherland.) You ask him for the certificate and he shows it?—That gets over it right away.

14,008. (Chairman.) I ask you again which do you prefer, the rules or the prohibition?—To put it quite plainly, unless the regulations were of a mild nature, I prefer prohibition. I quite admit that we can do a great deal and still use white lead. To prohibit white lead is a very serious thing. My own opinion is that a lot of lead poisoning can be done away with, although we have only come across one or two cases ourselves in 40 years. The washing and so on can all be provided for in my opinion.

14,009. I do not want you to give an answer that you are not quite sure about. You have told us that with regard to the washing arrangements, and so on, you cannot devise any means by which you can be quite sure that the rules are carried out?—Yes; if they became law they can be carried out in exactly the same way, as we provide boiling water at the present time.

14,010. How would you provide it where they are doing one room?—We have furnaces.

14,011. How would the large number of small master painters make provisions to be quite sure that these rules are carried out?—On every job there is a boy, and the boy is always told off about 11 o'clock to get the cans and the water hot.

14,012. How would the Home Office be quite sure?—Inspection would have to be left very much in the hands of those who are carrying out the work, because it is too wide a question altogether. The men would have to make the complaint; they are on the job. You could not expect anybody else to make the complaint.

14,013. (Mr. Sutherland.) There would be a foreman on the job?—Yes.

14,014. And the men themselves would complain that facilities were not given to them?—Yes.

14,015. In other lead industries where regulations have been enforced, the mortality and sickness statistics have come down very sensibly?—Yes.

14,016. Do you not think it is worth while, before lead is abolished, to see what the result would be of strict regulations?—Yes.

14,017. And then fall back on prohibition, if necessary?—Yes.

14,018. (Chairman.) The corollary of that is that you would be put to the expense of all kinds of arrangements, and if the rules are not found to be effectual, then you are to have prohibition?—I do not look upon the expense as serious. Our workshops are scheduled under the Factory Acts. We have wash-bowls for the men, and towels, and hot water is provided, and soap. There is no difficulty about it.

14,019. But how in country places, or on small jobs, are you going to be sure about hot water, nail brushes, and soap, and all the rest of it?—The foreman on the job can be allowed a sum to provide for that.

14,020. (Mr. Rice.) Do you understand that the medical examination has to be done at the expense of the employer?—I did not understand that.

14,021. If you took on a man to-day and discharged him in a month's or a fortnight's time, you would have to have the expense of having him medically examined before he went to other work?—That is a serious matter with 300 men.

14,022. I thought you did not understand that?—I may be expressing an opinion that is not wanted, but, in my opinion the working man is becoming more clean than he was years ago.

14,023. (Chairman.) And yet lead poisoning is increasing?—It is very rarely that you find a man going to his meals without washing himself. That is the case latterly.

14,024. If that is so, and the men are more careful, but lead poisoning is on the increase, does not that show that the danger must be very severe?—I should say, "Yes"; but, taking my own personal opinion, the more men we get, the fewer cases of lead poisoning we get. We have not had one for years.

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[Continued.]

(Chairman.) In the potteries many have not had a case at all, so I am not surprised to hear that.

14,025. (Dr. Collis.) It may mean that the men are more regular workers and less casual?—Yes.

14,026. Medically I put considerable stress on that. We find that casual work is associated with an increase of cases of lead poisoning; that is to say, that when a man comes into it first he is more liable to get it than he is after he has been employed in the trade for 12 months?—You think he becomes acclimatised to it.

14,027. I have no doubt of it. I think it may account for what you are speaking of now—that you are employing more regular labour and less casual?—The painting trade is difficult in that way. No other trade is like it as regards casual labour.

14,028. There is a good deal?—A very great deal of casual labour.

14,029. (Mr. Parsonage.) You take on the men in exactly the same way as you always did?—Yes.

14,030. When you do not want a man he is discharged?—Yes.

14,031. (Chairman.) You have to remove all the dangers which the men come into contact with to-day, and I must enumerate them again. First of all you must have these washing arrangements, and you must convince us that they can be carried out. You must devise some means by which you can be quite sure that all dust is removed; you must have medical examination at your expense, you must have overalls provided for the men, and washed at your expense, and you must be quite certain that under no circumstances are the men allowed to have their food in the rooms where the work is being performed. Then there must be provision made for the men to put their coats away so that they do not come into contact with lead dust. Now, taking a survey of the whole trade, do you think that such regulations could be put into force effectually, and if so do you prefer those regulations or do you prefer the prohibition of lead?—It may not be answering your question directly, but I think that regulations could be put into force without any great hardship on either masters or men.

14,032. I shall have to go through the whole thing again. I do not want to press you into giving an unconsidered answer?—I do not want to come here and give a hasty answer. I can briefly state one or two of the difficulties with regard to all that you have mentioned, quite easily. Supposing that there was a law about overalls and you had a hundred suits of overalls; you have one man 5 feet and another man 6 feet, and how are you going to sort them out.

14,033. (Mr. Parsonage.) It would take a long time to do that on a Monday morning?—Yes. If the provision of overalls was left to the men it would be all right. It is very rarely that I find a decent painter coming on Monday morning with dirty overalls. Splashing is a personal matter. Some men are as clean on Saturday as others are dirty.

14,034. (Dr. Collis.) With regard to washing the overalls, if a man takes them home to be washed, and carries them into the house at all, lead poisoning may arise from that. Should not the overalls all be washed away from the home at the expense of the employer?—But what are you to do. Our business is all over the country. You would have to send them to a laundry, where the danger would still exist.

14,035. Each factory would have its own personal washing arrangements?—That would be a difficulty in our trade.

14,036. (Mr. Parsonage.) If you had a small country job you would have to send them to be washed by some poor woman in the village who had half a dozen children, and they would be liable to danger?—Yes. You might as well prohibit building because workmen have accidents. They can be prevented to a certain

extent by seeing that things are in order. They are better than they used to be. So in this white lead matter we can, by sensible regulations, minimise the evil very much indeed.

14,037. (Chairman.) I must get a definite answer, so I must go through all these points with you. Now, the first point is with regard to overalls; where could they be kept overnight when the men were working continuously on one job. You understand that you would probably have to provide the overalls, and see that they were washed?—A room would have to be allotted.

14,038. But can you always get such a room?—No. You could on a large job. It might be a private house. Very often it could not be provided.

14,039. Then what would be the good of such a regulation. Supposing that the rule was in existence, what would you do?—I should go in for prohibition, because the other would be impossible to carry out.

14,040. I have told you what the rules would deal with. Now, you would have to arrange, in such a case as you spoke of just now, for the men to be quite certain that they could have their overalls in a place unconnected with their work?—It would have to be left to the foreman.

14,041. But what sort of rule are we to frame to make it quite certain that they would not have to take their meals in such a place?—It could not be done without having an inspector.

14,042. We cannot afford an army of inspectors. That is another difficulty?—That is a very great difficulty.

14,043. Then, again, with regard to the men's clothes, it has been enacted in other industries, where lead is permitted to be used, that under no circumstances are men's clothes to be placed in any room where they can come in contact with lead dust. How would you get over that?—It would be very easy in some places, but not in others. In a large new building you could not do it. Building is all rush. A man is taken into a room to plaster it, and out go the coats. It is not a question of whom they belong to, they are shifted.

14,044. You understand that medical examination would be done at the expense of the employer?—Yes.

14,045. How would you ensure that the men you employed had been examined?—Only by producing the health certificate, as Mr. Sutherland put to me.

14,046. Supposing that they had not got certificates?—Then do not employ them.

14,047. But supposing you wanted the men, what would you do then?—We should have to do without them.

14,048. But could you do without them?—We should have to. Sometimes now we cannot get the men.

14,049. Would not that be a very great inconvenience to the trade?—Yes, it would—and to the men.

14,050. I am speaking of your inconvenience at present?—It would be at times.

14,051. I can give a lot more illustrations. For instance, how are you going to safeguard the men from breathing the dust that is generated in all kinds of ways and the danger arising from splashes on the floor—splashes on their faces in stippling, and so on, which I have seen?—You could not do that in a practical way. They will not wear masks, or that kind of thing.

14,052. That is another difficulty. Now I will ask you again—unless you would like me to go on with these difficulties that I have been putting to you?—I will give you a definite answer this time.

14,053. Which would you prefer—regulation by a set of rules such as I have foreshadowed or prohibition?—Prohibition.

The witness withdrew.

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Mr. W. J. STYLES.

[Continued.]

Mr. W. J. STYLES examined.

14,054. (*Chairman.*) Do you attend to-day as the representative of the London Master Builders' Association?—Yes.

14,055. What is the nature of your business and where is it carried on?—Building and decorating, principally decorating, at 2, Market Street, Jermyn Street.

14,056. How long have you been concerned with house painting?—All my life. I entered the business in 1874.

14,057. What is the average yearly number of painters employed by your firm?—We employ about 100 per week. The most I have ever employed at one time is 250.

14,058. Are you aware of the magnitude of this lead-poisoning evil?—No, I am glad to say I am not. My experience has been very fortunate.

14,059. Do you know that there have been 284 definite deaths from lead poisoning in the last 10 years?—No.

14,060. Or that the death-rate from Bright's disease and nervous diseases due to work in lead is very high?—Directly traced to lead poisoning, do you mean?

14,061. That the death-rate amongst painters from Bright's disease is very much higher than in any other part of the population?—Has it been absolutely traced to lead poisoning?

14,062. The only inference to be drawn is that it is through lead poisoning?—I did not know it.

14,063. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same 10 years?—I did not know it.

14,064. Do you realise that these cases, reported voluntarily, are only a fraction of the whole, inasmuch as the Home Office has no legal right to pay for such reports, and is therefore bound to discourage reporting to some extent?—I did not know that.

14,065. If the proportion of deaths to attack is the same in your industry as in other lead industries, where we have all cases reported, the total number of cases of attack must be between 9,000 and 10,000 in the 10 years?—When you say in the house-painting industry, do you mean house-painters or the manufacturers of white lead?

14,066. House painters?—You surprise me.

14,067. Now I am sure you will agree with me that all this sickness and death is very deplorable?—I quite agree with that.

14,068. Do you not think it regrettable that this country should be behind other nations in protecting the men in this respect?—I do; but at the same time I can only speak from my own experience, and my experience is that we have had no lead poisoning at all.

14,069. I am not surprised to hear that you have had no cases, because in the pottery industry there are 500 potteries in Staffordshire, and only some 100 of them have had cases of lead poisoning at all; so that there are some firms that are quite immune, while others in practically the same situation might have a great number of cases of lead poisoning?—You are sure you are not speaking of manufacturers?

14,070. I am speaking entirely of painters?—Then I am surprised.

14,071. There are two ways of dealing with this evil; one is by a set of rules, and the other is by the prohibition of the use of lead, or, at any rate, by restricting the use of lead to a very small quantity. Now I will tell you very briefly what the regulations would involve, and I will go into them more deeply if you like. In the first place, you would have to provide proper washing arrangements for the men, and supply towels, soap and nail brushes, and also a proper supply of hot water. Do you think it would be possible in every case to meet those requirements?—I am sure it would not, but we allow five minutes for the men to wash themselves, and we always supply them with soap, and so on. I can only speak for my particular business. I do a very large small business, if you understand.

14,072. I do perfectly?—We get so many 5l. jobs or 10l. jobs. Some people would not give us the

facilities for boiling water, and our business does not demand it. It would be impossible to provide hot water.

14,073. The next thing is the supply of overalls for the men?—They supply them themselves.

14,074. But in other industries they are supplied by the employers. The point is this: if the State allows a trade to use a very dangerous element, they say that you must protect the men from all the dangers that ensue. Amongst other things they say, "You must provide the overalls, and you must see that they are properly washed." Would you object to that?—I do not know why I should; do you, Mr. Rice?

14,075. (*Mr. Rice.*) You must not ask me. The point you ought to be clear on is that the overalls would have to be supplied at the expense of the employer and maintained by him and washed by him weekly at his expense?—That is a serious item for me. Our rule is that the men supply their own, and they are clean every Monday morning.

14,076. (*Chairman.*) You will bear in mind the regulations that I have indicated and I will tell you some others, and then you will be able to say exactly how you feel about it. You would have to provide in all cases a proper place for the men to keep their overalls when they had finished work for the day?—That would be impossible.

14,077. And further, you would have to provide a suitable place for the men to keep their ordinary daily clothing while they were at work, so that they did not come into contact with lead dust?—In my particular business that would be impossible.

14,077a. Then with regard to food, you would have to be quite sure that in no instance were the men allowed to have their food in the places where they were working?—So far as I am concerned I should be very glad to arrange it, but you ask me rather a funny question. As I said just now, I have what you would call a large small business.

14,078. I know. You are the very witness that I want to get hold of?—If I am sent for to-day for one room, the people may say, "You must not come up the staircase." You have to have a ladder up to the balcony. Then with regard to getting water, I have had cases where we have had to go and take water from the cab rank.

14,079. (*Mr. Parsonage.*) That kind of thing does happen?—Very often.

14,080. (*Chairman.*) So that it would be extremely difficult to provide a separate room for the men to take their meals, would it not?—Yes. As I told you, I often have to do up a room where we must not go into the house. We have to put a ladder up to the balcony. The men might stop in the room and have their dinner, or go to the nearest coffee house.

14,081. If the men stay in the room it is a very dangerous thing for them. The dust is in the air, and they have had no opportunity of washing, probably. Then in any other industry where lead is permitted to be used it is enacted that medical examination must take place with regard to each of the workmen, and that the workman who has been examined shall carry a sort of certificate in his pocket. That examination is at the cost of the employer. Would you object to such a rule as that?—If it becomes law I cannot object to it. It simply means that the customer would have to pay for it. I cannot afford to pay for it; the profits are too low now.

14,082. Then with regard to the dust generated in different operations; can you dispense, for instance, with dry rubbing down?—No.

14,083. We are told that there is a considerable amount of dust generated in that process and other processes?—No doubt.

14,084. This Committee would insist, I think, at any rate the Home Office would, on some means being devised for carrying away the dust so generated. Can you think of any practical way of doing it?—No; I should be very glad to hear of one. You will have no first-class work if you do away with it.

14,085. Now I will put the last question. Having heard from me some of the restrictions that would be attached to your industry if lead is continued to be

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[Continued.]

used, would you prefer such a set of regulations or would you prefer the prohibition of lead?—Well, that is a funny question to put to me. If lead is prohibited something else would have to be used, so it would not interfere with my business at all.

14,086. I asked you which you prefer. We are here to settle this question?—I understand.

14,087. Which do you prefer, regulation or prohibition?—Personally it does not matter to me at all, but I should say that for the trade generally prohibition would be better. I fail to see how you are going to do away with white lead. If you can give us a substitute to use I will say prohibition.

14,088. That is not my question. I asked you which you prefer—regulation or prohibition?—You put a straightforward question to me, and as I say, if white lead is done away with, and I must not buy white lead because of the law, I must buy something else. It would not interfere with my business at all.

14,089. I have given you an idea of some of the rules which would attach to the trade if white lead is continued to be used in it. Now, would you prefer such a system of rules or would you prefer the prohibition of lead? You would be on the same footing as everyone else?—Of course I would. It is a funny question to put to me. If lead is prohibited something else must be used; therefore it would not interfere with me at all. If you ask my advice as to whether it should be prohibited or not I will give it.

14,090. I do not ask that. I ask you which, as an employer, you would prefer—rules or prohibition?—It does not matter to me which, as I say.

14,091. Yes, it does matter, because the putting into force of rules such as I have described would be a very costly operation?—Yes, but then my customers have to pay for it, so it does not appeal to me at all.

14,092. But still I would like an answer if you can give an answer. I will not press it if you would rather not give an answer?—I must qualify my answer somehow. You put a rather difficult question to me. Let me answer your question in this way: If you put this prohibition on it means extra cost of the work; therefore my customers have to pay for it, so it does not matter to me which way you put it.

14,093. I will leave it at that, then?—But I should say prohibition would be better, because I do not see how you are going to do away with white lead.

14,094. You say prohibition. I do not follow you?—I mean regulation. If we have to provide hot and cold lavatory arrangements, and all this, that, and the other, I do not see how it is to be done.

14,095. You have admitted the impossibility of carrying out these regulations?—To an extent I have. If I have a house to do up it is no trouble at all. It is where we have these small jobs that we have the trouble.

14,096. Now, which do you prefer, these regulations or prohibition?—You see the position I am in, do you not?

14,097. I think your answer is quite good enough. If you say you do not care which, I am content to take that?—I do not think I do mind which it is.

14,098. I do not want to press you to give me a definite answer?—You see, if lead is prohibited I have to use something else. If these regulations are in force I have to abide by them. I have one man in my employ at the present moment who has been with me over 30 years. He has had every one of his meals in the colour shop. He is with me now. He is just about my own age, and he is as well and hearty as, thank God! I am at the present moment.

14,099. Some men are quite immune from lead poisoning?—Many of the men in my employ are.

14,100. It is not rare?—I quite see the point.

14,101. (*Dr. Collis.*) Have you had any experience yourself of the use of paints which do not contain lead?—Very slight.

14,102. What was the result of that slight experience?—My men did not like it nearly so much as they do the white lead and oil.

14,103. But how did the work turn out?—It was very good.

14,104. Was it external or internal?—Both.

14,105. Could you give an estimate from that experience, though small, of how much extra it would cost your customers to have their work done equally well with a paint not containing lead instead of a paint containing lead?—I could not.

14,106. It would cost them more according to your experience, would it not?—I do not know of a substitute to take the place of lead for external work.

14,107. I grant that you do not know its equal, but even then if it was painted sufficiently often you could get the same protection with a paint not containing lead, could you not?—Our firm say not, and my men say not.

14,108. Not if you painted it twice a year? Could you not get the same protection?—Of course you could. If you only put whitewash on twice a year it would last, and that is only a water-colour.

14,109. There are some paints which do not contain lead which are more useful than whitewash. For instance, would a surface require painting once in three years with lead and once in two years with non-lead paint? I want whatever your experience leads you to think?—They are bringing forward so many of these enamels and leadless paints now that one has not had time to try experiments, has one?

14,110. I do not know what your opportunities have been?—If you painted the front of an ordinary house with whitewash or distemper or washable colour, or whatever you like, it would not last half the time.

14,111. Whitewash is different?—I meant some of these various oil paints which are on the market now which do not contain lead. I have not tried them, except enamels.

14,112. (*Mr. Parsonage.*) You do not use those outside?—For shop fronts.

14,113. (*Dr. Collis.*) You may take it that enamels do not contain lead?—I do not know what the ingredients of them are. If you say they do not contain lead, very well. They will last as long as white lead, I should think.

14,114. You have no experience of comparing flat paint with lead and flat paint without lead. Enamel is more or less a bright paint, is it not? I am referring to the comparison of an oil paint containing lead and an oil paint which does not contain lead. Enamelling is a more expensive method, and you would not use it for the front of a house, would you?—You would use a lot of it for the woodwork, but not for the main front.

14,115. Can you give me an estimate of the extra expense that would be thrown on the customer by painting with non-lead paint? If you used lead paints under regulations would it not put up the price that you have to charge to your customers practically to the same level?—I could not give an estimate.

14,116. (*Mr. Sutherland.*) Do you know that in Germany the Government, who own the railways, in deference to a demand something of this kind, made very extensive experiments with non-lead paints, and came to the conclusion that they could not dispense with lead paint, and they would not dispense with it. That in itself is a strong argument against the abolition of lead, is it not?—Yes.

14,117. In Germany the regulations were framed very much on the lines that the Chairman has foreshadowed to you. Now, do you not think that what the foreign painting trade can stand we ought to stand in this country?—I should think so.

14,118. Rather than part with a known basic material like white lead, whose qualities are established?—And unequalled.

14,119. Therefore, before you abolish white lead, would you not be disposed, as an experiment at all events, to submit to regulations to see whether they mitigated the evil effects?—Certainly I would; but you are putting it in a different way from what the Chairman put it to me.

14,120. (*Chairman.*) Shall I put it to you in my way again?—I have no prejudice one way or another.

14,121. The point is this—that the Office of Works have been making experiments for the last 10 years, and during the last six years in some instances they

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[Continued.]

have abandoned lead altogether, and they say the result is highly satisfactory. They have told us that they are going to abandon lead altogether, though they have not done so yet?—They are using lead in rather large quantities. Why do they use it on their own property?

14,122. They have been making experiments?—Only last year they painted a lot of their own property with white lead.

14,123. In some cases, where they have done without lead, the results have been very highly satisfactory. A witness who came here yesterday told us that the Office of Works had issued orders to prohibit white lead altogether, but it has not been done yet. That is as far as we have got. Now would not that influence you a good deal with regard to a substitute?—No.

14,124. Would not the Office of Works' experience be sufficient?—No, I should say still that white lead is the best stuff for external painting. I have no bias at all.

14,125. That answer is very conclusive. I do not want you to answer it if you would rather not do so; but I will still put my question to you as to which you prefer, to see whether you would like to change your mind at all. I ask you whether you would prefer the regulations, or whether you would prefer the prohibition of lead?—I should say the regulations.

14,126. Then I must put a few more regulations to you to see if you really mean that?—The few you have already told me are impossible in my business; that is the awkward part of it.

14,127. That is the point—how could you carry out the regulations?—I could not do it.

14,128. Then I will put it in this way: what do you think the Committee ought to do under the circumstances?—That is very awkward.

14,129. We have to protect the men's health?—I agree with you.

14,130. I put it to you as a practical man that certain regulations are necessary to protect the men's health. You tell me that those regulations are impossible to carry out. Now, under those circumstances, do you not think that it is imperative for the Committee to recommend the abolition of lead?—No, I do not.

14,131. You understand the corollary of that. It means that you are going to let these men suffer?—May I tell you something before you put down my answer. When I was advised to attend this Committee I took the trouble—or not trouble, but interest—to enquire of several of my men. I went round to the men who have been with me a number of years. I went to a man in the colour shop. First of all I went to my foreman, who has been with me about 14 years. I have several men who have been with me anything from 10 or 20 to 25 years. I asked them if they could suggest anything at all, and they all said to me, "It is simply a question of cleanliness amongst ourselves."

14,132. It is not a question of your own firm. I must take you back to the question. Do you know why this Committee has been formed? It is because of this grave suffering which exists among the workmen in your industry. The Home Office have asked us to advise them as to the best means for getting rid of the evil. You are a practical man, and I have told you of some of the regulations which, if enforced, would remove some of the dangers that the men suffer from to-day. You say that those are impossible to carry out?—I am afraid so.

14,133. Then I say, is not prohibition the only way of preventing the men suffering?—You see you are asking a very reasonable question, but it is difficult for me to answer. Only on Saturday we started at twelve o'clock to paint the ceiling of a jeweller's shop. We left off at twelve on Saturday night and started again at twelve o'clock on Sunday night and left off at six o'clock Monday morning. Now how could we possibly have all these regulations?

14,134. I admit that you have put to us very clearly that it is impossible in your class of trade to carry out the regulations which I have put before you. Now as regulations or prohibition are the only two things to remove the evil which the men suffer from to-day, if

you cannot carry out the regulations is it not a certainty that we must recommend prohibition?—I think you would have to recommend regulations.

14,135. Which you cannot carry out?—Now for instance on the Friday night I should have to say to the customer in the case of this particular Saturday night's job, "You must provide a lavatory for my men." If the customer objected, I should have to say, "You must do it." It would be the same for me as for everyone else. If nobody else had to ask him to do it, I should lose the customer, but not if everyone else had to.

14,136. It is very unsatisfactory?—I am trying to answer properly.

14,137. You have admitted to us that you cannot carry out these regulations. You have said this is impossible and that is impossible, and then, when I suggest that that means embracing prohibition as an alternative, you say, "Regulations"?—Now you put it to me in the light that you have put it to me now, I should say "Regulations" because then I should speak to my customer about what facilities he must give me.

14,138. Would you be prepared to bear the cost of medical examination, overalls, and so on?—I think I ought to have had notice of these questions and then I could have gone into the cost.

14,139. I do not want to press you. Would you like to take your evidence home and read it, and see how it looks, and then come again? I do not want to press you to any decision that you have not thought over. Would you like time to consider the whole matter?—No. I think, in answer to the question, I would say "Regulations," and the customers would have to pay for it.

14,140. What about the expense of medical examination, overalls, and all that sort of thing?—The same thing applies.

14,141. How are you going to arrange about the washing of overalls, not allowing the men to have their food in the room where painting is being done and so on?—They would have to go to a coffee house or a public house.

14,142. Do you think that these regulations which I have foreshadowed are practicable?—It will have to be done if it is the law.

14,143. You do not seem to have a single mind on the question?—I have. You, as Chairman, may think I have not, but, as I tried to explain just now, if I am not allowed to use white lead I shall have to use other stuff, and so will everybody else, and, therefore, I am protected with regard to my customers. If I am allowed to use white lead with restrictions then it will cost my customer more. It will be the same in the case of everybody.

14,144. (*Dr. Collis.*) Surely if it makes no difference to you it is much simpler to you not to be pursued by some inspector making you carry out a whole host of regulations and possibly dragging you before the court because one has been omitted, notwithstanding your best endeavours to carry them out. If you are going to be on all fours with your competitors if lead is prohibited, although you are going to be on all fours with them with lead and with regulations, surely life is going to be easier for you under prohibition. That is the view the Chairman presented to you?—I know of no substitute for white lead at the present moment. If I did I would say prohibit at once.

14,145. (*Chairman.*) I will put it in this way: if the majority of the witnesses before us have been in favour of prohibition instead of regulations, would you fall into line with them?—I practically answered that just now. If it was prohibited I should have to fall into line with other people.

14,146. But I ask you if the majority of your competitors have agreed to prohibition rather than regulations, would you fall into line with them?—Yes, I think I would. It is a funny question to ask, because I tell you I have no interest in white lead. You see what I mean.

(*Chairman.*) It does not matter. I will not ask you any more questions.



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[Continued.]

14,147. (*Mr. Sutherland.*) Would not the difficulty be removed if the use of white lead was prohibited for inside work and retained for outside work?—Yes, it would all have to be mixed inside. It would have to be ground down inside. That could not be done outside.

14,148. It is not in the mixing where the danger comes in, but in the rubbing down, and the dust arising from it?—But you would have to rub down in the case of other colours; with any colours you would have to rub down dry.

14,149. Not necessarily dry. There has been a big body of evidence that the question of white lead might be met by retaining it for outside work. The French are to abolish it two years hence, but they abolished it for inside work long before they decided to abolish it for outside work. Have you tendered to the Office of Works?—Yes.

14,150. Have you seen their specification?—Yes.

14,151. They use lead largely, do they not?—Yes.

14,152. (*Chairman.*) You have told us with regard to dry rubbing down that it is indispensable?—Yes.

14,153. There is a considerable amount of dust generated in that work?—Yes.

14,154. Do I understand that you know of no possibility of getting rid of that dust from the workmen?—I know of no possibility.

14,155. Then what do you suggest we should do in that connection to protect the workmen?—I cannot suggest anything.

14,156. Then supposing we were to devise—I do not say it is possible—an exhaust apparatus to remove the dust, would you pay the cost of that too?—Yes.

14,157. Would you pay the cost of overalls, and of medical examination and would you take care that all those other regulations were carried out to the letter?—Yes, provided it becomes law.

14,158. (*Dr. Collins.*) Under those circumstances, which do you think is going to be the most economical, the lead or the non-lead paints?—I cannot tell you.

14,159. (*Mr. Rice.*) You represent the London Master Builders' Association?—Yes.

14,160. The views which you have expressed are your own individual views?—Yes.

14,161. You have not been in conference with any other members of the London Master Builders' Association?—Not one.

14,162. Do you still think that the regulations foreshadowed by the Chairman, including the expense of medical examination which has to be borne by the employer—I do not know whether you were clear about that—and the purchase and weekly cleansing of the overalls, are regulations that you would be prepared to carry out?—I qualified that. I said provided it becomes law. The customer will have to pay for it.

14,163. You see no difficulty in doing it?—I see a lot of difficulty. I think it is an impossibility.

14,164. Then the conclusion is that, if they became law, you could not carry them out?—We should have to.

14,165. But the difficulties of carrying them out would be very great?—Very great indeed, almost impossible, more particularly in my class of business.

14,166. (*Chairman.*) How can you reconcile that with your previous answers to my questions?—I know of no substitute for white lead.

14,167. But how can you tell us that laws are impossible when you say that you will observe them?—They are not impossible if the customers will pay the money.

14,168. But you said just now that they are impossible to carry out?—I think they are impossible, because I do not think the customers would ever pay for them.

14,169. But you said that the rules would be impossible to carry out?—I will say so again. I have a single room to do and they will not let me up the staircase; I have to have a ladder up to the balcony. Now, who is going to watch what I do?

14,170. I ask you again. How are you going to carry out the rules I have put to you?—I do not know how to do it.

14,171. If they became law, you could be prosecuted for not doing it?—We should have to refuse the work.

14,172. You see the point?—I see the point. I know what I have said, and I fully realise the peculiar position in which I have put myself.

14,173. (*Mr. Rice.*) You hold no brief for the use of white lead?—Absolutely none. I have no shares or anything.

14,174. Do you think that the fact of white lead being prohibited would interfere with painters and cause loss of work?—I do not think so. We should have to find a substitute.

14,175. Do you think it possible that your customers would refuse to have work done, assuming that you could not get such a good finish with zinc white as you can with white lead?—No, I do not think they would, but if they ask me which I think is the better of the two I should have to say white lead.

14,176. (*Chairman.*) But supposing that white lead was prohibited and all the master painters were in the same position, what would be your objection to falling into line?—I should fall into line. I should have to find out some leadless paint. That is what I have been trying to explain to you all the way through.

14,177. Then if the Home Office prohibited the use of white lead you would not object to it?—No, I certainly should not. I could not if it became law. That is what I have wanted to tell you all the way through. I am not biassed in any way whatever. I thought that I was coming here to give you my opinion as to white lead. If it is forbidden I must find something else. It will be forbidden for everybody if it is forbidden for me, so it would not affect my business.

14,178. If all the master painters are on the same footing then would you not prefer the prohibition to the rules, taking it that none of them is allowed to use lead. Would not you rather be in that position than have these vexatious rules?—I suppose I ought to say yes. It would appeal to me more than to the high-class decorators who get the large work. I get so much small work and the difficulty would be far greater for me than for them.

14,179. (*Mr. Rice.*) I think the witness is rather confused. He is quite willing to abide by any law that is made, but he does not quite realise, I think, that the object of this Inquiry is to make that law, and that it is desirable that the law should be made to suit the best conditions possible. (*To the witness.*) We quite understand that you, as a law-abiding citizen, would abide by any law. The object of the Committee is to find the best law that can be made, and the object of your examination is to help the Committee to form an opinion. Does that help you to give a definite answer?—When I came into the room I was prepared to stick to white lead, but when the Chairman reads to me these terrible figures I do not know why I should stick to white lead, although there is my history perfectly clean, and perfectly true.

14,180. (*Chairman.*) You would not suffer if all the employers were in the same position?—No, I should not suffer; at least I hope not.

14,181. Would it not be an advantage to have prohibition instead of the rules if all the employers were in the same position?—If you make all these restrictions I think it would be better, but we should not get any work to do in white lead.

14,182. If all master painters were in the same position would you not prefer prohibition rather than rules? All would be in the same boat. I will not press you?—I am trying to think it through. You see, when I came here, I did not think we should have gone so deeply into the matter as that. I understood that I was coming to give my experience of the use of white lead amongst my employées. I have done that, and I have given it fairly and honestly, and I am prepared to stand by it. I can prove it. Men are still living who have been with us for many years.

14,183. (*Mr. Sutherland.*) You have a life's knowledge of the value of white lead, and you do not like to part with it?—If I cannot make my living out of white lead, but I can out of zinc white, why should I not?

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14,184. (*Chairman.*) If all the employers are treated in the same way would it not be very much better for you to be exempt from all these troublesome rules and regulations?—Now what do you want me to answer?

What is the question? What have I not answered? Do you ask whether I would rather agree to the regulations or to prohibition. Is that the point?  
14,185. Yes?—I should say prohibition.

The witness withdrew.

## TWENTIETH DAY.

Wednesday, 22nd November 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

LORD HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary.*)

Dr. IGNAZ KAUF.

*Evidence to 14,228 handed in and taken as read; witness then called and examined (through an interpreter).*

14,186. I am a Doctor of Medicine and have for a number of years devoted great attention to the subject of lead poisoning in general and among house painters in particular. I was for some years a Government Medical Officer (Bezirksarzt) for a district of Vienna. I was attached to the Labour Statistical Department of the Handelsministerium (Ministry of Commerce), and was specially commissioned by the Austrian Government to assist in the work of the Austrian Commission on Lead Poisoning. I was also Professor (Privatdozent) for Industrial Hygiene in the Technical High School of Vienna.

14,187. Since 1907 I have been a departmental chief of the Zentralstelle für Volkswohlfahrt (Central Organization for Social Hygiene) in Berlin; Professor for Industrial Hygiene in the Technical High School of Charlottenburg; and Editor of the *Archiv für Soziale Hygiene* (Archives of Social Hygiene), and in these positions have had an opportunity of studying the question of lead poisoning from an international standpoint. I am also in a position to study the operation of the Regulations for the use of White Lead in house painting both in Austria and in Germany, and have collected statistics which indicate the effect they have had upon the health of the workers.

### AUSTRIA.

14,188. In the course of my duties as Bezirksarzt in Vienna, I had occasion to note the great amount of lead poisoning that took place there, and in 1902 I wrote for the Austrian Society for the Protection of Labour a brochure on the subject—"Blei und Phosphorvergiftungen in gewerblichen Betrieben Oesterreichs" (Lead and Phosphorus Poisoning in the Industrial Undertakings of Austria).

14,189. In April 1904 the Austrian Government appointed a Commission to inquire into the whole question of lead poisoning. The result of the labours of this Commission is contained in six volumes published from 1905 to 1907. I was appointed a member of the Commission by the Austrian Handelsministerium, and I gave special attention to the matter of lead poisoning among painters, and was chiefly responsible for the report upon that subject contained in the 5th volume.

14,190. For the purpose of investigation of the subject of lead poisoning among house painters, the Austrian Government Commission drew up a set of 43 questions covering the whole area of the inquiry, *inter alia*—

(a) Production of white lead pigment.

(b) The process of painting, including the question of dry rubbing down, and the use of particular pigments and the question of substitutes for white lead.

(c) Provision of clothes and washing utensils for painters.

(d) Rules for the workmen.

(e) Medical inspection and instruction of painters.

14,191. The Commission called to their assistance 36 experts, being master painters and painters, Government officials, chemists and doctors, manufacturers of white lead and paint makers, and the questions were put to these experts and discussed with them all in conference. The Commission also made special inquiries in particular branches of house painting and among house painters, and made visits to various places of work.

14,192. The Commission found that it was only for Vienna that reliable statistics of lead poisoning could be obtained. There are three classes of what are called in England collectively "house painters," *i.e.*, Anstreicher, Maler, and Lackierer. For my present purpose I will refer to these by the general name of painters (Anstreicher). All the painters of Vienna are grouped together, and are members of the compulsory Sickness Insurance Fund (Krankenkasse), and it is from the annual returns of this fund that the Commission's figures are chiefly taken. These figures showed for the years preceding the Commission a somewhat large and steadily increasing rate of lead poisoning, as will be seen from the following table:—

*Lead Poisoning among Members of Sickness Insurance Fund of Painters of Vienna.*

| Year. | Number of Members. | Cases of Lead Poisoning. | Days of Illness. | Percentage of Illness Cases. |
|-------|--------------------|--------------------------|------------------|------------------------------|
| 1901  | 2,853              | 130                      | 3,053            | 4.5                          |
| 1902  | 2,988              | 125                      | 2,278            | 4.1                          |
| 1903  | 3,744              | 163                      | 3,387            | 4.9                          |
| 1904  | 3,539              | 197                      | 4,258            | 5.5                          |
| 1905  | 3,712              | 198                      | 3,763            | 5.3                          |
| 1906  | 3,661              | 253                      | 5,702            | 6.9                          |

14,193. The causes of lead poisoning may be divided into the objective causes, such as the processes creating poisonous dust, and the subjective causes due

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to carelessness on the part of the workmen. It was found that the workmen emphasised the objective causes, such as the processes of dry rubbing down and pumice-stoning; while the master painters emphasised the subjective causes such as the uncleanness of the workmen.

14,194. The Report lays very great stress upon the danger of dry rubbing down. In the first place, the Commission obtained information as to the processes of painting followed in a large number of businesses, particulars of which are set out on pages 15 to 20 of the Report. It was found that for inside painting it was the practice to rub down dry or to pumice-stone dry several of the various coats of paint, and that for considerable periods of time. Specimens of the air suffused with the dust caused by the rubbing down were taken and were analysed. These were found to contain white lead varying, in accordance with the amount of white lead in the surface rubbed and the intensity of the rubbing down, from 1 milligramme to 25 milligrammes of white lead in 1,000 litres of air.

14,195. The Commission found that the opinion of the workmen as to the danger of this process corresponded with the probabilities of danger shown by this analysis. They caused 50 painters, who had had repeated attacks of lead sickness, to be medically examined and questioned. "Of these 50 cases of lead poisoning, 23 men, *i.e.*, 46 per cent., were positive that the cause of their first attack of lead sickness was the dry scraping and rubbing down with pumice-stone or emery powder of priming filling or coats of paint containing white lead. These all stated that they had always kept themselves clean, and, in particular, had never eaten with unwashed hands." "When the technical-hygienic evidence as to the lead contained in the air and in the paint is remembered, and also the amount and duration of the dry process, and when it is also borne in mind that in the course of 5 hours' work a painter breathes about 5.5 cubic metres of air, then it is clear that the theoretical danger of the dry rubbing down is in complete agreement with the testimony of those concerned."

14,196. In the next place it was shown that—Far more lead pigment is used in Austria for outside painting than for inside:—

14,197. "For inside painting.—There has been used in Austria in the year 1904, almost exclusively on wood in building and alterations, including furniture and the interior painting of ships—

White lead - (about) 2,750 quintal = 270 tons.

14,198. "For outside painting similarly:—

White lead - - - 5,500 quintal = 540 tons.

Red lead - - - 4,000 quintal = 393 tons.

Of which last about 4,000 q. of white lead and the whole quantity of red lead was used for the painting of iron on bridges, machines, ships and rolling stock; the rest of the white lead being used for painting the fronts of houses and for wood on carriages and railway coaches. The fact that lead pigments are predominantly used for outside painting is clearly shown here. This use of them is more than three times the use for inside painting."

14,199. It was also shown that:—"Among master painters in Vienna there are for inside painting about 163 cases of poisoning per annum with a use of white lead of about 1,600 quintal = 157 tons; although for outside painting with white lead and red lead for the whole of Austria (9,500 quintal = 933 tons) there were not 80 cases, of which about 50 are in Vienna."

14,200. From these calculations the report drew this conclusion:—

"It would seem therefore that in inside painting there was a quite special process causing poisoning which does not occur in outside painting. In the ordinary work of inside painting, and especially for painting wood, the circumstances are primarily more favourable because non-poisonous pigments, such as zinc white, lithopone and earth pigments, &c., are always used with white lead, and therefore the pigment is almost always notably less poisonous than in the painting of iron on outside work which is commonly done with wholly lead pigments. The particular cause consists in the dry pumice-stoning and rubbing of

primings, puttyings, and other coats of white lead. The important fact in this is the causing of dust and the atmosphere of white lead dust which is formed thereby in which the painters of the room which is being scraped or rubbed down must remain for the whole of their work."

14,201. "Dry rubbing down is characteristic of inside painting only, as the fronts of houses are not in general rubbed down. Iron also is not commonly rubbed down, and carriages and railway coaches are only rubbed down wet, like the finer painting of furniture, and there is therefore no danger in them."

14,202. It was further calculated that of the 163 cases of lead poisoning in Vienna not more than 48 were due to simple painting, and that the rest were therefore due to dry rubbing down.

14,203. It will be seen that in view of the circumstances of Austrian painting the Report distinguishes between inside and outside painting. The general observations of the Report on this point may be usefully quoted.

14,204. "A sharp distinction is to be made between inside painting and outside painting. In both inside painting and outside painting the materials of the object to be painted differ. For inside painting there is chiefly wood, more rarely walls, and still more rarely iron or some other metal. For outside painting iron is the most important, and walls and wood are of less importance. It is well known that for each kind of painting there are different requirements. For inside painting resistance to the atmosphere of interiors, especially to the effect of certain gases. For outside painting resistance to the outside atmosphere, to severe changes of temperature, and to rain, &c. Employers agree that the change of colour and the yellowing of inside painting is due to the use of white lead for the last coat, whereas a coat of zinc white obviates this. On the other hand, for outside painting white lead has, as is well known, special advantages over other colours, such as zinc white and lithopone. There are also distinctions as regards inside and outside painting in respect of the kind of lead pigment used. In painting wood and wall surfaces in inside work white lead only is used, and red lead is only used in the rare case of painting iron. On the other hand, for outside painting white lead is predominant only for moving objects, and for the large area of painting of iron red lead has equal importance with it. The other lead pigments, such as chrome yellow and chrome green, are of about equal importance one with the other, and have only a subordinate place."

14,205. The facts found by the Commission in regard to the use of white lead for outside painting were in marked contrast with those in respect of inside painting. For outside painting there was found to be a very large and a growing use of white lead and at the same time a relatively small amount of poisoning. The great cause of poisoning, namely, the dry rubbing off, did not exist in the case of outside painting. Moreover, there was very strong evidence that, owing to the peculiar chemical combination of the white lead with linseed oil and the notable qualities of great resistance to water and great covering power due thereto, there was in the present state of knowledge no satisfactory substitute for white lead for outside use. This was especially the case in respect of minium (red lead), as several witnesses emphasised the fact that for the painting of iron surfaces there was no possible substitute. The final conclusions of the Report on this point are as follows:—

14,206. "The facts in regard to outside painting are notably otherwise [than in regard to inside painting]; there is a large use of white lead and red lead and a relatively small amount of lead poisoning. Having regard to the undoubted advantages of white lead for outside painting and of red lead especially for iron painting which are declared by all in the business, there is not likely to be any decrease in these figures, the more so in that the question of substitutes for outside painting is still in the stage of experiment and inquiry."

14,207. In its inquiry into the causes of lead poisoning distinguished by it as subjective the Commission was in the nature of things obliged to rely

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less upon statistics than upon the evidence of masters and workmen and visits to work places. The state of things found left very much to be desired. In far too many cases there was a great absence of elementary cleanliness, hands were not washed before meals, food was kept in the workroom or even in working clothes, and was eaten during work; cigarettes were also smoked during work; no special clothes were provided for work, and ordinary clothes were hung up in the workroom. In the opinion of the Commission this uncleanness could not be wholly ascribed to the carelessness of the workmen, although it was largely due to their ignorance of the dangerous properties of white lead and the absence of instruction upon the point. In a very large degree it was due to the absence of the provision of proper appliances for the observance of cleanliness. Insufficient time was given for meals, and too often no place was set apart for them. Upon this point the Report concludes with the following observations:—

14,208. "The recommendations on an earlier page for regulations for painting businesses and factories show sufficiently that there is still much to do for the protection of the health of workers in outside painting with white lead and red lead. In accordance with all experience the returns of the numbers of poisonings in these occupations could be reduced to a minimum by thorough sanitary precautions."

14,209. The sanitary and other regulations which were pressed by the medical experts included the following:—

- (a) The provision of proper means of washing and a place for clothes and food.
- (b) The prohibition of smoking and drinking of spirits during work.
- (c) Medical inspection of workmen before being allowed to engage in employment with lead colours, and subsequent periodic inspection.
- (d) Leaflets of instruction as to the dangers of lead colours.

14,210. One other point to which great importance was attached by the experts was the necessity of a declaration in respect of all colours containing lead that lead was therein. It was pointed out that the painter and even the employer did not know that a large number of paints sold under fancy names contained a high percentage of lead.

14,211. As a result of the Report of the Commission a set of Regulations was issued by the Minister of Commerce in April 1908.\* The chief provisions are:—

- (1) Prohibition of dry rubbing down and pumice-stoning (section 7).
- (2) Prohibition of white lead for inside use (section 4).
- (3) Notification of lead contents on paint cans, &c. (section 3).
- (4) Provision of washing appliances by employer and in certain cases work clothes and respirators (section 8).
- (5) Provision by employer of special rooms for washing and for keeping clothes where more than 20 employed (section 2).
- (6) Periodical medical inspection where more than 20 employed, and medical certificate before re-employment of a workman once lead-sick (section 6).
- (7) Provision of instructions as to the danger and nature of lead poisoning and the means of avoiding it (section 11).

14,212. In pursuance of the policy of requiring lead colours to be so declared, an Order was published on 26th April 1909 by the Ministers of the Interior, of Finance and of Commerce, prohibiting the transport of such colours unless the fact that they contained lead was clearly indicated.

14,213. It is now some 2½ years since the Regulations of 1908 came into force, and it is already possible to trace a marked diminution in the number of the

cases. I append a table in which the figures of lead poisoning for the years preceding the Commission, which have already been given, are for convenience repeated:—

*Lead Poisoning among Members of Sickness Insurance Fund of Painters of Vienna.*

| Year. | Number of Members. | Cases of Lead Poisoning. | Days of Illness. | Percentage of Illness Cases. |
|-------|--------------------|--------------------------|------------------|------------------------------|
| 1901. | 2,853              | 130                      | 3,053            | 4·5                          |
| 1902  | 2,988              | 125                      | 278              | 4·1                          |
| 1903. | 3,744              | 163                      | 3,387            | 4·9                          |
| 1904  | 3,539              | 197                      | 4,258            | 5·5                          |
| 1905  | 3,712              | 198                      | 3,763            | 5·3                          |
| 1906  | 3,661              | 253                      | 5,702            | 6·9                          |
| 1907  | 3,765              | 108                      | 4,939            | 5·5                          |
| 1908  | 3,546              | 167                      | 3,852            | 4·7                          |
| 1909  | 3,589              | 143                      | 2,973            | 3·9                          |
| 1910  | 3,917              | 138                      | 3,155            | 3·5                          |

14,214. It will be seen that the decrease commences in the year 1907, in which the Commission was sitting. No doubt the attention called by it to the dangers of lead poisoning, and subsequently the publication of the Regulations, had an effect even before the Regulations came into force.

#### GERMANY.

14,215. In the year 1903 elaborate regulations for the white lead factories were passed by the Bundesrath, and in the year 1905 extensive inquiries were instituted by the Department of Commerce and Industry with a view of making regulations for the painting industry. No Commission was formally appointed, and there is no public account of the investigations. As a result of the inquiry a set of Regulations were issued on the 27th June 1905\* :—

- (1) Prohibition of dry rubbing down and dry pumice-stoning (section 3).
- (2) Provision by employer of washing appliances (section 5).
- (3) Provision of special rooms for washing and for clothes (section 8).
- (4) Rules by employer (a) to require special work-clothes, and prohibiting (b) spirit drinking and smoking during work, and (c) eating or drinking before washing (sections 4 and 9).
- (5) Half-yearly medical inspection, and prohibition of work before recovery from lead poisoning (section 10).
- (6) A medical register (section 11).
- (7) Provision of instructions as to the danger and prevention of lead poisoning (section 6).

14,216. It will be seen that the German Regulations are in many respects similar to the Austrian Regulations, which, indeed, were to a large extent based upon them. There is in the German Regulations no prohibition of the use of white lead for inside painting corresponding with the prohibition in Austria, the circumstances of which have already been explained, but there is a similar prohibition of the dry rubbing down and pumice-stoning to which the Austrian Report attached such great importance. There is no provision in the German Regulations for the declaration of white lead contained in paint. The provision for medical inspection is somewhat different, and it is required to take place every six months instead of every three months. It is generally felt that the instructions as to the danger and the means of preventing lead poisoning prescribed by the German Regulations are unduly long and complicated and defeat their object.

14,217. I have given much attention to the collection and analysis of statistics showing the effect of the German Regulations upon lead poisoning; and I published some of the results of this investigation in the issue of the 5th September 1910 of the *Archiv für*

\* See Appendix IX.

\* See Appendix VI.

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*Soziale Hygiene* (of which I am an editor) in an article entitled "The Position of Lead Poisoning in the Industrial Undertakings in Prussia." The great statistical difficulty in Germany is the absence of any obligation to notify cases of lead poisoning. The only available figures for a large area such as Prussia are the records of the hospitals, and these, although reliable for an estimate of the increase or decrease of lead poisoning, do not give an accurate picture of the full extent of it, inasmuch as workmen only go to the hospital as a last resource. The returns for the Sickness Insurance Funds (*Krankenkassen*) give a more exact account for particular towns such as Berlin, but they cannot be obtained for many other places. A comparison of the Berlin Hospital and Sickness Insurance Fund's figures shows that the hospital figures must be multiplied by four or five.

14,218. The total hospital figures of lead poisoning in general for the whole of Prussia and for Berlin in particular from 1904 to 1908 were:—

Number of Cases.

| —           | 1904. | 1905. | 1906. | 1907. | 1908. |
|-------------|-------|-------|-------|-------|-------|
| Berlin - -  | 178   | 167   | 151   | 146   | 130   |
| Prussia - - | 1,050 | 1,103 | 898   | 920   | 900   |

Days in Sickness.

| —           | 1904.  | 1905.  | 1906.  | 1907.  | 1908.  |
|-------------|--------|--------|--------|--------|--------|
| Berlin - -  | 3,873  | 3,339  | 3,287  | 4,255  | 2,944  |
| Prussia - - | 27,943 | 26,965 | 22,855 | 23,586 | 21,150 |

14,219. It will be seen that, with the exception of the year 1905 (Prussia), these figures show a general decrease since the time of the 1903 regulations for white lead factories coming into force.

14,220. From the same hospital figures for painters in particular, of which I annex a table, it will be seen that there is an even more marked decrease since the 1905 regulations for painters came into force.\*

14,221. It will be seen that for and since 1906, when the regulations came into force, there is a decrease not only in the number of cases, but one even more marked for the number of days of illness, and this diminution is common to all the districts, although in differing degrees. It is also to be noted that not only is there a decrease in the number of cases of lead poisoning among painters, but that the proportion of the cases among painters to that of the cases of lead poisoning in general also shows a considerable decrease, the figures being as follows:—

| 1904.             | 1905.             | 1906.             | 1907.             | 1908.             |
|-------------------|-------------------|-------------------|-------------------|-------------------|
| Per cent.<br>35·5 | Per cent.<br>35·4 | Per cent.<br>31·8 | Per cent.<br>31·4 | Per cent.<br>28·8 |

14,222. The foregoing figures for the period ending 1908 relate to Prussia in general. I have been able to get statistics for Berlin for the period since 1908, namely, for the Sickness Insurance Fund of the Painters of Berlin. These are as follows:—

Lead Poisoning among Members of Sickness Insurance Fund of Painters of Berlin.

| Year. | Cases of Lead Sickness. | Percentage of Lead Sickness. | Days of Lead Sickness. | Percentage of Days of Lead Sickness. |
|-------|-------------------------|------------------------------|------------------------|--------------------------------------|
| 1907  | 379                     | 7·3                          | 19,451                 | 260                                  |
| 1908  | 298                     | 6·0                          | 19,223                 | 265                                  |
| 1909  | 235                     | 6·0                          | 11,769                 | 246·1                                |
| 1910  | 268                     | 5·4                          | 11,135                 | 224·5                                |

\* See Appendix XV.

14,223. These figures also show a steady decrease, not only of the number and percentage of cases of lead poisoning among painters, but also of the number and percentage of days of sickness.

14,224. There can be no doubt that the decrease of lead poisoning among painters both in Germany and Austria is due to the effect of the regulations. I have a strong opinion that the technical hygienic provisions of the regulations must, both in Austria and Germany, be supplemented by thorough and well organised measures for the medical instruction and the medical supervision of the workmen. This can only be done by a close co-operation of the doctors with the officials. Circumstances both in Austria and in Germany are not so favourable for this purpose as in England. There are too few officials to do the work of inspection as thoroughly as it should be done, and there are far fewer doctors than in England. So far as I am acquainted with English circumstances it would seem that in the widespread and numerous local sanitary inspectors and local medical officers of health, there is an organisation ready to hand and well adapted to carry out regulations in the way which I think most desirable. I would also point out that in England the circumstances are also more favourable, in that there is no wide gulf between the workers and the doctors or officials. I regard this as of great importance, as in my opinion the danger of lead poisoning, as of other industrial diseases, will be reduced to a minimum when the circumstances are such that workmen are ready to listen to doctors and so to become aware of the dangers and the way to meet them, and are ready to co-operate with doctors and officials in securing the observance of the regulations.

14,225. I have also a very strong view as to the importance of compulsory notification of all cases of lead poisoning. No industrial disease can be properly studied and checked unless there be sufficient material in the way of statistics.

14,226. I also attach great importance to duty of declaring lead (*Declarationspflicht*), i.e., that every pigment containing lead should be labelled "Containing lead and poisonous." The Austrian regulations require a notification of lead, but does not go on to require it to be notified as poisonous. Unless this declaration is made, master painters and workmen alike, and even paint dealers, handle poisonous lead pigments, often under fancy names, without any idea of their danger.

14,227. There can be no doubt that the greatest source of danger is the dry rubbing down. This is clearly shown by the facts stated in the Austrian Report. It was to meet this danger that the use of white lead for inside painting was forbidden, because it only occurs in inside painting and because in Austria very little white lead was used for inside painting.

14,228. The evidence before the Austrian Commission showed that the use of white lead for outside purposes, and especially for the painting of iron, was large and growing, and that it was regarded as indispensable for this purpose. With proper regulations I do not regard the prohibition of the use of white lead for outside painting as necessary, and certainly in the present state of knowledge, when there is no effective substitute for it, such a prohibition would be unjust both to the consumer and to an important trade.

14,229. (*Chairman.*) In the evidence that you have submitted to us you have laid stress on the danger of dry rubbing down?—I consider dry rubbing down and dry pumicing as extremely dangerous.

14,230. Did you ask the witnesses before the Austrian Commission whether they could dispense with dry rubbing down?—For the painting of outside work, particularly rolling stock the rubbing down is exclusively wet; but for inside work there is still a certain amount of dry rubbing down, but it has been very much restricted. On furniture, rubbing down is exclusively wet. I think it quite possible to dispense with dry rubbing down entirely, as wet rubbing down yields a very much better painting surface for high quality painting, because it gives a fine surface; but the drawback to wet rubbing down is that it involves, according to some painters, a slight increase in cost

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Some painters maintain that the increase in cost may be as much as 10 to 15 per cent., but the result is very much better with wet rubbing down.

14,231. Did you ascertain how they would smooth the first coat of paint before applying the second coat?—In indoor painting, chiefly on doors and walls, the first thing done is that a coat of size is applied; something which permeates into the wood or into the wall. Then over this they put a coating of some paste to fill in all the crevices and little holes. In Austria they use something termed "spotting out."

14,232. Is that lead?—It is not necessarily lead, but sometimes lead is added. I have in my report a number of compositions of such pastes as are used for this purpose. When it has been smoothly applied it is necessary to rub it down to polish it. For indoor work, particularly for doors, in Austria, they still persist in rubbing down dry, generally with pumice stone. The danger is very great, as in 200 working days, 80 days are occupied with rubbing down dry. I wish to add that of 50 cases of lead poisoning 23 men, that is 46 per cent., stated that they believed the lead poisoning to be due to dry rubbing down of paints used for obtaining a smooth surface by rubbing down with pumice stone or emery.

14,233. Do I understand that you cannot dispense with dry rubbing down in Austria?—I think it quite possible to dispense with dry rubbing altogether, because certain master painters found that dry rubbing led to a number of cases of lead poisoning, and the only disadvantage of wet rubbing down was the increased cost, and those master painters on their own account decided, before the regulation came into force, to abandon dry rubbing and substitute wet rubbing, which gives a superior surface to that given by dry rubbing. The German regulations and the new Austrian regulations have prohibited dry rubbing down altogether.

14,234. Both for inside and outside?—I think that the prohibition of dry rubbing down can apply only to inside painting, because outside paint in Austria is never rubbed down at all; rough surfaces are quite good enough for outside paint. For very delicate outside work, such as ornamental work, very superficial rubbing down is done with emery, but not the thorough grinding down which is done on inside surfaces. I think it very necessary to prohibit dry rubbing down altogether, although some of the outside paint, such as that upon carriage work, is rubbed down. In Austria this is exclusively done in the wet way, and as rubbing down might be done by people in a dry way, I think the prohibition should cover outside work as well.

14,235. Would it be practicable to invent any exhaust apparatus to remove the dust in dry rubbing down?—I think the construction of such an exhaust apparatus quite impossible, because the work is chiefly applied to such things as doors, and the working place consequently changes all the time. The door is probably placed on a couple of stools. The man uses a piece of pumice, and stoops down over his work. It may last anything from eight to ten hours a day, and the dust which is created from the rubbing down would rise straight up. No man will wear a respirator during eight or ten hours. An exhaust cannot be used, because the place of work changes all the time. The man may work on one door at one end of the room at one time, and later at another end of the room, and the door may be turned over. The exhaust is only practicable where the working place is fixed and the man is not inside that working place.

14,236. Now with regard to leadless paints. What witnesses did you examine with regard to the use of leadless paints for exteriors?—I wish to know whether you would like my general information on the point of replacing lead paints by other paints for inside and outside work.

14,237. Tell us first of all what witnesses you examined in the Austrian Commission?—The Austrian Commission consulted master painters, working painters (that is working men), factory owners, and the technical staff of factories. There was an endeavour to obtain as complete an evidence as possible.

14,238. Did the Austrian Commission, in examining the master painters, ascertain whether they had made any experiments, and for how long, with leadless paints?—A number of painters before the Austrian Commission have had experimental evidence on the point of other paints. In particular, a Mr. Meissl, who will be before your Commission to-morrow, has made exhaustive experiments with zinc white, as he himself is an owner or shareholder in a zinc white factory. Mr. Meissl's views are endorsed by all the master painters in Austria, and he is considered to be the leading authority amongst painters, as he is, apart from being a painter, also chemically educated, and he has made exhaustive experiments with substituted paints.

14,239. I want to know whether the master painters took their opinion as to the merits or demerits of zinc paints from Mr. Meissl, or whether their opinion was formed from personal experiments which they made?—A number of other master painters who gave evidence have made experiments on the durability of leadless paints, because the Austrian Government in inviting tenders specify either a pure lead or pure zinc paint, or they state that the paint must last a given number of years, generally five years. If five years is specified, it means practically a pure lead or chiefly lead paint.

14,240. (Mr. Sutherland.) That is the Government specification?—Yes, in inviting tenders.

14,241. (Chairman.) Do I understand that the Government contracts stipulate that the paint should have a duration of five years?—None of these master painters made scientific experiments, but practical experiments, and they invariably found that if they wanted to guarantee the paint to last three to five years, they had to use exclusively white lead; otherwise they could not guarantee that durability.

14,242. I am still rather in the dark as to what experiments they made?—Obviously they made experiments by making outside paints with other materials, and found that these other paints did not last.

14,243. That is the obvious interpretation; but was that kind of evidence given to the Austrian Commission?—The master painters of Vienna stated that for outside paint white lead was absolutely necessary. On the other hand, the master painters of Galicia, one of the northern provinces, stated that quite satisfactory results might be obtained with zinc white. The contracts for Galicia do not require paints of such high quality, as altogether Galicia is very backward.

14,244. You have not told us what kind of experiments the master painters made, and for what duration of time, and to what extent they were under inspection before they were condemned?—Mr. Meissl and other painters found, by practical testing, that zinc white was seen not to last after three years. After three years a zinc coat perished, whilst they found that the lead paint was still good after eight years. It began to perish after eight years.

14,245. Do I understand that the practical evidence was based on Mr. Meissl's examination?—No; Mr. Meissl and other painters.

14,246. But I want to know what experience the other painters had had. I do not want a mere statement that other master painters have said that zinc paints are impracticable. I want to know on what they based their decision?—No scientific experiments were made, but all the experiments and all the evidence are based on the result of fulfilling Government contracts or other painting contracts. It was frequently observed that zinc white was easily wiped off by very slight friction after three or four years, while this was not observed with lead. Lead might be relied on for a very much longer period. All the evidence is based on the results of these contracts with practical painting, but not on scientific experiments.

14,247. If the Committee desire it, could you furnish us with the evidence of the witnesses in respect of what you have just told us?—I can give you, in detail or in extract, the full evidence before the Austrian Commission or before the Berlin Board of Trade, dealing with the question of paints.

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[Continued.]

14,248. But dealing with the question of the durability of the trials of leadless paints?—I find that an inspector of the Austrian State railways has made experiments with leadless paints, and found that surfaces coated with leadless paint showed after a very short time (the time is not stated definitely) fissures and ruptures, and the coat was pervious to moisture, and the rain came through the roofs of the wagons which had been painted with leadless paints, whilst this was not the case with lead paints. I have here a very long report on experiments by Mr. Meissl on the respective durability of white lead and zinc white, but I think it is not necessary to give you this, because I think that Mr. Meissl will be here to-morrow to give you it himself.

14,249. Quite so?—The report says that other experts from Vienna, who had been called before the Commission, and master painters stated that they had nothing to add to the statement of Mr. Meissl.

14,250. Were the master house painters heard verbally and cross-examined on their experience with lead-free paints?—To these experts who were called a series of 43 questions was put. Every one of the experts present remained in the room and was entitled to cross-question the witnesses. Also the members of the Commission cross-questioned the witnesses. Mr. Meissl appeared for the painters of Vienna and gave a full statement. All the other painters said they had nothing to add to this, with the exception of a Mr. —, who made an added statement.

14,251. Do I understand that Mr. Meissl was the only witness who was really examined or cross-examined?—With the exception of Mr. —, Mr. Meissl was the only one who gave any lengthy evidence.

14,252. I did not specify lengthy evidence. I want to know if he was the only one who gave evidence, and if there was other evidence, what that evidence was?—The other evidence was from Mr. —, that he had two houses in Lemberg, one of them coated with white lead, and after five to six years the coating of paint was quite capable of being washed, and it withstood the washing quite well, whilst a house in the same neighbourhood had been painted with lithopone, but the lithopone had not worn as well as the other, so that the owner of the houses noticed the difference after a very short time.

14,253. "Short time" is too vague. What was the time?—The words used are "after some time."

14,254. That is not much use to us?—There is a further piece of evidence. In a similar case, a painter in Lemberg had painted his kitchen with lithopone; after nine months the coat of paint could be wiped off with the dry hand.

14,255. Are we to understand that the only evidence adduced before the Austrian Commission was that of a Mr. Meissl, who, I suppose, was the representative of the house painters?—And these two illustrations, one of the man who painted the outside of his house somewhere in the country or in the provinces, and the other of a man who painted his kitchen both with lithopone. All the other evidence is confined to a statement that they fully agree with Mr. Meissl, they give opinions without scientific experimental foundation.

14,256. (Mr. Sutherland.) Were the other witnesses present when Mr. Meissl was examined?—Yes, all the members of the Commission and all the witnesses were in the room, and they were all entitled to cross-question.

14,257. He spoke on their behalf?—He spoke on their behalf, and said they had nothing to add. I wish to add that there were a number of other experts present, such as Mr. Andes, the owner of a paint factory, and a Mr. Stehly, the owner of a zinc white factory. They made statements that lithopone or zinc white might yield very satisfactory results, but they gave no definite evidence. I wish to emphasise that these other gentlemen do not produce definite evidence; they only say that it answers.

14,258. So that, balancing one with the other, there is nothing left. Is that it?—I wish to emphasise that I attach particular importance to the evidence given by the master painters, but very little importance to the evidence given by factory owners.

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14,259. But have you not told us that you had no evidence from master painters?—Evidence from Mr. Meissl.

14,260. (Chairman.) Has any Austrian Government Department given leadless paint a trial on a large scale, as the British Office of Works have done?—The Austrian State Railways made practical experiments, regarding which I have already quoted the report of an inspector.

14,261. The following experiments have been made on a large scale in England with leadless paints which have proved eminently satisfactory. The Savings Bank in London was painted in 1906 inside and outside with zinc paints, and was reported to be in excellent condition in 1910. A large number of post offices and sorting offices in the London district were also painted with zinc paints, and were eminently satisfactory. The top structures of the Orient Steamship Company's liners, the Royal Yacht Victoria and Albert, and the Medina, on which their Majesties are at present travelling to the East, were all painted with zinc paints. Railway bridges and station roofs, for example those at Charing Cross and Cannon Street, are painted with coal tar, silica, graphite, and other such paints. Various gasometers and other iron structures have been painted with zinc and iron oxide paints. The exterior of the London Stock Exchange was painted with leadless paint; the results are reported by the official architect as being very satisfactory. Do you think that experiments made on such a large scale should weigh with this Committee in regard to the efficacy of leadless paints? I might also add that the Midland Railway Company's carriages and wagons have been painted with leadless paints since 1904, and the Daimler Motor Car Company paint with leadless paints, and the Bradford Corporation Trams are painted with leadless paint. I emphasise the New Savings Bank, because that was the experiment upon which the Office of Works decided to abandon the use of lead. The point is this: if the Office of Works in England, on the strength of experiments, consider it good enough to agree in the future to abandon the use of lead, do you not think that a very strong argument for this Committee to consider?—Before I answer that question, I wish to state that I think that for outside purposes, the only thing which is necessary is that the final coat is lead paint. The other coats can be zinc paint or some other paint. The only thing necessary is a final coat of lead paint, which will resist moisture and other influences. The primary coats can be some other material than lead. I wish to know whether, in all these cases which you state, the final coat was free from lead, and also whether the paints which were used and might have been sold as leadless paints had been analysed for freedom from lead.

14,262. (Chairman.) All the paints were analysed, and proved to contain no lead whatever, and all the coats, including the final coat, were non-lead?—I wish to state that while these experiments seem extremely important, and coincide with the results obtained by the Dutch Commission and the French Commission, they are in flat contradiction to the results found by the German and Austrian Commissions, and I think that all the chemical evidence is strongly against the possibility of such results as these experiments show; and Dr. Ragg, an English scientist, thinks the results of the Dutch and French Commissions, which coincide with these results, are somewhat to be doubted, and not to be taken as final. The experiments are not done on a sufficiently large scale to be conclusive. Dr. Ragg, of Woodford Green, Essex, maintains that the results of the Dutch Commission and the French Commission are not to be taken as valid. The evidence is inconclusive.

14,263. But do you know anything about Dr. Ragg?—Nothing whatever.

14,264. But you have not come here to quote Dr. Ragg as an authority, have you? We do not want to know your opinion of our English doctors, but we want evidence of what has happened in Austria?—I wish to state that, as I am a medical man, I have to obtain all my chemical information, so to speak, second-hand from other people, and as Dr. Ragg's

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results, which are chemically obtained, coincide with the practical results obtained by master painters, I have to take these results as conclusive.

14,265. Master painters in Austria?—Yes.

14,266. We could produce a hundred, or many more, English doctors who would give precisely an opposite opinion to that given by Dr. Ragg; do you not think that these practical experiments, concluding with the determination of the Office of Works to abandon the use of lead altogether, should weigh very much with this Committee? I will read out this certificate from the Office of Works: "In 1902 Sir Henry Tanner" (who is the head of the Office of Works) "began experiments on Patent Office roof." Mr. Paterson, who signs this, says, "I commenced to use it in 1904; thought it bad; was told to pursue experiments; did so; and these warranted us using it for a comparative test on a large scale at the Savings Bank in 1906—see schedule. In 1908 we were so satisfied with the results—he does not put that in, but that is what he means—"that a general order was given to specify zinc paints. In 1911 the London Schedule gave zinc as base of all paints." That is the determination of the Office of Works in England after the experiments which they made. In England we have passed the experimental stage?—I wish to state that similar experiments were carried out in Germany and in Austria, and I have here the Decree of the Railway Office in Berlin of the 23rd September, 1907. It is a notice to other places where they build wagons: "After thorough experiments lasting several years we have definitely found out that paint free of lead, in particular lithopone and mineral white, will not do to replace white lead, in particular for painting wood and other parts of railway carriages. Therefore lead-free paints are not to be used in future, and only any stock of lithopone or mineral white which may be in hand is to be used. In future white lead is to be used." I wish to state that in 1909 the Public Health Office sent out a circular to the various States requesting them to enforce laws to restrict the use of lead paint as much as possible. Experiments were made, and in 1911 they published, that, for outside purposes, their experiments were not conclusive. Again in 1911, in Bavaria and in Würtemberg, they prohibited the use of lead for inside paints, and for public buildings the use of lead paints inside is prohibited in all the States of Germany now. For outside purposes the use of lead is continued.

14,267. What are the exact words you used about the trials of leadless paints?—The use of lead paints to be restricted as much as possible.

14,268. What do you mean by the results of experiments with leadless paints in 1911 being inconclusive?—The words used are, "they have not so far given a conclusive result."

14,269. What does that mean?—I cannot add to what I have said that the experiments were conclusive as regards inside painting; but with regard to outside painting the evidence does not lead to any conclusion.

14,270. Then that does not come to any conclusion either way—either good, bad, or indifferent?—Not either way—good, bad, or indifferent.

14,271. Thank you. That is what I wanted to know?—I wish to state that the request of the Government to restrict the use of lead paints coincided in time with an international movement for the protection of the working men, particularly to fight lead poisoning and other industrial poisonings, and they concluded their communication with the request to prohibit the use of lead paints entirely for inside purposes, and that all lead paints used should be labelled as containing lead and poisonous.

14,272. (Dr. Collis.) Is that a request by the International Association to the Austrian Government, and did they practically adopt that, and is that the reason why they did not go outside?—This communication was sent to all the Governments, and on this communication the German Government issued a note saying that the use of lead paint was to be restricted as far as possible.

14,273. And their regulations are based on that request?—Yes. I wish to state that I sat on the

Committee which published this report, and they arrived at the same conclusion as the Austrian Commission, and found that for inside purposes lead-free paints were quite as satisfactory as lead paints, and should be used exclusively, whilst for outside paints this Committee did not arrive at definite conclusions, as they considered the evidence was not yet quite clear.

14,274. (Chairman.) They came to no definite conclusion?—Yes, for inside paints.

14,275. But with regard to outside paints, the conclusion they came to was that it was not yet quite clear whether or not zinc paint could be used?—Yes.

14,276. In other words, that their experiments have not been sufficiently progressive?—Exactly.

14,277. Could you tell us the composition of these leadless paints that were used, and what you mean by zinc white?—Zinc white is zinc oxide.

14,278. (Mr. Sutherland.) Have you used zinc sulphide outside?—I have no experience of zinc sulphide having been used at all outside. My only experience is either with lithopone or pure zinc oxide.

14,279. (Chairman.) Is not the only conclusion to be drawn that the Austrian State Railways and others have not had as good zinc paints as the Midland Railway and the Daimler Motor Car Company and His Majesty's Office of Works?—I have on this point only second-hand evidence. My general experience is that the paints used in Austria are very much purer, as they work from a very pure zinc ore, and that the English zinc paints used frequently contain quite considerable percentages of lead. The Austrian ones are quite free from lead. But this is second-hand evidence.

14,280. Can you tell us whether a suitable medium has been used?—The mixing of zinc paints is generally identical with the mixing of lead paints. The zinc oxide is always mixed either with pure linseed oil or linseed varnish—that is, linseed oil with an added drier, such as a lead soap.

14,281. In England the advocates of leadless paints consider that a different medium is absolutely essential?—I want to know then what medium is used if you do not use linseed oil, as they use for white lead.

14,282. Generally speaking, a refined boiled linseed oil, liquid driers and varnish?—That is identical with the Austrian procedure, but they use also boiled linseed oil for white lead.

14,283. And liquid driers?—The English way of mixing paint is very much the same as the Austrian, as they use for white lead always boiled linseed oil, to which you have added 1 to 2 per cent. of lead to form lead linoleate, and you also frequently add to the paint manganese borate, or manganese linoleate.

14,284. I note that you have put, in paragraphs 14,197-9, particulars of the amount of lead used in the whole of Austria. Your statistics regarding lead poisoning cases, however, refer to Vienna only, do they not?—I give the amount of lead used in Austria, and also the amount of lead used in Vienna. The statistics of lead poisoning cover Vienna only. They correspond with the amount of lead used in Vienna only.

14,285. Can you tell us if the sickness insurance scheme covers the whole of Austria?—The insurance holds good all over Austria, but the figures given cover only Vienna.

14,286. Then I shall confine my questions strictly to the city of Vienna?—Exactly.

14,287. In paragraph No. 14,211 of your evidence you summarise the Regulations of 1909, which have been in force in Austria for the last 2½ years. How is the observance of those regulations enforced in Vienna? Can the Government, for example, satisfy themselves that the prohibition of dry rubbing down is observed?—There are a great number of factory inspectors, a greater number than in England, who control all these painting places. Secondly, every workman can denounce his employer if there is any dry rubbing, either through his trade union, or else through the insurance society, or else through the member of Parliament for his district, because in every working place there is a copy of the regulations, and a man is compelled to give information against his employer.



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14,288. Is there any liability attaching to the employee if he does not denounce his employer?—I am not certain whether the employee can be fined, but the employer is invariably fined if dry rubbing down is done.

14,289. Can you tell us whether there are any statistics to show whether the employees have so denounced their employers in any instances?—There are no definite statistics, but I know a good many cases of employers having been denounced by their men either to the trade union, or to the inspector, or to the insurance society.

14,290. Can you tell us whether there have been any prosecutions in consequence of the intimation given by employees that the employers were breaking this rule?—Invariably prosecution takes place according to the regulations in every case where a man gives notice with regard to his employer.

14,291. You told us just now that there were more factory inspectors in Austria than there are in England. Can you tell us the number of factory inspectors in Vienna?—I am not able to give the exact figure.

14,292. Can you tell us how many factories and workshops and other places there are to be inspected by these factory inspectors?—I am not able to give the precise figure, but I have it from the Report of the Basle Convention for the Protection of Working Men that Germany has the biggest number of factory inspectors per factory, and Austria the second biggest number.

14,293. In Europe?—In Europe.

14,294. Then England only comes in third. We have in England, as you may be aware, 200 factory inspectors to inspect a quarter of a million factories and workshops. How does that compare with Austria?—I can only state that in Germany there are 600 factory inspectors, and whatever the number of factories is the industrial state of the two countries must show that the number of inspectors per factory in Germany is very much greater than in England.

14,295. Could you furnish us—not now, but at some other time—with the exact figures as to the number of inspectors in Germany and Austria, and the number of factories and workshops they have to inspect?—I shall be very pleased to send you accurate figures from Berlin.\*

14,296. Thank you, they will be very valuable. Can you tell us how often the inspector visits a place where painting is being done?—I cannot say how often the places are visited, but I think that the control is quite insufficient, and I think it highly necessary that for places where lead paints are made or where painting is done, you should employ auxiliary inspectors who only deal with this kind of inspection.

14,297. Could you tell us how often these auxiliary inspectors should pay a visit to the places where painting is in progress?—I think it is impossible to fix how often they should call. I think that inspection is much more necessary in places where lead paints exclusively are used, but I think it highly necessary that the inspection should be quite irregular, so that the people inspected cannot prepare for the coming of the inspector. Particularly, I think it necessary to inspect far more frequently in the summer, as very little painting work is carried on during the winter.

14,298. How does the inspector know when and where house painting operations are in progress?—The master painter is compelled to give information to the inspector regularly when there are any new buildings to be painted, of how many men he sends there, and at what time his men are there. The inspector must always have full information where the men of any master painter are working. If this information does not come regularly to the inspector the master painter is liable to a fine.

14,299. Do I understand that in respect of every job, however small, or however large, the master painter has to send a notification to the factory inspector, giving him the places and the number of men, &c., who are sent to undertake the work?—I think that I cannot quite settle this question because

small jobs are hardly inspected at all. I think that inspection of such small things is unnecessary. Information is only given on big buildings. I would not definitely say that there is no control.

14,300. But there is a possibility of very grave results if the small jobs are uninspected. They may be continuous, though small?—I think it extremely improbable that any working men would be without inspection for any length of time because a man would have a small job one day, but the next time he would probably be at work on one of the big buildings.

14,301. But supposing, as is the case in England, that men are kept continuously at work on small jobs, how would such men be inspected?—These inspectors also visit the small paint shops and odd places where painting is carried on, but the inspection is not nearly so frequent as in places where lead painting is done on a large scale and continuously.

14,302. Has the inspector the right of entry into private houses?—I do not know whether there is a definite right for the inspector, but the question has never been raised, because when any inspector comes to any house in Austria, saying that he comes from the Government, he is always admitted without question. Of course, it is very different from here.

14,303. I do not know whether to say "Happy Austria" or not?—I have done a good deal of inspecting myself, and I have never yet been refused admission.

14,304. I am sure that could not prevail in England. Have you ever heard the saying that an Englishman's home is his castle, and he is very jealous about protecting that?—I think that the Austrian esteems his own house quite as highly as the Englishman, but he is always willing to subordinate private interests to public interests.

14,305. Next, with regard to the prohibition of the use of lead for interior painting. Is this distinction observed in your opinion in Vienna?—It is carried out quite strictly, partly by the inspectors mentioned before, who will visit places, and sometimes even carry testing water, that is sulphuretted hydrogen water, with them, to test the paints. Also the control is greatly facilitated by the declaration that every vessel containing paint must be labelled as lead paint and poisonous, provided there is lead in it.

14,306. Are you aware that Dr. Ramhousek, speaking of the Kingdom of Bohemia in his evidence, states that there is no doubt that large amounts of lead are used surreptitiously for interior purposes?—I am quite willing to believe Dr. Ramhousek's statement that lead is used, and it simply endorses my statement that the control is not nearly sufficient.

14,307. But is it possible that the same surreptitious entry of lead might be introduced into Vienna?—I think that in Vienna extremely little or no white lead is used for internal purposes, because the regulation prohibiting the use of white lead for internal purposes was made at the suggestion of the master painters of Vienna.

14,308. But was not that suggestion of the master painters of Vienna made with a view of mitigating any of the rules that were applied to them?—I think that the attitude of the master painters in suggesting the prohibition of lead for internal uses was quite honest, and not done on tactical grounds, because in every case they did their level best to keep down the number of cases of lead poisoning, and altogether a case of lead poisoning is very costly for the master.

14,309. But do you think that the master painters of Vienna are more public-spirited than the master painters of Bohemia?—I think that the sole difference is due to the better information of the Vienna master painter. In Vienna extensive experiments were carried out, and extensive inquiries, while such inquiries were not carried out in Bohemia on any large scale; and the better conditions in Vienna are simply due to the better information.

14,310. (Lord Henry Bentinck.) Not to the new regulations?—Not to the new regulations.

14,311. To the awakening of public interest in the matter?—It is not a question of public interest, but of better knowledge.

\* See Appendix XVI.

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14,312. (*Chairman.*) But do I understand that that would account for the surreptitious use of white lead in the interiors of buildings in Bohemia?—I think it is simply due to the lack of knowledge amongst Bohemian master painters and lack of control.

14,313. But are not the Bohemian master painters under the same regulations as the Viennese master painters?—The same regulation holds good for the entire Austrian Empire.

14,314. Is the inspection in Bohemia as good as that in Vienna?—The control is the same, but it is insufficient in both cases.

14,315. Then your conclusions are that the use of white lead for interior painting in Vienna is not general?—Not general—very rare.

14,316. How is the provision of washing accommodation secured in every case for fixed workshops and for scattered jobs—particularly for very scattered jobs?—In the case of fixed workshops there is a very efficient control, and there is always provision of proper washing places, but in the case of temporary workshops, as in new buildings, the law only prescribes the provision of portable washing vessels, and it frequently occurs that the provision of these portable washing vessels is insufficient, and any kind of unclean vessel which may contain paint is used. The practice is only carried out efficiently in fixed workshops.

14,317. Is hot water prescribed in the regulations?—I think that only water is demanded.

14,318. In what manner is the rule for the periodical medical examination of the workers carried into effect?—In Austria every workman is inspected by a medical man once every three months, in Germany once every six months. In both cases there is a complete register of all men employed in paint shops.

14,319. Who keeps the register?—The owner of the workshop, but the register is controlled by the factory inspector.

14,320. Who pays for the inspection?—The employer has to pay for the medical inspection. The employer is responsible for the medical control entirely. I wish to point out that there is a similar regulation in Belgium, where every workman has to be inspected. The State pays partly for it, and the rest is paid for by the employers.

14,321. You have told us that there is a register kept of the workpeople who are medically examined. Can you tell us whether the workpeople are at liberty to see what is registered against their names?—I think that the working man has no right to inspect the book.

14,322. Where are these workpeople examined? Take the case of certain men on a job; I understand that they can be examined if they are located in the city of Vienna, but where are they examined when they are working on the outskirts or in country districts?—The contract between the employer and the man is always made in the town, even if the man does work out in the outskirts of the town.

14,323. You say they are examined in Austria every three months?—Yes.

14,324. Have the Government particular doctors who make these examinations?—The choice of medical officer is entirely at the discretion of the employer. The factory owner or the master painter has the right to pick any medical man he likes. I wish to state that I greatly admire the English way of having a sort of industrial medical men who control the statements of the private medical men.

14,325. Is it obligatory on the part of the men to be examined, or is it obligatory on the part of the employer to see that the men are examined?—The employer is compelled by law to provide the medical officer for inspection every three months, and the working man, if he does not submit himself to inspection, is liable to instant dismissal on account of breach of contract, as the three-monthly inspection is part of the regulations, and submission to the regulations is the basis of all contracts.

14,326. Supposing that the working man is put to any expense in getting to the doctor, does he have to pay that expense himself, or not?—The employer is liable for all expenses connected with it.

14,327. Are the workmen furnished with a certificate which lasts for a three months period?—The only certificate is the entry in the register.

14,328. Then how is a man who goes from one firm to another to assure the second employer that he has been properly examined?—The employer can always obtain the information from the Professional Insurance Society. The Insurance Society is run by the Government, and every painter or lead worker will belong to one particular professional society, and the employer can always obtain information from the medical officer of that society.

14,329. Does it ever happen, or can it happen, that any workman has any difficulty in getting employment because he cannot show at once that he has been medically examined by a doctor, probably in some distant town?—I have never heard of such a case.

14,330. If leadless paints only are being used in any particular case in Austria, do you grant an exemption from the regulations?—The workshop where leadless paints only are used would come simply under the regulation which enforces the provision of washing places in any painting or any working place—just under the ordinary factory regulations.

14,331. But such things as medical examination and the prohibition of dry rubbing down, &c., would not be enforced?—The question is not touched on in either the Austrian or German regulations, but in my opinion medical inspection and the prohibition of dry rubbing should still hold good, because there is always the danger of the so-called leadless paints containing a considerable percentage of lead, and also of lead being imported by the presence of linseed oil containing driers.

14,332. Do I understand that there is no inducement held out to encourage painting and decorating firms to dispense with lead altogether?—I think there is no particular inducement, but in Germany they apply certain regulations with the statement, "To apply only if certain processes are carried out." The Austrian regulations do not contain any such provision. According to the wording of the first rule, all these regulations hold good for work in places where lead or lead compounds are used, or paints containing lead—in any case whatsoever.

14,333. It would appear then as though there were exemptions for any master painter who did not use lead compounds?—Yes.

14,334. Would you like to modify your reply in view of that? I take it that it would be the case that if any master painter did not use lead compounds in the way specified there, he would not come under those regulations?—As the regulations stand at present, there is no particular inducement for any firm not to use lead paints, but I think it very important that one should make such a regulation and hold out this inducement to the firms.

14,335. In the pottery industry in England the users of leadless glaze are entirely exempt from all the regulations which appertain to those places where lead is used?—I greatly admire that regulation, and it is very frequently carried out in German regulations and in other Austrian trade regulations, but not in this particular case.

14,336. I note that the provision of working clothes and respirators by the employer, the provision of special rooms for washing and for keeping clothes, and the provision for periodical medical examination only apply in certain cases. What are those cases?—It holds good only in cases where there are 20 or more men employed.

14,337. What does this condition mean? Does it mean where there are more than 20 men employed on one job, or more than 20 men employed by one firm altogether?—As long as the firm employs 20 working men, then these regulations apply.

14,338. Then why has a distinction been made between places where more or less than 20 people are employed?—The regulation has been made chiefly because the employer who employs 20 men is more likely to be able to defray the cost of medical inspection and working clothes and so on. This is in particular a concession to the small employer.

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14,339. Then it practically means that a vast number of working men who are employed by small firms get no protection whatever in this respect?—I think that men employed by the small workshops are quite well protected, because firstly, the small workshops use extremely little white lead, and secondly, there is a great variety of work that a man is probably employed on, and he will consequently work with white lead only at rare intervals.

14,340. But surely one man can contract lead poisoning working by himself just as easily as if he is working in company with 20 others?—But the point is that it is very unlikely that he will be on white lead work for any length of time.

14,341. Are there in Vienna a large number of small master house painters who employ just a few men?—A very considerable number.

14,342. Then I understand that that considerable number of small master house painters are relieved of the responsibilities attaching to these particular rules?—In small workshops the employer is responsible that the men wear overalls at work and head coverings, but the men have to supply their own. With regard to medical provision, in cases of less than 20 employees the employer is responsible that the man is given all information on entering on the work, and at the first sign of lead poisoning he is handed over to the medical man of the insurance society.

14,343. But surely that is a permissive arrangement; at any rate, so far as the small employers are concerned, they are not obliged, unless they employ 20 men, to conform to the regulations that I have just enumerated?—The small man has to provide a washing arrangement.

14,344. You state, in paragraph 14,211, that the provision of working clothes and respirators by the employer, the provision of special rooms for washing and for keeping clothes, and the provision for periodical medical examination only apply in certain cases. Are these not exemptions from the regulations?—To some extent. The washing need not take place in a separate place in the case of less than 20 employees, and the men have to find their own overalls in a case of less than 20. The only real exemption is that the employer need not supply the medical inspector.

14,345. (Chairman.) In paragraph 14,213 you gave detailed statistics of lead poisoning among painters in Vienna. What proportion of these are house painters, and could you tell us what proportion are coach painters?—The division is strictly not house painters and coach painters, but coarse painters. Coarse painters would cover house painters and varnishers, and the varnishers would cover coach painters and painters of small tipped goods.

14,346. (Mr. Sutherland.) Lacquered goods?—Yes, lacquered goods. Three-fifths of the total cases of lead poisoning are amongst the coarse painters (that is the house painters) and almost two-fifths amongst decorative painters—that is, painters who do finer work—whilst only a very small fraction is confined to the varnishers. The varnishers would be the coach painters.

14,347. What proportion of the number of cases which you have given us are house painters?—Some 12 to 13 per cent. are painters—that is decorative painters—and the remaining 87 per cent. are coarse painters (literally layers on of paint in house painting).

14,348. May we take it that 87 per cent. of the figures are represented by house painters, and the remaining 13 per cent. by coach painting and other artistic work?—No; the coach painting itself represents quite a small fraction, something very much less than 13 per cent. The 13 per cent. includes the painters of fine ornamental work in houses.

14,349. Could you tell us what percentage of the men are engaged in house painting, whether it is ordinary house painting or decorative house painting?—Apparently there are three-fifths house painters and two-fifths decorative painters; and varnishers are quite a negligible fraction.

14,350. (Mr. Parsonage.) It is all house-painting work; that is the point?—Yes.

14,351. And coach painting is 1 per cent., perhaps?—It is quite a negligible fraction.

14,352. You are drawing a distinction between the ordinary house painter and the decorator, both working in house-work?—Yes.

14,353. (Chairman.) Are any of the two-fifths engaged in factory work?—No, they are not engaged in factory work. I only mention the members of the friendly societies of the particular guild of house painters.

14,354. Are we to understand that, generally speaking, the whole of the figures that you give us are men who are engaged in house painting?—They might be also painters of bridges. These figures do not cover men in factories, but only members of the painting trade.

14,355. (Mr. Sutherland.) Would railway stations come under this? I do not mean waggons, but the structures?—Yes, with the exception of a very small number who are engaged in varnishing.

14,356. (Chairman.) Can you complete the second column of that table (paragraph 14,213) by stating the number of members in 1906, 1907, 1908, 1909, and 1910?—I have not the figures with me, but I can send them to you from Berlin.\*

14,357. How do you estimate the number of fully employed house painters?—Those men are marked down as such in the insurance society.

14,358. Will you explain to us how these figures in column 1 of the cases of lead poisoning were compiled?—I do not count the number of working days, but the number of men who have worked 300 days, and the number of men is reduced to full workers; that is, workers who have worked 300 days a year. Say, for instance, two men had worked 150 days a year only, these two would be counted as one man.

14,359. (Mr. Sutherland.) It may represent a continually large number of men?—Exactly.

(Mr. Mason.) It is men—days divided by 300, really.

14,360. (Chairman.) This table, paragraph 14,213, shows a decrease in the number of cases. Do you not agree that the rate of improvement is very slow?—I think that the reduction from 5·5 per cent. down to 3·5 per cent. represents a very considerable quantity—a 40 per cent. reduction. The cases of lead poisoning included there include even the very lightest forms of poisoning—cases which might not be called lead poisoning at all in England.

14,361. What do you mean by "might not"? What are the symptoms of a case which "might not be called lead poisoning"?—In my definition of a slight case of lead poisoning, the loss of appetite of a workman is counted as a slight case of lead poisoning.

14,362. So it is in England?—Whilst colic of the intestines, which is a very common thing in England, would be counted as a severe case of lead poisoning.

14,363. (Dr. Collis.) If it keeps a man away from work, we call it a case of lead poisoning if it is due to lead?—I maintain that in England colic of the intestines is 80 per cent. of all the cases of lead poisoning, whilst in Austria it is only up to 10 per cent.

14,364. No; gastric symptoms include loss of appetite as well as colic?—Symptoms showing lead poisoning in the head, such as loss of nervous command, are very much more frequent in England than in Austria, and so I claim that my figures show a very considerable improvement as the result of these measures.

14,365. (Chairman.) It is very difficult now to know how to proceed, because if you are going to belittle these cases that you have given to us, it may affect their importance?—The chief point seems that within four years these measures have brought a reduction of 40 per cent. of all the cases.

14,366. As there is extreme difficulty, I will put it to you in this way: If, for example, we take the first

\* Complete figures have been duly inserted in 14,213.

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three years, 1901 to 1903, the average number of cases per annum is 139, and the percentage is 4.5. If we take the next three years, 1904 to 1906, the average number of cases per annum is 216, and the percentage something over 5. Then I notice that you do not quote the exact percentage for 1906. Leaving out the year 1907, which you suggest in paragraph 14,214 may have been an exceptional year by reason of the fact that the Commission was sitting, we come to the last three years, 1908-10. The average number of cases per annum in 1908-10 was 149 and the percentage 4, which is a fall from 4.5 to 4 per cent. I ask you whether that is not an extremely slow reduction?—I acknowledge that the drop of the first figure, 4.5 to 4 per cent. is only 11 per cent., which may not be very considerable. I wish to add that the Regulations came into force only on the 1st April 1909, although they were passed in 1907.

14,367. Even taking the lowest percentage of lead-poisoning cases, namely, 3.5 per cent. in 1910, this is still very high?—I think that, although the figure is not extraordinary, it is very much higher than a fair industrial risk.

14,368. (Dr. Collis.) You consider it is still so?—Yes, it is still so.

14,369. (Chairman.) I should like to compare your percentage of cases, if possible, with those occurring among painters in England and Wales. The Registrar-General gives the number of painters, plumbers, and glaziers as 221,000 at the last census. What proportion of this number would you deduct as plumbers and glaziers?—Dr. Woodliff furnished some figures to the Congress for the Protection of Working Men against Lead Poisoning, and he stated that among the 170,000 lead workers in England 47,000 were plumbers and the remaining 123,000 were either painters or glaziers. According to this calculation, assuming that you still have the same percentage, of the 221,000 about 163,000 would be painters and glaziers.

14,370. If your lowest percentage of illness cases, namely, 3.5, were applied to this estimated number of English painters—160,000 English painters—it would mean 5,600 cases of lead poisoning per annum?—I think that your comparison is grossly unfair, because the figures which I have given you apply only to the big city of Vienna, and you are assuming the figures taken for a big city for the whole of a country. But I am willing to let you assume the figures which you take for the whole of Austria, not for Vienna, and apply those to the whole of the English painters. The figures for the whole of Austria are between half and one per cent., and if you calculate the number of cases of lead poisoning on that basis, then I am willing to make the comparison. I will compare Vienna with London, but not Vienna with the whole of Great Britain.

14,371. You have not given us the figures for the whole of Austria, I understand, because you cannot do so?—I can do so.

14,372. Then why have you not done it?—I will endeavour to work out accurately what the percentage of lead poisoning for the whole of the Austrian Empire is. There is a statistical work by Dr. Teleky, and according to this the percentage of lead poisoning for the whole of the Austrian Empire is between half and one per cent.—nearer to half than one—and the percentage of lead poisoning is in Vienna exceptionally high, because Vienna is a big city, and a big city naturally has more unhealthy conditions than the country. I have calculated the figures for the whole of Prussia.

14,373. I do not want the whole of Prussia now; I will come to that presently. You say Dr. Teleky has compiled a statistical paper?—Yes, two years ago.

14,374. Would it not be better for us to ask Dr. Teleky to come over to England to be examined?—I am prepared to obtain for you all the figures from Dr. Teleky's book and from the registers of the insurance company.

14,375. But I think that the Committee would much rather have the particulars from Dr. Teleky personally, because if he has compiled the statistical paper we can cross-examine him on that, which is very

important?—I wish to say that Dr. Teleky's paper is more than two years old, and dates back a considerable time. It does not contain any figures for the time after the coming into force of the new regulations.

14,375A. But how are you to collect your figures to submit to us?—From the total number of cases of lead poisoning given in the book and from the number of lead workers on the books of the insurance society.

14,376. Exactly. So that you would get your figures from the tables prepared by Dr. Teleky?—Yes.

14,377. So that it would be better for us to have Dr. Teleky over here. It is rather unfortunate that you did not give us the figures for the whole of Austria in your original proof of evidence. Can you tell us whether the figures for the whole of Austria are collected on the same basis as those for the city of Vienna?—They are all counted on the basis of the insurance society.\*

14,378. Now in paragraph 14,199 you state the quantity of white lead used for inside painting in Vienna and for outside painting in the whole of Austria. Can you tell us the year or years to which that statement relates?—These figures relate to 1904 and 1905.

14,379. Then I suppose that the recent cases in Vienna, namely, 143 in 1909 and 138 in 1910, must, of course, have arisen from outside painting, seeing that the use of lead for inside painting has been prohibited?—I am not prepared to make a definite statement on that point. I happen to have the figures from Mr. Meissl's painting works. He says that in 1909 40 cases of lead poisoning occurred there, which all were the result of outside painting. I have no further figures. I think it probable that there are very few cases from inside painting, but I cannot say that there are none from inside painting on account of insufficient control.

14,380. How do you account for the number being 138 in 1910 when the rules had been in operation, certainly, for a year; in fact for nearly two years?—I maintain that the drop down to 138 from the maximum of 253 in 1906 shows a very considerable success, but although the regulations only came into force in 1909, the cases of lead poisoning started to decrease in 1906. On account of the inquiry the master painters and paint producers were visited a great deal by people who sat on that Committee, and these continual inquiries made the men very careful, and so the regulations did their work practically before they were in force.

14,381. But does not this show that the use of lead for outside painting is still a very grave source of danger?—I do not consider the use of lead for outside painting a very great danger. I think that firstly what cases of lead poisoning there are may be partly due to the use of lead for inside paint where it is not stopped by control. On the other hand the provision of washing arrangements and other sanitary arrangements is not kept up with such thoroughness in the case of outside paint as with inside paint, because generally the danger with outside paint is considered very much less than with inside paint.

14,382. You have told us that the opportunities for smuggling in lead for inside painting are practically nil in Vienna?—I maintain that although some white lead may be used for internal painting in Vienna, my chief point is that it is used internally very much less than it is in Bohemia, and the chief danger with outside paint is that the washing arrangements are not so perfect as they are for inside work.

14,383. Then are we to understand that the regulations in force are not consistently carried out?—You are quite safe in assuming that they are not strictly carried out in every case.

14,384. But it shows at any rate that lead poisoning cannot be stamped out merely by abolishing the use of lead for interior work?—I think that with a good controlling staff it would be possible still by the prohibition of using white lead for inside paint to reduce the number of cases of lead poisoning amongst painters to a number which would constitute just a fair trade risk.

\* Statistics obtained direct from Dr. Teleky are given in Appendix XXXIII.

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14,385. Now you have told us that the factory inspectors in Austria are largely in excess of those in England, and yet, notwithstanding that, you do not consider that there is sufficient controlling influence to insist on the regulations being enforced?—I think that, although the number of inspectors is in excess of the number in England, the number is still very insufficient, and I think it necessary to have inspectors dealing only with this particular branch of industry.

14,386. Now, with regard to German regulations which came into force, I understand, in 1906, how is the observance of those regulations enforced in Germany?—Through factory inspectors.

14,387. Who, I understand, are even larger in number than is the case in Austria?—Yes, slightly.

14,388. Who does the inspection necessary to secure the observance of the regulations in Germany?—The factory inspector.

14,389. Can you tell us how many places, factories, and workshops, and the rest, there are which have to be inspected by these inspectors?—I have not these figures.

14,390. Do you know how often an inspector visits a place where painting is being done?—Every working place must be inspected at least once a year.

14,391. I suppose that answer refers to factories?—This refers to factories and workshops coming under the factory byelaws.

14,392. How does the inspector know when and where house-painting operations are in progress?—The German reports of these factory inspectors show that there is great difficulty in seeing where temporary work is done, as the inspectors only have on their books fixed working places, and they visit such fixed working places and find that the men are working somewhere else. A great deal of delay is caused in this way. The arrangements for visiting temporary working places are not as drastic as in Austria.

14,393. Has the inspector the right of entry into private houses?—This is the same as in Austria. The request of the Government inspector would always be granted at once.

14,394. Are we to understand that the factory inspectors pay visits to the painting which is being done in a private house?—Yes, it may occur that the inspector enters a private house for the purpose of watching work done and the conditions.

14,395. Does the same system prevail in Germany as you have told us prevails in Austria—that the master painters are obliged to send in the names and addresses in connection with painting operations which are being done all over the country in private houses?—The master painter is simply compelled to give the inspector any information he may ask for.

14,396. So that the inspectors, to be cognisant of the different places all over the country where painters are employed in private houses, would have to go to the master painters and find out themselves?—Yes.

14,397. Now in paragraph 14,218, you present statistics of lead poisoning for Berlin and Prussia, based on hospital records. Have you observed that the rate of improvement is very low—only 5·5 per cent. per annum for Berlin and still less, 3·8 per cent. per annum, for the whole of Prussia?—I maintain that the difference between the years with the minimum and the maximum is a difference of 25 per cent., and that on an average it is a reduction of 5 per cent. per year.

14,398. 5·5 per cent. per annum for Berlin and 3·8 per cent. per annum for the whole of Prussia?—It leaves very much to be desired; the slow rate of improvement is due to lack of control, and it does not satisfy me.

14,399. Now these tables, being based on hospital figures, must necessarily be very incomplete?—The collection of figures is complete only for Berlin, but all these hospital cases represent more severe cases, and consequently they give a very definite indication of the total rate of decrease.

14,400. But if they only record the severe cases, there must be a vast number of others which are less severe, and which are not recorded?—To obtain the total number of cases of lead poisoning, it is necessary to multiply the hospital figures by four.

14,401. You cannot tell us among how many painters these recorded hospital cases of lead poisoning have arisen, can you?—This is on about 100,000 painters in the whole of Prussia and about 5,000 in Berlin, roughly.

14,402. But how are these statistics compiled?—The figure of 5,000 is given from the insurance register and the figure of 100,000 is taken from the professional census. In the census every man has to state his profession.

14,403. As with us?—Yes.

14,404. You also give us, in paragraph 14,222, a table based on records of the Sickness Insurance Fund. This shows a similarly slow improvement, does it not?—I think that the improvement is very slow—very much slower than it should be.

14,405. In paragraph 14,224, you lay stress on the favourable position for inspection in England. Are you aware that there are only 200 factory inspectors to enforce the Factory and Truck Acts in a quarter of a million work places?—I think that the conditions are so very favourable for factory inspection, because the factory inspectors are so very much supported in their work by sanitary inspectors.

14,406. You refer to sanitary inspectors as being suitable for enforcing regulations. Perhaps you are not aware that these are officials of the local authorities, and therefore your suggestion would involve the inspection by sanitary inspectors of work carried out by employers who are often prominent members of the local governing authority which appoints the sanitary inspectors. Would not this be open to very grave objections?—I do not see that this is any new difficulty at all, because the sanitary inspectors are also inspectors of houses, and frequently their duty might bring them into conflict with a house owner or with an employer who is a member of their county council in the same way; I do not call it a difficulty, because you have the same difficulty in all ordinary work.

14,407. If a large number of the employers of labour themselves prefer prohibition to a cumbersome and irksome code of regulations, what should you say to that?—I think that whatever you do, even if you prohibit lead for inside only, you will still have a fairly complicated set of regulations, because you must control outside paint, and for inside paints you must secure the paints being really free of lead, and I think it extremely difficult to see what this Committee can do.

14,408. But that is not quite an answer to my point. Supposing that a large majority of the witnesses before us, employers, prefer the prohibition of the use of lead to a set of irksome and cumbersome rules, what would you say to that?—I think that the question resolves itself into this—whether you prefer the interest of possibly public health and the health of the workers to the interests of the lead industry on the one hand, and whether there are possibly other interests involved in the lead industry. And even if you do prohibit white lead altogether, you will be compelled still to have control to test that the paints are actually free of lead.

14,409. (Dr. Collie.) I will just take the pages about which I am going to speak and give you the sections—first, paragraph 14,199. You note that it is there stated that the number of lead poisoning cases among painters in Vienna for inside painting is about 163 cases, and I notice that 163 cases in the table on the previous page is the total number for the year 1903. In the same paragraph, 14,199, at the end, it is further stated that these cases are for inside painting, and that there were 50 additional cases in Vienna for outside painting. Should the number for Vienna not be 163 in the previous table, but 213?—It is an average figure. It is not for 1903. I will give you the years for which it is an average figure if you want them.

14,410. I will leave that point, as it is only a small one. In paragraph 14,202 on the same page it is calculated that, of 163 cases of lead poisoning in Vienna, not more than 48 were due to simple painting. Does this mean that even if all dry rubbing down was entirely abolished still those 48 cases could not be got

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rid of?—I obtained all these figures simply by inquiring from the various master painters in Vienna and from the men themselves.

14,411. In other words, you cannot answer the question?—If the dry rubbing down had been abolished, I am not prepared to state that there would not have been 48 without experimental evidence.

14,412. Do you think the number of cases of lead poisoning increases when fresh men are exposed to the attacks of lead?—I think that the bringing of new men to lead labour is increasing the chance of lead poisoning by subjective causes—that is, inexperience or lack of cleanliness in working and thereby an increase in lead poisoning is possible by bringing new men.

14,413. Have you noticed in your table (paragraph 14,213) that there is a great increase of the number employed in the year 1903 as compared with 1902?—Some increase is due to a new way of counting. In 1901 the figure has been taken as the number of men in the union on a particular day. From 1902 onwards it is the number of men working days divided by 300, counting only full working men, that is, men who have worked 300 days in the year, as I think I stated before.

14,414. If we calculate the number employed in the following years up to 1909, calculating from the percentage of cases as against the number of cases given (working backwards) it would appear that the amount of work done has been stationary, or even going back during those years. That is to say, that the men employed have been a constant factor among whom you would expect a steadily decreasing number of lead-poisoning cases as this permanent staff became, as we know they do, more immune from the influence of lead?—I do not know of any immunity against lead, even with long use to it. Secondly, amongst these men there would still be a natural change, old workers dying and new men being employed, and you would still have the same number of men unused to the work, and men who increased the subjective danger of lead poisoning. There being no immunity, the number of new hands coming in, thereby keeping up the subjective danger of lead poisoning, it is not fair to assume that the danger would automatically grow less with a stationary number of workers.

14,415. With regard to white lead factories, the regulations stopped women being employed. Men took their place, men being known to be less prone to lead poisoning than women, and the number of cases reported annually increased by leaps and bounds, till we had four times as many each year notified as we had previous to the regulation stopping women from working in white lead. With regard to the years which we are discussing in this table, the number of working days apparently in 1909 is more than 100 less than in 1907, which shows a fair reduction and slack work. You can calculate that?—The amount of painting work done is strictly proportionate to building work done.

14,416. The same point holds good. There is a decrease in the amount of employment, and you would expect an automatic decrease in the number of cases out of proportion to the absolute numbers. Increase of employment and quicker work send up the cases of lead poisoning quite out of proportion to the number of men employed. Similarly, decrease of employment and slack work cause a more rapid decrease of lead poisoning than the absolute number of men employed would show?—The reduction of the numbers of men working in 1909 is not simply a reduction of the number of hours worked, but is only a reduction of men working. The men who did work in 1909 worked their full hours as before, and the other men were simply made unemployed.

14,417. When speaking of the cases in Germany in paragraph 14,223, you draw attention to the decrease in the percentage of days of sickness. Turning to paragraph 14,213, and taking the comparative years which you have given us, starting with 1903, I notice that the days of illness per case have risen since 1903 from 20 to 22 in 1910, passing through the following figures—for 1904, 21·6; 1905, 19; 1906, 22; 1907,

23; 1908, 23; 1909, 20·8; and the full year of regulations 22·2. How does that bear out the statement that the regulations have been beneficial?—I maintain that paragraph 14,223 only refers to the total number of days of illness, not the number of days of illness in any individual case.

14,418. But then on my point of the total number of days for each individual case, it seems to show that the individual cases are more severe?—I maintain that the difference of 21·6 to 23 is quite immaterial. The chief thing is that whilst you have in 1905 a total of 3,763 days of illness, in 1910 you have it down to 3,155. That is a decrease of 600. From 21·6 up to 23 is so small a difference as to be immaterial.

14,419. It at any rate shows that the severity of the cases has not diminished. Do you think that it has diminished, because I understand the paragraph to mean that?—I am quite willing to acknowledge that these figures do not show a decrease in the severity of the illness, but the chief thing is the total number of sick days have decreased, and that is the chief economical result of these new regulations.

14,420. You do not think that, generally speaking, the severity of the cases has diminished?—Not from these figures. The figures do not show it.

14,421. With regard to paragraph 14,222, what does the last column "Percentage of days of lead sickness" mean. I cannot gather its meaning—percentage of what?—It is badly stated in the heading. It should be "number of days of lead sickness per 100 workers."

14,422. That is very different. I absolutely misunderstood it. So that what is claimed to be the effect of the regulations in Austria and Germany is a reduction of the total number of cases, but no alteration of the severity of the cases. I want to get that quite clear?—Yes.

14,423. Then in Appendix XV., in the table on lead poisoning among painters in Prussia, the regulations came into force on the 1st January 1906. There appears to be a marked decrease in the first year, but after that the decrease becomes very gradual, and seems to show that the full power of the regulations can now be estimated. Will you tell us whether that is so or not?—I do not think that this quite exhausts the possibilities of regulation, because firstly, in Germany you have not got the prohibition of the use of white lead for inside paints. It will come into force now.

14,424. When?—It is intended to prohibit the use of white lead on inside paints in Germany, and when this comes into force I expect a further decrease in lead poisoning. Further, from 1905 to 1906 you have a very great drop in cases of lead poisoning, because the regulations are now. You have similar results in all factory regulation. A regulation has its greatest benefit when it is newly put into force. Later people get lax in observation and control of the regulation.

14,425. Were more inspectors appointed when the regulations came into force in Germany, and later in Austria, to see to the carrying out of the regulations?—No, no new inspectors were appointed.

14,426. Did the Austrian Commission take into consideration how many cases of lead poisoning occur in factories in the process of making white lead and mixing lead paints ready for use?—Yes, all these figures of lead poisoning in lead factories were taken into consideration—that is in the making of white lead and oil paint ready for use.

14,427. What is the proportion of cases of lead poisoning in Austria due to the use and the preparation of lead paints and the manufacture of white lead for the preparation of lead paints to the total number of lead poisoning cases in Austria?—I have no accurate information on that point. I only know that there are not more than roughly 300 men employed in white lead factories to some 30,000 painters.

14,428. This chart shows the lead poisoning in the whole of Great Britain, for all industries (showing a diagram to the witness.) The second column is for all industries except the use and making of paints. You have seen Dr. Legge's calculations from the total deaths?—Yes.

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14,429. That is founded on those?—The inference is that the total lead poisoning has decreased very rapidly.

14,430. That is so in factories, and due to regulations, as shown by columns for industries with regulations; the column for painters shows no fall at all?—A calculation based on deaths does not give a very accurate result.

14,431. Do you not consider that this is an additional reason for considering seriously as great an abolition of the use of lead in paints as can reasonably be adopted?—I, as a medical man, can only appreciate the question from the public health point of view, and not at all from the economical point of view, and, consequently, I do not think myself entitled to answer the question whether the abolition would be justified on these grounds. On the other hand, I wish to say that I am extremely glad that I have been able to see these diagrams on white lead, and I am very grateful to you for having called my attention to these diagrams.

14,432. When men are busy at their work in the summer, is there any tendency for them, even though suffering, to continue at their work, so as to earn all the money they can during the busy season, and not declare the nature of their illness?—Your experience tallies exactly with what I think is stated in the Austrian report with regard to the concealment by men of symptoms of lead poisoning, so as not to lose the opportunity of work. But whilst they are at work in the summer, they are probably well fed, and do not show the poisoning. You have, tabulated, the number of cases of lead poisoning per month, and when the slack season begins and the men begin to be unemployed, they are underpaid, and consequently underfed, and then symptoms of lead poisoning show. So the withholding of information about lead poisoning is not always intentional.

14,433. In which part of the year is the greatest incidence of lead poisoning in Austria, in your experience?—The figures do not refer to lead only—to the general industrial diseases in January, February, and December.

14,434. We find somewhat the same in factories in England, and there is no seasonal occupation in factories, so that that does not support your suggestion. Then it may happen that men working in summer feeling some illness may continue at their work, and not declare the condition of their health?—Yes.

14,435. Did the Austrian Government establish their Commission because of the International Association requesting them to abolish the use of lead for internal purposes?—The request of the International Association came in 1910, whilst the Austrian Committee sat in 1906.

14,436. Then the Austrian Commission considered that the German regulations of 1905 were not sufficiently strict in that they went one better, and abolished for internal painting?—The difference between German and Austrian regulations is simply this—that in the German inquiry it did not come out that the use of white lead for interior painting was much more dangerous than for outside painting. The Austrian Commission was called on different lines, and consequently gave different results. The master painters who were called before that Commission stated that the chief danger of lead poisoning was due to dry rubbing down of inside painting, and consequently the Austrian regulations have that additional prohibition.

14,437. (Chairman.) When you say master painters, you mean Mr. Meissl?—Yes.

14,438. (Dr. Collis.) Would it then be wonderful, or in the ordinary march of events, for Germany to have regulations in 1905 which were shown on further investigation in Austria to require strengthening by the abolition of lead paint for interior work in 1906. If England three years later, in 1911, found it possible to do away with lead in the same way as France has, we should have definite progress of which Germany and Austria had given us two steps, and we only take the third?—I think it is quite a natural sequel,

provided that you can overcome the resistance of the white lead industry of this country, and provided that you can put a sufficiently high value on the public danger against the damage to that industry.

14,439. (Mr. Sutherland.) You use the term "simple painting." What do you mean by that? It is in paragraph 14,202?—These are cases of outside painting where you simply put on a coat of paint and do not polish.

14,440. How do you think the poisoning arises in those cases?—It all depends on the cleanliness of the workmen. They soil their hands and eat and smoke without washing the hands.

14,441. Do you think that there is any danger to the workman from the vapours given off by wet paint newly applied?—I think that the real danger is that all paint containing linseed oil will give out the volatile turpentine contained in the linseed, and that has nothing to do with lead.

14,442. What is the physical action on the air of a room of linseed oil and turpentine spread over a large surface?—The turpentine will exercise an irritation on the breathing organs.

14,443. Do you think that certain effects of nausea and trouble that painters experience come from the absorption of the oxygen in the room by the linseed oil and paint?—I think that it is quite impossible, because when you have fresh paint in a room, you invariably have the windows open, and the consumption of oxygen by the linseed oil would be so slow as to make it impossible to affect the oxygen property of the atmosphere.

14,444. But if you go into a room that has been shut up, for instance, where it is newly painted and newly varnished, you experience the same effects of nausea that are ascribed to lead?—I think it is quite possible that such a thing may cause nausea, but of a totally different type from the nausea due to lead, because nausea the result of lead would show itself only after a considerable time, whilst the nausea due to linseed oil or turpentine would show itself at once in irritation of the breathing organs.

14,445. Some of the complaints that are ascribed to lead may be due to the effect of the oil and the turps on the atmosphere of the room?—I think it not possible that you might ascribe the results of turpentine poisoning to lead, because the symptoms of lead poisoning are totally different from the symptoms of turpentine or linseed oil poisoning.

14,446. In paragraph 14,201 you say that iron is not commonly rubbed down. It is not rubbed down in the sense that we rub woodwork down, but it is chipped, and that creates dust?—I acknowledge that it is possible to raise quite a lot of dust in chipping iron, but this is never done in Austria. Old paint on iron is invariably removed with caustic soda, or if it has to be removed by rubbing, it is done wet.

14,447. In the case of blistered paint on iron, what do you do?—I do not consider that a possibility. I think that if the iron has been properly prepared, there is no possibility of blisters.

14,448. I understand from you that if the regulations in Austria were more strictly enforced there would be a great diminution of the cases of lead poisoning?—I certainly think it very possible to obtain a very great reduction of lead poisoning by better control enforcing the regulations, particularly cleanliness, and giving the apprentices, the men now to lead work, better information and better teaching of how to work with lead and keep clean.

14,449. That points not to the uselessness of regulations, but to the necessity of their enforcement?—Exactly. All that is required is better control and better information for the new men.

14,450. Then as to the question of cost. If prohibition was to be enforced we should still have to keep up a staff of inspectors to see that it was carried out?—I think that it would certainly still require a very considerable number of inspectors, though possibly not the same number that you would require otherwise.

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[Continued.]

14,451. That being the case, would it not be much more reasonable and fair to the established usages of the trade and in the interest of the manufacturers of white lead to first of all try regulations?—Speaking purely as a medical man, I am in favour of total prohibition; but speaking as a medical man and as a national economist, I am in favour of allowing white lead to continue providing a new set of regulations and very strict control to enforce these regulations. Should these regulations and the strict control fail to produce good results, then there is still time for total prohibition.

14,452. Assuming regulations, would it not help to bring about a change in the incidence of lead poisoning in a more natural way by granting exemption to a painter who made a signed declaration that he was not using lead paint?—I think that the exemption of lead paint in workshops where only lead-free paints are used is practicable, provided that you can rely entirely on the good faith of the employers, and that in case of breach of good faith you can proceed against the employers with great severity. And you would all the same be able from time to time to obtain samples of the paint and the oil and analyse them for freedom from lead.

14,453. The Prussian State Railways have no interest in maintaining lead paint?—The Prussian State are in no way interested in the white lead industry.

14,454. Then the fact that after making extensive experiments with zinc and finding that it would not answer their requirements they abandoned it, is a very great testimony to the value of white lead as a paint preservative?—The decision that white lead was superior to zinc was made in 1907. In 1909 there came a further order from the Government to try to dispense as far as possible with white lead. Experiments were carried on, and in 1911 the conclusion was arrived at that for interior purposes on the State railways white lead should be abolished. For outside purposes it is still being used, but experiments are at present being carried out to test whether it would not be possible to use other paints.

14,455. It is abolished for inside the carriages?—It is abolished for inside the carriages.

14,456. For outside the carriages white lead is still being used?—Yes.

14,457. For the purpose of comparison, what would you take as the constituents of a lead paint and a zinc paint?—Do you mean the constituents of the white lead itself?

14,458. Take pure white lead and pure zinc?—I do not feel competent to answer the question, as it is purely a practical question. I can only give you second-hand information.

14,459. Have you any figures showing the number of individuals as against cases?—In 1905, in Vienna, there were 198 cases, 152 individuals, and in 1904, 197 cases, and 159 individuals. I have come across cases where one individual had up to four and five attacks of lead poisoning in one year.

14,460. (Dr. Collis.) In the English statistics we never consider that a man can have more than one attack in one year. If a man is notified to us in July of this year, he could not have another attack, according to us, before August of next year?—I follow.

14,461. (Mr. Sutherland.) You make returns of recurring cases?—Yes. The first figure gives the number of cases, and the second figure the number of persons.

14,462. (Mr. Parsonage.) Have you ever instituted any test to ascertain if the volatile vapour from fresh paint gives off lead compounds?—I have never made any experiments myself on that point, but I have heard of some experiments. I have never yet come across any experiments which I would accept as quite conclusive. Personally, I think it extremely improbable.

14,463. Do you think it possible to so improve on the Austrian regulations as to bring lead poisoning down to the average of an ordinary trade risk?—On

account of the poisonous nature of lead, there always will be a certain number of cases in addition to the ordinary factory accidents which may occur in factories connected with any industries, but I think it quite possible to reduce by proper care the number of cases to a figure exceeding only very slightly the figures obtained from ordinary trade risks.

14,464. My question does not apply to factories, but to ordinary house painting. Can you suggest any improvement on the present Austrian regulations?—I think this is possible, provided you prohibit the use of lead for inside paint, and have very good control to enforce the regulations and give the new men entering on the work very full information. Then I think it is possible to reduce the lead poisoning to nothing more than a fair trade risk.

14,465. But the use of white lead is now prohibited for inside work and while it is still used for outside, how can you prevent it being used inside?—With full control.

14,466. That is control that they have not got at the present time in Austria?—I have stated several times to-day that I am not satisfied with the present methods of control.

14,467. You cannot make any suggestions which will improve them still further to make them effective?—I think it possible to reduce the risk of lead poisoning amongst painters to a fair trade risk by the following methods for temporary work such as outside work on buildings, a good provision of portable washing arrangements; the provision of a separate cloak room so that the men change their working clothes and their other clothes in a place free from lead; the foreman superintending the work at this temporary place to be responsible for the use of the washing arrangements, and for changing of the clothes, and generally for the keeping of all these regulations; monthly medical inspection instead of a three-monthly inspection, and thorough information to new men on the dangers of lead. If possible, this information should be given to all apprentices whilst they are apprentices. And all men to be examined medically before they enter on the profession.

14,468. Would you suggest that all men working at the trade should go as apprentices and learn the trade, and be brought up to the risks of it, instead of men being introduced into it after they have grown up?—I think that a proper apprentice system would greatly reduce the danger of lead poisoning. I think that the persons most easily subject to lead poisoning are new men who enter on painting without any previous knowledge, and who simply get the position, as it is called, by submission. This is a way in which labour is put out for public competition on the Continent, and labour may consequently fall into quite unskilled hands, and those unskilled hands are most liable to poisoning.

14,469. (Mr. Gardner.) Following on that answer, are we to understand that in Vienna quite a number of painters have gone to the trade after they have become adults, without previous training?—The assumption is quite justified. Quite a number of men amongst the painters have not been through a proper apprenticeship.

14,470. Is there an apprenticeship system in Vienna?—Yes, there is a proper apprenticeship system and there are proper trade schools teaching painting.

14,471. Can you tell us if there is much more outside painting work in Vienna than inside painting work?—I cannot give any definite information on that point.

14,472. I understand that the Commission which sat were of the opinion that the lead poisoning which was taking place was due principally to inside work, and that there was very little risk run on outside work, and for that reason they prohibited the use of white lead inside?—Yes. There is very little danger connected with outside work.

14,473. Of the cases which are quoted, it is said that three-fourths, taking them roundly, were due to the dry rubbing down of paint. Dry rubbing down



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[Continued.]

has now been abolished, but I find that in 1910, as compared with 1904 and 1905, there has only been a reduction of about a third in the number of cases of lead poisoning. In 1904 it is 197, and in 1905, 198. So that if three-fourths of the cases were due before that to the dry rubbing down of paint, and dry rubbing down has been abolished, how is it that there is such a poor saving?—I think that on the whole for all painting work the number of cases of lead poisoning has decreased some 50 per cent., and not as you say, 30 per cent.

14,474. I did not say per cent., I said a third. You see in 1905 there were 198 cases, and in 1910, 188 cases. That is only a decrease of 60, and you have no inside work done at all. We were told in your evidence in chief that three-fourths of the cases reported were due to dry rubbing down, and now we find only a saving of 60 cases. Now, in reply to the chairman, you said that a case of lead poisoning in Vienna was very costly for the master. Will you tell us in what way it is very costly to the employer?—All the money for compensation is found by the employers and by the workers, and if the number of cases of lead poisoning goes up, then the amount of money to be found will go up, and that comes out of the masters' pocket partly.

14,475. Partly?—Two-thirds out of the worker's pocket, and one-third out of the employer's pocket.

14,476. But that would not make a case exceedingly costly for the employer, if two-thirds came from the worker, and only one-third from the master. You not being a practical man would know very little about outside work. You said there was no rubbing down of outside work. Can you give us any information as to how outside doors are prepared and brought up in Vienna?—Doors are polished before being painted with the priming coat. They are invariably rubbed down wet, and as they are, so to speak, a finer article than the wall, they do not really come fairly under the heaping of outside painting. Outside painting, as I use the term, applies chiefly to walls.

14,477. But between the different coats of paint they cannot be rubbed down wet. What process is applied to smooth the doors down between the different coats of paint?—They are invariably rubbed down wet.

14,478. You referred to a circular which was issued to the Railway Department, asking them not to use lithopone in future, but to use white lead. I would take it from that that what they had been using on wagons and vehicles was not good zinc white paint, but lithopone. Here we look upon lithopone as one of the very cheapest classes of material which can be used. Was the lithopone which was used equal to good zinc white paint?—I have no information on the quality of the paint used; nor the method in which it was used.

14,479. (Mr. Fell.) I want you to give us some reason, if you can, why the percentage of lead poisoning in the case of carriage painters is so small?—Because for varnish work in Austria wet rubbing down is done exclusively; no dry rubbing at all.

14,480. But carriage painting is done under cover in the same way that you do the interior of a building?—In spite of that work being carried on in closed buildings, there is no reason why there should not be wet rubbing down. In 1905, whilst there were 8 per cent. of house painters having lead poisoning, there were only 2·7 amongst coach varnishers.

14,481. Do you mean that the number of painters employed in the coach-building trades is almost infinitesimal?—I said that there is a small number of men only employed in carriage varnishing, but the proportion of lead poisoning amongst those employed is still very much lower than the proportion of lead poisoning in any other kind of painting.

14,482. Do they do no dry rubbing down at all on the wheels or under parts of the carriages?—No, none at all—exclusively wet rubbing.

14,483. Exclusively wet rubbing?—I maintain that all rubbing down of carriages or coaches is done wet, and gives much better results than dry rubbing.

14,484. The evidence we have received from the practical men so far is wrong, then, because they have all stated that it is impossible to rub down curved surfaces and the under parts by the wet process?—I still maintain that in Vienna, according to my information (I am not, of course, a practical man), it is always done in the wet way, with very good results, but at an increased cost.

14,485. What I cannot understand is this: why should you prohibit the use of lead in a room which is only painted possibly once in five years, and yet not prohibit it in a paint-shop where paint is used daily, and you must have an enormous accumulation of lead dust?—I think it does not matter in the least how much a workshop is used. The only thing which does matter is the amount of lead dust in the air, and the amount of lead dust in the air may be very much more in the case of a room which has been painted only once in five years, than in the case of a properly cleaned workshop, which is used continuously. The lead dust may accumulate, but the lead dust accumulating would fall to the bottom, and would be continually removed by proper cleansing, and the amount of lead dust in the air, under proper arrangements would be less than in the case of inside painting where dry rubbing takes place.

14,486. Do you know that in Vienna and in Berlin, where they have very large tramway systems; they have tried substitutes in connection with the tramways?—I only know that in Vienna they have used a considerable quantity of lead paint in their tramways, such as chrome-yellow and chrome-red, but whether they have tried any substitutes, I do not know. I have no information whatever about the paints of the Berlin tramways.

14,487. (Chairman.) Did the Austrian Commission include in their terms of reference an inquiry into coach painting?—The Austrian Commission has enquired into the low percentage of lead poisoning amongst varnishers (that is coach workers) and has found that the low percentage was chiefly due to the wet rubbing which was exclusively resorted to.

14,488. Then it was included in their terms of reference?—Yes.

14,489. (Mr. Fell.) Do you think that if dry rubbing down was prohibited in a coach building shop, there is no necessity for the prohibition of lead?—I think that lead paint in coach varnishing shops would be quite harmless if you resorted to wet rubbing down, and insisted on scrupulous carefulness on the part of the workers.

14,490. (Mr. Mason.) Are we to understand from the expression "carriage varnishers" that the majority of carriages in Austria are varnished on the natural wood?—The term "coach varnishing" is simply a trade name. Coaches over there are generally given first a coat of size, then a coat of dense paint, over that a coat of ordinary paint, and a final coat of varnish. On account of the final coat of varnish, the whole profession is called "varnishers."

14,491. Can you suggest any reason for the increased percentage of lead cases which is almost universal in recent years, though the conditions are practically the same?—I can give no reason for the increase, because there is no increase. The number of cases of lead poisoning has steadily decreased.

14,492. Since the regulations only?—Yes, since the regulations only.

14,493. In the last sentence of Regulation 4 in the Austrian Regulations special exemptions are mentioned. Can you give us an indication of what those exemptions were?—I have no information whether these exemptions have been used in any way or to any extent.

14,494. (Mr. Kinggate.) Might I ask you the constitution of the Commission that enquired into the question of lead poisoning, and whether any coach maker representative was on the Commission?—The Commission was constituted of master painters, working painters (that is workmen), chemists, factory owners, University professors, medical men; and amongst the

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[Continued.]

master painters was included a representative of a carriage factory, a furniture varnisher, and one worker in a coach varnishing shop.

14,495. Evidence was submitted to the Commission that the whole of the work in a coach making shop was rubbed down wet?—Yes; they had first-hand evidence that the rubbing down was done wet.

14,496. All rubbing down?—All rubbing down.

14,497. We quite understand what is meant by rubbing down in England. With regard to the question of sand-paparing of the bare wood when lead colour is first put on, it could not be rubbed down wet because it would raise the grain at once?—The first coat on the wood is not rubbed with sand-paper at all. On the first coat a second coat of paint is put, which is polished wet.

14,498. And on wheels, taking an ordinary carriage wheel?—I assume that this holds good for wheels as well, because wheels are not specially mentioned, and representatives of the coach varnishing firms were present on the Commission and acknowledged that all rubbing down was done wet.

14,499. It costs a lot of money to do it, and it seems very strange?—I have stated that the wet rubbing means an increased cost.

14,500. A greatly increased cost. With regard to experiments on railways, Mr. Sutherland suggested that very extensive experiments have been carried out. Those are not yet concluded, I understand from your statement?—I stated that in 1911 experiments in favour of using lead-free paints for outside purposes were not concluded.

14,501. If it has been proved by the Midland Railway Company that it is possible to do without lead at all in the outside painting of the coach, is it not quite possible that that could be carried out in Austria?—I think it quite possible, but on the other hand, the Austrian State Railways have carried out such experiments, and they did not come to the conclusion that lead-free paints answered as well as lead paints.

14,502. They are still carrying on the experiments?—Yes, experiments are still being carried on.

14,503. You appear here to-day in a dual capacity as medical man and economist. It is suggested that some injustice would be done to manufacturers by the abolition of the use of white lead, and I would like to put it to you from an economical standpoint: having regard to the amount of illness, and the number of deaths caused by lead poisoning, and seeing the great difficulty there is attending the carrying out of the regulations, would it not be in the interest of the country from an economical standpoint to abolish the use of lead, as the health of the worker is more important than the manufacture of white lead?—I have gone for a considerable time into the cost of providing by the community for those who are ill and for those left by death. It is very difficult to say which is the greater value of the two. Any industry, which endangers life has not the same right to consideration as any other industry. I as a medical man, and as an economist, feel myself not capable of deciding which of these two values is the greater, and before stating that the value of public health is greater than the value of the industry, I would like to test whether it would not be possible to make the industry a fairly healthy one.

I wish to add that although at present the balance in favour of public health against the value of the industry may be doubtful, if by improved regulations you decrease the number of cases of lead poisoning considerably, then you certainly increase the value of one side of the balance, namely, the danger of the poisoning, but there is no chance of the value of the lead industry being decreased.

14,504. You will admit, I presume, from your practice, that there are some men very much more susceptible to poisoning from lead than others?—I certainly believe that some people are strongly predisposed to lead poisoning.

14,505. Then whatever regulations you might make, there is still a danger attending the use of lead?—Yes.

14,506. (Mr. Robins.) Do you think that it would be beneficial to have the hours restricted in a paint shop, and only allow so many hours' work by a painter?—I certainly think that the time at work has a great deal to do with the danger of lead poisoning, as in all cases of employment, and particularly in dry rubbing. The amount of lead possibly absorbed would be directly proportional to the time the man spends at his work. If a man who does dry rubbing for five hours a day would get lead poisoning after a month, a man who did it for ten hours a day would probably get it within a fortnight; therefore I think it advisable that for all kinds of lead painting a maximum should be fixed.

14,507. I take it then you agree that overtime should be abolished? Overtime is worked in England extensively?—I am strongly against working overtime in any industry, and particularly so in lead painting. There is a strict regulation against overtime in lead works, particularly in the chamber process, or in dangerous work, and I certainly think that the prohibition of overtime should extend to lead painting.

14,508. What are the hours in Austria?—The average time is nine hours a day.

14,509. What do you think the hours should be reduced to?—If dry rubbing still exists, then you would have to have a fairly low maximum. If dry rubbing is entirely abolished, there is no more reason to have a maximum than in any other trade. If you have ten to twelve hours a day in iron work, you should certainly not restrict the painter to anything below the present nine hours. If you have only the wet-rubbing, there is no reason why he should not work as long hours as other workers.

14,510. (Chairman.) You have told us that there must still be a certain amount of lead poisoning, a considerable amount, in fact, notwithstanding that dry rubbing has been abolished. You also said that you consider that men working in the lead industry should have restricted hours. How do you reconcile those two statements with the last one?—The question of maximum hours has not been considered generally in Austria and Germany. The figure which I gave before of nine hours a day is only an average, and not a regulation.

14,511. Do you not think that it would be beneficial to the men if the hours were reduced, say from nine to seven?—I certainly think that seven hours a day would be much better than nine.

14,512. But I mean in respect to the health of the men?—That is what I mean.

The witness withdrew.

## TWENTY-FIRST DAY.

Thursday, 23rd November 1911.

Present:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary*).

Dr. JOSEF RAMBOUSEK.

Evidence to 14,530 handed in and taken as read; witness then called and examined (through an interpreter):

14,513. I am an official of the Statthaltereı (Government) of the kingdom of Bohemia, one of the most industrial in character of all Austrian provinces. The Statthaltereı is the highest administrative authority (Verwaltungsbehörde) of this kingdom, and as such is the central sanitary authority (Sanitätsbehörde) of the whole province, including Prague. My own duties comprise the direction of all sanitary industrial questions for the whole of Bohemia. I formerly occupied the same position at Klagenfurt, the capital of the province of Carinthia (Kärnten), and as that country is the centre of the Austrian lead-industry, I had the opportunity there of making a thorough study of this subject. In the beginning of 1907 I was called to the Statthaltereı of Prague in consequence of my many years' experience in industrial hygiene, and was at the same time appointed professor of industrial hygiene (Privatdozent für Gewerbehygiene) of the German Technical High School (Deutsche technische Hochschule) at Prague. I am the author of a number of books and articles relating to the subject of industrial hygiene and its various branches, industrial poisoning in general and lead poisoning in particular. Principally: "Verhütung der Bleigefahr" (Hartleben Vienna, 1907), "Gewerbliche Vergiftungen" (Veit & Co., Leipzig, 1911, which will be published in English by Arnold, London, at the end of 1912), "Gewerbehygiene für österreichische Amtsärzte, Verwaltungsbeamte," &c. (Deuticke Vienna, 1909). In this latter book I have discussed all the questions relating to the Austrian legislation upon lead poisoning. I was recently commissioned by the Austrian Government to prepare the Austrian department of the International Hygiene Exhibition held this year (1911) at Dresden.

14,514. In my official position I have the opportunity to become acquainted with the sanitary circumstances of the whole kingdom of Bohemia, as the Statthaltereı of Bohemia has the supervision of all sanitary industrial matters including industrial inspection (Gewerbeinspektorat), being an industrial authority the second tribunal of appeal. The Statthaltereı as such has the right to impose directions and regulations, which are suggested by the referees, as, for instance, by me, in matters of industrial hygiene and industrial poisoning. The organisation of the official supervision and inspection is as follows:—The industrial authority (Gewerbebehörde) of first instance is the district Bezirkshauptmannschaft, under the direction of which the Bezirksarzt (official doctor) inspects the industries for the purpose of enforcing sanitary regulations. There are 106 such doctors in Bohemia, and in Austria about 400. The several districts (Bezirkshauptmannschaften) are grouped into industrial districts of inspection (Gewerbeinspektionsbezirk), each of which is supervised by an industrial inspector (whose duties are technical and not medical) and who has assistants under him. Of these industrial districts of inspection there are only 11 in Bohemia and 38 in Austria. The way in which this machinery operates is as follows:—When any breach of the regulations or other sanitary trouble is brought to the attention of an industrial inspector or official doctor, either by his own inspection or by some

other means, such as a report from the Krankenkasse (Sickness Insurance Fund) he requires it to be remedied. In case of disobedience he informs the Bezirkshauptmannschaft, which in the first instance gives a warning, and for a repeated offence inflicts a punishment. In all cases of appeal the Statthaltereı decides (as a tribunal of second instance), but has also the right to interpose directly by means of the Bezirkshauptmannschaft. The highest authority (*i.e.*, of third instance) for sanitary matters is the Ministerium des Innern (Ministry of the Interior) and for industrial matters the Handelsministerium (Ministry of Commerce), which, in certain cases, act jointly. Official doctors (Bezirksärzte) are all responsible in the last instance to the Ministry of Interior, the industrial inspectors to the Ministry of Commerce, but both are also responsible to the governor of the province.

14,515. It is in this manner that, as an official of the Government, I have been able to collect a mass of information, and from time to time to give suggestions concerning industrial poisonings, especially lead poisoning. I have collected exact statistics of the number of cases of lead poisoning in Bohemia, especially in the lead-colour factories and among house painters, and, in particular, the results of the regulations of 30th April 1908 (which came into force in 1909), which were a consequence of the Austrian Commission which reported in 1907.

14,516. The Sickness Insurance Fund (Krankenkassen) are obliged to give annual reports to the Statthaltereı as to the state of sickness, with a declaration of the cause of sickness by the Bezirksarzt. From these reports I collect all cases which are indicative of lead poisoning and order inquiries to be made and remedial measures to be taken. The regulations of 1908 have been of great use for this purpose, as I am able to put them into force myself and to control their operation through the official doctors and the industrial inspectors. In this manner I have ascertained the following figures of lead poisoning for the kingdom of Bohemia:—

|       |   |
|-------|---|
| 1905: | 106, of which there were about 20 house painters. |
| 1906: | 91, of which there were about 17 house painters.  |
| 1907: | 147, of which there were about 18 house painters. |
| 1908: | 132, of which there were about 24 house painters. |
| 1909: | 89, of which there were about 13 house painters.  |
| 1910: | 70, of which there were about 9 house painters.   |

Of course, these figures are not complete, as a great many cases escape notice on account of insufficient reports. It is also to be remembered that in the last year inquiries were made with much greater exactness than the previous years (1905-1906); nevertheless, these figures (like those of Kamp for Vienna) show distinctly the beneficial results of the efforts made to check lead poisoning, and especially the regulations of 1908.

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[Continued.]

14,517. The effect of suitable regulations, combined with the instruction of the workers, is best to be seen in a lead-colour factory near Prague, which showed 25 lead poisonings when I came here. As a result of my visits there with the official doctor, and the remedial measures effected by me, and the instruction given by me to the workers every year, the figures for lead poisoning show the following decrease :—

| 1906. | 1907. | 1908. | 1909. | 1910.                                      |
|-------|-------|-------|-------|--|
| 25    | 16    | 7     | 2     | 2 (slight poisoning not well ascertained). |

This good result was obtained, although the factory is technically not well arranged and produces red lead (minium, mennige) and white lead every year with unchanged production and management. Similar good results were obtained to my knowledge in a factory in Carinthia, where in the year 1909 there were 30 cases of lead sickness, and in 1910, after the regulations, only 12 cases. I cite these examples, although they refer to factories and not to house painters, because they give exact figures and show well the effect which can be obtained by regulations without prohibition. For the rest, some official doctors expressly mention in their reports, which I have before me, the excellent effects of the regulations, in spite of their not being perfectly obeyed in all respects. This imperfection of observance in Austria is due to the insufficient supervision, owing to the inadequate number of industrial inspectors and official doctors, who have many other duties in addition to these in connection with these regulations. In England circumstances are, I understand, far more favourable.

14,518. Although there can be no doubt of the beneficial results of the regulations, yet the various provisions of the regulations have not been all equally effective. From my observation and information, I have very little doubt that the prohibition of the use of white lead for inside painting is not generally observed. Apart from the difficulty of distinguishing between inside and outside painting, white lead is preferred to zinc white and other pigments for its qualities of durability and covering power, and it is very difficult to discover when it is being used, say, for priming, which is subsequently covered up by zinc white paint. At any rate, there is little doubt that a large amount of white lead is thus surreptitiously used for inside purposes. In my view, this provision of the Austrian regulations, which was due to the special circumstances of Austrian house painting, was unnecessary. The chief danger upon which the Austrian report lays stress is the dry rubbing down. I am of opinion that it was sufficient to have prevented this, as was done in Germany. I notice that the figures for lead poisoning among painters in Germany show a rate of diminution at least equal to that of the figures for Austria, although in Germany there is no prohibition of the inside use. Moreover, experience shows that in the present state of knowledge there is no universally effective substitute for white lead either for outside or for inside use, so that to avoid the expense which repainting would put upon either the consumer or the trade, recourse is had, and is likely to be had, to the surreptitious use of white lead.

14,519. As one whose life study has been hygiene, and whose career has made him familiar not only with the scientific and official standpoint, but also with the actual circumstances of industrial life, I hold a strong opinion that any hasty interference with the natural development of industry for reasons of hygiene is in the highest degree undesirable. All the parts of the industrial structure are so closely inter-related that it is not easy to measure the effect which an interference with one part will have upon other parts. There is always the danger that an ill-considered interference with industry for reasons of hygiene will defeat its own object, and that by the destruction of one industry

those very workers whom it is sought to protect, or perhaps an equally important and numerous body of workers, will be deprived of their livelihood.

14,520. The prohibition of the use of a dangerous article is a mode of dealing with the danger which is, to my view, somewhat childish in its simplicity, and would lead to an intolerable interference with the machinery of civilisation if it were applied to all the substances which are of greater danger than white lead. Danger in varying degrees is an incident of very many industrial occupations, and there are many occupations more dangerous than that of the painter.

14,521. Hygiene must not be merely negative in its action. Its method must be to study all the factors of the industrial situation, and to make a dangerous industry non-dangerous. Science will work by the elimination of dangerous processes, and, in co-operation with both capital and labour, by the regulation of the conditions in which the dangerous article is used. Above all, the danger must be brought to the attention of all who have to handle the dangerous substance.

14,522. Moreover, my study of the matter has shown me that prohibition is always difficult, if not impossible, to effect in the absence of satisfactory substitutes for the dangerous substance. Unless there be adequate substitutes, the use of the dangerous substance will be continued, but it will be used surreptitiously, and this surreptitious use will increase the danger, as those handling it will be the more likely to be ignorant of their danger.

14,523. The question of substitutes for white lead is one which has engaged my attention for some time, and I have closely followed the fortunes of the various pigments which have from time to time been introduced to take the place of white lead. I have noticed that the proclamation of these pigments as complete substitutes has proved to be premature in a double sense, and that the proposed substitute has been found either to be itself poisonous or to be less effective than white lead. Zinc white was said to be a complete substitute, and a great agitation in France ended in the prohibition of white lead, and, to my knowledge, some factories in Germany and Austria gave up the manufacture of white lead. But experience showed that in covering power and durability zinc white is inferior to white lead. Then lead sulphate was introduced from England and proclaimed to be the long-desired substitute; but that was speedily found to be worse than zinc white. Next lead sulphate prepared dry was advocated by the Belgian Chemists' Association as being non-poisonous, but that again has been shown to be deficient in covering power and durability. Then, both by experiments on animals and by unfortunate losses of life, the preparations of lead sulphate were shown to be poisonous. Latest has come lithopone, of which the experience has been equally bad. It is clear that, as was found by the report of the Austrian Commission, we have not yet passed out of the stage of experiment and research; this is perhaps sufficiently proved by the fact that such experiments and researches continue to be made, as indeed is most desirable.

14,524. While dealing with the question of substitutes for lead pigments, I should like to mention that in my visits of inspection in Bohemia I have repeatedly found cases of lead poisoning in zinc white factories, and I am satisfied that the majority of substitutes for lead pigments themselves contain lead. Zinc when unrefined contains much lead, and is thus the more dangerous, as the workmen handle something which they take to be free from danger.

14,525. I may observe that the views which I have just mentioned were expressed by me more fully in an article written by me in 1906, "Verhältnis der Hygiene zu Gewerbe und Handel" (the Relation of Hygiene to Industry and Commerce), and also in other publications by me concerning industrial dangers and the way to combat them. In spite of the many prophecies to the contrary nothing has occurred in the subsequent development of the question which would cause me to modify these views.

14,526. In my view prohibition is only a last resource when the danger cannot be adequately dealt

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with by regulation. In the present state of knowledge, when there is no satisfactory substitute for white lead, the proper way to combat lead poisoning is by effective and thorough enforcement of regulations, especially the elimination of the dangerous process of rubbing down, and, above all, by the instruction of the workers. Owing to the comparative fewness of the inspectors in Austria and Bohemia, and to the difficulty of supervision, the regulations requiring the provision of washing materials and separate rooms for washing, and for clothes are not enforced as well as might be desired. So far as I know them, the British circumstances, where there is a widespread organisation of local sanitary inspectors, and where there are very many more doctors than in Austria and Bohemia, are far more favourable for this purpose.

14,527. I would like to emphasise the importance of cleanliness (the so-called personal prophylaxis), concerning which I am prepared to make detailed suggestions.

14,528. I also desire to lay great stress upon the instructions of the workmen: Provided that you have prohibited unnecessary dangerous processes, such as dry rubbing down, and have afforded the workmen the means of cleanliness, the most important point is that the workers should know the danger of lead poisoning and the means of meeting it; they will then be in the position of other workers in dangerous trades. From one point of view the great importance of all regulations is perhaps the advertisement which it gives of the dangers of lead poisoning.

14,529. In this connection I attach great importance to the *Declarationspflicht*, i.e., the duty of declaring when a pigment contains lead. Such a declaration calls constant attention to the danger of the pigment, and it is especially necessary when fancy names of colours prevent workmen and master painters from knowing that they are handling lead.

14,530. In any scheme of regulations there should also be provision for periodic medical inspection. Wherever there are workshops this is easily effected, but for the painters' trade in general there should be no real difficulty when there is a system of national health insurance, such as I understand is about to be introduced into Great Britain. Here, again, the far greater number of doctors make the circumstances in Great Britain more favourable than in Austria or Germany. Medical inspection is in particular the only way of preventing the repetition of the poisoning which is a feature of this disease. It enables the elimination of those who have a peculiar susceptibility to this disease. In this connection it has occurred to me that it might be possible to require some sort of a medical certificate or licence before a workman is allowed to take up the occupation of painter.

14,531. (*Chairman.*) You have had unique opportunities of watching the way in which the regulations are observed in the kingdom of Bohemia?—Yes.

14,532. How is the observance of regulations enforced?—The observance of regulations is enforced by medical officers and by technical inspectors.

14,533. Do the medical officers do any inspection themselves?—Yes.

14,534. In what way?—The medical surgeons—the officers—can make inspection in every industry. The official medical men have the right to inspect every industry, and particularly the right of inspecting dangerous industries, which they may inspect more frequently if they see fit.

14,535. Are you speaking exclusively for the kingdom of Bohemia?—Yes, exclusively. I was officer in Carinthia seven years ago. Twice I was in Carinthia. Regulations were not in force then.

14,536. Now, in regard to these doctors and inspection. What is the official name for these doctors?—District surgeons.\* I am also a district medical officer, but in the service of the Bohemian Government and not of the municipality, so I am neither confined to a municipality nor to a single district.

14,537. How many of these medical officers are there?—105.

14,538. How many inspectors are there that inspect factories and the private houses where painting is done?—Approximately 20 factory inspectors (in 12 factory inspection districts) besides 12 further subordinate officers of factory inspection (commissaries). These factory inspectors also inspect private places.

14,539. Can you give us the number of factories?—There are about 600-700 big manufacturing establishments, 6,000 "factory" establishments, and about 38,000 "workshop" establishments in all Bohemia; of these about 9,000-10,000 are visited yearly by factory inspectors, and to this must be added the visits of the district surgeons (*Bezirksärzte*).

14,540. How often does the inspector visit a place where painting is being done?—Inspection takes place sometimes rather rarely; as a rule, only for some special reason if the inspector happens to hear that irregularities occur in the workplace.

14,541. Then he does not pay surprise visits?—All the inspections are made, so to speak, by surprise, but there is no definite number of inspections per year fixed. The medical officer has a right to visit these places also unexpectedly, independently of the factory inspector.

14,542. How does the inspector know when and where house-painting operations are in progress?—The inspector can learn this only by inquiry from the employer. The employer is compelled to answer this inquiry.

14,543. Is it a fact that all the inspectors have to go round to the master painters to inquire periodically where painting operations are being carried out?—Yes. They have to make these inquiries themselves.

14,544. Now, in paragraph 14,518 of your proof, you mention the difficulty of distinguishing between inside and outside painting?—Frequently outside painting and inside painting are carried out at the same time, and consequently it is very difficult to decide which paints have been used outside only and which inside, and they may be frequently exchanged.

14,545. You have stated that a large amount of white lead is surreptitiously used for interior work, notwithstanding that it is forbidden?—I am quite convinced of this; I think the existence of this prohibition of inside painting with white lead more dangerous than its non-existence, as it leads to all sorts of underhand dealing.

14,546. I suppose that it is almost impossible for the factory inspectors to be able to find out whether white lead is used for interior purposes?—It is extremely difficult for them.

14,547. Now, if this regulation is persistently broken, how can you be sure that other regulations are being observed?—I think that it is very much easier to enforce the remainder of the regulations, because the remaining regulations all deal with the personal protection of the workers.

14,548. For example, how can the Government satisfy themselves that the prohibition of dry rubbing down is observed?—This can be enforced by surprise visits of the inspector, which would be particularly frequent after cases of lead poisoning in a particular workshop.

14,549. Yes, but then prevention is better than cure. Would it not be better for the factory inspectors to inspect the places before the outbreak of lead poisoning had incurred?—I wish to state that I think I was rather misunderstood. Inspections are made in such places even without lead poisoning occurring there, only if any lead poisoning cases occur inspections become more frequent in such places.

14,550. You have told us that there are 20 factory inspectors, not counting the 12 subordinate officers, and that they have to inquire from the master painter where the different painting operations are being done, and you further stated that these 20 inspectors pay surprise visits. Now, would you consider it a surprise visit if the inspector had been informed beforehand where these operations were being conducted?—In most cases the inspector would obtain a very large number of lists of places where painting is carried out, and he would visit only a very small number of the places on his list.

\* "*Bezirksärzte*" not to be confused with "*Distriktsärzte*."

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14,551. In regard to the number of factories and workshops in the kingdom of Bohemia, it appears from the reports of the Austrian Factory Department that there are no less than 9,013 in Prague alone? That is all the industries, even the small ones.

14,552. But I understand that all these 9,013 are subject to inspection?—The inspector has the right to visit all industrial places, however small, with the exception of home industries.

14,553. Is not the inspector instructed to visit all industrial places?—It is an instruction to inspectors to visit even the smallest places regularly.

14,554. Could we infer this—that if the factory inspector has not asked for information from any master painter, that master painter knows that he is perfectly safe from inspection?—That inference is not justified, because the inspector may make his inquiry at the very last moment, or whilst the painting is in progress, and may go, after having inquired, straight away to the place of painting. The inspector is also able to obtain the information as to where painting is carried out from the police. There are 12 districts with district inspectors, but several of the districts have two inspectors, or even two inspectors and assistants. There are 20 inspectors (above mentioned) in 12 districts, and the number of inspectors increases continually.

14,555. I understand that the number of factories and workshops in the kingdom of Bohemia is about 36,600. In addition to the inspection of these factories and workshops there must be a vast number of private houses where painting operations are being carried on: so that if you distribute the 20 inspectors over the whole area it must be extremely rarely that a surprise visit is paid?—The number of visits is very small, but the precise figure is given in this report. (See my answer to Q. 14,539.)

14,556. Let me give you an illustration: In Carlsbad, according to the 1909 Report, there were 3,943 factories and workshops, and the inspectors visited 288 of these, leaving 3,655 factories and workshops that were not inspected that year. In 1910 there were in the Carlsbad district 4,042 factories (647 of them large scale undertakings), and of these 754 were visited in the course of the year?—The number of visits paid varies a great deal, as the inspectors have also other work to carry out.

14,557. What time would the factory inspectors of the Carlsbad district have for inspecting painting operations in private houses?—The number of visits paid to private houses depends strictly on the way in which the inspector divides up his own work, and he would visit private places particularly, only if he received information from the medical officer that the state of health was bad in some district, or on some intimation from the Government, or some other private information.

14,558. So that however good the regulations may be the difficulty of enforcing them is very great?—Although it is extremely difficult to enforce these regulations, it is my experience that all regulations dealing with the personal protection of the worker are strictly followed.

14,559. Then I think that we must take it that in the kingdom of Bohemia you trust not so much to the inspection by the inspectors as to the good faith of the employers and the employed to keep the regulations?—They do not rely exclusively or chiefly on the goodwill of the employers to keep the regulations, but experience teaches that all employers, or the majority of them, do their best to enforce the regulations.

14,560. But is not that the same thing?—There is no implicit reliance placed on the good faith of the employers, but I think it fair to assume that a test of, say, a number of 10 cases, will show what the state of other factories will be. To test a small percentage will give you a fair indication of the conditions in other places.

14,561. But there is no certainty that the regulations are being carried out from the fact that the inspectors have called to see?—There is no absolute certainty that the visit which shows the state in a few places will show the state in all places; and the time

since the regulations have been in force is not long enough to say with certainty that the regulations are carried out everywhere. But as far as has been ascertained the regulations are carried out well, and with very good results.

14,562. But you will admit that the facts that have been ascertained with regard to the carrying out of these regulations are very scanty?—Bohemia is divided into 12 factory inspection districts, and further into more than 100 administrative districts (Bezirkshauptmannschaften), so that several administrative districts have one factory inspector. The administrative districts are hereafter called sub-districts. An inquiry into every one of these 100 sub-districts showed that the regulations were well enforced in all these 100 sub-districts, or in most.

14,563. I must ask you how you acquired that information?—The Government addresses a circular to the officials of every one of these 100 sub-districts, and they have to report all their experiences. In what way the sub-districts collect their experiences is not always exactly known and not always the same, because in the relatively small sub-districts it is not difficult for the administrative authority to collect experiences. The officers, especially the older ones, are well acquainted with the local conditions.

14,564. That is important: You have stated on the one hand that there are only 20 inspectors to do a vast amount of inspection required by something like between 30,000 and 40,000 factories and workshops, and then when I ask you on what you base your statement that inspection is carried on, you refer to these sub-districts. I want to know in what way the sub-districts proceed with inspection?—In the case of such an inquiry to the sub-districts, the medical officer or the inspector would visit at least 10 industrial places in every one of these sub-districts, and this inquiry would then give detailed reports of 10 industrial places in each of these 100 districts: so you would have detailed information concerning 1,000 places, which would be one-ninth of the total industrial places there. So the Government can get very precise information and exact answers to inquiries concerning particular industries, as in our case about the painter's trade.

14,565. I do not quite understand what procedure is adopted. Does the medical officer or inspector go round to a factory and ask the occupier whether the regulations have been broken?—The medical officer of the sub-district will make personal inquiries into the place, and visit the place to inspect personally.

14,566. But is the medical officer qualified to inspect all the intricacies of the various operations which have to be safeguarded?—Yes; he is competent to inspect any kind of factory. It is even his duty to watch over all unhealthy trades or factories (Reichs-sanitätsgesetz of the year 1870, § 8).

14,567. Are these sub-districts governed by local authorities?—No, this is a misunderstanding; the Bezirkshauptmannschaft (sub-district) has a Bezirkshauptmann as chief, who is subordinated to the Government, so that all these sub-districts are under the government of the kingdom.

14,568. I am extremely sorry to be so wearying and persistent with regard to this, but you have come here to advocate regulations in substitution for the prohibition of lead; and I am very anxious to ascertain from you in what way these regulations are enforced?—I shall be extremely pleased to answer all questions on any one point, or on all. I am very grateful if I can learn the English view and compare it. It is very interesting to me. If it is impossible to enforce the regulation in England it will still be less possible to enforce the prohibition of white lead, especially as long as no substitute is invented for it.

14,569. Now, can you tell us how the provision of washing accommodation is secured in every case in house painting?—There is always a provisional washing place affixed to the canteen at the place where the building process is being carried out.

14,570. But supposing that it is a small job?—In case of only a few men being employed it would be quite sufficient to provide just the few washing basins without any special place to put them, or in case of its

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being a short job, the man might return to his home for the purpose of washing and having his meals.

14,571. Supposing that there are a small number of painters engaged in painting an occupied house?—In that case the employer is compelled to provide washing accommodation, either in the kitchen or in some other place in the occupied house.

14,572. Is the periodical medical examination of the workers carried into effect in the same way as it is in Vienna?—The regulations for medical inspection are the same for the whole of Austria, with the only exception that every big city is divided into a great number of medical sub-districts, and every city will have, for its small area, a very much greater number of medical officers than the country.

14,573. In paragraph 14,516 you point to an improvement as shown by statistics of the insurance funds. You wish us to understand that these figures are very incomplete, do you not?—The figures are very incomplete, because insurance does not specialise on cases of lead poisoning, but puts a number of lead poisoning cases down as other illnesses. I have the original papers concerning this compilation.

14,574. Can you give us any idea as to how many cases are omitted from the tables?—I think that the number might be, perhaps, two or three times the number given, but I do not wish to say so with any certainty.

14,575. I ask the question because the number of lead poisoning cases shown by your table is so much smaller than that given by Dr. Kaup for Vienna?—In Vienna the majority of the lead poisoning cases are treated in the hospitals, and, consequently, every lead poisoning case is put down as such. Further, the insurance is in the hands of a very few big central insurance places, whilst in a country like Bohemia it is not possible to classify the cases so accurately. Also the insurance is spread over a large number of offices. Dr. Kaup's figures will probably be very complete compared with those of Bohemia. Also, all the insurance societies of Vienna have special medical men dealing with industrial poisoning.

14,576. Is it possible, therefore, that the small numbers recorded in Bohemia do not give a fair indication of the whole amount of suffering from lead poisoning?—The figures given by me are only a relative indication of the amount of lead poisoning going on, but the drop of my relative figures will show that there is an improvement brought about by these new regulations.

14,577. If the reporting is so very incomplete, the records may show half the cases one year and only a quarter of them another year. Is not that so?—I think that the figures are a very fair indication of the improvement brought about, because always, not only with regard to lead poisoning but other illnesses with which I have to do, only a definite percentage will be recorded, and I would not have given any figures if I had thought that there would be any danger with regard to the percentage recorded. The only variation is that towards the later years, when the regulations have been enforced, and the declaration of lead poisoning has become obligatory, the number of cases recorded is far more complete than before, and so the figures appear more unfavourable to the result of the regulations than they really are.

14,578. I suppose that it is fair to infer that the number of cases of lead poisoning in the kingdom of Bohemia is not less in proportion than those that occur in Vienna?—It would be fair to state this, comparing the cases of lead poisoning in Prague with those in Vienna, but not for the whole country, because the conditions in the country are very different from the conditions in a big city.

14,579. In paragraph 14,517 you point to a very fine result of applying regulations in a lead colour factory. This is quite similar to the experience in such factories in England?—I think that the results were very favourable. I wish to state that I inspected one white lead works personally for some time, and the cases from 1906 to 1910 were as stated in paragraph 14,517. They dropped from 25 to 16 in 1907, next year 7, next year 2, the year after that 2, and in 1910 the two cases were only very slight.

14,580. I suppose you will admit that the inspection of a factory is a very different thing from the inspection of a large number of indiscriminate houses?—I still maintain that this shows that in every case if regulations are well enforced the regulations will show beneficial results. The chief point conducive to the carrying out of regulations is not control but good information to the workers.

14,581. Now I will ask you this: If a large number of the employers of labour themselves prefer the prohibition of the use of lead to a cumbersome and irksome code of regulations, do not you think that the Committee should support them?—I think it is not necessary to take any notice of such preference on the part of the employers, because if the new regulations are to be cumbersome and make the industry too difficult to carry out, they will automatically give up that industry, and replace white lead throughout by lead-free paints, provided that these other paints will give as good results as the lead paints.

14,582. I do not think that you quite see the point. This Committee is sitting here to deal with the evils of lead poisoning, and what I ask you is this: If the employers prefer the prohibition of the use of lead to a system of cumbersome and irksome regulations, do not you think that the Committee ought to support the employers?—I think that if the employers really prefer abolition to regulations, then there is no further question, provided that the white lead can really be replaced by some other paint.

14,583. I do not want you to go outside my question. I think your answer was that if the employers prefer prohibition there is nothing more to be said?—Yes. The resistance of the master painters is caused only by the uselessness of the substitutes for white lead, which is proved. The greatest resistance does not come from the employers—that is from the master painters but the greatest resistance comes from the makers of white lead in Austria. I wish to add that Austria, and particularly Carinthia, has a very big lead industry, and this is the chief industry of an otherwise industrially poor country, and the prohibition would not only hit the employers but also a very great number of the workers.

14,584. You speak of the absence of satisfactory substitutes for lead. Have you any personal practical experience which guides you in this?—In Bohemia the Government quite recently made inquiries in all the sub-districts whether white lead could be replaced by lead-free paints.

14,585. To whom did the Government apply?—A number of experiments were carried out in Government works and on Government contracts. Other experiments were carried out by big private contractors, and from all districts the reply came that lead-free paints were not satisfactory substitutes for white lead.

14,586. Who supervised these experiments?—These experiments were partly carried out by private contractors and partly by Government works. One of the experiments was the painting of a Government railway station in Prague.

14,587. On what grounds was the opinion formed that leadless paints were not satisfactory?—Chiefly insufficient covering power and insufficient durability.

14,588. Can you tell us anything about the formulas that were used?—Yes, lithopone and zinc paints were used. It is always the same.

14,589. Do you mean that the formula is always the same?—They are very nearly the same, as lithopone contains a considerable quantity of zinc white; but zinc white by itself also was used. The colours sold in our country as lithopone are not pure and contain zinc oxide as well as zinc sulphate and barium sulphate.

14,590. When were these experiments made?—These experiments were carried out during the last two or three years.

14,591. For how long were these trials made before the decision was arrived at?—The paints were tried for two to three years. In a number of cases it was shown, before the expiration of two years, that the substitutes were unsatisfactory. I have the experience

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in Bohemia that frequently colours which are denoted as lead-free contain lead.

14,592. If the Committee have evidence of practical successes with leadless paints, that must weigh with them very considerably?—If you have actual satisfactory results with lead-free paints, then there is no question that you should go over to these lead-free paints, provided that these results are satisfactory and have been conclusively proved to be satisfactory.

14,593. The Office of Works is a great Government department, and they have issued an Order this year prohibiting the use of lead in any of their painting work in future?—Has this Order been carried out?

14,594. It has only just been issued as a general Order, but the decision was arrived at from experiments made by the Office of Works some five years ago, in painting the outside and inside of the New Savings Bank in Kensington, and they came to the conclusion that the substitute was so satisfactory that they could abolish the use of lead in the future. I must say that they have been using lead up to the present time, but we had a notification from the Office of Works yesterday to the effect that the Order had now been issued to prohibit the use of lead throughout their work?—I would like to know the nature of the paint which was used on the Savings Bank.

14,595. I cannot tell you that. I do not think that that is the point. The point is that the Office of Works have satisfied themselves that leadless paint is a good substitute, and on those grounds, and those grounds alone, they have decided to abandon the use of lead in the future?—I have not the slightest wish to uphold the use of lead, but my experience throughout Bohemia and elsewhere is that lead-free paints do not form a satisfactory substitute for white lead, and I am also of opinion that if you have prohibition you will still have great difficulties in enforcing the prohibition so that only lead-free paints are in use.

14,596. I quite agree. I could give you other instances of large public buildings, for instance, the London Stock Exchange, which is painted exclusively with leadless paints, and which is reported by the official architect to be very satisfactory?—I, of course, have to accept the opinion of the public architect, but my experience is quite contrary to it.

14,597. The workmen, if certified by the medical officer as suffering from lead poisoning, are entitled to compensation. If a man is suspended because the doctor is not quite sure whether he is suffering from lead poisoning, or because the doctor feels that if the man is allowed to remain in the employment he may get lead poisoning, can a workman in Bohemia receive compensation?—The working man is only entitled to compensation if he actually is ill, but he never will be stopped from work by the medical man unless he actually is ill. Would you permit me to make a general remark? I would like you to see the difference between English and Bohemian conditions and Austrian conditions.

14,598. In what way?—In Austria they were trying to decide between the question of prohibition or cumbersome regulations, and they had to decide in favour of regulations, because they had to place a very high value on the white lead industry. Austria is otherwise an industrially poor country, and the prohibition would cause a very great industrial loss and general economic disturbance.

14,599. May we assume that if it had not been for the existence of this important white lead industry in Austria the authorities might have decided to prohibit the use of white lead in painting?—I certainly think that the importance of these industries was not the sole factor which led the Austrian committee to the conclusion not to adopt prohibition. The importance of the white lead industry may have been a big factor, but an equally big factor was the impossibility of replacing white lead by any substitute.

14,600. (Dr. Collis.) How many are there employed in the white lead industry in Bohemia?—There is only one white lead works in Bohemia, and that employs some 30 men, but there is a very big industry in the rest of Austria (especially in Carinthia).

14,601. How many men are employed in all the country to whom the regulations apply?—There are some 300 or 400 men employed in some three big white lead works in Austria, but these white lead works are the property of one big white lead company, who also own the lead mines. The whole of these lead works are the property of the Bleiburger Bergwerks Union. That is one big trust company.

14,602. Do I understand that in the whole of the empire of Austria there are, amongst the men working in factories, fewer than 1,000 men employed in the processes that lead to the manufacture of white lead?—There are several thousand men employed in lead mines and white lead works, as there is one mine by itself employing over a thousand men.

14,603. But all the lead ore which comes from that lead mine is not used for making white lead?—No.

14,604. It is used for the recovery of silver and gold; for making lead sheets; and probably you may be able to say correctly that of the amount of lead ore which is raised only one-third goes to make white lead?—I think that rather less than a third is so used.

14,605. I quite agree; I did not want to underestimate it?—I cannot say with certainty, because Austria exports a large quantity of lead.

14,606. What I wanted to ascertain, if possible, was the real importance in Austria, as regards the number of men employed, of the manufacture of white lead, which had, at any rate, an important bearing on the decision of the Austrian Commission not to entirely abolish its use?—It is impossible to say how many working men might be affected by any decree of prohibition, as not only the white lead makers themselves would be affected but also a large number of men in the mines, and also if the mine would lose the outlet for a certain part of its lead it might become altogether impossible to work the mine at a profit. It is impossible to say how far the effects of this decree would go. For example, the whole Lead Mining Union might be ruined in consequence of this. It is not possible to express such things in numbers. It is very clearly put in the ministerial decree given in this report which I produce.\*

14,607. The argument is clearly put?—Yes, the argument.

14,608. Not the numbers?—The principle is set out.

14,609. But it does not state the numbers, because they are difficult to estimate?—This decree contains no figures whatsoever. It only sets out the principle of the way in which this decree might affect other industries.

14,610. Is zinc white made to any extent in Austria?—There is some zinc white made, but only very little, and the interesting part is that several cases of lead poisoning have occurred in the making of zinc.

14,611. I will come to that. Are there supplies of zinc ore in the mines in Austria?—Not a very large number; only some. The zinc occurs together with lead.

14,612. Is it not possible that the manufacture of zinc white might employ a large number of people who would lose their work if white lead was prohibited?—I think that this is impossible, because the methods of manufacture are totally different.

14,613. I did not mean the very same men, but that the total occupation of the kingdom would not be diminished by one manufacturer taking the place of another?—Austria has not enough zinc to cover the demand. They would have to go to Silesia for their zinc, and the zinc industry would go out of the country in that case. There are only quite small zinc works in Austria.

14,614. So that the manufacture of white lead does bulk very largely in Austria as a form of employment?—Not only is it a very important industry, but it is practically the sole large-scale industry of Carinthia, one of the Austrian provinces.

\* See Appendix XVII.



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[Continued.]

14,615. The conditions in Great Britain are very different. Here the white lead industry, compared with all the industries of Great Britain, is not so large. It does not bulk to the same extent, and we have no special place which depends entirely as Carinthia does on the manufacture of white lead?—I should be glad to know if the English conditions are different from those in Austria, which I doubt.

14,616. If the conditions are totally different in this respect, you will understand that that reason which weighed with the Austrian Commission does not weigh very largely with us?—I quite see that this big factor does not exist for an English committee, but I wish to emphasise that this was not the sole factor moving the Austrian committee. It was only one factor.

14,617. Yes, I understand that, but it is one?—Yes.

14,618. In the manufacture of zinc white in Austria, by which method is it manufactured—by the direct or the indirect method?—As far as I know it is generally made by the direct process.

14,618a. We in England, where zinc smelting is done, not for the purpose of making white zinc but for the purpose of making zinc spelter, also get cases of lead poisoning, and we are not at all astonished to hear that in the manufacture of zinc white by the direct method, lead poisoning cases occur?—It depends whether you work your zinc into zinc white from coarse zinc or from refined zinc.

14,619. Does it not depend on whether the zinc ore contains lead?—It is exactly the same whether you have zinc ores containing lead or metallic zinc containing metallic lead.

14,620. In manufacture?—Yes.

14,621. That is what I mean, but the number of lead poisoning cases which occur in the zinc factories surely do not compare with the number that occur in the white lead factories in the manufacture of white lead?—You cannot compare the number in any way. I made the statement merely for the sake of pointing out a rather curious fact.

14,622. Could you tell us anything in regard to employment during the years 1905 to 1910, of which you give the table in paragraph 14,516. Was trade busier or slacker at any of the periods of those years there given?—There has been a steady increase of employment in Bohemia from 750,000 workmen employed in 1905 up to 850,000 in 1909 and 923,000 in 1910.

14,623. All house-painters?—No; all workers.

14,624. But have you any figures concerning house painters only?—I cannot give any figures relating to house painters only. It is a very fluctuating number.

14,625. Trade was bad all over Europe in 1909, and probably there were fewer employed?—The general depression of trade in 1909 does not affect the figures for Bohemia, because the steady increase of men employed was kept up during 1909.

14,626. But you do not know for painters?—No. It only applies to the workers employed generally.

14,627. I ask the question, because in England in 1909 and 1910 (both of which years were bad for lead industries generally) we had, owing to the slackness of trade, a considerable fall in lead poisoning cases in our factories. We did not ascribe it all to the effect of regulations, as I understand you are claiming for Austria. We recognised the industrial conditions of the moment, and were not surprised when we found in 1911 that we were reaching the level that we stood at previously. I think that to claim 1909 and 1910 as years to show a reduction is not fair?—I have watched the conditions in Bohemia steadily for these last few years, and I have not observed any depression in the painting trade during 1909 or 1910, and I have not known of anyone making a statement to that effect either.

14,628. We would like figures, if possible, because I think it is a matter of common knowledge that there was depression in business circles over the whole of Europe and in America—in fact, in the whole world—during the two years that I have quoted, and I have

not heard that Bohemia was an exception to the rest of the industrial world?—I know of no depression in the painting trade in Bohemia during the years you refer to.

14,629. I would suggest that your own figures of lead poisoning for the kingdom appear to establish the same point, because, if you take the number of lead poisoning cases among workers other than house painters for the kingdom of Bohemia for the period, you get a fall between 1908 and 1909 from 108 to 76, and between 1909 and 1910 a further fall from 76 to 61, and these are for the whole kingdom. They are not affected by the regulations at all, and seem to justify my conclusion that slack trade produced the fall and not the regulations?—I maintain that my figures actually show an improvement as the result of the regulations. The figures for lead poisoning have apparently gone up, because the statistics have been far more complete since the time the commission sat. After 1907 and 1908 the records are more complete. Before 1907 the records are very incomplete.

14,630. You do not answer my point. General cases, apart from house painters in Bohemia, have fallen steadily from 1908 to 1910 as far as the figures go?—Other cases have also fallen, because regulations were made concerning all lead industries, not only house painting.

14,631. When did they come into force?—Regulations are made in single cases wherever lead poisoning occurs by the Government directly. I am personally the district officer dealing with lead poisoning in such cases, and I ordered the inspection of places where lead poisoning has occurred, and I have myself made regulations. As soon as the insurance sends notification of a lead poisoning case, inspection of the place takes place at once, and then regulations are made for that place. Regulations may be made specially for one place, if in one place lead poisoning occurs more than in other places. The case quoted in paragraph 14,517 is a case in point of regulations being made for one particular place and of special regulations showing good results. There is no general regulations for lead works in general. There are special regulations for painters using lead paint, and other sets of special regulations for any special industry, but there are no general regulations for the lead trade in general.

14,632. We recognise the value of regulations, but we also recognise that we must, in considering their value, pay attention to the amount of work being done during one of two years, and that it is not fair to judge of regulations and their efficiency in less than five years, the figures being taken over that whole period?—I do not claim that my figures are conclusive. They only support my theory, and I think that they will be conclusive after a longer period.

14,633. With regard to paints that were used by the Austrian Commission in their tests, I understand you to say that zinc white and lithopone were used. Lithopone is not zinc white. It is zinc sulphide with barium sulphate, and zinc white is zinc oxide. Lithopone, we have been told, is not a good paint at all. If you mix zinc white with lithopone you will probably not get as good a result for outside work as by using zinc white alone. May that be a possible reason why some of the experiments of the Austrian Commission failed?—I wanted to say that lithopone is (by us) seldom employed in a pure state—not that lithopone is zinc oxide. Zinc white has also been used by itself for these tests, and I said so some time ago. I am quite willing to acknowledge that a number of these experiments are inconclusive, because the designation or trade names of paints do not actually show what the paint consists of, and any white paint which is free of lead may be designated as lithopone, although it may be anything. But it is equally certain that experiments with pure zinc white failed—in fact, no other medium than lead has given perfectly satisfactory results from my knowledge everywhere.

14,634. I suppose that Mr. Meissl is the person to be asked the composition of the paints that were used?—He certainly would have more experience on that point, and particularly with regard to Vienna.

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[Continued.]

14,635. (*Mr. Sutherland.*) Like most of our witnesses, you locate the great danger in painting in the dry rubbing down. If this was abandoned and there was greater personal care on the part of the workers, would the risk of painting, in your opinion, sink to the normal industrial risk?—I think that other methods as well are necessary to bring the risk down to the normal industrial risk; I put this in as my answer:—

1. The duty of declaring lead colours.
2. Technical measures for the prevention of dust in the use of lead colours.
3. Personal prophylaxis, work clothes, observance of cleanliness, prohibition of smoking and eating.
4. The instruction of the workmen with regard to the danger.
5. An obligation on the part of the masters and also of the workmen to obey the rules and make use of the remedies.
6. Periodical medical inspection and the keeping of a register as to the condition of health.
7. Protective regulations for working and the exclusion of workmen with certain diseases from dangerous work.

14,636. Do you attach any importance to a statement made to this Committee that new paint gives off a volatile lead compound poisonous in its effects?—Volatile lead compounds are only possible at very high temperatures—temperatures like the boiling point of lead.

14,637. In a normal room you would not have such a temperature?—I refer to a temperature of two or three thousand degrees. I acknowledge the existence of volatile poisons in paint, but these poisons are chiefly benzol, and similar mediums used for mixing the paint. Benzol poisoning occurs particularly in ship painting. This danger is particularly intensive in the case of painting very small enclosed places. I have further experience on that point, I think.

14,638. Is it not likely that there would be an accumulating opinion on the part of workers and employers that would ensure a better observance of regulations, assuming that they were established?—I think that usage to the regulations and good information on the point will lead by itself to a strict obedience of the regulations.

14,639. Is it not likely that as the result of these regulations and the location of the danger to dry rubbing down the painting trade would find some other process in the place of dry rubbing down?—I think it very probable that you might find a process to replace dry rubbing down. This will be a question which Mr. Meissl will deal with.

14,640. Would not the mere fact of the wide distribution of instructions to workmen and the obligatory labelling of all the lead paints as poisonous put the workmen on their guard, and so tend to reduce the number of cases of poisoning?—That is my view. I think that lead poisoning would be reduced in this way.

14,641. Would not regulations for a period of, say, five years definitely determine their usefulness? The Government would then, if the regulations failed to effect a marked improvement, have public opinion strongly behind them for prohibition?—I think that public opinion would be on the side of the Government if the regulations had failed after five years; I think that five years would be quite a fair time to show whether the regulations could do some good, and only in the case of regulations not bringing about any reduction of lead poisoning would it be safe to assume that the regulations did no good.

14,642. Would it not be a serious step to take to close down a large industry like the making of lead, and throw some thousands of workers on to the world destitute, including the miners, because there would have to be a curtailment in that respect, as these men could not be diverted into other industries?—Yes. But I cannot presume to give a strict opinion on English economic conditions.

14,643. Do you realise what the prohibition of lead for paints would mean to England?—I have no opinion on the importance of white lead in England. I am only willing to give you my opinion with regard to Austria.

14,644. Do you know that in 1910 there was 325,497*l.* worth of zinc oxide brought into this country from Germany, the Netherlands, Belgium, France, the United States, and other foreign sources, as against 440*l.* worth introduced from British possessions? This is from the Statistical and Information Department, London Chamber of Commerce?—If there really is no zinc to be had in England, then the question of discussing the use of zinc oxide becomes quite impossible.

14,645. I am referring to zinc oxides. In the same period we had 71,000*l.* value in lead and 66,000*l.* from British possessions; so that in the two they balance, but in the other there is a great disparity?—I have some slight knowledge of English conditions, but I do not come here to lay down the law on English conditions to Englishmen. But if it is so, the conditions in England and in my country are very similar.

14,646. I will tell you, Doctor, that the National Association of Master House-Painters in this country have definitely passed a resolution (and they represent something like 1,500 master house-painters) that they would prefer a trial of regulations rather than the prohibition of lead?—If that is so, then the conditions in England are also in this direction very much like the conditions in Austria, and I was very much surprised to be told by the Chairman that the conditions in England are totally different from those in Austria.

14,647. (*Chairman.*) What Mr. Sutherland is giving you is some private information which I know nothing about. What I put to you was a fact within the cognizance of the Committee, namely, that several witnesses who have been examined by us have said that they would prefer prohibition to rules and regulations?—I am more surprised by your statement Mr. Chairman, than by Mr. Sutherland's statement.

14,648. (*Mr. Sutherland.*) With reference to the experiments which the Government carried out at Prague, did the Government lay down their own formulae?—The Building Department of the Bohemian Government decided in every case what kind of paint was to be used on any particular building.

14,649. But did they lay down the way in which it should be mixed first, or did they accept general paints, and then make an analysis?—The office laid down strictly of what composition the paint was to be in every case.

14,650. Have you those formulae?—The only instance of a formula which I can produce is the statement that pure zinc white was to be used in one instance.

14,651. You did not mix zinc white with lithopone?—In some instances a mixture of lithopone and zinc white was used.

14,652. Zinc oxide?—Yes. In other cases pure zinc oxide and other paints were also tried.

14,653. (*Mr. Gardner.*) In the cases of poisoning which have come under your observation, can you say if there were more cases among those workers who went into the trade as adults than there were among those who entered as boys and served an apprenticeship?—I think that the time spent at the trade does not make the man immune against lead poisoning, but the fact that the man has been apprenticed from his young days probably leads him to know the trade very much better, and the man who knows his trade thoroughly well is far less liable to lead poisoning than a man who is only an occasional worker.

14,654. (*Mr. Parsonage.*) Have you known any cases of poisoning or illness where painters were using so-called non-poisonous substitutes for white lead?—I have come across a number of cases of painters having used so-called lead-free paints, and those paints did contain lead and led to lead poisoning amongst the painters.

14,655. Have you had any complaints of illness other than lead poisoning, where they have been using these so-called non-poisonous paints?—I know of poisonous paints other than lead, as, for instance, chrome or

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arsenic, or any of these; but, according to my experience, pure zinc paints are quite non-poisonous.

14,656. You spoke of benzol vapour. Do you not think that the use of cheap substitutes for turpentine tends to increase the dangers of lead poisoning, because they give off a vapour?—I consider turpentine substitutes, particularly the so-called quick driers, very dangerous. I wish to add to this that poisoning by these quick driers, the benzol, for instance, always will be an instantaneous or acute poisoning, whilst lead poisoning always will be a slow and chronic lead poisoning.

14,657. Would it not be an advantage to add to the regulations the prohibition of the use of these cheap substitutes for turpentine?—I think such a prohibition very advisable, and the Board of Trade of Hamburg have actually issued the prohibition of quick driers—benzol and similar quick driers.

14,658. Would it not be much easier to prevent lead poisoning from the use of lead if its use is prohibited than to carry out the regulations governing its use?—I think it quite easy to decree the entire abolition, but I think that it will not be the slightest use unless with the decree you issue an efficient substitute for white lead. By "efficient" I mean that the substitute will be able to compete with white lead in price. I mean to say, as long as we have no substitute for white lead which is perfect as to price and usefulness, a white lead prohibition is impracticable.

14,659. (*Chairman.*) How many painters are there employed in Bohemia?—There are about a thousand.

14,660. (*Mr. Kinggate.*) With regard to paragraph 14,516, "Cases of lead poisoning," could you give any account of other industries in which these cases occur. I notice in 1907, 147 cases, only 18 cases of which are house painters, leaving 129 other cases of lead poisoning. Have you any statistics with regard to the industries in which those cases of lead poisoning occur, and particularly I want to know the number of coach painters?—There were 38 printers, 27 china workers, 14 stove factory workers, 18 painters, 11 glass workers, inclusive of glass painters, 5 potters (besides these there were a few very slight cases of lead poisoning amongst potters not included in this), 4 instrument makers, 23 workers in chemical works, 3 of them workers in nitrite works, 3 men soldering lead chambers, 17 workers in white lead, red lead and zinc white works, 1 maker of lead tubes, 1 shot polisher, 1 metal worker, 1 maker of organ pipes, 1 file cutter, and 1 cutter of garnets.

14,661. No cases of lead poisoning in any coach-making works?—Those are included amongst the 18 painters and brush hands.

14,662. (*Mr. Robins.*) Are we to recognise all through your evidence that you consider the painter's occupation is a dangerous one?—I consider all industries dangerous in some respect, and although at present there is a fairly high rate of professional poisoning amongst painters, I think that if the methods suggested by me are made law, and are strictly obeyed throughout, the danger for painters will drop to quite a reasonably low degree.

14,663. Do you not think that with these regulations where lead is used, restricted hours of work would be beneficial to the painters?—My measures include a maximum day for painters. I regret not having been able to read out my entire scheme. I think that your question brings up a point I have wanted to raise for some time. I consider that overwork is one of the greatest dangers for lead workers, and is greatly conducive to lead poisoning, and consequently a maximum should be fixed.

14,664. (*Chairman.*) What number of hours, on the average, do you consider that house painters and other working men should work?—The average would be eight hours, and the regulation is that no worker in Bohemia should do more than nine hours a day (not counting the intervals), but my observation is that most painters work as long as they can work and whilst they have light to see.

14,665. Do you think that seven hours a day would be sufficient for an ordinary painter to work?—I think

seven hours would be sufficient. The seven hours should be divided into reasonable intervals, so that the men get pauses in their work. The intervals are very important, because they should be used for cleaning.

14,666. Seven hours a day or 42 hours per week?—Yes. I think it important that these seven hours a day should include a number of intervals, so that the men can clean themselves.

14,667. I think that you would like to make an observation or two in connection with the dangers of inside painting?—Yes. I consider lead paints for inside purposes very dangerous, but I think that it would be no use prohibiting the use of lead paints for inside purposes, as the state after prohibition would be worse than before, because lead paint would be either used surreptitiously or else ignorantly, and consequently the lead paints might be used without the necessary care and without proper observance of the regulations, either on account of there being no control in the matter or else the men acting in the belief that the paints used are quite harmless.

14,668. What are your opinions concerning the necessity of labelling cans which contain the paint?—On the point of the declaration of paints containing lead being poisonous, I wish to emphasise the necessity of uniform method of designing the cans containing the paints. The Austrian regulation in that respect is bad, because it simply says that all paints containing lead must be labelled as such. I think it necessary that there should be a uniform way of denoting all vessels by putting on them, preferably in very striking red colour just these words: "Containing lead, and poisonous." And preferably putting above it the sign of cross-bones and skull to make it intelligible to the illiterate, because chemists who sell poison in bottles are compelled to put on them the cross-bones and skull. They label all bottles containing poisons for the benefit of illiterate people.

14,669. (*Mr. Sutherland.*) I gather that you think that if white lead was prohibited, paint would be sent out not as we buy it now but as mixed paint, and therefore would there be greater difficulty in detecting adulteration by white lead. If white lead is abolished, the practice of buying paint would change from buying it as paste white lead or zinc into buying it ready mixed for use, and with that form would come the possibility of adulteration with white lead?—I think it quite possible that the sale of ready mixed paint will open a door to adulteration.

14,670. (*Chairman.*) You have told us about the dangers of dry rubbing down. Would you like to add anything to that concerning any other dusts which are generated in the course of painters' work?—I think that there is a great deal of danger in the sale of dry white lead, which is then ground by the painters and mixed by the painters with oil. During this process a great deal of dust is made. I would like to see it made law that lead shall be only sold ready mixed with oil and never in the dry condition.

14,671. Would you like to add anything to your statement in connection with the duties which devolve on the employer?—It is very important that in case of any regulations being broken, not only the employer, but also the employee, should be liable to a heavy fine.

14,672. I understand that you would like to make a statement in connection with workmen suffering from certain diseases which are likely to pre-dispose them to lead poisoning?—It has been observed that certain illnesses pre-dispose workers to lead poisoning, and if these illnesses are combined with lead poisoning, the case is generally a very severe one. The illnesses which pre-dispose men to lead poisoning, and which are accelerated and made more severe, are tuberculosis in all its forms, hydrocephalus, epilepsy, alcoholism—all forms of mental and nervous diseases—rheumatism and similar diseases, and diseases of the kidney. All men suffering from such diseases should be advised not to enter any profession connected with lead.

14,673. (*Mr. Mason.*) Are those diseases caused by lead?—I am quite aware that lead poisoning may cause all or any one of the illnesses. If you have already had illness before you come into contact with lead, you are

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far more likely to get lead poisoning, or the lead poisoning will make the illness very much graver and more rapid than before. I would like to say that if

at any time the Committee requires any further information on any point I shall be very pleased to communicate it in writing.

The witness withdrew.

Mr. ODO MARIA MEISSL.

Evidence to 14,688 handed in and taken as read; witness then called and examined (through an interpreter).

14,674. I am a master painter in Vienna, and have had over 30 years' experience. I employ some 300 to 400 hands, and have been entrusted with commissions for a number of public works of great magnitude, such as the Thulln bridge over the Danube. I have also studied the chemical composition of pigments.

14,675. I have given great attention to the question of lead poisoning among painters, and before there was any question of regulations took special measures of precaution in my own business; and I have for many years, by writing and by speeches, endeavoured to call attention to the dangers of lead poisoning and the best way of obviating them. In 1907 I was summoned by the Austrian Commission on Lead Poisoning as an expert to represent the Viennese master painters, and I may claim that a considerable number of the recommendations of the Commission's Report and also the regulations which were a consequence of it were made as a result of the information and advice which I was able to give as a man of long practice and experience.

14,676. Sufficient time has now elapsed to enable me to form an estimate of the working of the regulations which were issued on the 25th April 1908. They have been, speaking generally, properly enforced, and there can be no doubt as to the beneficial results which have followed from their operation. Anyone who, like myself, had many years of experience of the condition of things before the regulations were made cannot fail to observe the marked decrease of lead poisoning since the regulations.

14,677. From a practical point of view the regulations to a great extent are worked by the workmen themselves through their powerful trades union organisation. The painters of each of the 21 districts of Vienna have their own separate organisations (Verband der Maler und Anstreicher), and these are all part of a larger organisation of the building industries (Baugewerbe) of Vienna, which again are one group of the Baugewerbe-Genossenschaft for the whole of Lower Austria. The painters of Vienna all belong to a sickness insurance (Krankenkasse) to which there is a contribution by the worker and employer, as I understand is proposed by the health insurance legislation which has recently been introduced in England. As the trades union (Arbeiter Organisation) is of a somewhat social democratic character, and many of its officials are officials of the Krankenkasse, there is a strong tendency for the Krankenkasse to report every possible breach of the regulations to which its attention is called by a painter applying for sick pay, and from the employers' point of view the regulations are quite sufficiently enforced in this way.

14,678. I may say that I have, for a large number of years, spent a good deal of time and money in endeavouring to procure or make an effective substitute for white lead, but as I showed the Commission in my evidence, this is impossible, at any rate for use in outside painting.

14,679. In my judgment and experience white lead is indispensable for outside painting owing to its special properties and its exceptional durability and covering power, which are the result of the peculiar chemical combination which it forms with linseed oil. The chemical combination of white lead with linseed oil is such, that as the linseed oil oxidises when it is exposed to contact with the air, sometimes it forms a kind of lead soap which, when it hardens, remains elastic so that under variations of temperature it expands and contracts instead of cracking. Zinc white which is the next substitute for white lead makes in combination with linseed oil a different soap (zinc soap) which has far less resistance to the action of rain, &c., and changes of temperature. From a practical point

of view the "life" of pigments for outside use is determined by their power of resistance to the influence of water, and as one who is familiar with zinc white for outside use, I know that the effect of sunshine on zinc white is to make the zinc soap soluble in water; therefore it is far less able than white lead to resist the influence of water. For inside painting white lead has not so great an advantage over zinc white because white lead tends to turn yellow under the influence of sulphuretted hydrogen, but even for inside use white lead is indispensable for specially damp places.

14,680. The other great advantage of white lead is in respect of covering power. It is true that owing to the greater specific gravity of white lead the same weight of zinc white spreads over a larger surface than does the same weight of white lead, but zinc white has to be used with a much larger amount of linseed oil to make it sufficiently fluid to work. The result is that for the same degree of opacity more coats are needed for zinc white than for white lead. These circumstances show why it is much more costly to paint with zinc white than with white lead, since the use of zinc white increases the two chief items of the cost of painting: (1) the amount of linseed oil, and (2) labour. I calculate that the ratio of labour to materials in painting (at any rate in outside painting) is 60 per cent. labour and 40 per cent. materials, so that if it be assumed that three coats of zinc white have to be given for two coats of white lead, the greater cost is apparent.

14,681. From the point of view of those who have to maintain large structures (especially large iron structures), the greater cost of maintenance of buildings painted with zinc white is of even more importance than the greater initial cost of painting with zinc white. This is equally important for master painters who have to give a guarantee for maintenance. Surfaces painted with zinc white have to be renewed at least every three years, while surfaces painted with white lead will last for eight years. The cost of scaffolding, &c., for the purpose of renewal also becomes a heavy item.

14,682. From my special experience with regard to the painting of large iron structures, I was in a position to put before the Commission evidence showing that red lead (minium) is in a special way indispensable for this purpose.

14,683. These advantages may be summarised as follows:—

- (1) Minium is the only pigment used for such purpose which is soluble and forms a special combination with linseed oil (lead soap).
- (2) Minium is the only pigment which can be painted directly on slightly rusted and not properly cleansed surfaces, as it acts like a putty sticking on the loose parts of dirt, rust, etc., wherefrom other paint would peel off.
- (3) Minium sinks into all the pores of iron and enables a smooth even surface to be painted.
- (4) Minium makes the hardest ground paint, a fact of great importance, because it is found in practice that if the first coat be softer than the second, and therefore more elastic, the second coat is broken away.
- (5) Minium is the only paint which is not injuriously affected by water.
- (6) Minium is practically an air-tight paint.

14,684. I have made experiments myself with the object of finding a non-poisonous substitute for minium for painting on iron, and experiments have been made for this purpose by various bodies, such as the Royal

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Railway Administration (k.k. Eisenbahnministerium), and by the municipality of Vienna, since the date of the Commission for the same purpose, but no such substitute has been discovered, for the reasons which I have indicated above, which were adopted by the Commission.

14,685. In my opinion one of the most important provisions of the regulations is the requirement of a declaration when a pigment contains lead. In the absence of such provision workmen and master painters handle substances containing lead which are even more poisonous than ordinary white lead without being aware of their danger.

14,686. My own experience causes me to emphasise the danger of smoking, especially cigarette smoking. I notice that, speaking broadly, apart from special predispositions to lead poisoning, the workmen who suffer most from lead poisoning are those who smoke cigarettes.

14,687. I also attach importance to the provisions to meet the case of those who have a predisposition to lead poisoning. It is well known that there are some persons who are peculiarly susceptible to it, and it is desirable that they should be altogether prevented from working with white lead. Originally it was proposed that anyone who once suffered from lead poisoning should not be allowed to work again, but I pointed out to the Commission the gross injustice of depriving a man of the employment in which he had perhaps been trained for years merely because he had one attack of lead poisoning, and in consequence of my representations the regulation was limited to requiring that no one who had been attacked by lead poisoning should again be employed as a painter until he had a medical certificate of complete recovery.

14,688. The point upon which the Report of the Austrian Commission lays most stress is the danger of the dry rubbing down of white lead paint. There can be little doubt that the dust created by this process was the chief cause of lead poisoning among house painters. I informed the Commission, and my statement was confirmed by other experts in the trade, that there was no process of the dry rubbing down which could not be done wet. The wet rubbing down, in many cases, gives a better result, especially for fine work, although, of course, it adds to the cost of labour.

14,689. (Chairman.) What substitutes for white lead paints have you tried?—The only thing which might be considered as a substitute for white lead is zinc white. It is the only white colour which comes into consideration.

14,690. Have you tried that extensively?—I have personally made extensive experiments with zinc white, and I have actually been for ten years representative of an English zinc white firm. I was compelled to abandon representing that firm because I found that zinc white did not answer the purposes as well as white lead.

14,691. What is the name of the firm you represented?—, formerly —, — was the inventor of lithopone.

14,692. How many years ago was it that you were agent for this firm?—It is about twenty years ago.

14,693. What substitutes for white lead have you used since then?—There is no substitute for white lead for outside work. The only thing which might be considered would be artificial barium sulphate.

14,694. What substitutes for white lead have you used for experimental purposes since you abandoned the agency of Messrs. —?—There are no other white paints than those already given, but I have made a number of experiments with zinc white with a number of different media.

14,695. Can you give us any illustration of the experiments you made with zinc white for exteriors?—As I found that linseed oil and zinc white did not give a durable coat of paint, I attempted to mix zinc white with varnishes or with resins. I made experiments on a very large scale, and in all cases the result was a negative one.

14,696. (Mr. Sutherland.) Was the result negative when you included varnishes?—Yes; they were found to peel off.

14,697. (Chairman.) For what length of time did these experiments extend?—These experiments have extended over a period of more than 20 years, and a number of these experiments were carried out at the instigation of the authorities.

14,698. When was the last experiment begun?—The last experiment on a big scale was made approximately three years ago, and the paint after one year came off like water paint.

14,699. We have never had anything quite as bad as that in this country, and we have had some examples which have been highly satisfactory. Have you heard of the Office of Works, a great Government department?—Yes.

14,700. They have made a trial of leadless paints on a large scale on the new Savings Bank buildings, and the result was so satisfactory after four years' trial that the Office of Works have decided in future to abandon the use of white lead in painting?—I have stated in the statement which I have prepared that the difference in my experience and the experience of the Office of Works is that most of my work was carried out on iron structures. Now, zinc white has to be used on iron structures in combination with very little oil; whilst in the case of painting zinc white on stone or wooden walls, it can be used with a large quantity of oil. Consequently a great part of the oil remains unsaponified, and consequently the result of zinc oxide on stone or wood might be very much better than on iron.

14,701. Do I understand that you have not made any experiments on a large scale on stone or wood?—I have made experiments both on stone and on wood, and found that zinc white would give quite satisfactory results, but on wood it required an additional coat of varnish. So the durability of the paint was the durability of the varnish and not the durability of the zinc paint.

14,702. Do I understand that your objection to zinc white is only as regards painting on iron?—Iron and wood. My experience is that on iron the whole of the oil is converted into very soluble zinc soap, while in the case of wood some of the oil remains unsaponified and might therefore remain for some time as a medium. But my experience is that for outside purposes it was not good enough, as the woodwork of some windows had been painted with zinc oxide and linseed oil, and when the windows were washed the paint came off as if it were chalk rubbed on with water.

14,703. In the illustration that I gave you of the Office of Works, a very large amount of the painting on the exterior was on wood, and that, they maintain, was highly satisfactory?—The difference in the experience in the English Office of Works and my Vienna experience might find its reason in the difference in climate. I think the strong sun over there is largely responsible for the different results, but in any case I would very much like you to read the exposé which I have prepared where I set out the reasons why zinc oxide paints cannot be durable.

14,704. Then with regard to painting on iron I would like to point out to you that we have had evidence from the South Eastern and Olintham Railway Company who told us that the railway bridges and station roofs at Charing Cross and Cannon Street Railway Stations were painted with coal tar, silica, graphite, and other such paints, and that they have been highly satisfactory. The same thing applies to a great many other railway bridges?—I would like to know for certain whether no red lead had been used previously for coating the iron before these other coats were applied; and also I wish to say that I cannot quite see how the comparison comes in, as graphite and tar are always black, and to obtain a white or grey paint you would have to add a considerable quantity of other white bodies. I quite acknowledge that there are very good black or dark colours for paint which will protect ironwork, as, for instance, carbon paint, or oxide of iron.

14,705. Will you tell us how the Austrian regulations are enforced?—One of the chief ways of controlling obedience to the rules is doubtless in the hands of the

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Trade Commissioners—those commissioners who attend only to one trade, and who inspect the larger workshop or factory at least five or six times a year.

14,706. Are those inspectors appointed by the Government?—Yes, like Dr. Rambousek. There is an Industrial Office in Vienna (called Gewerbe-Inspektorat), which has some 30 such inspectors, and every district has one or two inspectors on these lines, and these inspectors deal only with their own district, so that most workshops can be inspected five or six times a year.

14,707. Are the figures of these inspections available?—I may say that I have heard from other master painters that their workshops are inspected regularly, and my own workshop is inspected at least once every eight weeks or so, and then when the inspector finds anything he does not approve of he always insists on alterations. There is a further control by the insurance. It is a question of information in various districts.

14,708. You are speaking of your own workshop now, are you not?—Yes.

14,709. I want to know generally what the system of inspection is in Vienna. For instance, I find that there are 3,195 factories and workshops in one district of Vienna alone?—The master painters of Vienna number 800.

14,710. I am speaking of the number of factories and workshops which have to be visited by the inspectors?—There is in every district of Vienna an inspecting office. Every inspecting office contains more than one inspector—sometimes three or four—and every inspector has a certain number of workshops under his notice.

14,711. I understand that there are 3,195 factories and workshops to be inspected in the second district of Vienna, the district in which your works are situated, and that there were only 829 visits paid to those 3,195 factories and workshops in 1910, leaving 2,366 factories or workshops which were not visited at all?—That is not right. I still think it possible for painting workshops to be inspected five or six times a year, although only 829 visits were paid to 3,000 workshops, because amongst these 3,000 workshops are a great many workshops which do not require any inspection, because the work carried on there is not dangerous to health in any way.\*

14,712. If there are very few inspectors available it practically means that they utilise most of their time in visiting the master painters' establishments?—I wish to say that these inspectors practically confine their visitation to trades where the workers have to deal with poisonous substances, or where the trade is dangerous; but there is a further and very efficient control from the insurances (Krankenkassen). All these insurances are practically run by the Socialist force in Vienna; and as soon as only a few cases of lead poisoning occur these insurance officials give information so that inspection of the workshop takes place and the offending party is fined.

14,713. But how does the inspection arise through the insurance; is the factory inspector notified?—In case of such an inspection taking place on account of information by the insurance, a visit is paid as a rule by four persons—firstly, the district medical officer, the industrial inspector, a member of the magistracy, and a confidential person.

14,714. Do they each go separately?—No, the four of them go together. Every person employed in any workshop whatsoever must be a member of the insurance society.

14,715. How many cases of lead poisoning have occurred among your own workpeople since the regulations came into force?—About six or seven a year amongst 400 men.

14,716. You stated in your evidence that you employ between 300 and 400 painters?—Yes, in the

\* Later note added by witness:—

I do not know the reason why my workshop was so often inspected in the year 1911, in this year up to the present date (20.9.12) no inspection has taken place.

season, not in winter time. Now I have only 200, and in January about 120 or 130.

14,717. What is the average number you employ?—The average number is perhaps 250 to 280.

14,718. Is not six or seven cases a very high percentage?—Only very slight cases. If one has a little pain in his stomach or shows the blue line on the gum we send him to the doctor, and he writes "Lead sickness," because the insurance like to have as many lead poisoning cases as possible, so as to be able to start a new discussion and advertise the labour cause in the House of Parliament.

14,719. You have told us that your factories are inspected very thoroughly?—There is a triple inspection of the works: firstly, by the industrial officer, secondly, by the medical officer, and, thirdly, from time to time an inspection by the magistrate on account of danger from fire.

14,720. And yet the percentage of lead poisoning cases amongst your workmen is about 2.5?—There is a great deal of change in the personnel of the works, and a good many workers enter the workshop when they already suffer from lead poisoning. A good many of these cases which are put down as lead poisoning are only very slight cases where the men are absent from work only for a few days.

14,721. When does the medical examination of your workmen take place?—The regulation demanding medical inspection of the men is not strictly enforced. If the men miss the day on which they should go to the medical inspector they do not go until the next inspection falls due.

14,722. Do I understand you to say that your workmen, or some of them, are suffering from lead poisoning when they enter your employ?—I mean that a number of the men enter my workshop when they have lead poisoning in a latent form; that is, they have a certain quantity of lead, and the little quantity of lead which they may absorb there may bring out the lead poisoning.

14,723. But do not a certain number of men who may have lead poisoning in a latent form leave your establishment and go elsewhere?—Yes, I acknowledge that.

14,724. Does not one balance the other?—I think that these two quantities do not balance each other, as in my works about half of all the lead painting is done, and when men leave other painting shops they probably come to my workshop, but if they leave my workshop they would not go to other painters, but they would go to some other trade where they would be removed from the influence of lead. For outside work I do not employ regular or skilled painters, but only occasional workers who may have been at some other trade before, and who, when the painting season is over, go back to some other trade.

14,725. You lay stress on the danger of dry rubbing down?—That is the most dangerous process of all.

14,726. Can you dispense entirely with dry rubbing down of lead painted surfaces?—It is possible to do all kinds of rubbing down in the wet way perfectly satisfactorily, only the cost of doing it is slightly increased.

14,727. When a first or priming coat of lead paint has to be rubbed down before a second coat is applied, what would you use for rubbing down?—Pumice stone and water.

14,728. But would it not take a long time for the first coat to dry sufficiently to allow a wet rubbing process to be applied?—There is no reason why there should be any extra waiting, because, for dry rubbing down, you have to wait until it is absolutely dry and set hard, otherwise in rubbing down you would not obtain a polish, but a sort of smearing effect, whilst in wet rubbing down it is not necessary to wait until the surface is quite so hard. It must be hard, but not so hard.

14,729. In the case of a priming coat applied directly on new woodwork would not the use of a wet rubbing process involve a risk of raising the grain of the wood?—Rubbing down a first coat is only done with very fine work. In very fine work necessarily the first coat would be so thorough that the woodwork would not be

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exposed in any way to water, and consequently the grain could not be raised, as the woodwork is entirely protected. Also the first coat for fine work must have a certain uniform thickness.

14,730. (*Dr. Collis.*) Could you tell me how long the cases of lead poisoning you have had in your works usually have been employed for a long time or a short time?—My experience is that the lead poisoning is strictly confined to men new to the work, who have been in the place only a short time. In my own case there are 19 men who have been employed for 25 years, one of them, a strong man, who has to rub up every year some 70 tons of red lead. None of these has ever shown the slightest symptom of lead poisoning.

14,731. Have the cases occurred mostly among the regular painters, or among the people who are taken on for a short period?—Most of the lead poisoning cases are amongst occasional workers.

14,732. Who may not have been employed before in painting?—No; they would be men who would have some previous experience of painting, but who would follow for some time the profession of painting, and at other times some other trade.

14,733. So that the idea that they come to you with lead in the system is hardly justified if they have been at another trade for some period before they come into your employment?—I hardly think that these men who come to me from other works would have had lead in their system, but there might be cases of men coming to me from ironworks where they might have been employed in the rubbing up of red lead. But the chief cause of lead poisoning, in my opinion, when you employ prepared paints, is lack of cleanliness or inexperience on the part of the workers.

14,734. Can you say what additional steps you consider should be taken in Austria, if your establishment is inspected four or five times a year, by three and sometimes four inspectors at a time, and yet you have a rate of lead poisoning among your workers which is very high?—I think that the figures of lead poisoning in my case are low, because it has to be considered that most other paint shops would do perhaps 25 per cent. lead painting, and the rest of the painting with other colours, while in my workshop lead paints almost exclusively are used. I also have the experience that in other workshops you get one case of lead poisoning for every 5 cwts. of lead paint used. In my own workshop you get one case of lead poisoning with every 13 tons of lead paint.

14,735. Then you consider that your workshop is better than the others in Vienna?—I claim that my workshop is better than other workshops in Vienna, on account of the regulations which I enforce.

14,736. You would consider that the effect of the regulations now established in Austria is fully shown in the health of the workers in your employ?—I do not think that my work is all carried out as it should be under those regulations, because in the summer, when most of the painting is done, out of 400 men in my employ as a rule some 300 men are employed outside Vienna, and many of these men may be employed at a distance of three or four hundred kilometres from Vienna, and some of these men are taken into employ out there. Consequently I or my foreman are unable to control the workers outside Vienna in the same way as they are controlled inside my own workshop. Inside my own workshop there are practically no cases of lead poisoning.

14,737. Yet the conditions under which your work is done are better than the average conditions in Austria under these regulations?—I claim, that my painters work, perhaps, under better conditions than other painters in the rest of Austria, but other painters frequently have more favourable conditions for enforcing the regulations than I have with my own painters. Most other painting workshops employ 80 per cent. of their men inside their own workshop and only 20 per cent. outside their workshop on outside work, while I employ only 25 per cent. of the men in the workshop in the summer, and 75 per cent. of the men on outside painting.

14,738. It is unlikely that the conditions of employment which you represent yourself, in any way differ

from the conditions of employment in England. I understand that under the regulations now in force in Austria you can only get the lead poisoning cases down to 2·5 per cent., which we should not accept. As an instance, I point out to you that in the pottery trade, where we only have an incidence of 1·4, a very important committee was appointed to inquire into the very high incidence of lead poisoning?—I think that I have proved by my exposé that if you prohibit the use of lead paints for interior work entirely, you can at once reduce the incidence of lead poisoning to a third of the present rate, and then lead poisoning would be 0·8 per cent.

14,739. But I understood that in Austria the use of lead for interior work was prohibited?—The prohibition of lead for inside paint does not affect my work much—only slightly—because my work is practically confined to outside painting.

14,740. We have people confined to outside painting in England in a similar way, and if we had similar regulations carried out to the best of our ability, as they are with you, you can only hold out to us the prospect of getting a percentage of 2·5, which, as I have already pointed out, is a great deal higher than we, in England, consider it should be?—I have an incidence of lead poisoning of 2·5 per cent. amongst my painters, who are almost exclusively outside workers working with lead paint. Amongst all painters there are 40 per cent. of outside painters. If these 40 per cent. of outside painters have an incidence of 2·5, then the whole of the painters will have an incidence of 1 per cent. I think that with further information to the working men it is possible to reduce the 1 per cent. to zero almost.

14,741. The percentage I gave in the potteries of 1·4 is 1·4 per cent. of the people exposed to the possibility of getting lead poisoning, and a percentage of 2·5 among outside painters of those who are using lead paints nevertheless remains extremely high?—I think it quite possible to greatly reduce the incidence of lead poisoning amongst workers by giving them further information. I think that in the case of interior painting the working man really has no protection against poisoning on account of the continuous formation of lead dust, but in the case of outside painting lead poisoning is invariably the worker's own fault, on account of lack of cleanliness.

14,742. With regard to inside painting, why should there be danger at all when you have abolished lead for inside work?—I would point out that the incidence of 2·5 per cent. refers only to outside painters; consequently, the incidence for all painters is 1 per cent., and as the incidence of lead poisoning amongst painters before the introduction of the regulations was 3 or 4 per cent., there is a great improvement, and I think with further information to the workers you can reduce the figures still further.

14,743. Yes, I quite follow that; but my point is this: that where these regulations have been carried out under the very best possible conditions in your factory, with an inspection occurring four times a year by three people specially set on one side to make these inspections, yet with regard to outside painters there remains a percentage of 2·5. The rest of Vienna we know has not kept so low. The 2·5 apparently represents the result of the regulations carried out by the best possible means under your own supervision to-day. That represents a very much higher figure than we can possibly accept in England?—The men under supervision as I should wish it represent only 25 per cent. of the men in my employ. 75 per cent. of the men in my employ are outside my supervision because they do not work in Vienna, and that is where most of the cases of lead poisoning occur.

14,744. You consider that most of the cases of lead poisoning occur outside Vienna?—Yes. Outside there is no inspection.

14,745. No inspection at all?—How can they be inspected? I am in London and I have workmen in Chatham or in Liverpool. How can they be inspected there?

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14,746. That is the question which I ask you?—It is impossible. No inspector can go on all the railways and bridges in the mountains. It is quite impossible.

14,747. (Mr. Sutherland.) What is the nature of your business—I mean what class of work do you do?—Mostly painting ironwork, bridges, viaducts, gasometers, and so on.

14,748. Railway stations?—Railway stations and roof construction, and railway work in general.

14,749. Can you tell me why zinc oxide ground in oil is packed in metal kegs and not in wood casks?—In the case of white lead with linseed oil you obtain saponification of a certain part of the oil by the lead, and the lead soap forms a mixture with the linseed oil and the lead; so that there is a complete mixture of one solid mass which is not likely to leave the cask, whilst in the case of zinc white, a certain amount of the oil is saponified by the zinc, but the remainder of the oil remains free, and is separated from the zinc white and the soap, and is likely to leak out of the cask.

14,750. Is not that a very great argument as to the value of white lead as against zinc. The white lead after a year's time in the cask would be better than it was when it was put in, but in the case of zinc you would have a solid body of zinc that you would very probably have to chisel, with a superstructure of oil?—Neither white lead nor zinc white are improved by age; but the white lead can still be used after having been kept for a year or more, whilst, on the other hand, zinc white mixed up with oil, after one year's keeping, cannot be used, because you have a solid hard mass of zinc white and a separate mass of oil. If you stir up the solid mass of zinc white again with oil you obtain a new pigment, which has practically no covering power.

14,751. Many master painters do order large quantities of white lead to put into tanks to store it, for the sake of its getting old, and therefore getting better value out of it?—I think that the buying of large quantities of white lead mixed with linseed oil is a mistake due to lack of information. I think that linseed oil alone improves with age, but not white lead. The white lead mixed with oil after some time gets tough. I think that the ideal way of proceeding is to buy a large quantity of linseed oil, let it lie for several years, and then mix it with white lead.

14,752. I do not mean in the mixing of paint, but in the grinding to a stiff paste. The point I wanted the Committee to know was this: that what happens if you put the oil and zinc in casks is that the zinc becomes a solid mass, and the same process goes on, does it not, in actual paint?—Yes.

14,753. The same affinity in the case of lead and oil operates to preserve the paint, and the less affinity between the zinc and the oil operates to make the paint poorer. Is that not so?—I wish to refer you to my exposé, where I have clearly stated that the great durability of lead paint is due to the formation of a very durable lead soap, whilst zinc white is not durable, because you obtain a zinc soap which is easily hydrolysed, and consequently you get a separation from the paint of the zinc plus the fatty acid, and consequently the zinc coat is not durable.

14,754. What would be the result on your own special branch of bridge painting, and railway stations, if zinc were substituted?—I wish to state that my experience is that zinc white paint is perfectly satisfactory if a durability of only two years is required instead of the customary five or six years' durability. If customers are satisfied to have all their work painted over again every two years, and are ready to spend so much more money on this repeated new painting than I am quite in favour of the introduction of zinc white, as it would give us so much more labour.

14,755. You refer in your evidence to giving an undertaking with regard to the maintenance of paint over a certain number of years. What kind of undertaking do you have to give?—In undertaking a contract I always guarantee that my paint will last at least five years. In case of the paint going bad before five years I have either to refund the money or put on another coat of paint.

14,756. Is it a common condition in Austria with regard to public work to guarantee that the paint shall last for a certain length of time?—Three years and five years. Some people are content with three years; some require five years. If they only want three we give a three years' undertaking only. It is better. The Government requires five. A good lead coat stands for eight or ten years, and zinc stands for two years. Therefore you must spend about five times the money if you use zinc instead of lead. So that in England where all painting costs in a year 10,000,000L., if you want to have zinc you must spend 40,000,000L. or 50,000,000L.

14,757. You do not object to regulation?—I think that regulation is absolutely necessary, because the disease must be brought down to a very small number. The stopping of lead poisoning is only a question of cleanliness and information to the workers. If the workers will always observe cleanliness, and are well informed as to the danger of lead, I think that lead poisoning can practically be stopped, and if employers will submit themselves to the duty of enforcing cleanliness and giving their workers proper information it will be quite safe then to permit lead for all outside work.

14,758. How long have your regulations been operative?—I cannot say exactly, but I think two years.

14,759. Do you consider that a sufficient time for all the workers and the master painters to have understood them?—No. I think that it will take at least another five or six years before these new rules will be quite understood and carried out everywhere, particularly in the provinces where they are not so directly under the influence of the Government officials.

14,760. Do you think that it would be dangerous to such structures as bridges and railway stations, if you were compelled to use zinc oxide?—I think that it is impossible to test whether there is any real danger in giving a railway bridge or similar structure a bad coat of paint, because there is a continuous inspection of railway bridges and other structures by Government inspectors, who always insist on a new coat of paint for every bridge or structure as soon as they see a deficient coat of paint.

14,761. What is the average time in which you have to renew?—Six or seven years.

14,762. Do you renew oftener with zinc than with lead paint?—Lead paint would stand perhaps two or three years longer. Zinc paint goes off in the second year.

14,763. You paint a lot of Government bridges, do you not?—I have painted more than 9,000.

14,764. You can give us the information we want. Have you had to repaint them before the regular period has expired?—I have never been compelled to renew a coat of lead paint before the contract time has expired, but it has occurred several times that I have had to renew a coat of zinc paint before the contract time has expired. My worst experience was with a coat of lead and zinc paint mixed. In this case I had to renew the paint before a year had expired. I removed it before I had been remonstrated with by the authorities, because I myself observed how badly the paint had worn. My opinion is that by having lead and zinc paint mixed you get an electrical influence which destroys the paint.

14,765. Are your bridges painted white or light colour?—The bridges in Austria are generally painted grey; but according to my experience the darker the colour the longer the coat lasts. I can give you the reason for that if you wish.

14,766. The substance of the paint is really lead?—The very darkest colours used on bridges never contain more than 8 to 10 per cent. of dark colouring matter and the lighter ones generally contain only 1 to 2 per cent. of added colouring matter.

14,767. Do you use genuine pure lead?—The basis of the paint is chemically pure white lead. I use 90 per cent. of such white lead, and I make a small addition of calcium carbonate, as a rule 10 per cent., for technical reasons. Then it stands longer than pure white lead.



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14,768. Do you mix your lead paints with any varnish?—Never for iron work. My experience is that if you add varnishes to lead paint you get a sort of solidification or gelatinisation, which makes the paint unfit for use. I use pure linseed oil.

14,769. Do you use boiled or raw linseed oil?—You cannot use the raw linseed oil, because it dries too slowly, and during the extended period of drying the paint might be damaged, either by dust or rain.

14,770. Do you use any special kind of linseed oil, or just the ordinary boiled oil of good quality?—The best process is to buy pure raw linseed oil, stock it for half a year, and then boil it with a small addition of lead or manganese. Stand oil is no good for the sun or against dampness.

14,771. Do you consider that zinc or other leadless paint in which there is a large proportion of varnish should be compared with paint mixed with linseed oil and turpentine?—To use turpentine is, in my opinion, no better than to use water, because pure turpentine should evaporate without leaving any residue. In fact the test for turpentine is to dip paper into it and dry the paper, there afterwards being no stain on the paper.

14,772. For zinc paints, do you mean?—For all paints. At times turpentine is used in conjunction with too rich oils.

14,773. You have not answered my question. I mentioned turpentine only incidentally. The question is, do you consider that zinc paint or other leadless paint, in which there is a large proportion of varnish should be compared with paint mixed with linseed oil?—I think that this would lead to a comparison of the media, but not to a comparison of the bases, and I think it an unfair comparison to make.

14,774. But I want your opinion, if you can give it. Which is the better paint?—If you have varnish it is all the same whether you put zinc or lead. Oil and varnish have quite different qualities. For outside work varnish is no good. Oil is much better.

14,775. I am speaking of outside work?—You do not get the elasticity with the varnish. I think that varnishes are not fit for outside use, because on account of insufficient elasticity they are likely to peel. For the highest quality of work, such as very fine coaches, no varnish whatsoever is used, but only linseed oil which has been stocked for some 20 or 30 years.

14,776. That is in Vienna?—Yes. If varnish has to be used for outside work a considerable percentage of linseed oil must be added to take away its brittleness. In the case of coaches the last coat of the 20 or 30 years old linseed oil is only there to give a surface polish. The colour and durability depend on the base and the first coatings. I also wish to state that I do not consider myself an authority on coach painting, but only on outside painting. I am not a coach painter, therefore it would not be fair for me to talk about it.

14,777. Would it not add very largely to the cost of the whole of the painting of this country if we had to abandon the use of linseed oil in paint and substitute a large proportion of varnish?—I think that the cost would go up a great deal if you were to use varnish instead of linseed oil, and although the cost would go up such a great deal, you would not attain your object.

14,778. You would not get the same protection?—No.

14,779. Do you know that, although the Office of Works have expressed their intention of abandoning lead, the Admiralty and the War Office are amongst the largest consumers of lead in the country?—I wish to state that four years ago the German State Railways prohibited the use of white lead on their carriages, and for all painting work. After two years this prohibition was recalled, and white lead was reinstated as the sole paint. Also the experts of the Austrian Navy decided that white lead was the only paint to be used for Austrian men-of-war.

14,780. You spoke of some experiments you had made in which the zinc paint after twelve months or so dusted off?—I divide paints into three classes, namely, paints which form a stable compound with linseed oil—

lead paints; paints which form an unstable compound with linseed oil; and zinc paints, and different paints, such as barium sulphate or iron oxide paints, which do not combine at all. The lead paints are the most stable, and the zinc paints the most unstable. In between these come the paints such as iron oxide or barium sulphate paint. In my exposé I have given a long dissertation on the durability of lead soaps, and I have also shown that the life of the paint depends only on the stability of the soap formed.

14,781. Have you great belief in the value of red lead?—Yes.

14,782. Would you tell the Committee why you hold that belief?—Red lead is of so fine a grain and the saponification of the linseed oil is so quick and so thorough, that when red lead is merely stirred with linseed oil it mixes so intimately with it that it forms rather a combination than a mixture. This can be clearly seen if red lead and some other kind of pigment in powder form is merely stirred up with varnish without the aid of any colour mill; the red lead immediately forms a homogeneous mixture like butter, while any other colour makes an uneven mass as if it were stirred up with sand. In consequence of the exceptionally fine distribution of the pigment in the case of red lead, it is obvious that in the skin of paint red lead lies so close and so finely that a thoroughly air-tight coating is formed which makes a foundation for a rust-protecting paint.

14,783. You do not think that you could dispense with red lead in the painting of ironwork?—No, never. You can, perhaps, mix lead but never dispense with it. My experience is that it is quite impossible to obtain iron quite free of rust. If any paint, excepting red lead, is put on to rusty iron the rust peels off and the paint with it, but red lead forms on top of the rust a cohesive paste and coat which cannot be peeled off with the rust, and then it is possible to put on top of the red lead coat any other paint which may be decided upon.

14,784. Do you think that graphite is a good substitute for red lead?—No.

14,785. (Chairman.) Would you agree that, owing to the difference in climatic conditions between England and Vienna, a paint that was not suitable for Vienna might be quite satisfactory for England?—The difference in climate might be held responsible for ordinary covering paints which are meant to give a colour, but for red lead the conditions in England and in Vienna would be precisely the same. Red lead is the finest main paint everywhere, both the English product and the Austrian product. Further, red lead forms with varnish a smooth compound, not merely a mixture, which will stick on to the iron perfectly well, although there may be rust on the iron, and, in fact, it will cement the rust on to the iron, and if there is any chipping, only a small flake of the red lead coat may be pushed off, whilst with any other paint the whole coat will be pushed off.

14,786. But excluding red lead, what do you say?—I think that a paint which will make a satisfactory coat in Austria will make a satisfactory coat of paint in England, and *vice versa*, only the durability or the life of the coat of paint might not be exactly the same in England and in Austria.

14,787. That is not quite an answer to my question. Excluding red lead, should you say that, owing to the different climatic conditions of England and Vienna, a paint that might suit England would not be suitable for Vienna, or *vice versa*?—I think it is all the same. In Austria, if I paint a bridge where there is much dampness and much heat and much mist, the coat stands only six or seven years, but when there is a bridge in a town between houses it lasts eight or ten years. If you paint a bridge near the sea, neither lead nor zinc stands any longer against salt water.

14,788. Your evidence is almost entirely in regard to the painting of iron bridges, is it not?—No. I do outside work in general—large factories especially.

14,789. But is not your evidence almost entirely confined to the painting of iron?—My experience is confined almost entirely to outside work, and chiefly to ironwork; but I have done the painting of big factories,

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and this includes, of course, the painting of large walls and wooden surfaces.

14,790. Have you made any experiments with leadless paints on surfaces other than iron?—I have made extensive experiments with leadless paints on surfaces other than iron. Of my work, about 80 per cent. is outside work, and 20 per cent. inside work. All the inside work is carried out with zinc paint.

14,791. Have you made experiments recently on an extensive scale with zinc paints, outside, and on surfaces other than iron?—During the last few years I have used zinc paint for outside work only if it has been expressly stipulated for by the person giving the contract, because throughout the past I have obtained bad results with zinc paint for outside work.

14,792. Have you tried during the last two or three years, by extensive experiments, to obtain a leadless paint for outside work for wood or stone?—I paint every year some 30,000 or 40,000 square metres with zinc paint, only by express stipulation of the person giving the order, but whenever I use paint other than lead I decline all responsibility for the durability of the paint. I completed one big contract for the railway offices at Villach, and after one year the paint had to be renewed.

14,793. When was that painting done?—The painting was done two years ago, and last year the railway authorities asked me to renew the coat of paint at my own expense, as it had not lasted. I declined to renew the coat of paint, as I had stated on undertaking the contract that I declined all the responsibility concerning the durability of the paints.

14,794. Was that on iron?—In the case at Villach it was on iron, but I painted a large wooden fence at Vöslau with zinc paint, and after one year, when the fence had to be washed, all the zinc paint came off by washing as if it had been chalk.

14,795. Is that your only experience of zinc paints applied to wood?—There have been a great number of other cases where zinc paints were applied to wooden surfaces, and I have invariably found that for outside work within a year the zinc coat has given out.

14,796. But I want to know in what years these different zinc paints were applied?—It has occurred every year that outside wooden structures have been painted with zinc. Frequently this has been caused by confusion on the part of my employees who mixed up the paint which was destined for inside use with the paint which was destined for outside use. Invariably when zinc paint was used for woodwork outside the results were bad.

14,797. Is it possible that the paint used on the outside work might have been a cheap lithopone paint, which was only suitable for inside work?—It was in most cases a pure zinc white. It is always against the interest of the master painter to use zinc white instead of white lead in Austria, because white lead costs only 60 kronen for two hundredweight, while zinc white costs 90 kronen. A krone is 10*½*d.

14,798. (Mr. Sutherland.) 5*2s. 6d.* per two hundredweight for white lead. That is not mixed?—With lithopone you cannot do any good for outside work.

14,799. (Dr. Collis.) What are the respective costs of a litre of best zinc white paint and a litre of best white lead paint?—It is impossible to give an accurate figure on this point, as linseed oil everywhere has gone up from 70 kronen to 120 kronen in the last few years.

14,800. What would be the respective costs (because I presume linseed oil costs the same whether you are mixing lead or mixing zinc) of a litre of white paint ready for use made with zinc and a litre of white paint made with lead. You need not give the absolute figure?—Taking linseed oil at 100 kronen, the cost of a white lead paint ready for use comes to about 66 kronen per kilogramme, and a white zinc paint 94 kronen per kilogramme. The zinc paint goes about 1.4 times as far as the lead paint, so that the two paints in actual use cost about the same, the balance being slightly in favour of lead, because two coats of lead paint are equal to three coats of zinc paint.

14,801. Are the prices of the two paints very different to start with?—It is somewhat difficult to say. There is no great difference in the prices. The actual

prices work out at about the same. In addition to this I maintain that two coats of lead paint will do the same as three coats of zinc paint.

14,802. (Mr. Parsonage.) Do you consider yourself a practical house painter, doing a fair size of house in your painting work?—I certainly can consider myself a practical house painter, as I have done the painting work for the Imperial Castle. I do only two classes of painting work throughout, either work in very big quantities under big contracts, or else work of the very highest class. I have been paid 50 kronen for 9 square feet, because it was such fine work. I have painted a door for an Austrian Prince, and I have got 1,000 francs for it.

14,803. You said that you consider turpentine to be as useless as water to mix paint with?—No. I consider turpentine quite indispensable for painting work, particularly in conjunction with rich oils, or if you want to obtain a thin coat of paint so as to bring out the grain of the wood; but turpentine can only be considered as a thinner and never as a binding medium. Good turpentine should evaporate without leaving any trace of residue.

*Dr. Collis in the Chair.*

14,804. (Mr. Gardner.) I understand that you are a practical painter, and that you have been trained to the trade?—Yes; I think that I have learnt the trade from the beginning. Originally I was a chemist, and then I turned over to painting, and I have been occupied with painting for 30 years. I started painting with only two men in my workshop.

14,805. At the Austrian Commission you were the spokesman for the house painters in Vienna?—Yes.

14,806. Is there more outside house painting in Vienna than inside house painting?—About 60 per cent. of all the work is inside painting, and 40 per cent. outside painting. If you would have the kindness to read the exposé you would find it all.

14,807. The Commission prohibited the use of white lead for inside painting, because of its dangers, and they considered that the rubbing down process was very dangerous to the workmen. One would naturally conclude that the lead poisoning would be practically nil—that there would be practically none of it now in Vienna when there is no rubbing down and no white lead used for interior work?—As long as you have ignorant or careless workers you will have a certain percentage of lead poisoning. Theoretically, the prohibition of lead for inside purposes, and the prohibition of dry rubbing down, should stamp out all lead poisoning. The lead poisoning which occurs at present is only due to careless or unclean workmen.

14,808. But if a man has learnt his trade and been at it since he was an apprentice as a boy, he cannot be an ignorant workman. I understand that there is no rubbing down on outside paintwork, so from what do the present lead poisoning cases arise?—The reason of lead poisoning is chiefly the ignorance of the workers and their unwillingness to be taught. As a rule, the workers will not believe in the danger of lead poisoning until they have actually had the disease. For instance, in spite of all regulation men are too lazy to wash their hands before they go to their mid-day meal, and in spite of all precautions they will always smoke cigarettes on the sly whilst they are at work. It is impossible during the summer to be very strict on the point with the men, because the men know that there is an insufficient supply of labour, and if you remonstrate with a man too severely during the summer he throws up his work or threatens to throw up his work, because he knows that the master painter cannot do without the men in the summer. When a man has had one attack of lead poisoning he will believe in the reason for the regulations. Nowadays a second attack of lead poisoning for one man is extremely rare.

14,809. But these conditions would apply in 1904 just as they applied in 1910?—If there is a new law passed which involves information to the workers and employers, and the creation of inspectors to control a particular matter, it must necessarily take some time before these new measures have taken effect—namely,

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until the workers and the employers have learned the importance of these regulations and the way of applying them.

14,810. Yes, but in 1904 all the work outside and inside was done with white lead; 60 per cent. of the jobs are inside, you say, and 40 outside. There were 197 cases of lead poisoning in 1904. You have dropped 60 per cent. of the jobs that white lead was used upon, and you are only doing 40 per cent. of the jobs with white lead, and you have still 138 cases of lead poisoning. You have only a reduction of 59 cases?—I think that in 1904, and before then, a great number of lead-poisoning cases were not identified as such by the insurance people, and by the hospitals. On the other hand, since these regulations have come into force there is rather a lead-poisoning scare, and a number of illnesses which really are not lead poisoning are put down as lead poisoning. In fact, if a painter or any lead worker has the slightest noise in his inside people call it lead poisoning.

14,811. You said that a large number of your men, and men employed by others, are employed in the workshop?—There is no such thing as a painters' workshop properly so-called; it is only an office which controls the work done. Most of the work is done outside, as it is impossible to bring a railway bridge into the workshop.

14,812. Do the majority of the men work outside?—Twenty-five per cent. of my men work under my own control in Vienna, or within the precincts of Vienna, and 75 per cent. work at such a distance as to be beyond my control.

14,813. White lead paint has been prohibited for interior purposes in Austria and Vienna, and you only use white lead for outside work, and there is practically no rubbing down on the outside of buildings. I presume that outside doors are of a highly finished character in Vienna?—Yes.

14,814. They are here. If you got an outside door to repaint, the first operation would be to wash and polish it down with pumice stone? That would be wet rubbing down?—The old paint would be removed by some chemical means if it was to be removed, and always with fine work. On oak you must never use removers containing water; the oak turns black. You use a mixture of pure alcohol and benzol. We do not burn in Austria; it is very dangerous. We remove all with the concentrated benzol and the concentrated alcohol.

14,815. No burning off is ever done?—No; it is not so good, and it spoils the wood.

14,816. Take a door which is not an oak door but a pine door; you have stripped off the old paint, and polished it down with pumice stone and water and given it a coat of paint. What processes do you adopt after giving it a first coat of paint?—If the first coat is a lead coat it is always done with pumice stone and water, but all doors are painted with zinc colours and not lead colours. On top of the final coat of paint there is always put a coat of varnish, which protects the paint. Consequently the non-poisonous paint may be used, and then dry-rubbing down may be resorted to. It is no use to paint them with lead, because if you varnish the door it is only the varnish that has to stand.

14,817. In that case zinc paint is quite good enough?—Zinc paint is quite good enough if a varnish is upon it. You can rub it dry or wet as you like. If you have fine work you will give a varnish over it. You can paint doors and windows and all kinds of woodwork with zinc if you give varnish, because the varnish is the last coat, and the varnish has to stand against the effects of the air. In this case it is quite useless to use lead paints. When you have a varnish you can paint with zinc paint quite well. There is a bridge in Roumania that cost 40,000*l.* to paint. It is some kilometres long. You cannot put a varnish over it, and varnish is not so good, and if it were so good you could not pay for it. That is why we must have lead paint. But not for fine work. If you paint houses or offices outside and use varnish you may have an enamel which contains zinc, and that is all right.

14,818. (Chairman.) Do I understand that in your opinion for the outside painting of houses where a varnish is used zinc will do perfectly well?—Perfectly well, or better even, because only the varnish has to stand against the atmospheric influence.

14,819. Therefore, to sum your evidence up, from your point of view lead is required for metal work?—Not only for metal work. I have painted this year 20 manufactories, one of which cost 2,000*l.* or 3,000*l.* Manufactories cannot be varnished. The people would not pay for it, and it is not so durable.

14,820. For other work than domestic house painting, you have thought it necessary to advise that lead should be retained; but, for ordinary house painting, in your opinion, zinc can be substituted, provided you use a varnish?—I do not want to speak of a business I do not understand. The carriage painters may also use whatever paint they choose, because they have varnish.

14,821. You state in your evidence that you stopped using zinc practically 20 years ago, but just lately you told us that you were still using zinc now and again. Is there not a large difference between the quality of zinc paint manufactured now and that manufactured 20 years ago?—I have discarded zinc white chiefly because its use for inside work does not give a sufficiently big market, but I maintain that the quality of zinc oxide is the same as that supplied 20 years ago. But there is a great improvement in the quality of the lithopone supplied.

14,822. (Mr. Sutherland.) The zinc oxide is a constant quality?—Yes, pure zinc oxide.

14,823. (Mr. Gardner.) I take it from your evidence that you consider that red lead is the only substance which can be used for protecting iron or steel surfaces?

In all cases where ironwork is exposed to the influences of the weather and where the coat of paint has to stand a great deal, red lead must be used, but in the case of transverse bearers or support beams where the ironwork is inside a house or is otherwise protected, and does not require to have much resistance against atmospheric influences, iron oxide paint can be used.

14,824. Have you any experience of ship work?—My only experience is that the Austrian navy uses nothing but lead paints.

14,825. If your men paint red lead over rust, do they never scrape the paint off again?—There seems to be a misunderstanding. I do not wish to state that you can paint with red lead over a thick layer of rust. You can only paint over a very thin film of what I call "fly rust"—small grains of rust which are difficult to remove. You never paint, of course, over a thick layer of rust.

14,826. You also think that red lead is the only paint which is not injuriously affected by water. Have you ever tried iron oxide paint on your work?—In Vienna they recently built a very big gasometer with a surface of over a million English square feet, and the part of the gasometer which is under water was covered with all sorts of paints for the sake of experiment. A few months ago it was inspected, and all the paint, with the exception of the red lead, had flaked off or had become scaly or spongy.

14,827. Have you ever heard of the Forth Bridge?—Yes.

14,828. You would not be aware that the Forth Bridge, which is exposed to sea air, is painted entirely with iron oxide?—No. I think that iron oxide is, next to red lead, the best paint. In the case of paint exposed to the influences of sea atmosphere it does not matter very much which you use, because no paint will last very long if exposed to that atmosphere. In the case of constructions like railway roofs iron oxide is superior to red lead, because the sulphurous gases in the smoke will affect the red lead but not the iron oxide.

14,829. What we call the bilge in vessels where all the dirty water collects is painted with iron oxide, even in war vessels. Is not that an additional proof of the value of iron oxide?—I maintain that Austrian navy experts consider red lead the only paint, and indispensable for under-water painting. As I said, no paint will stand the action of sea water for any great

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length of time, but red lead will withstand the action longer than any other paint. I further state that paints for ships are generally made with resin, and it does not matter very much what the base of the paint is if you use resin.

14,830. Are you talking of outside?—Yes.  
14,831-2. But I am talking of inside. The bilge is inside?—It might be done, because it is such a very big surface, and iron oxide is only a third of the cost of red lead, but it will not keep.

The witness withdrew.

## TWENTY-SECOND DAY.

Wednesday, 6th December 1911.

### PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.

Mr. J. PARSONAGE.  
Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*).

Mr. C. RICKER-DEVROEDE.

Evidence to 14,852 handed in and taken as read; witness then called and examined (through an interpreter).

14,833. I am a master painter, having my office and workshop at 14, Rue Montoyer, Brussels. I have been in business for 25 years. I am president of the *Chambre Syndicale des Entrepreneurs de Peinture de Décor de l'Agglomération Bruxelloise*. I am also *secrétaire-tresorier* of "*Le Journal des Peintres*" and acted as vice-president of the 7th Congress of *Fédération Générale des Entrepreneurs de Peinture de Belgique*, being the first International Congress (at which Mr. Sutherland was present as representing England), held at Brussels in July 1910. I formerly used to mix all my own white-lead colours; having a proper grinding and mixing machine, but since the Law of July 1910 I am not allowed to grind the white lead myself. I purchase the white lead in oil from G. Grove, Utrecht.

14,834. Zinc white is largely used in Belgium for interiors, and is a better white colour, but it does not incorporate the oil. If allowed to stand any length of time the oil comes to the surface and the zinc sinks to the bottom of the canister.

14,835. There is no efficient substitute for white lead for outside painting at the present time, and even for inside painting, in the vicinity of water or where the atmosphere is humid, zinc white does not stand so long as the lead.

14,836. So far as can be at present foreseen, there will never be a complete prohibition of white lead in Belgium. There was a great discussion in the *Chambre des Représentants*, extending from the session 1903-4 to 1909, in which the whole history of the use and abuse of white lead was gone into. In November 1903, Dr. Delbastée brought forward a proposition for the prohibition of the use of white lead in all house painting, under severe penalties. His introductory memorandum was almost entirely confined to the humanitarian side of the question.

14,837. Two thousand six hundred and eighty master painters signed a protest to the effect that, in their opinion, the efficiency of the work of white lead only could be guaranteed, that the harmful effects did not exist where this product was used with care and cleanliness, and that the adoption of this law would cause considerable prejudice to an industry already seriously prejudiced by the employment of materials which do not possess the lasting qualities found in white lead alone.

14,838. The proposed law was considered by the three sections of the *Chambre des Représentants*, three of which adopted and three rejected it. An exhaustive inquiry was begun by the central section in 1904, but

was suspended because the Government thought it desirable to deal with the matter under the Law of 2nd July 1899, regulating the security and health of industrial and commercial workers, and an *arrêté royal* was issued on the 13th May 1905, coming into force on 15th August 1906, concerning the employment of white lead in works of painting-buildings.

14,839. This *arrêté royal* imposed regulations upon the master painters requiring—

2. Notice to be given to the factory inspector of workshops where white lead was ground.
3. Grinding to be done in such a manner that the workmen did not breathe white lead dust.
4. Sealed receptacles for carriage of white-lead powder and watering floors.
5. No contact with the hands of workmen while mixing, &c.
7. Prohibition of rubbing down dry.
8. Working clothes to be provided.
9. Washing appliances to be provided.
10. Quarterly medical examination.

14,840. These regulations were found difficult to enforce in practice where men were working in private houses to which there was no right of access, by the inspector, and where the street was the principal workplace used.

14,841. These regulations, however, drew forth an emphatic protest on the 19th May 1907 from the Master Painters' Federation, who addressed a memorial to the Government and Parliament reiterating a resolution passed at their Liège Congress in 1905, that, although white lead was irreplaceable for certain work, they preferred a total prohibition of its use, making, or importation, to a regulation which they were unanimously of opinion was inapplicable to their workplaces.

14,842. In consequence of these criticisms the Section Centrale resumed their inquiries, and by their reporter, M. Verhaegen, presented their report on the 19th February 1908, being the result of four years' work.

14,845. The report split up the subject into headings:—

1. Is the employment of white lead in works of painting dangerous to health?
2. Can white lead be replaced by other materials?
3. Can the Legislature prohibit the use of white lead in works of painting?
4. Ought the Legislature to consider the question of indemnifying against loss the manufacturers of white lead?
5. How can the law be carried into effect?

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[Continued.]

14,844. The answers to the questions were:—

1. Yes.
2. The report confirms the conclusions arrived at by the Conseil Supérieur d'hygiène publique de Belgique in 1902, that white lead is replaceable for at least inside work by zinc white, which is, however, more costly.
3. Yes; the Belgium Legislature is justified in regulating, limiting, or even prohibiting the use of white lead for painting, provided there is a real necessity to do so relatively to the danger run.
4. No.
- 5.—(1) The transformation of white lead works to zinc white works, if possible.
- (2) If it were possible it would be useless, as the Vieille Montagne are the only producers of zinc in Belgium, and, in consequence, of zinc white.  
(NOTE.—It was afterwards shown that there are other small firms producing zinc in Belgium, but the Vieille Montagne are the only producers of zinc white.)
- (3) The industry could not subsist only on the white lead required for exterior painting.

14,845. The committee proceeded to recommend in this report the adoption of additional regulations rather than the prohibition of the use of white lead.

14,846. Dr. Delbastée and his friends directed their criticism to the conclusion of the Section Centrale contained in their fifth recommendation, on the ground that all the other recommendations pointed to the entire prohibition of white lead. The reporter, however, insisted that the section felt that the principal source of danger was by means of dust which was chiefly caused by the white lead in powder. It was found by the Section Centrale that 50 per cent. of the total production of white lead in Belgium was delivered dry. They also felt that if white lead were interdicted, then, logically, the employment of minium, massicot, litharge, American white zinc (which contains lead and arsenic), green lead, green copper, vermilion with mercury base, and of all the colours which were sources of danger to the workmen, should also be prohibited. It was also pointed out that Belgium ought not to go beyond what had then been done by way of regulation in France, Switzerland, Germany and Austria. Also, as was pointed out by the report of the Conseil Supérieur d'hygiène publique of the 28th November 1907, the wholesale colour merchant who is not a white lead manufacturer, and who grinds his colours under the best conditions, would be seriously affected by a complete prohibition.

14,847. The debate on the propositions of Dr. Delbastée and the Section Centrale commenced on the 28th May 1909, when the Minister of Industry and Labour gave the Government support to the proposition of the Section Centrale. The debate was continued on the 9th June 1909, when Mr. Verhaegen (the reporter) pointed out that an industry ought not to be suppressed except in the last extremity, and that the suppression of white lead would practically confer a monopoly on the Vieille Montagne, also that no other country had done more than regulate the use of white lead. He pointed out that the difficulties of inspection enforcement urged by Dr. Delbastée applied equally to a prohibition of white lead for paint. The Minister of Industry and Labour pointed out that the position of the white lead workers was not less favourable than of numbers of other workmen, and that one of the chief objects to be attained by regulations was the education of the workmen. He also emphasised the importance of the elaborate inquiry undertaken by the Canton of Geneva in 1907. At the adjourned debate on the 11th June 1909, it was arranged that Dr. Delbastée's propositions should be treated as proposed amendments to the report and proposals of the Section Centrale. Dr. Persoons pointed out at this session that designers of embroideries used white lead in transferring the design to the materials, also lace makers

for blanching purposes, and Mr. Verhaegen instanced china, glass, mastic, and gas-joint making as additional uses of white lead.

14,848. At the sitting of the 10th June a vote was taken, when an amendment of Dr. Delbastée to the Section Centrale's report was defeated, so far as the prohibition was concerned.

14,849. The second vote was taken upon the propositions of the Section Centrale at the sittings of the 7th July 1909, when the Government moved an amendment to Article 2, providing that the arrêté ministerial could prohibit not only the employment but also the sale and transport of other lead products. This amendment was accepted both by Dr. Delbastée and Mr. Verhaegen on behalf of the Section Centrale, and carried. The Bill was then put to the vote as a whole, and carried, 92 members voting for and 31 abstaining.

14,850. The Bill was then considered by the Committee of Industry and Works of the Senate, who made a report on the 22nd of July 1909, very shortly and ably summarising all that had gone before and indicating that the Government shared the views of the Section Centrale, and thought that their propositions would give great satisfaction. The committee supported the vote of the Chamber of Representatives on the ground that the Legislature ought not to use the remedy of prohibition except with the greatest care, and only when the necessity was absolute. The transport and use of white lead in powder and cakes for employment in painting works was undoubtedly the greatest danger, and ought to be prohibited, but the danger arising from white lead destined for other uses was not so great, and regulations as to the sale, transport, and employment appeared amply sufficient.

14,851. The Senate considered this report on the 5th August, and passed the law with discussion *nem. con.*

14,852. The law is dated 20th August 1909, and royal decree providing regulations in pursuance thereof is dated 25th July 1910.

14,853. (Chairman.) You are a master house painter, are you not?—Yes.

14,854. Can you tell us how many master house painters there are in Belgium?—About 4,000.

14,855. In paragraph 14,834 in your proof you say that zinc white is largely used in Belgium for interiors?—And a lot of white lead also. It depends on the master painter. There are master painters who only use white lead.

14,856. Are there master painters who only use zinc?—No, there are none who only use zinc.

14,857. You also state that zinc is more difficult to use than lead would be?—If zinc white only were used, the education of the painter would have to be recommenced.

14,858. Is that the only difficulty in using zinc white for interior painting?—Yes. At present many painters do not even know zinc white. That is talking of workmen, of course, and also of many masters.

14,859. But is the want of knowledge on the part of the painter the only difficulty in using zinc-white paints for interior painting?—Yes; it is the only difficulty.

14,860. Will you tell us in detail what are the difficulties you meet with in outside painting which you have not already overcome in inside work?—You are speaking of the use of zinc white?

14,861. Yes?—The principal difficulty is that zinc white does not dry as easily as white lead, and you cannot use the same driers as for white lead.

14,862. What leadless paints have you tried for outside painting?—Zinc white (meaning oxide of zinc), also sulphide of zinc.

14,863. What medium did you use?—Linseed oil or boiled oil. In Belgium no other oil is used. Also they use a certain amount of poppy oil for zinc white for grinding it, because otherwise it hardens in the cans when exposed to the air.

14,864. Did you try the addition of a small quantity of good copal varnish?—In the painting of buildings one uses enamels; one can also prepare zinc white with

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[Continued.]

turpentine and also white varnish for colours which must dry quickly.

14,865. Then it is no good pressing you if you do not know. How long do you find white lead stands where the atmosphere is very humid, as in greenhouses?—Two to three years.

14,866. Would you be surprised to hear that zinc and lead have been found to be equally perishable under such conditions?—The painting of greenhouses is a special class of work and would probably be undertaken by a glazier.

14,867. But that is not the question I asked you. In your evidence you particularly mentioned the fact that zinc white did not stand well in humid atmospheres, such as greenhouses. Would you be surprised to hear that both zinc and white lead have been found to be equally perishable under such conditions?—I make no mention of that in my deposition. I speak there of "zinc white," not lead. I am persuaded that if the lead was properly applied it would last considerably longer under those circumstances than zinc white.

14,868-71. *The witness was asked if he was speaking only of iron, or of both wood and iron; but he states—in the correction of his evidence—that the point was not fully put to him (by the interpreter).*

14,872. Is that only a personal opinion of yours?—It would be the opinion of all the master painters in Belgium, and I cite as an example the fact that the re-painting of the greenhouses at the Royal Palace of Laeken, in Belgium, has just been put out for estimates, and it is specified that white lead must be used.

14,873. Are those greenhouses made of wood or iron?—More iron than wood.

14,874. In paragraph 14,836 you mention the motion brought forward by Dr. Delbastée, in November 1903 for the prohibition of the use of white lead in all house painting, under severe penalties?—Yes.

14,875. The fact of this motion being presented shows that the evil must be very serious, does it not?—I have never given any statistics applying to Belgium, although I was asked on several occasions to do so. It was rather a political question than otherwise.

14,876. Have you any definite statistics as to the number of house-painters employed and the number of lead-poisoning cases that occur amongst them every year?—In the whole of Belgium there are 25,000 to 30,000 painters. I know of isolated cases of lead poisoning, but there are no statistics of any kind.

14,877. (*Sir Godfrey Baring.*) Are there no Government statistics issued at all?—Neither Government nor otherwise.

14,878. (*Chairman.*) You are aware, I suppose, that the prevalence of lead poisoning amongst house painters in other countries in Europe is very great?—I do not know anything whatever about other countries, except possibly in France, where the method of painting is somewhat different.

14,879. Now, let us consider in somewhat greater detail the regulations which you summarise in paragraph 14,839. In England the dry grinding and carriage of dry white lead are almost unknown?—I do not know.

14,880. The precautions against lead poisoning arising from the handling of dry white lead may therefore be disregarded when we are considering the prevention of lead poisoning amongst house painters in this country?—Yes, I suppose so.

14,881. We are left therefore with the consideration of the remaining four provisions, namely, Nos. 7 to 10 in paragraph 14,839 of your proof: (7) Prohibition of rubbing down dry. (8) Working clothes to be provided. (9) Washing appliances to be provided. (10) Quarterly medical examination?—No. 5 should also be included.

14,882. That sort of mixing is not done in England, as I have just said?—It really applies here to ordinary painters.

14,883. In paragraph 14,840 you admit that the enforcement of these regulations is practically impossible in private houses, where the inspector has no

right of entry?—Yes, that is so. I can explain what does happen, and how the thing is actually enforced.

14,884. How then would it be possible to prevent the dry rubbing down of painted surfaces? Sixty per cent. of the working painters in Belgium belong to the unions, and the moment an employer attempted to make a man do dry rubbing down the fact would be notified to the unions by the workman.

14,885. Is that the only possible way of detecting any infringement of this regulation?—Practically speaking, up to the present I do not know of any other method. Already the various inconveniences of the law have been found, and they are being discussed at the present moment with a view to putting the thing in better shape; they are trying to find a way to get the inspector into private houses; they are endeavouring at present to ascertain how it can be done.

14,886. Now you lay stress on the danger of dry rubbing down, do you not?—Yes, it is very dangerous.

14,887. Can you dispense entirely with dry rubbing down of lead-painted surfaces?—No, for dry rubbing down can only be done with old paint. It would perhaps be just as dangerous with white zinc as with white lead.

14,888. What do you mean by that?—The effect of zinc white dust would bring about just as much illness, though possibly not exactly the same kind as white lead.

14,889. On what authority do you tell us that?—The old painted work has got not only the original materials that were put on to it, so to speak, but all sorts of dust and so on, which has gradually accumulated on it.

14,890. What do you mean by dust and so on?—General filth.

14,891-2. *The witness—in his corrections—states that these two questions were not put to him (by the interpreter).*

14,893. (*Chairman.*) Do you come here to tell us seriously that any form of dust is as dangerous as the dust generated by the dry rubbing down of lead paint?—For the interior it is less dangerous, because dry rubbing down is practically not done now.

14,894. I cannot leave the question like that. You have stated that zinc dust was just as dangerous as lead dust, and I want to know on what authority you make such a statement?—I refer to an article by M. Liber.

14,895. I will put one further question, and if you do not answer it I must leave the point. You have told us that in your opinion zinc dust is as dangerous as lead dust for workmen to breathe. Is that only your personal opinion?—I am willing to abide by the opinion of the gentleman who writes the article—M. Liber.

14,896. Can you dispense entirely with dry rubbing down of lead-painted surfaces?—Yes, entirely for old paint but not for new; the work would be better for it. The final result would be better for it.

14,897. Now, when a first or priming coat of lead paint has to be rubbed down before a second coat is applied, what would you use then for rubbing down?—The first coat never is rubbed down. (*The witness was understood to be referring to the enduit.*)

14,898. I am not speaking of the filling, but of the first coat of paint that is put on?—It is done dry on the first coat on top of the *enduit*, but there is no dust from fresh paint.

14,899. When a first or priming coat of lead paint has to be rubbed down before a second coat is applied, what would you use then for rubbing down?—I would wait till that first coat was dry, and then I would rub it down dry.

14,900. Would it not take a long time for the first coat to dry sufficiently to allow a wet rubbing process to be applied?—It would be a year or two before it would be in a state in which you could do that.

14,901. (*Sir Godfrey Baring.*) What do you mean by *enduit*, because a lot turns on that?—A white lead putty—chalk and white lead.

14,902. Made of white lead, oil, and a drier?—Yes, and chalk.

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[Continued.]

14,903. (*Chairman.*) I do not think you quite understand my question. I am assuming that a door has received its first coat. Now I ask, would it not take a long time for that first coat to dry so as to be sufficiently hard to permit of wet rubbing down?—One year at least. When the rubbing is done dry it is fresh paint, and consequently there is no dust.

14,904. (*Mr. Rice.*) Take a piece of white wood with nothing at all upon it, what do you put on that?—The first thing I would do would be to rub it down with glass-paper; then I would put on a coat of paint of two-thirds oil and one-third turpentine.

14,905. (*Chairman.*) What would you do then?—Then the next thing would be to fill up any small nail holes and so on with mastic—putty. If it is first-class work, the next thing that is put on is what I call *enduit*.

14,906. (*Mr. Sutherland.*) But that would not involve sand-papering?—For ordinary work I would not put on what I call the *enduit*.

14,907. (*Chairman.*) Do I understand that there is no rubbing down done at all up to this point?—No.

14,908. When does the rubbing down first begin?—If it is first-class work where the *enduit* is put on, there is rubbing down wet, and it is generally done three weeks or a month after. For good work it is absolutely necessary.

14,909. Does the *enduit* contain lead?—Yes, generally lead.

14,910. In what way can you make sure that working clothes or overalls are supplied to and worn by every worker?—The workman supplies his own clothes, and they are regularly cleaned every week.

14,911. How are you to ascertain that they are worn by every worker?—The employer goes round and sees these things himself on his visits to the work, and, in any case, in Belgium the workmen are very clean in their habits.

14,912. But you have told us that, generally speaking, it is practically impossible to enforce these regulations?—That refers only to the inspectors.

14,913. But that is what I mean. How are they to know that the men are wearing these overalls?—The employer himself goes round to the work, and would notice it.

14,914. But are we to understand that the employer in every instance goes round to every job to see that the workmen are wearing their overalls?—The employers do go round to all the work, and if the employer himself does not go, it would be a director who would go round.

14,915. Do I understand that the employers in Belgium have a sort of private inspection of their own?—Simply going round for the ordinary daily visit to see that the work is going on in the usual way of business. Doing that, he would notice if any workman did not wear overalls.

14,916. How can proper washing appliances be provided on every painting job?—When the ordinary materials for the work are taken round to the job, special buckets and soap are also included for the purpose of washing. The buckets must not be used for other purposes. And when a workman is first engaged he is always given a toothbrush, a nail brush, and a small metal cup and a towel for each man, and the latter is renewed every week.

14,917. I am quite sure that these different things are given out to the workmen, but I want to know how you are sure that the workmen use them?—Their companions on the job who did use the appliances and wear overalls would reproach them if they did not.

14,918. Article 7 requires employers to provide water and the requisites for rinsing the mouth, as well as for washing. How is this done when the men are working at a private house?—I repeat what I said just now as to water and soap and toothbrushes and so on being supplied by the employer. When the medical inspection is made every three months, the doctor questions the workmen on these points as to whether they have had the appliances and used them.

14,919. Do I understand that the only opportunity of ascertaining whether the men have rinsed their mouths is when the doctor examines the men once in three months?—Yes.

14,920. Article 7 also requires that the employer or his deputy shall see that the workman wash and rinse their mouths before taking food or drink, and before leaving the workshop. How can you be sure that this is carried out?—Nothing is done. These articles are posted up where the workmen can see them, and the workmen are old enough to know how to carry out the requirements. They are not children.

14,921. What is your opinion of the medical examination?—I would like to give it in a report which I have here.

14,922. I do not want a report. I want a short answer to my question. You may put the report in if you like. Is it the report of a medical man or is it your own?—It is a report initialled by the medical man. Each workman is in it.

14,923. I have here your letter which has been written on this question.\* I only want a short answer?—The medical inspection should be done in duplicate; that is to say, there should be two copies of this thing, one of which should be forwarded every year to a central office, presumably a Government office.

14,924. (*Mr. Rice.*) But what we want is your opinion on the thing as it stands?—It is not sufficiently severe. Shall I quote this report?

14,925. (*Chairman.*) I would much rather that you quoted a passage from your own letter. That will be a quite sufficient answer?—That is not my own opinion. I simply signed the letter as the president of the association who wrote it.

14,926. I understand that this letter was written and signed by you, in which you speak of medical examination in the following words: "Of all these regulations the most iniquitous is the medical inspection imposed on the operative painter. This provision, which is vexatious and humiliating, is without any effect"?—I have just explained that I signed this letter as the president of the association.

14,927. The Belgian Association of Master House Painters?—Yes, but it is not my personal opinion.

14,928. It is quite enough. It is rather unfortunate that you should have had to sign it. Is that statement, which you signed in the letter I have just read out, the opinion of the council of which you are president?—Yes, of the majority of the members.

14,929. Is this association of which you are president the same as the federation to which you refer in paragraph 14,841 of your evidence?—No; the federation is the federation of all the master painters in Belgium.

14,930. I want to get it quite clear which is the federation of all the master painters. Is it the one of which you are president?—It is the *Chambre Syndicale*. It is the painters' section of the Brussels Chamber of Commerce, of which I am president.

14,931. Does that painters' section embrace all the master painters?—No, not even half.

14,932. What does the federation embrace?—The federation is an association of all the painters' chambers in Belgium; therefore, the *Chambre Syndicale* of which I am president would be a part of the federation.

14,933. (*Sir Godfrey Baring.*) Do all the chambers of commerce make one federation?—Not all the chambers of commerce, but all the painting sections of the chambers of commerce.

14,934. (*Chairman.*) In paragraph 14,841 you state that the Master Painters' Federation (that is the society that embraces the whole of Belgium, I take it) passed a resolution at Liège in 1905 stating that they preferred the total prohibition of white lead to the application of regulations?—Of the 4,000 master painters in Belgium only 800 are members of the federation.

14,935. You can put that as an addition to your answer, but I want to know whether that resolution was passed?—Yes.

14,936. The same view was set forth in the Master Painters' Federation Memorial of the 19th May 1907, and again repeated in the letter dated 30th September 1911?—Yes.

\* Appendix XVIII.

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[Continued.]

14,937. I want to clear up the question of the numbers that these different corporations represent. Both these societies have passed resolutions in which they say that they prefer prohibition of white lead to these regulations. I want to know about how many of the painters in Belgium are included in these two organisations?—800 out of 4,000.

14,938. Have the other 3,200 master house painters made any declaration one way or the other?—No, they were neutral.

14,939. What is the protest?—It was made before the regulation of the use of white lead. It is a protest of 2,800 master painters in Belgium.

14,940. Have the balance of the 4,000 made any move one way or the other in favour of prohibition or in favour of regulations since then?—Nothing beyond this.

(*Sir Godfrey Baring.*) Some of the balance of the 3,200 have signed this, I understand.

14,941. (*Chairman.*) Did the balance of the master painters, namely, 3,200, in any form make any protest against the regulations or in favour of prohibition?—No, nothing beyond this. This is not a protest against the regulations.

14,942. Was not this protest produced and signed before the regulations were put into force, and consequently before the irksomeness of the regulations was understood?—Yes, that is so. It was several years before.

14,943. With regard to the 800 firms that belong to this federation, are they the principal firms of master house painters?—Yes, most of them.

14,944. Could you tell us how many men they employ?—It is really a very difficult thing to say, but, taking an average of 20 workmen for each, say about 16,000.

14,945. I want to know whether the 800 firms employ as many men as the balance of firms who do not belong to this federation?—The 3,200 altogether employ 9,000 to 15,000. That makes the 800 employ more than half.

14,946. We may take it that more than half the men employed in the house-painting trade belong to the 800 firms?—Yes; that is what I mean.

14,947. Do I understand that a committee of the Belgian Government in 1909 proceeded to adopt additional regulations, though the Master House Painters' Federation had stated in a memorial in 1907 that they would prefer prohibition of the use of lead?—Yes; that was the substance of the report of the Section Centrale to Parliament.

14,948. The Belgian Government proceeded to pass a royal decree adopting additional regulations, notwithstanding the protest of the 3,200 firms who put forward the fact that there was no danger in using lead in house painting?—Yes.

14,949. The report of the 19th February 1908 admits that the employment of white lead in painting is dangerous to health?—Yes.

14,950. You have no definite statistics, but if they were collected for the whole of Belgium, I suppose that the number of lead cases would be very large?—The cases are very rare.

14,951. Why should Belgium be immune from lead poisoning when other countries are not? Is the process of painting different?—I do not know anything of what happens outside Belgium.

14,952. But may we not take it that Belgian painters are just as subject to lead poisoning as painters in other European countries?—Yes, I suppose so.

14,953. Then presumably the percentage of lead-poisoning cases in Belgium would be about the same as they are in England, Austria, and so on?—I cannot say—not necessarily, because the process is not always the same. For instance, in France, the man who puts on the *enduit* (the filling) takes the stuff in his hands, and so on.

14,954. (*Sir Godfrey Baring.*) Whereas in Belgium he fills in with a knife?—Yes.

14,955. (*Chairman*) (*to the witness.*) You admit that the prohibition of the use of lead would be the simplest solution?—For myself I would prefer to see

the medical inspection, which would be the best and simplest way of getting rid of the whole trouble.

14,956. (*Sir Godfrey Baring.*) Made much more rigorous? You said that it ought to go beyond what it does now?—At present it is not enforced as it should be.

14,957. (*Chairman.*) At any rate, the majority of the house-painter employers in Belgium prefer the prohibition of the use of lead?—I am convinced that it is not so. It is not possible to judge by a protest made by some of the master painters only.

14,958. At any rate, the Corporation of Painters would prefer the total suppression of white lead to regulations?—With regard to the statement that the Corporation of Painters would prefer the suppression, that refers to the federation. I explain that the federation consists of 200 master painters out of 900. At the meeting at which that letter was signed 60 were present, and 40 were in favour of the letter and 10 were against; so that it is the opinion of 40 out of 900.

14,959. (*Mr. Rice.*) That is in Brussels?—Yes. I am not speaking about the provinces at all. The letter refers to only the Brussels section.

14,960. (*Chairman.*) How many men do those 200 employ?—There are large firms and small firms, and there are large firms which are outside. It is a difficult thing to say how many. I have no figures that I can give. Certain of the employers consider that the *Chambre Syndicale* is more or less a political body, and they will not join it.

14,961. But I understand that you are president of this society?—It is not really a political organisation, but there are master painters in Belgium who will not associate themselves with it because they think it is a political organisation.

14,962. (*Mr. Rice.*) Of the number present, would 40 represent the council? Was it a general meeting or a council meeting?—It was a general meeting.

14,963. (*Sir Godfrey Baring.*) Everyone was summoned to it?—All the 200 were summoned and 60 attended.

14,964. (*Chairman.*) Do I understand that when they were summoned they knew what the meeting was about?—Yes. It was on the agenda paper.

14,965. So that practically we may say that the people who stayed away assented to the resolution. They knew what was going to be put before the meeting?—There are always a large number of people who remain absolutely indifferent until the thing is done, and then they start to shout. It is unpleasant to say it, but true.

14,966. At any rate, a large majority of them voted in favour of it at the meeting?—Yes, 40 against 20. I said 10 in favour, but it appears that it is 20—2 to 1. The principal reason of the 40 was because of the medical inspection costing them money.

14,967. I understand that the Belgian Parliament reserve the right to prohibit the use of white lead if they find that there is any real necessity to do so?—No, that is not so. The article only refers to dry white lead in powder.

14,968. You agree, no doubt, that injury to health is more important than the possibility that the customer might have to pay a little more for the more frequent painting of his buildings, if lead were prohibited and substitutes did not prove so durable?—The answer to that question would be very long. There is a whole list of comments that I would like to make on a question like that.

14,969. But surely it is a very simple point?—Admitting that a client would be willing to pay a little more, in my opinion the painting work for exteriors would become impossible simply with zinc white, and would cause very considerable trouble in the case of public buildings, and railways, and so on, particularly for painting on metal. What I say is so true that, although at the commencement of this law, which was passed in 1909, only white zinc was used for the State railways of Belgium, within recent months we have had so much trouble with zinc white that an order for 60,000 kilogrammes of ground white lead has been placed by the works at Malines, the largest workshop



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of the State railways in Belgium, about 3,500 workmen being employed there.

14,970. How many of these are painters?—At least 500 would be painters.

14,971. Notwithstanding this opinion of yours, up to the 30th September 1911 they could only collect 20 master painters to vote against the total prohibition of lead in all painting operations. How do you account for that?—I have already explained why. You must take into account the Belgian character. They object, generally speaking, to regulations of any description.

14,972. The manufacture of white lead is a very important industry in Belgium, is it not?—Very important. The principal manufacturers in the whole of Europe are probably Debbaudt Frères, at Brussels.

14,973. Is the manufacture of white lead confined to a few firms in Brussels?—There are about five important firms.

14,974. In Belgium?—Yes. Debbaudt Frères export thousands of kilogrammes to the United States.

14,975. Now, the decision of the Belgian Section Centrale not to recommend prohibition was dated 19th February 1908. It was not until 1909 that France adopted prohibition?—Yes.

14,976. Do you not think that the Section Centrale might have come to a different decision if they had reported after 1909?—I do not think so. The Belgian law, as a matter of fact, was only voted after the French law.

14,977. The Belgian law in favour of regulations and against prohibition?—Yes.

14,978. You refer in paragraph 14,847 to the danger of one company in Belgium securing a monopoly of the supply of zinc. How is it that they are monopolists?—I do not say that at all. It is M. Verhaegen, the Belgian rapporteur, who says that.

14,979. Do you agree with that opinion?—Yes, it is my opinion also, because in Belgium and even in Holland it is the Vieille Montagne Company which exports the most.

14,980. Of what do they hold a monopoly?—Zinc white in powder.

14,981. How does the output of zinc ore from the mines with which they are connected compare with the output of zinc ore of the whole of the rest of the world?—I cannot say.

14,982. If they are not monopolists of zinc ore what are they monopolists of?—It is a question of Customs duty on the stuff entering.

14,983. A monopoly means something that you can control. What do they control? If the Belgian firm had the right of collecting all the zinc from all the zinc mines in the world, then they would be monopolists of zinc: that I can understand; but unless they have a patent form of manufacture or a monopoly of the zinc ore how can they be monopolists?—It is recognised that the zinc white they turn out is the best. It is also recognised in France, where the Vieille Montagne Company, have also works, and the company's product which is sold in Belgium is superior to that sold in France.

14,984. Do I understand that they have a superior method of manufacture?—Yes, it is a process of manufacture which is superior.

14,985. They have a monopoly in that particular respect?—It is doubtless a manufacturing secret, because they will not allow anybody to go near their works. Two years ago a party from the School of Painting at Brussels went to visit the works of the Vieille Montagne Company, and they showed them the whole of the works except that part in which zinc white was manufactured. They make other things besides zinc white.

14,986. (*Lord Henry Bentinck.*) If the opinion in the chamber of commerce is 2 to 1 in favour of total prohibition, do you not consider it likely that the opinion of the employers outside the chamber of commerce is equally strong in favour of prohibition? What reason have you for thinking that the opinion outside is not equally favourable to prohibition?—Simply my knowledge of the trade and of the people themselves.

14,987. (*Dr. Collis.*) Do I understand that you desire that the quarterly examination should be made more strict?—That is so. Each time the workmen are

examined it is found that they have improved so far as the questions of cleanliness are concerned.

14,988. Do you find that they have improved as regards health or only as regards personal cleanliness?—I am speaking simply of cleanliness.

14,989. Do I understand that you consider that cleanliness is the most important thing in reducing the danger to the workers of contracting lead poisoning?—It is the most important thing to the workers, and it is recognised by all the reports which have been made up to the present date.

14,990. Do you consider it more important than the question of dust?—Yes, much more important.

14,991. You speak entirely for yourself and not for others, I presume?—Yes, I speak simply for myself. I cannot speak for everybody.

14,992. You do not speak for any of the Belgian doctors?—Do you mean as to the relative importance of the dust and so on?

14,993. Yes?—The doctor says the same thing. Each time that the doctor visits my works he looks first of all at the man's nails, then at his teeth, and then he makes the man stretch his hands like that (*describing*).

14,994. But surely you could not expect the doctor to look at the dust?—The principal point is that a workman does not continue to sand-paper all day. It is only a very small portion of his time that he is doing it.

14,995. If the medical examination was to be made more thorough, and I presume more frequent, how then do you suggest it should be held?—Once in three months is enough, having these registers in duplicate, and having one each year sent up to a central office.

14,996. But how would that affect the doctor's examination? It would not make it more careful, and it would not make the men more careful?—Under those circumstances it would be done with regard to everybody. At the present time every painter is not examined.

14,997. Is it not the law that they shall be?—Yes, it is the law that they shall be, but it is not carried out. I am speaking of the small employers who actually do work themselves. Those are the people who do not pass a medical examination.

14,998. A man who does not employ any men?—Not necessarily. He may employ men, but there are plenty of employers who are also practical workmen themselves, and, being employers, they do not have to pass the medical examination—they or their sons or members of their family.

14,999. All the painters themselves are to-day examined, are they not?—In the large businesses the medical inspection is properly done, because the men are collected at a certain time in order to meet the doctor, but in small businesses—employers, for instance, who have only one or two workmen—it is difficult. They escape from medical examination. They do not happen to be there when the doctor comes in. The whole thing is not organised in the same way, and as a matter of fact they are not examined.

15,000. Is the medical register open to the inspection of any Government official who has to look after these workshops and factories in Belgium?—Yes. The register must always be kept at the disposal of the Government inspector.

15,001. Then if the Government inspector finds that a person is employed whose name is not down in the register as having been examined, surely he can prosecute the occupier?—Yes. The occupier has to have at the disposal of the inspector two registers, the medical register and also a register of the workmen whom he employs, and if the inspector finds workmen in one and not in the other, he would have him fined.

15,002. What is the charge that the medical inspection imposes on the occupiers? How much is the doctor paid? Is there a Government scale?—Five francs for the first ten, and 1 franc for every succeeding ten. So that if you had 50 you would pay 9 francs and 14 francs for a hundred.

15,003. That is a good deal less than ours. Ours is 25s. for 50. Is that considered a fair fee to offer a medical man for examining such a number of men—

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9 francs for the medical examination of 50 men?—Considered by whom?

15,004. By the Belgian Government?—Yes, it is considered enough. It is done very quickly. The doctor does not take an hour to examine 50 men.

15,005. Does he take about a minute to examine each man?—The first time that a man is examined it lasts longer. Particulars are entered in the register at each three-monthly examination, and the doctor, if he does not remember a man, can refer to his own remarks on the previous examination. The first time it takes considerably longer. It depends necessarily upon what happened three months before as to whether it takes long or not.

15,006. Do you in Belgium consider a doctor working hard for an hour reasonably paid at the rate of 9 francs an hour?—I sum it up by saying that we have had no complaints from the doctors. I have the list of doctors here.

15,007. How many Government inspectors of factories and workshops have you in Belgium?—You do not mean medical?

15,008. No; factory inspectors?—I do not know anything about it, because I have nothing to do with factories.

15,009. (Mr. Sutherland.) Why did the Belgian State Railways abandon the use of zinc paint?—They have not entirely abandoned it, but they found it necessary to take up white lead again.

15,010. For what—for their rolling stock or their stations?—For first coats on the rolling stock and the preparation of the *enduit*, the filling.

15,011. Does that apply also to their structures and stations?—No, it does not apply to them, because the work in connection with stations and buildings is done by contractors. It is all put out to contract.

15,012. But do they specify in the contract for lead or for zinc?—No, they do not do so nowadays. At the present time prices are being asked for a new station at Ostend, where there will be more than 100,000 francs worth of painting work, but no mention is made of white zinc or, for that matter, of white lead. The contract will be actually given out to-day.

15,013. (Lord Henry Bentinck.) It is not specified that it shall not be zinc white?—No, it is not specified at all.

15,014. It does not specify white lead?—No.

15,015. (Mr. Sutherland.) How is the specification framed?—Simply so many coats of paint in colours to be decided by the architect.

15,016. Your objection to zinc paint is that it does not stand like lead? You do not object to the use of zinc except on the ground that for outside work it does not stand?—For outside work it does not last. It is not solid. Nobody would contest that. In Belgium even the adversaries of white lead did not contest the point that white lead is much more durable and lasts longer than zinc white.

15,017. For outside work?—For outside work.

15,018. You are of opinion that to strengthen zinc paint by the addition of varnish would add considerably to the cost of it?—You are speaking of exterior painting?

15,019. Yes, exterior painting?—Enamel does not stand in any case out of doors, as has been shown by experiments.

15,020. I am not speaking of putting it into the category of enamels, but I am speaking of using varnish with it?—The question of price does not come in except from the point of view that you would have to have more coats of paint, but in any case the use of varnish with white zinc for exterior work would be disastrous from the point of view of the durability of the work. Varnish would crack.

15,021. Even good enamels are not suitable for general use over broad surfaces?—You are still speaking of the outside?

15,022. Yes?—They are not used for outside at all. The use of enamels outside is quite impossible, principally on account of the rubbing down. It would have to be done so very much better, and so on, in order to hold.

15,023. Your opinion is that, for a basis of comparison between lead and zinc, we can only compare them as mixtures with oil and turpentine?—I quite agree that you can only compare them if they are with linseed oil.

15,024. The question has never really been put before the master painters of Belgium, has it, as a definite question, except in the case of the Brussels section of the chamber of commerce?—Do you mean officially?

15,025. I mean has anything been put before the master painters officially by the federation with regard to whether they would prefer prohibition or regulation?—No.

(Chairman.) Let me read this to you from paragraph 14,841, because it is very important: "These regulations, which drew forth an emphatic protest on the 19th May 1907 from the Master Painters' Federation, who addressed a memorial to the Government"—

15,026. (Mr. Sutherland.) I meant has it been put before the whole of the master painters of Belgium by any organisation whether they would prefer prohibition or regulation?—It has not been officially or semi-officially put before them.

15,027. (Chairman.) Are there any means of putting it officially before them?—No. Even if the Government officially sent out a questionnaire to them all, I am quite sure that at least 80 per cent. would not reply.

15,028. (Mr. Rice.) I understand that you are only speaking for Brussels. I see that you are president of the *Chambre Syndicale* of Builders and Painters in Belgium?—Only for Brussels. I was vice-president at the seventh congress of the General Federation of Master Painters in Belgium.

15,029. Was this question of prohibition raised at that seventh congress?—No.

15,030. And therefore no vote was taken on that?—The question had already been done with, so to speak. The rules were already in force.

15,031. Yes, but I did not know whether they protested at this time?—No. The congress was an international one, and this was simply a national question.

15,032. In Antwerp, and other towns such as Ostend, you have *chambres syndicales*, I take it?—Yes, and there was a special protest in 1906 sent by the master painters of Antwerp to all the parliamentary representatives of the district of Antwerp. It is a protest against the suppression of white lead. You will see therefore that Antwerp, although their chamber is affiliated with the National Federation, are not of the same opinion, because they are absolutely against the suppression of white lead.

15,033. Can you tell me the voting of the Antwerp federation? What were the proportions?—Unanimously.

15,034. Unanimously against?—It was unanimously voted that a letter protesting against the suppression should be sent to all the Parliamentary representatives.

15,035. How many members are there?—One hundred and thirty. It is the most important of these organisations outside Brussels.

15,036. One hundred and thirty members of the Antwerp Painters' Society, or whatever you like to call them, met together and they were unanimous in signing this protest against the suppression of white lead?—Yes.

15,037. Do you know anything about other towns? Take Ostend, for instance?—They have taken part in the whole.

15,038. In Brussels they are 2 to 1 against the continuance of white lead, and in Antwerp they are altogether in favour of white lead?—The first part of the proposition was that they would prefer the suppression to regulations which they objected to; that was because they could not stand the medical inspection and the cost of it.

15,039. (Chairman.) Are the 130 members of the Antwerp section included in the total of 800 given to

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us as members of the Master Painters' Federation?—They are.

15,040. What is the date on which the Antwerp section of the Master Painters' Federation made their protest against the prohibition of lead?—1906.

15,041. But on the 19th May 1907 the Master Painters' Federation, which included the Antwerp section, addressed a memorial to the Government in which they said they preferred a total prohibition of lead to the regulations which were being introduced?—Yes, but it must be remembered that each town has the right to only three delegates, and a town which had, for instance, 20 master painters in all, would have the same representation as the city of Antwerp.

15,042. Did the Antwerp section of the Master Painters' Federation make any protest to the main body when this emphatic protest was made to the Government on the 19th May 1907?—They protested all through.

15,043. In what form did they make their protest?—Verbally at the meetings.

15,044. But that is hardly evidence. Have you any evidence to produce that the Antwerp section of the Master Painters' Federation objected to this declaration which was made on the 19th May 1907 to the Government, in which they said they preferred total prohibition to regulations?—Yes, in the minutes of the federation.

15,045. Would you kindly send us those minutes?—Yes, I can produce them.

15,046. (Chairman.) How many medical inspectors are there in Belgium?—One for each province, that is, nine.

15,047. (Mr. Gardner.) I understand that there is a good deal of zinc white used for interior work?—There is a great deal used, but not so much as there is of white lead.

15,048. There are no special men employed for painting with zinc white?—No.

15,049. Can you explain why you said that if white lead was to go out and zinc white was to be used, the painter would require to begin his education over again?—Only one painter out of twenty is capable of properly applying zinc white. Those who put it on and are not accustomed to putting it on, do poor work.

15,050. It is just a matter of custom, then. How long would it take a man to learn to paint with zinc white?—A very good man would probably be able to learn it in six months, but the average individual with the ordinary average intelligence would take a couple of years.

15,051. Do the painters in Belgium serve an apprenticeship to the trade or do they enter the trade after they are adults?—There are apprenticeship schools, but they are not obliged to go through those schools.

15,052. Do they go to the trade as boys and be trained?—They begin about 14 or 15. Most painters you find have been through all sorts of jobs, not only building and so on. But those who have been at it all their lives began about 14 or 15 years of age.

15,053. I will take a painter who has been trained to the trade and who spreads all sorts of material, oil paint, flat paint, varnish enamel, and distempers. How many years would it take him to learn to spread zinc paint?—Six months to two years.

15,054. But an ordinary painter spreads a dozen different materials, and each one of these requires different treatment. How would it take from six months to two years to learn to spread zinc?—The majority of painters use white lead, and a lot of it, and the use of white zinc is only a small proportion.

15,055. The use of enamel is a small proportion of a painter's trade, but if a painter is expected to be able to spread enamel, and he can spread enamel, why cannot he spread zinc?—It is a totally different thing; and who says that any ordinary painter can put on enamel?

15,056. I do not?—There are few that can put on enamel.

15,057. I am referring to men who have been trained to the trade—the trained painter. I am not

speaking of the man who has gone into the trade as a last resort. Every man can put on paint in that sense?—It is a question principally of the making up of the zinc white paint. Zinc white paints at the present time, when flat surfaces are required, take a large amount of turpentine, and it is very easy to spoil the work with zinc white by putting a little too much turpentine or a little too much oil. It therefore comes to a question of mixing. If I could discuss the thing for five minutes with someone who completely understood the trade I could explain it, but it is a long technical question.

15,058. Do they mix zinc paints in exactly the same manner as they mix a white lead paint?—No, not at all. You want much more oil in the white lead.

15,059. Do they use ordinary raw linseed oil?—One does not usually use boiled oil with zinc white.

15,060. Then the answer is that they use ordinary raw linseed oil?—Yes.

15,061. Those who have used zinc successfully use refined boiled oil, of which I showed you a sample?—The more you refine linseed oil, the more it loses its quality.

15,062. That is a matter of opinion. Dry rubbing down has been prohibited in Belgium. Does that include sand-papering or glass-papering between the different coats of paint?—It refers to the whole thing to all the coats.

15,063. Then there is no sand-papering between coats at all?—No, dry rubbing down is entirely prohibited legally, but as a matter of fact the prohibition is not carried into effect for freshly-painted surfaces, which you cannot rub down otherwise.

15,064. I understand that in Belgium, in Brussels in particular, outside doors the main doors of houses are finished in a rather high-class manner. Are they brought up with white lead, and are they varnished as a finish?—In general the main entrance doors are finished with the same perfection as a carriage would be. They are of two kinds: first of all those which are treated simply with varnish after the fashion of varnished wood, and then there are also painted doors, which always have applied to them at first underneath coats of white lead.

15,065. And are they always finished in varnish?—Emmels are never used outside, and there is no varnish in the paint. The natural wood doors are varnished and done in the same way as polished furniture. For a painted door if it is left white no varnish at all is used, but for doors otherwise coloured a small quantity of varnish is put into the paint for the outer coat.

15,066. (Mr. Fell.) Do you speak both for house painters and carriage painters?—No; I only speak for the house painters. I have a certain knowledge of the whole subject and can answer questions.

15,067. Have you carried out any experiments with regard to painting vehicles with non-lead paints?—The only experience I have of the question is with regard to my own automobile, on which I do not use any lead at all. It happens to be the fashion in Brussels at the present time to use brown ochre, which is made up principally with turpentine, and seven or eight coats are put on before the wet rubbing down.

15,068. Do you anticipate any difficulty in connection with using zinc white, say, instead of lead on work of that description?—Coach-building is not my trade, but I do not think that lead is used any more at all for coach-building.

15,069. Is it not a fact that at the present time a very large number of Belgian vehicles are exported to this country, which are painted with lead?—I do not think so.

15,070. Do you know anything about Messrs. Van den Plas's factory?—Yes, I know the firm quite well, and the porter of my house is a grinder in that business.

15,071. Is it not a fact that that firm uses white lead and not a substitute?—I am quite sure that they use very little white lead.

15,072. Do they reserve all the white lead for vehicles which are sent over here?—I do not believe

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that there is any difference between those that are made for Belgium and those that are sent over here.

15,073. (*Mr. Mason.*) Following on a question of Mr. Gardner, I would like to ask you whether enamelling is a different branch of the trade from ordinary painting?—The application of enamel is done by all master painters just the same as ordinary painting, but they all have special workmen for that particular work.

15,074. That is what I mean, it would be a different man who would apply enamel from the man who applies ordinary paint?—Yes.

The witness withdrew.

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Evidence to 15,103 handed in and taken as read, witness then called and examined (through an interpreter).

15,078. I am the principal partner of the firm Eugene Expert-Bezanson & Co., which has its head office at Aubervilliers, near Paris, and its principal works at Saint André, near Lille, where we manufacture both white and red lead. In 1909 we succeeded the firm Ch. Expert-Bezanson & Co., of which also I was the principal director. This company had important works in Paris, where it also manufactured zinc white from 1903 to 1909.

15,079. I have very closely followed the agitation in France during the last ten years for the prohibition of the use of white lead. The Law of 20th July 1909 applies to "factories, workshops, buildings in course of construction or repair, and generally in every work-place where painting work is being done on buildings." The important sections are:—

"Article 2. At the expiration of the fifth year from the promulgation of the present law, no white lead, linseed oil containing lead, or special product containing white lead shall be used in any painting operation of any kind carried out by working painters, either on the exterior or interior of buildings."

"Article 3. A regulation of the public administration, issued after conferring with the Consultative Committee of Arts and Manufactures and with the Commission on Industrial Hygiene, shall, if necessary, specify special operations which may be exempted from the preceding provisions."

15,080. I would first remark that the law does not come into force until the 1st January 1915. Secondly, it only prohibits the use of white lead by house painters, that is to say, as far as buildings are concerned; it does not prohibit any other use of white lead, e.g., by coach painters. Thirdly, Article 3 authorises the Minister to allow "derogations" in the application of the law.

15,081. A perusal of the Parliamentary debates proves that there were two motives for this last attenuation of the prohibition: (1) To lessen the injury inflicted upon the manufacturers in order to justify the refusal of an indemnity to them; (2) to avoid inconveniencing the consumers by an immediate complete cessation of the production; and to make it possible for the Government to retrace its steps or to shut its eyes if the enforcement of the law appeared to be impossible.

15,082. The Law of 1909 has up to now had absolutely no effect. All master painters are already well acquainted with zinc white. When the industrial manufacture of this product was discovered about 1846, everybody believed that it would replace white lead, its qualities being evident, and its defects, i.e., especially its durability, not being immediately apparent, while the price of zinc, which is now always higher than that of lead, was at that period very advantageous. The white lead manufacturers themselves believed that their industry would disappear. Several of the more important consented to make an agreement with the Vieille Montagne, and there was a question of proposing to the Government the prohibition of the use and the manufacture of white lead; by way of indemnity the manufacturers would receive the monopoly of the

15,075. (*Mr. Robins.*) Is it not the fact that zinc white is much easier of application than lead to the painter?—I think quite the contrary, and that is the opinion of everybody who follows the calling of painter.

15,076. Is it not a fact that the disastrous results might be from the improper mixing of zinc white as with white lead?—Yes.

15,077. I take it that the failure of zinc white is from the improper mixing. That is the main point?—I have already said that—and the quality of the zinc white itself, which does not combine with the oil, whereas white lead forms a whole with the oil when ground with it.

manufacture of white zinc, which monopoly they resold in advance to the Vieille Montagne. This combination failed by reason of the refusal of my grandfather to associate himself therewith, and also of the protests presented to the Government by painters, colour merchants, lead refiners, etc. However, all master painters had willingly tried the new product; but they soon perceived that, in a great number of instances, zinc white did not cover, dried very slowly, and had little resistance. They continued to use it as well as white lead, but only in work which did not necessitate great opacity or permanency.

15,083. A law sets the seal upon progress, making it general, but in France, at any rate, the law cannot bring about progress by force. If the greater number of painters, although well warned, do not commence to apply the law until such time as it becomes obligatory one can affirm that its application will not be enforced on the 1st January 1915. Now painters are, in fact, not abandoning white lead. If the consumption of zinc white has slightly increased it is because of an increase in the general consumption of paint as the interior decoration of apartments in light shades is by degrees becoming more general.

15,084. In the absence of official figures, my personal experience gives me reason to suppose that the consumption of white lead in France at present is from 23,000 to 25,500 tons, almost exclusively for painting buildings. The consumption of oxide of zinc must be about 7,000 to 8,000 tons, of which 5,000 to 6,000 are used in painting. That of lithopone is about equal to that of oxide of zinc. These figures have scarcely varied during the last three years. Master painters are asking for the same quantities of white lead because they cannot do without it.

15,085. When the Parliamentary Commissions made their inquiries they heard—

- (1) Doctors.
- (2) Working painters.
- (3) Master painters.
- (4) Architects and engineers.
- (5) Manufacturers.

15,086. (1) Amongst the doctors opinions concerning white lead were not unanimous. Ex-Senator Treille, who considers that clean, sober and prudent workmen are not exposed to the malady and who opposed the prohibition, is a distinguished doctor. The celebrated Dr. Armand Gautier has fought lead poisoning for 40 years, but, in spite of this, he does not consider it necessary to prohibit the use of white lead. Dr. P. Carnet, Professor of the Faculty of Medicine of Paris, has strongly criticised the law (*Journal "Le Progrès Médical,"* 11th September 1909). I only mention the best known. I might also mention, among other well known names, Dr. Lucas-Championnière, Dr. Bouclardat, and Dr. Barth.

15,087. (2) As regards working painters, the commissions of the Chamber and Senate practically only listened to M. Craissac and his comrade, M. Robert, who represented the National Federation of Painters, which in reality comprises only a few hundred workmen.

Almost all the workmen remained indifferent, and to an impartial observer their abstention sufficed to

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prove that the workmen themselves did not demand prohibition.

15,088. (3) Master painters in general made the mistake of assuming indifference. Many are small people who do a great deal of work and have not the time to give to such questions, they thought that the manufacturers of white lead were sufficiently well placed to defend them. Finally, many of them, no doubt, thought that if all their competitors as well as themselves were legally obliged to do costly and fragile painting, this would not by any means be against their interests. M. Diolé, M. Ciroux, and M. Montot, large master painters in Paris, Bordeaux, and Dijon, defended white lead, but the authorities were not willing to accept their evidence. 1,620 less important master painters of Bordenaux and Dijon sent their written testimony and that of 6,000 workmen, but they were not taken into account.

15,089. (4) A thorough inquiry should have been made amongst competent architects and engineers, but private architects were not questioned, and their opinions were looked upon with suspicion. The most important association of architects, the "Société Centrale des Architectes Français," on several occasions manifested its opposition; on 22nd April 1909 it ratified the report of M. A. Vaillant, who concluded definitely against the adoption of zinc white out of doors, but a deaf ear was extended to this society of such standing and independence.

15,090. As to the engineers, the Government confined itself to questioning those in the service of the State; and as the Minister of Public Works, their chief, had already indicated on many occasions that his opinion was decided, independence and courage would have been necessary on the part of those engineers to combat it. During the ten years that white lead has been prohibited in public works no report of the practical results obtained has been required of the engineers.

15,091. (5) The manufacturers of white lead were heard several times at the Chamber of Deputies and the Senate, but it was too late. The question had been decided in advance; the condemnation of white lead had become for many legislators an indisputable dogma, and the Socialist party had seized upon the white lead question as an opportunity to create a precedent.

15,092. The Socialist Deputy Breton, one of the principal authors of the law, who had originally made a report almost without an examination of the question, was too intelligent not to listen to the protests of interested parties: he was obliged to issue new reports and to enter into lengthy studies in order to combat our arguments. I do not call in question the sincerity of his convictions, but his convictions were at the start firmly anchored in his mind, and whenever contrary arguments were put before him he stubbornly contested them. His arguments were subtle but not profound. He never refuted the scientific opinions of the great Belgian chemist Stas (Report of the Jury of the Paris International Exhibition, 1855, Class 10, Chemist, Member of the Belgian Royal Academy, reproduced in the report of the Chamber of Deputies by M. Breton, 1907, annex, page 775). His own laboratory experiences were accurate in themselves, but his practical conclusions were incorrect. They were contradicted by the work of M. Lenoble. Pamphlet entitled "Study of the relative value of the covering Power of Zinc White and White Lead," by E. Lenoble, a Lille doctor of Science (reported in the Breton Report, 1907, annex, page 786). The French Parliament eventually approved M. Breton, but this cannot be a final judgment, particularly for other countries. In Switzerland, the Grand Council of Geneva very carefully studied this question after considering all the French documents and reports, and the report of the Grand Council of Geneva is the best refutation of the French Parliamentary Reports.

15,093. It follows from what precedes that the French Parliament had considerable difficulty in seeing daylight in this affair. How could political men properly appreciate such contradictory evidence? A better method would have been: (1) From the medical point of view, to consult official statistics; (2)

from the technical point of view, to have practical experiments carried out. The Parliamentary Commissions did indeed seek these sources of information, but the following is the deplorable manner in which it was given.

15,094. (1) Up to 1907 the Government had followed the question without instituting precise medical inquiries. They produced press articles, lectures and speeches of doctors, some of whom were indeed eminent men, such as Dr. Brouardel, Dr. Laborde, &c., but as none of them carried out any methodical inquiry, the Geneva "rapporteur," M. de Morsier, was able to say of their statements—"they are drawing-room statistics." Dr. Armand Gautier, President of the Academy of Medicine, has also studied this question for many years from the statistical point of view. His opinion, reproduced in the Annex of the Parliamentary Report, is that hygiene of the painters has already made considerable strides, and that it can progress further under Parliamentary measures, and while not ignorant of the danger, he persisted in combatting total prohibition (for exterior work).

15,095. The reason of such vague discussions is that in France there are no complete official mortality statistics. The administration of the Assistance Publique has established certain statistics for Paris and the Department of the Seine, and the Prefecture of Police has done likewise; but a perusal of the discussions (annexed to the Parliamentary Reports) shows that no definite basis for information is to be found therein. In any case there is no information concerning the provinces.

15,096. In 1906 the Government entrusted Dr. Dieulafoy (Professor at the Faculty of Paris) with the work of explaining the medical question to the Senate. Dr. Dieulafoy had no statistics, and it was thought that the Senate would commence consideration of the white lead question within a few days. Dr. Dieulafoy therefore addressed to the director of every hospital in Paris a telegram asking, "How many lead-poisoning cases have you in hospital at this moment? How many lead poisoning cases came to the hospital to-day for admission, or as out-patients?" The replies gave 31 painters as being treated and 12 out-patients—i.e., 43 painters suffering more or less from lead in the Paris hospitals on July 7th, 1906. This was the principal argument used by Dr. Dieulafoy before the Senate. In the course of the discussion M. Poirrier, senator, said: "43 cases in one day, that would make in each year  $43 \times 365 = 15,065$  cases!" M. Poirrier did not reflect upon the fact that cases treated at the hospitals remain there at least 15 days, and that the out-patients, if really ill, come back again later for further consultation. It is also known that painters suffering from chronic lead poisoning were brought up from the provinces and, with others who could simulate lead poisoning, were rushed into the hospitals on that one day.

15,097. The Government never realised the inaccuracy of such information. One of the Ministers, however, who followed one another at the Ministry of Commerce had endeavoured to obtain more precise documentary evidence. By a decree of 3rd November 1905 he instructed Dr. Mosny to make a complete inquiry in all the hospitals in France, which was completed within a year. But no notice of the work of Dr. Mosny was taken by the succeeding Minister, and the new "rapporteur" of the Senate, M. Pedebidou, in his report of June 1906, confines himself to saying "the results of Dr. Mosny's investigations are too incomplete to allow us to take cognisance of them." In 1908 the white-lead manufacturers in vain asked for news of Dr. Mosny; neither the Minister nor the Parliamentary "rapporteur" ever spoke of them again.

15,098. (2) The same scrupulous Minister wished to elucidate the technical question. By a decree of 1905 he had appointed a commission to make a comparative study of white lead and zinc white, presided over by M. Pascal, member of the Institute. This commission held several sittings, decided upon its method of procedure, and asked for a small credit in order to carry it out. But the Ministry changed; the Government showed an entire lack of interest in the affair; Senators have no right to propose credits; the Chamber

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was occupied with other matters at the moment. The commission was forgotten and the Parliamentary "rapporteur" in 1908 naturally did not mention it.

15,099. Other experiments without official value served as arguments for the enemies of white lead. In 1902 a non-official society, called the "Société de Médecine Publique" made experiments in the buildings of the Pasteur Institute (annex). In spite of defective white lead and improper proportions of oil and turpentine, white lead had the advantage. In one of these tests (on plaster) the white lead resisted the atmosphere, whilst the zinc white flaked off heavily (I produce a photograph of this). When in 1909 it was found that the Government and the "rapporteur" had forgotten the official commission, the Société de Médecine Publique passed a resolution to the effect "that white lead and zinc white are of equal value," and the Parliament adopted these resolutions as though they were official.

15,100. I should next like to examine in a few words the consequences of the error into which the French Parliament was misled. Zinc white manufactories have not yet been developed. A number of attempts have been seriously made to manufacture zinc white and have, generally speaking, failed. When I succeeded my father, I gave up this branch of my business, the financial results of which were mediocre, although our product was held to be very good. One of the principal white lead manufacturers of Lille has had a zinc white factory for some five years, where experiments are still going on, but there is not yet any production. The Société de Malfidano owned a zinc white works (Department of Pas de Calais), but it was shut up in 1905. I could cite other examples.

15,101. The Société de la Vieille Montagne has, in actual fact, a monopoly. Practically only the New Jersey Zinc Oxide Company, and one other company which imports entirely from Holland, sell zinc white in France. So far as the white-lead manufacturers are concerned, they do not dare to accumulate stocks and manufacture actively. They live from day to day. If in summer the consumption experienced somewhat exceptional activity, this was because of a scarcity of supply; the intermediary merchants are in a most embarrassing position: zinc white is sometimes not to be had at all, and the master painters do not know what to do.

15,102. The question arises as to what would happen if the whole of the world's market were suddenly thrown back upon zinc white. What will happen if countries like England, Germany, the United States, who consume much more paint than France, prohibit white lead? The lowest price of zinc that we have known is 15*l.* and lead, 10*l.* The highest we remember were zinc, 29*l.*, and lead, 20*l.* But the periods during which these price limits were reached were simultaneous for both metals. It is our industry that is the most important from the point of view of the consumption of the metal in its final form. If lead is abandoned and the consumption thrown back upon zinc, we shall see lead at 10*l.* and at the same time zinc at 30*l.* or perhaps more. White lead will be worth 13*l.*; zinc white will be worth 35*l.* The consequence will be inevitable frauds and a serious increase of the danger owing to the clandestine use of lead.

15,103. My conclusion is simple: we have made a mistake in France. Our neighbour would do well, before imitating us, at least to wait and see what is going to happen in France.

15,104. (Chairman.) You are a white-lead manufacturer?—Yes.

15,105. And as your business depends on the use of white lead, your desire, naturally, is to protect the industry in which you are engaged?—From the point of view of France, I am naturally interested in the manner you suggest; but from the point of view of England or any other country, I am entirely disinterested, for the reason that probably it would be best for the manufacturers of white lead in France if all the countries prohibited the use of white lead. It would bring about an extraordinary situation which would necessarily entail a reversion to the use of white lead.

15,106. You are only expressing your own opinion when you say that, I take it? I give my opinion, but I have not come here simply for the purpose of protecting the industry, seeing that I do not know that it is really to my interest to do so.

15,106a. Now, in paragraph 15,080 of your proof you state that the law in France prohibiting the use of white lead applies only to buildings, and not to the painting of coaches and the like? That is so.

15,107. May not this be because the French Government recognised the difficulty of enforcing regulations among house painters, whereas it is easier to secure the observance of rules in factories where coaches and similar articles are painted?—By no means. The principal reason why coach-building and other industries using white lead were not included was in order to provide a reply to the demand of the white lead manufacturers for an indemnity; and whilst, as a matter of fact, 90 per cent. of their output goes for ordinary house-painting, it did leave them something. It was not enough, but it was sufficient for an argument for the Government. Also, secondly, the Government came to the conclusion that for coach-building white lead was absolutely necessary. I point out that the organisation of carriage-builders wrote to the Minister to ask whether the law applied to carriage-building. The Minister answered it did not; and the organisation stated when publishing the Minister's reply: "We are satisfied that the trials which have been made for replacing white lead by zinc products have given very discouraging results."

15,108. You point out that house painters are still using white lead?—Certainly. The consumption has not diminished so far.

15,109. I did not speak of the consumption. I say you point out that house painters are still using white lead exclusively?—Yes, just as much as ever.

15,110. Do you not think that they are relying on the long period of grace allowed them?—There are still three full years before the prohibition becomes absolute. The law has already been in force for two years, and there is no indication whatever of the slightest change in the general customs of painters, so far as concerns the use of white lead.

15,111. Is it not likely that they regard this further period of three years as ample time in which to adopt a substitute for white lead, without having troubled to look for one up to the present?—Probably the majority of them are quite indifferent, and do not give the subject much thought at all. Many of them certainly think that at the end of these three years it will be necessary to extend the period.

15,112. But in the meantime they are doing nothing to find a substitute?—By far the greater number of them have not done so. There are a few exceptional cases in which painters are now only using zinc white. The majority say that it is best to wait until the moment when substitution must be made, and then they will see.

15,113. There are some master painters in France who have accepted the law as it stands, and are using exclusively zinc white?—I only know one firm which uses zinc white exclusively. There are a few others who use a considerable quantity of zinc white, but still a certain amount of white lead.

15,114. Now, it is very good of you to come here to-day and give us your opinions, but we are bound to assume that the French Government were serious in passing the law of 1909 in the form in which it was accepted by both Houses of Parliament. We cannot, therefore, allow the views of one gentleman, however eminent, to weigh with us very much when he is in opposition to the settled decision of the French Government.—First of all, the discussion of the question took eight years. It commenced in 1901, and the final law was not passed until 1909, and it was not passed without the very greatest difficulty, there being a very important minority. It is not only my opinion, but it is also the opinion of many gentlemen of much greater standing than myself—I would instance the case of M. de Morsier, the rapporteur of the Swiss Inquiry. Another eminent individual whom I would quote is Dr. Armand Gautier. Although he does not

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say definitely in his report that the Government has done something exceedingly stupid, it is quite simple to read between the lines.

15,115. In paragraph 15,086 you refer to the differences of opinion among doctors concerning the evils of white lead. Such differences are not unknown in England; but I know of no medical expert in this country who would say that a clean, sober, and prudent workman runs no risk of lead poisoning? The opinion, nevertheless, is the opinion of Dr. Gautier, as well as Drs. Carnot, Lucas, Championnière, Bouchardat, and Barth. I want to add that these doctors whose names I have given do not deny the fact that there are certain individuals, perhaps one in a hundred, perhaps one in a thousand, who are specially susceptible; but what they do assert is that an industry should not be ruined on account of these few.

15,116. If a susceptible man, for instance, breathes lead dust, which he may get from dry rubbing down or from any of the other sources of general dust in the room where he is working, how can he avoid the risk of lead poisoning simply by personal cleanliness in washing and the like after his work is done?—Obviously, a man who is very susceptible to lead poisoning could not avoid it by the precautions of ordinary cleanliness and so on, but when he realised that he was indisposed owing to lead he should go to the doctor, and it might be necessary for him to change his occupation.

15,117. It appears from your evidence, and you have told us so this afternoon, that the agitation regarding lead poisoning among house painters in France has been going on for a long time. Have the master house painters ever agreed to take organised action in regard to this question?—The great majority of the master painters have remained entirely indifferent to the question of white lead, but exceptions are to be found in the case of the *chambres syndicales* in Bordeaux and in Dijon. That is a master painters' association. In this case it has nothing to do with the chamber of commerce. Bordeaux collected the signatures of 1,600 master painters, who protested against any change, and the signatures of 6,000 workmen.

15,118. In paragraph 15,088 you speak of evidence tendered against the proposed prohibition. In view of the decision of the French Government, I suppose we must assume that the evidence on the other side was stronger?—I am obliged to say that during the whole inquiry the authorities were very unjust to us. When a manufacturer gave evidence the reply was always that he was an interested party and no reliance was to be placed upon his evidence. When a master painter gave evidence it was always suggested that his evidence must be taken with suspicion, because he was in the pay of the manufacturer of white lead. It was even said that the master painters who purchased their white lead from the white-lead manufacturers owed the latter money, and consequently they were entirely in the hands of the manufacturers of white lead.

15,119. I want to point out, with the greatest respect to yourself, that a very great deal of your evidence has been devoted to the belittling of the evidence on which the French Government acted, and I can only repeat that this Committee, in view of the fact that they only have two or three witnesses from France, should be guided by the action which the French Government decided upon after weighing all the circumstances of the case put before them?—I cannot of course individually oppose or place myself against the decision of the Government, but time alone will tell, and I can at any rate cite a similar opinion on the part of the gentlemen already mentioned, Dr. Armand Gautier, M. de Morsier, and so on. Besides that, one might mention very important occasions when the French Government has been entirely wrong, one being *l'affaire Dreyfus*.

15,120. Do you want that put in evidence?—I sincerely consider that the two errors of the Government are comparable.

15,121. Now I gather from paragraph 15,090 of your proof that the use of white lead has been prohibited for public works in France for ten years?—Yes.

15,122. Then, surely, if this prohibition had proved detrimental to the Government buildings in France, its

effect would have been exposed, would it not?—I am persuaded that it has been bad in many cases, but it must be remembered that the Government official pays for the work not with his own money but with the money of the taxpayer, and if the work costs more, as it undoubtedly does, either through the cost of the material or the fact that it has to be re-done more often, there is nobody to complain. I desire to put in an official circular of the Minister of War, being a technical instruction on the employment of various zinc paints. In this paper the Minister of War recognises that a coat of zinc paint covers less than a coat of white lead, and consequently the cost is more.

15,123. What is the name of the Minister of War?—It has changed often since, and I could not say.

15,124. When was that published?—In 1902.

15,125. That is a long time ago. Can you tell us from your own knowledge whether the buildings that were painted with non-poisonous paints were perfectly safe?—There is a famous example, namely, the Garabit Bridge, in Auvergne, which had to be re-painted at the end of one and a half years. I must say the advocates of zinc white stated in regard to this bridge that the material used was of poor quality. But in all such constructions as iron bridges, although no white lead is used on them now, an additional coat of red lead is put on, and consequently really the danger to the workmen is very little less.

15,126. (Mr. Sutherland.) You mean before the white zinc is put on?—Yes.

15,127. (Chairman.) But does not the prohibition of poisonous paints in the case of Government buildings apply to red lead?—It is not leadless paints; it is white lead.

15,128. Have you any other instances to give us where Government buildings have been rendered unsafe by the use of leadless paint?—No. I might mention the Metropolitan, the Paris Underground Railway, where a zinc white paint has been used, but in this case there were first of all two coats of red lead, and secondly a certain amount of green was added to the zinc white in order to arrive at the desired colour, which green is a compound of lead, and consequently the whole protection of the ironwork of the Metropolitan is really in the hands of lead.

15,129. Now, in paragraph 15,094 onwards you refer to the absence of statistics of lead poisoning in France. Have you no definite statistics to offer us with regard to lead poisoning and the number of house painters employed in France?—The only official statistics are those of Dr. Armand Gautier, which the rapporteur of the Chamber of Deputies would not accept. He was favourable himself to zinc white. Beyond that there are the statistics collected by the Master Painters' Association of Bordeaux, already mentioned, which contain the signatures of 1,600 master painters and 6,000 workmen, of the whole of whom about 740 stated they had had a touch of lead poisoning, not merely in any one year, but during the whole of their life. All the others were safe.

15,130. (Mr. Sutherland.) The workmen?—It includes the whole—the workmen and the masters.

15,131. (Chairman.) What do you mean by "a touch of lead poisoning"?—An attack.

15,132. Severe, moderate, or slight?—Including severe and slight. It is 143 out of 7,600. But these figures are not official and are not complete.

15,133. In paragraph 15,096 of your evidence you call attention to the 43 cases of lead poisoning under treatment in Paris hospitals on a certain day, and you point out that it is unfair to multiply this figure by 365 to get the number of cases in a year?—Yes.

15,134. Now, if we adopt your own suggestion that 15 would be an average number of days for such cases to remain on the books of the hospitals, we should have 43 multiplied by 24; in all 1,032 cases in the year in Paris alone. The estimated number of cases for the whole of Great Britain is only about 1,000 per annum?

—I would point out that I have also stated in my evidence that this number 43 was abnormal. For instance, previously to the day in question M. Craissac recruited a number of painters who had suffered from the effects of lead in the provinces, and it is known.

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that he offered them money to come forward and attempt to get themselves accepted at the hospitals as suffering from lead poisoning. In addition, Paris, because of its large population and the prevalence of alcoholism and bad sanitation, would be likely to show the greatest number of cases.

15,135. I will ask you in a moment what your authority is for stating that these cases were manufactured, so to speak, and sent to Paris. Even supposing that the explanations are reasonable, it would still mean that the amount of lead poisoning in France is appalling?—No. The figures for 1905 and 1906 were without any doubt falsified.

15,136. Which figures do you mean?—The number of cases.

15,137. The number of cases in the Paris hospitals in 1906?—The proof of the fact that the figure was falsified and that people were brought from the provinces lies in the figures given by Dr. Armand Gautier. With regard to the total cases of lead poisoning in Paris hospitals, they were in 1902, 87; in 1903, 48; in 1904, 72; and in 1905, 153.

15,138. Were not those figures rejected by the French Government?—The figures were not refused by the Senate. Dr. Armand Gautier himself gave evidence, and put in his figures before the Senate Commission. What I meant before was that sufficient weight was not given to them. I would like to say that the white lead question was very much to the fore during the years that I have referred to, and doctors were more disposed than usual to put down cases amongst painters which presented a certain amount of difficulty in diagnosis, to lead. I would mention particularly nephritis, which can presumably be caused by lead, but which is also well known to be brought about by other causes. In a painter it is more often put down to lead than it should be.

15,139. How did Dr. Armand Gautier collect his figures?—Dr. Armand Gautier was especially nominated by the Police Department in Paris to officially collect these figures, and consequently had access to the registers of all the hospitals in Paris.

15,140. But I suppose that there must have been a very large number of cases which were not in the hospitals and which, therefore, he did not come across?—Necessarily the figures would not include any cases which did not come to the hospitals, but Dr. Gautier said in one of his depositions that the majority of the cases probably did come to the hospitals, and this can be verified through the number of fatal cases.

15,141. The figures which you have given only refer to house painters, do they not?—The figures that I have given refer to painters only. At the foot are given the figures for the whole of the lead poisoning in all trades.

15,142. I note, however, that the French report on the use of lead compounds in painting for 1907 quotes statistics of the mortality of painters in Paris?—Yes.

15,143. The tables given on page 719 of the report, for example, seem instructive?—Yes.

15,144. If we take the figures for men over 40 years of age, it appears that the death rates are as follows: deaths from phthisis among painters, 1,213; deaths from cerebral hæmorrhage and paralysis among painters, 237?—The death rate where?—I do not understand?

15,145. In the city of Paris from 1893 to 1899?—What was the total death rate from phthisis?

15,146. Among all males over 40 the death rate from phthisis in Paris during that period was 776, and the death rate from cerebral hæmorrhage and paralysis was 177?—I should not care to say anything with regard to figures which have just been put before me for the first time.

15,147. Were not you cognisant of these figures?—No.

15,148. It would appear, from these cases that I have cited here, that the mortality amongst painters is materially greater than amongst other male workers?—I have not made any study of these figures, not having seen them before, but I would only remark that it is not reasonable to compare painters' figures with the relative figures for all males. They should be compared with the figures of another trade.

15,149. But how can you account, then, for this increased mortality amongst painters other than by the fact that the painters use a highly dangerous material, namely, lead?—I cannot see how lead can have any influence on those diseases mentioned, with the exception of the second and last, that is to say, cerebral hæmorrhage, paralysis, and nephritis, in which it plays a certain part, but probably not much. In other words, a good many of these cases have nothing to do with lead, or are not caused by lead.

15,150. It is a curious thing, is it not, that the figure for painters should be so very much higher than that for all males?—I cannot say more without looking further into the matter.

15,151. They are specially interesting, from our point of view, from the fact that they coincide precisely with similar figures for the United Kingdom?—I suggest that in both cases a comparison should be made with other industrial occupations and not with all males. It must not be thought that lead is the single material used by painters which is noxious, because almost every material which is employed by the painter has an injurious effect.

15,152. Could you tell us some of the elements, other than lead, which are injurious?—First of all an element of every paint, turpentine, then other materials as lead colours, and so on.

15,153. (Dr. Collis.) You have knowledge of the publication of the French Government (I refer to a dossier in connection with the inquiry made by the French Government) upon which the law was passed prohibiting the use of lead, and in which your own name appears on several occasions—or I presume it is your name?—It was myself and my father jointly who did it.

15,154. You have quoted the figures of Dr. Armand Gautier. You are aware, I presume, that these figures were controverted in the report I have referred to, and those of M. Bertillon were stated as against them?—Would you let me look at the report for a moment, please? (The report was handed to the witness.) M. Bertillon never denied the exactness of the figures of Dr. Armand Gautier so far as they went, because they were figures of cases, not deaths, but the discussion between M. Bertillon and M. Treille was on the figure of the number of deaths.

15,155. M. Bertillon quotes cases to 1903, 4,078, where Dr. Armand Gautier gives 2,071, and he proceeds then to explain why his cases are more numerous and a more just estimate of the number of cases which occur in the city of Paris?—I can only say that Dr. Armand Gautier was officially nominated, and therefore he had the entrée into all the hospitals, to all the hospital registers, and so on, and he had to make his reports officially; and Dr. Armand Gautier, as an individual, is an eminent person, which is not the case with this gentleman (M. Bertillon), with regard to lead poisoning. I would also point out that this is not an official publication. It is simply a report of a Committee of the Chamber of Deputies, a Parliamentary Committee.

15,156. As there seems to be some dispute in France over the figures of Dr. Armand Gautier and the figures of M. Bertillon, which are also controverted further, it is hardly possible for us to accept the figures which you have put in merely based on Dr. Armand Gautier?—I ought to point out that I have never stated that the figures of Dr. Armand Gautier are absolutely exact. I can simply say that these figures are the only ones which have been officially collected. There are numerous other doctors who have given figures, but none of them are in any way official.

15,157. Yes, but that is hardly my point. I suggest to you that as these figures were controverted in France, and apparently rather strongly so, we are hardly in a position to enter into the dispute which took place there with regard to these figures, and, therefore, we are not in a position to judge whether the figures you place before us are absolute?—That is so; but what I wish to point out is that without question there were the most extraordinarily exaggerated figures and statements made with regard to lead poisoning during the whole course of the inquiry, and in any case



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I would express the opinion that, even taking one of the figures given by M. Bertillon, if there were 500 painters who had attacks, slight or severe, of lead poisoning, due mostly to their own lack of ordinary precautions, that would not provide sufficient argument to altogether modify the whole industry, seeing that in comparison with this 500 you have thousands upon thousands who are not affected by lead.

15,158. But how many painters are there in the city of Paris?—There are no statistics, but most people say 15,000 to 18,000.

15,159. Do you not consider a case incidence of 500 among 15,000 to 18,000 high? I would point out that these figures are not all painters. They include painters, but they are for all industries.

15,160. Taking the same proportion that we have already taken, it gives us 400 among the 15,000 house painters roughly. I am sorry to trouble you on the point, but I wish to point out that there was before the French Government another set of figures presented in addition. I notice that your dossier is quoted in this report in reference to the existence of lead emanations. Have you carried out any further experiments since the two authorities which you quote in your dossier, namely, in 1855, and the opinion expressed by Dr. Armand Gautier in 1903, to meet the experiments carried out by M. Heim and M. Hébert, M. Breton, M. Trillat (in his experiments on guinea pigs), and Dr. A. Marie. They are quoted in support of the statement that lead emanations are given off?—Dr. Heim himself refutes M. Breton. The experiments carried out by M. Breton have an interest purely scientific, that is to say, the results showed that if there were any lead emanations they were something so exceedingly small that, practically speaking, they would be ignored. M. Heim has come to the same conclusion.

Mr. FELL in the Chair.

15,161. (Mr. Sutherland.) You know the Maison Leclaire, the celebrated firm of French house painters?—Yes.

15,162. Leclaire was the first man who devoted himself, on humanitarian grounds, to making the use of zinc white practicable as a paint?—Yes.

15,163. He, more than any other Frenchman, popularised its use, did he not?—Certainly.

15,164. Notwithstanding this fact, you say that his firm are large users of white lead?—Up to the year 1903 or 1904, the firm of Leclaire used about 15,000 kilos. of white lead each year.

15,165. How many tons is that?—It is about 15 tons a year. The director of the Leclaire firm admitted it, but he gave a very natural explanation—that they had cases in which architects specified that they had to use white lead. But in view of the capital that was made out of that fact during the inquiry in France, they gave up using it, and probably ever since they have not used any white lead.

15,166. They resented the capital that was made out of it?—Yes.

15,167. By whom—by the lead manufacturers?—Yes, by the lead manufacturers.

15,168. I was going to ask the reason for the use of the white lead. You said that architects specified it. Now that suggests another question, and that is that architects have more confidence in white lead than in zinc?—Certainly, that is so; and in confirmation of that I would like to put in the evidence of M. Nénot before the Senate. M. Nénot being a very well known architect, the architect of the Sorbonne and other large public buildings. He stated that this firm of Leclaire had a personnel composed of workmen accustomed to dealing with this product (meaning zinc), and in spite of all these guarantees it is observable that exterior painting work executed by this firm offers less resistance to atmospheric influences than work done with white lead. In resumé, zinc may, perhaps, by law succeed lead, but it will never replace it. He means that it will never really be an efficient substitute.

15,169. What is the nature of the Government buildings painted with leadless paint in the last 10 years? There must be more than the bridge that you

cited?—I speak of all public buildings of any kind such as the hospitals, schools, and so on.

15,170. Are they all painted with leadless paint?—Yes.

15,171. I gathered from a reply which you made to the Chairman that the question of cost does not enter into consideration, because it is Government work?—Exactly.

15,172. What, in your opinion, are the alternative paints to white lead?—I know of no substance which can entirely replace white lead. The only substitute of which I have any knowledge, and which is considered of comparative value, is zinc oxide, and that certainly can take the place of white lead under certain circumstances, but not generally. For the exterior certainly zinc white cannot be used, because of its inferior lasting powers. This also has to be taken into consideration, that it is extremely difficult to apply zinc white properly, and that fact accounts for the extraordinarily divergent opinions on zinc white which have been given by different employers. In Paris there are a few master painters who have made a speciality of zinc white, and have carefully trained some of their workmen up to the use of zinc white; but this is quite another thing from supposing that the large mass of workmen could properly apply it.

15,173. (Dr. Collis.) Would you explain to us what is the character of the monopoly that the Vieille Montagne Company has with regard to zinc ore?—The Vieille Montagne Company is not favoured by the law. It has no legal monopoly. It was founded at the beginning of the nineteenth century, and at that time possessed most of the zinc mines. In 1848 Leclaire sold his process for manufacturing zinc white to a company, which immediately re-sold the process to the Vieille Montagne Company. The company has therefore a fifty years' reputation behind it. They have a trade mark which is known, one might say, over the whole world, and those who might desire to enter into competition with them would have to fight, of course, against this. They originally had a capital of 9,000,000 francs. The company has been exceedingly prosperous, and has extinguished its capital. It has very large reserves, and it makes an annual profit of something like 10,000,000 francs. Clearly it is an exceedingly difficult thing to fight against such an organisation, and I have myself, unfortunately, experienced it.

15,174. Have they any control of the zinc ores suitable for making zinc oxide?—No. The Vieille Montagne Company works two processes; one consists of burning the metal, and that only is carried out in France. In Belgium the company make zinc white by the direct process, but they do not own any mines the product of which specially lends itself to the manufacture of zinc white. There are none in Europe of this particular kind of zinc ore. It is all in America, and controlled by the New Jersey Company.

15,175. The direct process?—Yes.

15,176. Is there not another large company or trust in Germany?—There are several other companies in Germany and Belgium, and they form with the Vieille Montagne Company a trust which affects zinc, not zinc white, but necessarily that has an indirect effect also upon zinc white.

15,177. Are the American company in harmony with them? Do they work with them?—I cannot state definitely that that is so.

15,178. Are there certain zinc ores which are not suitable for the production of zinc oxide?—Certainly; it is obvious that a zinc ore which contains a very large proportion of zinc is used for the production of metal zinc, and the ores which are used for the production of zinc white are those which are poor in zinc, and those poor or low-grade ores are difficult to treat on account of the presence of a number of other materials, largely lead. The ore treated by the New Jersey Company is the only one that does not contain any lead. The difficulty of abstracting the lead provides the reason why such companies as the Maestricht Company sell zinc white with not less than 4 per cent. of lead. For the last ten years many attempts have been made to produce a process by which zinc and lead can be

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separated, notably in Algeria and Tunis, but so far without any effect.

15,179. Does it make any difference what ore is used when zinc white is prepared by the indirect method?—Do you mean so far as the quality of the product is concerned?

15,180. Yes?—The effect on the ultimate product of the ore would depend upon the amount of lead that there was originally in the metal treated. Where you have more lead there would be more lead in the ultimate product, and, consequently, from the strict point of view, that would make it inferior, but as a matter of actual practice we know that oxide of zinc with a certain percentage of lead in it is for some special purposes superior to the other product.

15,181. As a paint?—Yes.

15,182. But it is not accepted as a pure zinc, is it, with lead in it?—Formerly in specifications a half per cent. only was allowed for impurities that is, lead, in white zinc, but in recent years several companies, particularly the Maestricht Company, who manufacture by the direct process zinc white containing a certain percentage of lead, have made great efforts to obtain a modification of this, not only in Belgium but in France, and successfully. One very grave result of this should, however, be noted. The method of testing whether a paint contains lead is by adding a small quantity of sulphide of potassium or sodium. If this turns black it shows that lead is the basis of the paint; but if a certain amount of lead is allowed in the white zinc paint it is clear that this no longer constitutes a control, as such quick method does not allow one to distinguish a paint containing 3 per cent. lead from another one containing 10, 20, or 30 per cent. Under these circumstances it is obvious that inspectors cannot make sure that lead is not being used, and this necessarily opens the door to fraud.

15,183-6. That is not quite what I wanted. We have large supplies of zinc ore from Broken Hill, Australia, and that is sent to this country, but not for making zinc oxide?—Of course, it might be used for producing oxide; but in Paris, for instance, they use largely zinc that has been taken from houses which have been demolished.

15,187. Do we understand that any form of spelter can be used for making zinc white by the indirect method?—Zinc white is also manufactured from the residue from galvanising works. The zinc bath is thrown away after a certain time when it becomes impure for galvanising purposes, but it still has 87 per cent. of zinc in it, and that is used for manufacturing by the indirect process. But I desire to point out that if the white lead were suppressed entirely, and it was necessary, therefore, to make zinc white in very much larger quantities, there would be difficulties, because such sources of zinc as supply now what is necessary would not be sufficient. I am talking about the direct residue from galvanising and so on.

15,188. Has either of the companies, the German or the Belgian or the American, any control over the ore from Broken Hill, Australia?—I could not say, but I should imagine that the Broken Hill authorities belong to the Zinc Trust. My reason for thinking so is that recently the representatives of the other European zinc organisations were in Paris for the purpose of a conference, and they were awaiting the arrival of representatives from Australia.

15,189. You think that they have some control over it?—Yes, I think they are in the trust.

15,190. (Mr. Parsonage.) Have not the Zinc Corporation, a British corporation, bought the residue of the ores belonging to Broken Hill? The original owners were unable to treat the zinc ore at Broken Hill, so they sold it?—I have no special knowledge of the Zinc Corporation, but I should imagine that it is included in the Zinc Trust, of which I have spoken, my reason for thinking so being that the rise in the price of zinc which has taken place during recent months was foretold by the zinc people in Belgium and Germany. personal acquaintances of my own, a couple of years

since, and they did not attempt to hide the fact that there would be a rise.

15,191. (Mr. Fell.) But you do not know of your own knowledge?—No.

15,192. (Mr. Parsonage.) You spoke of a firm who use zinc white exclusively?—Yes.

15,193. Can you tell me how it is possible for this firm to compete with other firms using white lead when your own statement is that they have to train the workmen specially to use zinc white, and also that it is not so durable, and that it is more expensive than lead? When you speak of zinc white being more costly the question necessarily arises as to who pays the extra price, and on consideration you will see that it is the customer who would pay it. In high-class work,—and the Leclaire firm is a firm which does principally the best work, a firm of very good reputation—the question of covering power is necessarily not so important. For instance, a plastered wall to be prepared in light colours in an interior would not have a number of black spots and discolorations upon it, and therefore three coats would be sufficient. On the contrary, if an architect wished to have a room painted white instead of the original colour, brown, a master painter who used white lead would say that two coats were sufficient. The Leclaire firm would say that three coats necessarily of zinc oxide would be required; and seeing that the architect probably had worked in the past in connection with the Leclaire firm, he would not refuse the three coats when he would know that in any case neither firm would lose because they would not pay the extra cost but the proprietor of the house. Necessarily the higher the class of the work, the less the customer would be likely to perceive the difference.

15,194. (Mr. Sutherland.) It would meet Mr. Parsonage's question if you told him that Leclaire's are a firm of such eminence that they practically command their own prices?—One could say that it is about the first house of the kind in Paris. I should desire to add to what I said before that one of the conditions of the sale of the Leclaire process to the Vieille Montagne Company was that the Leclaire firm should always buy their zinc at a lower price. That was one of the conditions when the process was sold in 1850. Probably during the recent inquiry in France, when the Vieille Montagne Company would naturally have an interest in the success of zinc oxide as against lead, they would during that period allow a still greater discount in order that the work done with it might bear a better relation from the point of view of cost to white lead.

15,195. With reference to the question of the men being rushed into the hospital on a certain day, you said that a telegram was sent on one day to the hospital asking how many men were suffering from lead poisoning at that moment. You said that men were rushed into the hospital from the provinces. That would suggest that prior notice was given that a telegram was going to be sent on a certain day to enable them to send these men in. Surely you do not ask us to accept that. (*This question was not translated and put to the witness.*)

Sir ERNEST HATCH resumed the Chair.

15,196. (Chairman.) I do not think we can question the findings of the French Committee, and therefore I do not think that the point ought to be gone into any further. You stated that the men were bribed to come into the hospital. I wish to know who were the parties interested in making out a case against white lead, and who you suggest found the money for bringing in these men, seeing that zinc manufacturing firms were not developed in France at that time with the exception of the Vieille Montagne Company. Is it suggested that that firm were finding the money to get these men?—Obviously I cannot definitely prove this, but I have a firm conviction that Craissac received money from the Vieille Montagne Company. My reason for this is that my father and one or two other manufacturers thought it would be useful, during the course of the inquiry, to obtain some details in regard to Craissac, and had him shadowed. Craissac was formerly a painter, but has

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not done any work for the last seven or eight years. As a result of this shadowing it was found that Craissac daily visited, not the head office of the Vieille Montagne Company, but one of their principal representatives. After the white lead inquiry was over an article was published in the "Figaro" in connection with troubles amongst stable lads in the racing stables, which suggests that he lived on money which was obtained in this manner, and in addition during the course of the white lead inquiry a paper which is called "L'ouvrier Peintre," which is a workmen's journal, and copies of which I have sent to senators and others interested, definitely accused Craissac of being in the pay of the Vieille Montagne Company. It was published in 1908, and openly accused him. I do not fear any criticism on it, because I have the absolute conviction myself, having been through the whole thing.

15,197. (*Mr. Kinggate.*) How did the Government arrive at the conclusion that it was absolutely necessary to use white lead in coach-painting?—I have no special knowledge of that subject, but it is well known that the coachmakers are quite unanimous on that point.

15,198. Is that simply the view of the employers? There was no inquiry made of any description with regard to the use of non-poisonous paints in coach-painting?—No.

15,199. You stated that the Government arrived at this conclusion. I want to know whether it was simply from making inquiry from the employers or whether any special inquiry was held?—I have no special knowledge.

15,200. It is in your evidence. With regard to the list of lead-poisoning cases in hospital, does it differentiate between house painters and coach painters?—Coach painters are included in Dr. Armand Gautier's figures.

15,201. (*Mr. Robins.*) What is the average number of hours per day that a French workman works in the manufacture of white lead?—The general practice is 11 hours per day.

15,202. Has the State any control over the number of hours worked in those works?—There are no special rules for white lead works, but they are under the general rules of the Government, which fix the limit at 12 hours for all industries, with one or two special exceptions.

15,203. (*Chairman.*) Does the 11 hours usual in white lead works include meal times?—No. They come at six and they go at half-past six, and they have an hour and a half for meals.

15,204. (*Mr. Robins.*) Do I take it that there is never any excess of hours worked over the 11 hours?—They have no legal right to work over 12, and if, as occasionally happens, it is necessary to keep a few workmen for some special purpose, they allow them to come late the next day in order to make up for it.

I would like to add one word. In what I have said about the Government I do not accuse them of bad faith, but simply that they were deceived. The whole thing commenced in this way: In the year 1900 a Paris paper published under a heading which may be translated as "Divers Facts" a story about some children who had been playing with some pots of paint with the most disastrous results. This sensational story was published in all the papers of Paris, and it was from that date that the whole agitation started. My father made an inquiry to the authorities into the whole thing, and the answer was, that it was a pure fabrication, and that the painter whose paint-pots the children had got hold of as a matter of fact did not exist.

15,205. (*Mr. Parsonage.*) Neither the painter nor the paint-pots?—Exactly. Naturally, the public never knew the truth.

The witness withdrew.

## TWENTY-THIRD DAY.

Thursday, 7th December 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary*).

Mr. NOOIJEN.

Evidence to 15,218 handed in and taken as read; witness then called and examined (through an interpreter).

15,206. I am a member of the Guild of Dutch Master Painters (Bond van Nederlandsche Schilderspatroons) and secretary of its insurance fund; delegate to the congress held at Sheffield in 1909 by the National Association of Master House Painters and Decorators of England and Wales.

15,207. I have closely followed all the work of the Dutch Commission appointed in 1903 to investigate the extent to which white-lead paint could be replaced by zinc white, and the reports and counter-reports in respect thereof. Taken as a whole, my guild does not object to the accuracy of the final conclusions of the Commission, having regard to the materials used by it for its experiments; but it is generally considered by the master painters in Holland that the zinc-white paint prescribed was too thick to work with, and that, in fact, the zinc-white paint used was frequently diluted with oil with or without the knowledge and consent of the persons supervising the tests.

15,208. The universal opinion in Holland among the master painters is that it is much better to paint the outside of buildings with white lead, as it resists the atmosphere much better than zinc white. The one disadvantage is that in the neighbourhood of bad-smelling or dirty water, which gives off sulphuretted hydrogen gas (H<sub>2</sub>S), the white lead is liable to discoloration.

15,209. I have tried all the known substitutes for white lead, and have painted my own house with zinc white mixed with stand oil only, and it lasted three years at the south-west side and four years at the north-east side. White lead mixed with stand oil or boiled oil lasts several years longer. White lead is not used in Holland for finishing interior painting. Zinc white is largely used in Holland for interior decorative work owing to its retaining a pure white colour better in comparative; dark positions when mixed with linseed oil, and to its resistance to

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sulphuretted hydrogen gas, which is given off by the bad-smelling water of the canals, such as at Delft, Leyden, and Haarlem, where the large factories let their dirty water into the canals and spoil the fresh water.

15,210. Zinc white is nearly always used for interiors mixed in stand oil, so as to produce a kind of an enamel similar to Ripolin, Velours, &c. The interior of my house, painted nine years ago with this paint mixed with stand oil, is still in excellent condition. White lead, whether mixed with stand oil or linseed oil, when not exposed to light is apt to turn yellow in interiors.

15,211. Most decorators in Holland mix their own paints, procuring the dry material and the colouring matter. For first-class work for shining surfaces stand oil is used in the mixing. Stand oil is linseed oil boiled a very long time, and is of two kinds, thick and thin. The thin stand oil is most suitable for inside work and the thick stand oil for outside work, as when used inside it has a tendency to turn yellow. Zinc white mixed with stand oil forms a very strong paint for the outside, but must be thinned with raw linseed oil. Zinc white mixed with stand oil forms a very strong shining paint for interior works, but must be thinned with turpentine (not oil).

15,212. White lead mixed equally well with stand oil, and mixed and thinned with linseed oil, makes the best of all paints for the exterior apart from its liability to turn colour when attacked by sulphuretted hydrogen. It is impervious to atmospheric changes, and the oil forms with the white lead an elastic coat which expands and contracts instead of cracking with variations of temperature. Zinc white, on the contrary, is simply held in solution, and is unable to offer the same resistance to damp and humidity, it is not elastic, because it hardens very much. When mixed with stand oil it will last for three years in exterior painting as against the five years of white lead in the same circumstances. The price of stand oil is, however, high, being at present about 1s. 6d. a kilo. It forms a fine varnish which protects the zinc white from the ravages of the weather and makes its use possible out of doors.

15,213. Zinc white varies very much according to the atmospheric conditions. Sulphurous acid ( $H_2SO_4$ ) is fatal to zinc white, even when mixed with stand oil, as was proved in the trial painting of bridges at Amsterdam and Utrecht. At Amsterdam, where the smoky and humid atmosphere causes sulphurous acid, the zinc white only lasted one year, but at Utrecht, where it is clear, it lasted four years.

15,214. A ship must be painted, for the outside, under the water-line with red lead mixed with linseed oil, and above the water-line with iron minium mixed with linseed oil, with a large quantity of driers in it and again covered with zinc white. A great many painters in Holland use one-third white lead for putty (filling), but it can be replaced by zinc white.

15,215. In my business I mix all my own paints, and have a gas engine to work the mixing machine in my workshop. I buy all the white lead dry, as I find it very difficult to test the quality when it has been mixed with oil. All proper precautions are taken against dust, and I have never had a case of lead poisoning among my workmen. There is, however, a very large and growing consumption of white lead ground wet in oil—i.e., the white lead, being ground in the manufactory, is mixed there by a special method with water during the process to prevent all danger from dust. The water is driven away when oil is mixed with the white lead.

15,216. In Holland it is the practice to rub down old paint wet, and remove the residue whilst still wet. We do not use any dry process, except among the ship painters, where there is the greatest danger of lead poisoning, because they remove the old paint by dry scraping the old white lead and red lead coats which causes lead dust. Very little turpentine is used in the preparation of zinc-white paint by me, but we use poppy-seed oil in addition to the stand oil for flat surfaces.

15,217. At present no regulations of any kind exist in Holland, but it is understood that as a consequence of the findings of the White Lead Commission in 1909 some regulations are likely to be issued.

15,218. White lead is used in very large quantities in all the departments of the Government.

15,219. (Chairman.) We are very much obliged to you for coming over to place your opinions at the disposal of this Committee. You will understand, of course, that the Dutch White Lead Commission must carry greater weight with us than any individual opinion, seeing that the report, dated October 1909, embodies the final conclusions of the Commission, who presumably were in a position to obtain and judge of the best available evidence?—Yes.

15,220. Can you tell us what led up to the appointment of the Dutch White Lead Commission in 1903?—I am very sorry, but it has been a political question. The question to my mind was a political one, as some of the members of our Parliament felt inclined to take it up on behalf of the workmen, although the master painters were fully convinced that there was actually no lead poisoning at all. So it was on behalf of the Government that the thing really started, and the master painters in Holland were opposed to it, because they were sure that there was no lead poisoning at all. That is what I want to explain to you. That is the reason why the workmen asked them to have a Commission to find out if there was really lead poisoning at all or not.

15,221. But I understand that no instructions were given to the Commission to inquire into the existence of lead poisoning at all? No. They asked the Commission to get another paint instead of white lead.

15,222. But I suppose we must assume, from the fact that the Commission was appointed, that lead poisoning did exist amongst house painters in Holland?—It is my opinion that, as a matter of fact, it does not exist.

15,223. The Government appointed a very important Commission, including some of the leading men in Holland, such as professors of the Polytechnic School at Delft, the chief engineer of the navy, the first lieutenant of the staff of the artillery, a civil engineer and architect, and others. Do you suggest that the Government appointed this very important Commission without any knowledge, or in the belief that there was no lead poisoning at all in the country?—The agitation caused in the Chamber by the labour members had something to do with the Commission coming about. I am decidedly of opinion that what is called lead poisoning in Holland is not always lead poisoning.

15,224. That is always stated in every country. Do I understand you to say that there is no lead poisoning at all in Holland?—In our painting shops; I do not say anything of the painting of ships.

15,225. But is there any lead poisoning amongst painters?—Yes, there is lead poisoning, but not amongst house painters.

15,226. Are there any statistics published of the incidence of lead poisoning amongst house painters?—No, not yet.

15,227. Did the Government know how many cases of lead poisoning had occurred in Holland amongst house painters in any particular year?—I do not know a case in the Hague.

15,228. But did the Government have any figures showing the amount of lead poisoning that had existed in any one year in Holland?—No.

15,229. Are there any published tables of the mortality amongst house painters in Holland?—Nothing more than you can find here in the report.

15,230. Are there any figures published, of any kind, of lead poisoning in Holland?—No, not more than you can find here in the report.

15,231. Then I shall confine my questions to you entirely to the final conclusions of the Dutch White Lead Commission. The first two clauses read as follows:—"Taking everything together, the Commission are of opinion that their labours lead to the following conclusions: (1) Zinc-white paints are much better able to withstand the action of

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" sulphuretted hydrogen gas than white-lead paints, which soon become motley and black. Where such gas occurs much, that is, near stinking canals in our cities, zinc-white paints can be substituted for white-lead paints with good results. (2) Zinc-white paints are not so well able to withstand frequent recurrent action of vapours containing sulphurous acid as white lead paints are. As the vapours occur in coal smoke of locomotives, steamers, tall chimneys, &c., zinc-white paint which is much exposed to such smoke, for instance, in railway stations, &c., will soon become corroded, and is certainly not able to replace white lead there." The Commission found that zinc-white paints did not stand well when exposed to the vapours of sulphurous acid?—Yes.

15,232. Would the same objection be valid against other substitutes for lead, such as iron-oxide paint, bituminous paints, graphite paints, silica paints?—There are no other substitutes than zinc oxide and zinc sulphide. We do not use graphite paint in the Netherlands. It is used in England.

15,233. I want to know whether the same objection would be valid against other substitutes for lead. I gave you a list of several substitutes. If you do not know, you had better say you do not know? White lead is an oxide paint, and zinc white is an oxide paint. They are both oxides. One is oxide of lead and the other is oxide of zinc.

15,234. Do you wish to say that the other paints are different things and do not compare with zinc and lead?—They are different things altogether.

15,235. What paint would be used in the instance where you say vapours and coal smoke of locomotives, steamers, and tall chimneys prevail? You say that zinc-white paint which is much exposed to such smoke will soon become corroded. Do you use white lead for such purposes?—For locomotives and such things you must use white lead, and not zinc white, because the zinc white may be black very soon.

15,236. I understand that white lead is used in railway stations in Holland?—Yes.

15,237. I understand that these substitutes are not used in railway stations?—That is right. You cannot use zinc white in stations, because the zinc white may be black very soon with the acid.

15,238. It is quite enough if you simply say that the paints I have read out do not compare, and you cannot give an answer. Clause 3 of the "Conclusions" reads: "Zinc-white paints applied on zinc, Portland cement, or iron (the latter having previously been provided with first coats of red oxide of lead or iron) are able to withstand the action of the open air during five years quite as well as white-lead paints, and can entirely replace the latter, provided they are not exposed to the action of vapours containing sulphurous acid"?—Yes, that is true.

15,239. Conclusion 4 states: "Zinc-white paints applied on wood, iron, zinc, Portland cement, and plaster, remain in an equally good condition in the interior of buildings as white-lead paints, and can entirely replace the latter there, provided they are not exposed much to vapours containing sulphurous acid or to great dampness." In conclusion 4, sulphurous acid is alluded to again, and a new difficulty is mentioned, namely, that of great dampness?—It is true what is here, but you cannot have an air without having sulphurous acid in the air. It is always in the air. Here in the cities you have sulphurous acid in the air. You will always have damp in the air. You will always have something in the air to take away the zinc white. I think that zinc white will not stand in the open air on account of the acids which are working into the zinc white.

15,240. Then you do not agree with the finding of this Commission?—No, I do not believe in the report.

15,241. Do you agree with conclusion No. 4?—I agree with that.

15,242. How long do you find white lead stand when the atmosphere is very humid?—I think five years.

15,243. Would you be surprised to hear that zinc white and lead paints have both been found to be equally

perishable under such conditions?—No, I am no surprised.

15,244. Is there a considerable amount of painting done in interiors where there is exposure to great dampness in Holland?—No.

15,245. Would it not therefore be only a small proportion of such interior painting which would be exposed to excessive humidity?—In my opinion, with inside work you never get the dampness that you get outside.

15,246. That is not what I have asked. I want to know whether there is any question of excessive dampness with regard to inside work?—No, there is no excessive dampness in inside work.

15,247. Conclusion No. 5 reads: "Zinc-white paints applied on wood, if not exposed much to the action of vapours containing sulphurous acid, will in many cases remain, during five years, in an equally good condition in the open air as white lead paints, and can replace the latter with good results. But in all places where accumulations of water remain during a long time, such as on window sills, the lower side of cornice work, &c., they will, even after three or four years, deteriorate in the course of a short period to such a degree that re-painting will become necessary for the preservation of the wood. In this respect, therefore, they are inferior to white lead paints"?—It is my opinion that this conclusion of the Commission was wrong concerning the first part of the question. I have seen the tests they have made.

15,248. Can you tell us how long the zinc-white paints and white-lead paints respectively will stand where they are applied on wood and exposed to excessive moisture, such as window sills?—You must make a difference between the north, south, east, and west sides. On the north side you never have the sun. The zinc white is not elastic, and white lead is elastic. Where you put zinc white on the north side you have never the sun, and it will stand in a wet country three years; but on the south side it will stand only one year and a half or two years. That makes a difference. You understand the north side of a building is always in a better condition—three years or two and a half for zinc white, and three or four years for white lead.

15,249. In what way are zinc-white paints inferior to white lead in these specially exposed positions?—Zinc white goes away; it does not keep the oil; the oil goes away, and after two years you have only powder, and you can brush it off with a dry brush.

15,250. Can you tell us what proportion of the whole of the paintwork will consist of painting on exterior woodwork which is liable to be exposed to accumulations of water? The Commission say that it is good, with the exception of window sills and cornice work. What proportion of the whole of the exterior painting do the window sills and the cornices form?—I think a sixth or an eighth part of a building.

15,251. The following is the text of conclusions 6, 7, and 8:—(6) Zinc-white paints such as the White Lead Commission have used successfully, cover at least equally well as the white-lead paints customary in this country. The zinc-white putty used by the White Lead Commission is quite as serviceable as ordinary white-lead putty. (7) Painting with zinc-white paint, such as the Commission used on new woodwork in the open air, is not dearer than painting with the white-lead paints customary for that purpose. (8) Painting on existing paintwork, so-called re-painting, in the open air, with zinc-white paints, such as the White Lead Commission used, is dearer than with the white-lead paints hitherto in use, inasmuch as the wood painted with zinc-white paints involves a greater expense in rendering it fit for the re-painting than does wood painted with white lead in rendering it fit for further painting with white lead. In the case of painted wood which is exposed to the open air, the possibility is moreover not excluded that where such wood is in an unfavourable condition of humidity (see under V.) (that is the window sills and cornice work) "it may have to be re-painted sooner than if it had been painted with white-lead paints. In these circumstances the cost

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" of maintenance of wood painted with zinc-white paint, and exposed to the open air, is further increased in connection with this shorter duration as compared with wood painted with white-lead paint." Is the increase of expense referred to in conclusion 8 a particularly serious one?—It is about a third more. The total extra cost is a third.

15,252. (*Mr. Sutherland.*) That includes labour?—Yes, wages.

15,253. (*Chairman.*) Do I understand that the increase of cost which would be entailed by the use of zinc white for outside painting arises entirely under three heads: (1) the additional preparation required on surfaces to be re-painted; (2) the possibility of earlier re-painting being necessary where the work is exposed to unfavourable conditions of humidity; and (3) the increased cost of maintenance of wood painted with zinc-white paint as compared with that painted with white lead?—Under No. 1 there is an increase in labour. It is a third.

15,254. What about No. 2?—White lead will stand five years, and zinc white three years.

15,255. What do you say with regard to No. 3?—My opinion is that this question is not of so much importance as Nos. 1 and 2. I cannot see that there is so much difference between painting with white lead and painting with white zinc. It cannot have much influence.

15,256. On what figure do you base your reply to question No. 1, that it will be a third extra cost?—They cannot put zinc-white paint on old white-lead paint unless they have first a special preparation for the paint to put it on. That is what I base my one-third of the cost on.

15,257. But if you use zinc-white paint entirely, the extra cost disappears?—Then there is no extra cost.

15,258. Conclusions 9 and 10 read: "(9) Lithopone paints cannot replace white-lead paints in the open air, because they have proved to be altogether unfit in this respect. (10) For paint work above water, first coats of oxide of iron have, during five years, proved to be quite as good and serviceable as first coats of red oxide of lead. For coats of paint under water, oxide of iron cannot be used. Coats of oxide of iron paint are cheaper than coats of red oxide of lead paint. When oxide of iron is used for the first coat much more technical ability is required for the painting of the covering coats than is the case when red oxide of lead is used for the first coat." The Commission tell us that oxide of iron cannot be used under water. Could not bituminous paints be used in such positions?—I do not know.

15,259. We have been told that the Orient Steamship Company and other shipping firms use a leadless paint on surfaces that will be ordinarily under water?—It is possible. I do not know.

15,260. I understand that you do not agree with the findings of the White Lead Commission?—No, not the 6th finding.

15,261. You say that you do not agree with the findings of the Commission in their final conclusion No. 6. What evidence did they take before they arrived at that very important decision?—The Commission made tests on black painted boards.

15,262. Do I understand you to say that the Commission did their work inadequately?—The Commission supplied paint to the workmen, and this paint was so thick that an ordinary painter in Holland could not use it. So my opinion is that it was not done in a practical way. The test may have been all right, but it was not done in a practical way as it was done by the painters in Holland.

15,263. How long was this Commission sitting?—Seven years.

15,264. Do you mean to say that during those seven years they did not give reasonable trials to leadless paints?—With the buildings? Yes, generally they made good tests. We believe that the workmen whom they put on the zinc-white paint given by the White Lead Commission (the workmen upon the ladders) put oil in it, because the zinc-white paint of the Commission was too thick to work with. We have

told our Minister that it is not possible to paint with the zinc-white paint of the Commission.

15,265. This Commission must take the findings of the Dutch Commission and weigh them very closely before they accept the opinions of a gentleman, however eminent he may be, and however sincere he may be, as conclusive where they are in conflict?—I only told you my opinion, and it is not only my opinion, but I can assure you that it is the opinion of the Association of Master House Painters in the Netherlands of more than 1,500 men, and all those men say the thing that I say now to you.

15,266. Did the Master Painters' Association have an opportunity of giving evidence before the Royal Commission?—No. The Commission did not ask us to come there.

15,267. Did you make any suggestion that you should be asked to give evidence?—Yes; we tried to get into the Commission to give our explanations.

15,268. And were they refused?—Yes, they were refused.

15,269. Did you have no representation on the Commission?—Only two, Mr. Kippel and Mr. Smith-Azn are master house-painters.

15,270. Did they sign the report?—Yes.

15,271. Did these members represent you on the Commission?—No.

15,272. Are they responsible men?—Yes.

15,273. And they signed the report?—Yes.

15,274. And they apparently agreed with the findings of the Commission?—They represent only their own opinions.

15,275. But apparently they agreed with all the findings of the Commission?—Those two master painters, Mr. Kippel and Mr. Smith-Azn, have done all the work in the seven years. I have seen it. I have often spoken to several members of the Commission, and they told me: "It is such a difficult thing for us that we must believe what the master painters say on the Commission." It is true what they say; it is a difficult thing. I have spoken to Mr. Metzelaar and other members, and they have told me that it is such a difficult thing. "We know nothing about the white lead question, but the master painters know all."

15,276. Are these master house painters very experienced men?—Yes.

15,277. And they are highly honourable gentlemen?—Yes.

15,278. And they have signed this report so much against the interests of your business?—Yes.

15,279. (*Sir Godfrey Baring.*) In fact, according to you, they inspired the report. They were the only two men that understood it, as I understand. Those two master painters practically drew up the report. Is that what you say?—Yes, that is true. Article VI., which I condemn so much, is signed by those two master painters, but it does not represent the ideas of the master painters of Holland.

15,280. (*Chairman.*) What made them sign a report which is so much opposed to the opinions of the majority of their fellow master painters?—I cannot say.

15,281. I understand that the Dutch Government contemplate issuing regulations to protect the workers from lead dangers?—They will make regulations, but they have not yet made regulations. They will come.

15,282. Have you any idea what those regulations will be?—Yes; I think the first will be that the dry white lead must be mixed with oil in the white lead manufactory. In Belgium it is forbidden to have dry white lead in the shops of the painters. They must mix it with oil in the white lead manufactory. That will be one regulation.

15,283. Would you prohibit dry rubbing down of painted surfaces?—Yes, certainly, because it makes dust.

15,284. When a first or priming coat of lead paint has to be rubbed down, before the second coat is applied, what would you use for rubbing down?—Pumice-stone wet in water—or you can do it in oil.

15,285. Would it not take a long time for the first coat to dry sufficiently to allow the wet process to be applied?—No; it is the same time, whether you do it wet or dry, and I should say that in a wet condition it

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is quicker. You have only to put your pumice-stone in the water.

15,286. But would not that rub the wet paint off?—No.

15,287. Have you ever tried rubbing down the first coat with the wet process?—Yes.

15,288. How long after the paint has been put on?—The following day.

15,289. But you could not do it before the following day?—No; the coat must be dried off. It takes 24 hours to dry. Where you have a white-lead coat, it will dry enough the next day for rubbing off with wet pumice-stone.

15,290. Then I suppose you would have to provide washing appliances for the workmen?—Yes.

15,291. Can you always supply towels and soap and nail-brushes?—Yes; that we do in our shops.

15,292. But when they are out on a job?—There is a law (I think it is a local law—it is a law of the Hague) that as soon as we begin to work in the house we must have water in the house for the w.c.'s and for washing the hands of the workmen, and the workmen tell their association if the master painter has forgotten it. He has only to say it to a policeman of the building police and the master painter has the same day a letter from our local government to do it. It costs nearly nothing. I have to pay for water in such cases to our local government  $4\frac{1}{2}$  guilders in three months, and then I have water enough.

15,293. (Mr. Sutherland.) On all your jobs?—Yes.

15,294. (Chairman.) Have you any factory inspectors in Holland?—Yes; factory inspectors come to see the workplaces.

15,295. How can they be quite sure that these rules will be carried out in private houses?—The workman is our friend. The workman is ordinarily the friend of the master. If the rules are not carried out the workman brings it to headquarters of the building police and the master is compelled to do it. The workman and the employer are not always at one. The workman knows that it is to his own interest that the rules should be carried out, and if they are not he will bring it before the building police, before whom it should be brought.

15,296. But are there any means of inspecting the work done in private houses to ensure that these rules are carried out?—Yes; a great lot is done. I see plenty in the Hague.

15,297. How many factories and workshops would these men have to inspect?—I cannot say. They are always walking in the streets, and they go in a place where they see workmen and they look, "Is all in good condition here?" and if it is not in good condition you have soon a letter from the local government. There may be 15 or 20 men.

15,298. Would you arrange to have a system of medical examination of the workers to see whether the men are suffering from the effects of working in lead dust or working with lead? In England and in other countries it is obligatory on the part of the employers to see that each of their workmen is examined once a month or once a quarter to see whether working in lead is affecting his health. I want to know whether that is one of the rules that it is proposed to introduce into Holland?—I cannot say.

15,299. Have proposed regulations, that would be applicable to the industry, been discussed by the master painters?—No, not yet. I hope that will come very soon, but we have none to-day.

15,300. I suppose the Government will take care that the special rules applied to the building trade would be as complete as those which are in vogue to-day in the potteries in Holland?—Yes.

15,301. (Dr. Collis.) I understand that you consider that this Commission was appointed because of political influence brought to bear by the working men?—That is my opinion.

15,302. Surely the working men had some reason for pressing the Government for this inquiry?—Yes, the white-lead poisoning. We have in the Netherlands white-lead poisoning, it is true, but it is not with the painters; it is the sailors. There are cases in Amsterdam and in Rotterdam where you have ships, and when

a ship comes from the sea and the sailors have nothing to do, then the captains of the ships say to the men, "You must remove the old paint"; and they do that work in a dry condition. It is dangerous work and they get white-lead poisoning. In the hospitals in Amsterdam and Rotterdam, you will find cases of white-lead poisoning among those sailors.

15,303. Have you any figures pointing to that fact? We want figures to prove the point?—No. I can get them for you when I go back to Holland.

15,304. (Chairman.) You said that there were no statistics at all. If you have any, I should like to have them?—Very well.

15,305. (Dr. Collis.) You think that the working men had some definite knowledge in their minds that made them press the Government to appoint the Commission?—There are those cases of white-lead poisoning that I told you of. Workmen do not talk about those questions. They know they do not apply to painters but to seamen. Do you know what I mean?

15,306. It appears to me that the working men must have proved to the Government of the Netherlands that there was an evil to be remedied, before the Government appointed the Commission, and that the danger was taken as proved in 1903?—The danger existed in 1903, and they have taken different precautions in manufactories and everywhere where white lead is used; and now all those precautions are taken the workmen are compelled to obey them.

15,307. Precautions in the manufacture of white lead, do you mean, or in the use of the paint?—In my workshop, when I have white lead to mix with oil, there is only one workman who does it, and for 20 years the same workman. He wears a respirator before his face. That man has been at work 20 years, and he is as well as we are. The only dangerous moment in my shop that can give lead poisoning is the moment when the white lead is taken out of the cask to put it into another one to mix it with oil. Then you can have white lead dust. That is the only moment, and for that moment I provide this respirator.

15,308. That is what I wanted to know. The Government were first acquainted with the danger before they appointed the Commission?—Yes.

15,309. (Mr. Sutherland.) You are connected with a large organisation of master painters?—Yes.

15,310. How many members are there?—1,300 or 1,400.

15,311. How many men, roughly, do you think they will employ?—I think 10,000 men.

15,312. An average of about eight men in each shop?—Yes.

15,313. You have a large insurance society in connection with your organisation?—Yes.

15,314. And you insure the men yourselves against accidents?—Yes.

15,315. Is white lead poisoning an accident under the Dutch law?—Yes, when poisoning is caused by accident.

15,316. You are the secretary of that insurance society?—Yes.

15,317. If you had any cases of white lead poisoning amongst the workers employed by your members, they would come under your notice?—We have not had one.

15,318. But if you had one, you would have to certify the accident?—Yes, and we would have to pay.

15,319. And your association is under the approval of the Government?—Yes.

15,320. It is really a private association connected with the State?—We deposit certain moneys with the Government, and they administer the insurance society. The Government pay, and then the society reimburses the Government.

15,321. Have you had any cases of lead poisoning out of these 14,000 men?—No. In the last nine years not one case has come to me.

15,322. They cannot get compensation without it comes through you?—It is impossible, because I am secretary, and I must sign.

15,323. For how long has lead poisoning been an accident in Dutch law?—Since 1903.

15,324. Did the Dutch White Lead Commission consider the question of lead poisoning?—Yes.

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15,325. But they had no instruction to consider the use of lead in relation to lead poisoning?—No.

15,326. Then the value of the evidence lies in the conclusions that they formed as to the value of different paints?—The aim of the Commission was to find something equal to white lead to prevent the use of white lead.

15,327. Now you have a very large experience of white lead and of zinc oxide?—Yes.

15,328. In your opinion, as a master painter with very large experience, can zinc oxide or lithopone take the place of white lead for outside work?—No, never.

15,329. Would you say that it could take the place of white lead if it were fortified or strengthened by the addition of varnish?—When you mix your zinc white for outside work with stand oil, then you make your paint stronger. You will have a very good paint, but it is always inferior to white lead.

15,330. And without the addition of varnish or stand oil, there is no comparison between the two paints?—No; it is absolutely impossible.

15,331. There is no alternative to white lead except zinc oxide and zinc sulphide for very light work?—No.

15,332. Have you any resolution of your members, in connection with your organisation, against the findings of this Commission?—Yes, that is what I told you.

15,333. Yes, but we understood you to say that that was the opinion of your members, but not a definitely passed resolution?—I have a resolution here in Dutch. The resolution was signed by the president and secretary of my association.

15,334. Was it passed after the report had been issued in 1909?—Yes, after that report. We have had two reports.

15,335. (Chairman.) What action was taken when the Commission was appointed, and while the Commission was sitting?—While the Commission were sitting, our association made the same tests as the Commission were making, and did not agree with the Commission's results. They got different results.

15,336. Did they communicate with the Commission, as a representative body, while they were sitting?—No.

15,337. Can you show us the resolutions?—Yes, I will let you have them.

15,338. Will you tell us how many people attended the meetings, and so on?—Yes, I can give you all that information.

15,339. (Mr. Sutherland.) The Chairman asked you, with regard to woodwork, as to the proportion of window sills and cornices, to which the Commission refer in their report; is it about an eighth?—When you have a house built with our Dutch bricks, then you have another proportion different from when you have a house as you have here.

15,340. With stucco?—Yes.

15,341. Though the proportion might be small, the window sills and cornices are places where the wet collects, and it is very important that they should be protected, and the Dutch Commission say that zinc paint is deficient on these very points?—It is important, although the proportion is small.

15,342. Do you not think that this report of the Commission is qualified very much by all sorts of reservations? For instance, "If not exposed much to the action of vapours containing sulphurous acid, zinc white paint applied on wood will in many cases remain during five years." That is a very important and serious qualification. In large cities like London, Manchester, Sheffield, and Birmingham, sulphurous acid is abundant in the air, and you could not put zinc paints outside without their being exposed to the action of the acid. In positions like stations, which they exclude, where you get the smoke from locomotives; they say that zinc will not stand. Therefore this report is a weak report for zinc, in my opinion, because it is qualified at all points with "if this and if that do not exist, then zinc white will do." I want to know your opinion as a master painter on that point?—Yes, it is very much qualified, and that is the opinion of all the members of our association.

15,343. (Chairman.) Were the two master painters on the Commission selected by the Masters' Association?—No, by the Government.

15,344. (Mr. Sutherland.) Would you tell the Committee what is the action of the sun on zinc paints on the outside, for instance?—When it has been there for a year and a half, the oil has gone away, and what you have over is a dry powder of zinc white, and, with a brush or your hands, you can take all the zinc white away. That is not the case with white lead—never.

15,345. Does not zinc-white paint also strip off?—Yes, because zinc white is not elastic. White-lead paint is always elastic. Zinc white is too strong, and, therefore, cracks.

15,346. The conditions of atmosphere in England are very much like the conditions in your own country, Holland?—Yes.

15,347. And we may take it that what would stand there, or otherwise, would be much the same here?—Yes.

15,348. Generally speaking?—Yes, generally. You have the same wet weather as we have.

15,349. When you said that the extra cost was a third more, did not you include the extra cost of the material—the paint?—The paint is not expensive, but the salaries of the men are expensive, and it is that that costs the money.

15,350. But zinc oxide in this country is very much more expensive than lead, and zinc oxide takes a great deal more oil and turpentine than lead takes?—Yes, but the wages are the most.

15,351. I am dealing with the materials now. With us, roughly, there is an increase of a third in material apart from the labour of applying the paint. Does that obtain with you? Do you get zinc white as cheaply as lead?—No. I think that zinc white will always be more expensive, because you must give more coats.

15,352. But I mean the raw material per hundred-weight?—Then it is not so expensive as white lead.

15,353. That is contrary to experience in this country?—The extra cost is not in materials.

15,354. Then the cost comes on the additional labour involved?—Yes, the wages.

15,355. Assuming that the work was painted with zinc white and had to be re-painted, is that any more expensive than painting with lead on lead?—You must always remove your old zinc white coats, because the old coat is hard and does not hold to the new coat.

15,356. So that, really, a great deal of the cost is in the preparation?—Yes, in the preparation.

15,357. You have had a very large experience of zinc paint, have you not?—Yes. We use zinc paint always for interior work. I think that I use 4,000 kilos a year of zinc white for interior work; and of white lead for exterior work, 6,000 kilos.

15,358. The painting in the Hague is very well done, is it not?—Yes. The places in the Netherlands where the best work is done are not Amsterdam or Rotterdam, but the Hague, Haarlem, Utrecht, and Arnhem.

15,359. The best painting work is done there?—The best painting work is done there.

15,360. You are quite convinced that there is nothing to take the place of white lead amongst white paints?—No; that is my opinion.

15,361. For outside work?—For outside work.

15,362. (Mr. Gardner.) We have been told that, in a country where the use of white lead was prohibited for inside work, we would never be able to see, so long as a man was using white lead outside, that he did not put it on inside. In the Netherlands they use zinc white inside and white lead outside. I want to know if there is no danger of the two things being mixed?—You cannot use the white lead inside for the last coat, because it is yellow in a few weeks. White lead asks a strong light. You can feel the difference. There is such a difference between the one and the other that the workmen cannot make a mistake.

15,363. Do the workmen in the Netherlands find any difficulty in manipulating zinc white as against white lead paint? Do the same workmen use both



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paints?—It is possible. I call at the work; it is a beautiful day: I say to my workmen, "Stop the work inside; we have sunshine now; you go outside," and the same man does it.

15,364. He changes from white lead to white zinc without the slightest difficulty?—Yes.

15,365. The one man uses both paints?—Yes.

15,366. We have had evidence that it takes two years to train a man to use zinc white?—No, that is not so.

15,367. Are your workmen trained from boyhood to the trade, or do they come into the trade as adults?—Yes. My father was a painter, and I was born in a painter's shop.

15,368. But are all the journeymen trained to the trade from boyhood?—Yes.

15,369. Still referring to the question of zinc white, you say that you cannot put zinc on the top of white lead without special preparation?—No, you must always take off the hard coat so that they shall properly unite.

15,370. But I am not speaking of putting zinc on zinc, but of putting zinc on white lead?—I understand. Some preparation has to be done to make the two go properly together, one on top of the other.

15,371. I understood from you that white lead paint was always elastic, no matter how old it is?—Yes, if you compare it with zinc white. I speak always in comparison with zinc white.

15,372. In painting with zinc white, your preparatory coats must always have zinc. You do not use white lead for bringing up the work before putting zinc on it?—We use white lead always for the first coats for inside and outside, and for inside after the second coat we continue with zinc white, and outside with white lead. The first coats are always white lead inside and outside.

15,373. You bring up the work from the beginning with white lead and then you change to zinc?—Yes, and we put white lead in our filler-up—in our putty.

15,374. I am rather interested to learn, I being a working painter, that you have had no lead poisoning among the painters in the Netherlands. You said that the work was highly finished. You have a good deal of sand-papering between coats?—I do not use sand-paper.

15,375. Glass-paper?—It leaves too much mark. It does not give a smooth surface.

15,376. How do you smooth down between the coats?—We take artificial pumice-stone and put it in water, and then we rub it off. I do not use sand-paper. I do not like sand-paper. I use Schumacher's Bimstein (artificial pumice-stone).

15,377. You find that it works quite well on the top of a coat of paint 24 hours' old?—Yes; but you must always use your white lead very thin. That is a rule, is it not?

15,378. It is not always done?—Thick work is bad work, is it not?

(Mr. Sutherland.) Yes, I should think you are quite right.

15,379. (Mr. Gardner.) You use a good deal of stand oil. It is what we should call fat oil. You use a good deal of it?—It is a very good material. In every Dutch shop you will find it. We make our enamel colours with it. When you mix white lead with it, you have the best exterior paint you can think of. It will last seven or eight years.

15,380. Has this oil been boiled?—Very, very long boiled. It is linseed oil.

15,381. It is really a boiled linseed oil exposed to the action of air?—Specially boiled.

(Mr. Sutherland.) It is specially boiled; steam boiled, I think.

15,382. (Mr. Gardner.) Then it would not be so thick. It practically comes to this, that that oil is almost equal to varnish, so that when you put on paint with stand oil in it is practically putting on a varnish paint?—No, that is not varnish. Varnish is made of other things.

15,383. Yes, I know, but for wearing power that is almost equal to a varnish, though there is no gum in it?—No gum.

15,384. Paint made up with that oil is practically a varnish paint?—You would not call it varnish.

15,385. But practically it is a varnish?—No, it is not a varnish practically. When you put this on a coat of colour your colour will change colour directly, and that is not the case when you have varnish. You must mix it with your colours. There is thick and thin stand oil.

15,386. Are they both boiled?—Yes; the dark one is longer boiled.

15,387. (Mr. Parsonage.) Zinc white takes longer to dry than lead paint?—Yes.

15,388. Considerably longer?—We always use driers.

15,389. Zinc white takes considerably longer to dry?—Yes.

15,390. And still between coats of zinc white you can rub down wet in 24 hours?—I have spoken of white lead, not zinc white. Zinc white is fat, and you must give to zinc white a longer time to dry, because it is fat.

15,391. In rubbing down interior work, that only applies to the first coat of white lead, where you can rub it down within 24 hours?—Yes.

15,392. After that coat, you cannot rub down within 24 hours on the zinc?—No. You would have to give it a longer time to dry.

15,393. You would have to leave the rubbing down altogether, or rub down dry with some fine paper?—No, always wet. When you have your zinc white of very good grade, it is not necessary to rub.

15,394. Do you find zinc white finer, when it is laid on, than lead, or a little coarser?—I have Belgian zinc white, and it is very fine.

15,395. But is it finer, in that it does not show the brush mark?—I have my machine, and it goes in the machine, and when it has passed the machine it is fine.

15,396. But is zinc white thinner in the brush work than white lead?—I can hear whether a man has zinc white or white lead, because white lead is dull in the brush and zinc white not. White lead makes a noise when he works with it; but zinc white not.

15,397. But can you get a better finish off the brush with zinc white than with white lead?—The best work to look at you make with zinc white. We mix our white lead with thin oil for the last coats for outside work. When you mix the stand oil in the white lead for outside work you get enamel paint, and you have also the same fine-looking work as zinc white for inside.

15,398. (Mr. Fell.) Have you done any carriage painting?—It happens that I do a little carriage work, but I am not a carriage painter.

15,399. Have you made any experiments in substitutes for white lead on carriages?—No. That is another branch of the trade. I will give you these papers (*handing some small green books to the Committee*).

15,400. (Mr. Robins.) I take it from you that the Dutch Commission was sitting for seven years?—Yes.

15,401. And during that time they made very careful experiments with white lead?—Yes.

15,402. In the course of your evidence you mentioned, with regard to the experiment with zinc white, that the zinc white was given in too thick a condition for the workmen to make good experiments?—Yes.

15,403. Seeing that the Commission sat for seven years, had it not time, after finding that such a blunder had been made, to make a good experiment with regard to zinc white, as careful experiments had been made with white lead?—We have in those two books told our minister that it is not possible to carry out the experiments with the thick paint.

15,404. How was it that such careful experiments were made by the Dutch Commission with white lead and such careless experiments made with zinc white, seeing that from your evidence the zinc white was not in a condition for the workmen to use, and the workmen had to add some other matter to it?—But the Commission did not say that. We say that. There is a great difference. Our association in the Netherlands say to the Dutch Commission that it is not possible to use the zinc white as it is said to have been used in the experiments.

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15,405. The Dutch Commission sat for seven years. When did it come to the knowledge of the Dutch master painters that these imperfect experiments had been made?—Here are the formulae of the paints. Some of the tests by the Government the master painters never saw.

15,406. (Chairman.) But is it not the fact that the Commission contained some very able representatives of the master painters?—Yes, that is true.

15,407. And would it not be the ordinary course of events for the Commission to consult the master painters on the Commission?—Yes.

15,408. Then do you think that the master painters on the Commission would have agreed to have a formula used which was not an accurate one?—In point of fact it is true that the formulae they used are unusable. I cannot say why they did it, but my opinion is that what they used is unusable.

15,409. Then do you mean that the master painters on the Commission were not paying proper attention to their duties? If this formula was wrong, why was it passed by the master painters on the Commission?—I do not know the reason.

15,410. The Commission drew up their final conclusions after they had received these two documents which you put in?—There are two preliminary reports and these are answers.

15,411. After these had been printed and sent to the minister, then the final conclusions were issued in 1909?—Yes.

15,412. Do you wish us to infer that the final conclusions which the Commission issued were based on a wrong formula?—Yes, that is my opinion. They did not think it necessary to refer any more to the matter, because they had already explained their views.

15,413. Notwithstanding that they were informed by these documents that they were going on wrong lines, they persisted in going against the advice they had received?—Yes.

15,414. (Dr. Collis.) Would you tell me how the right to compensation is established in the Netherlands when a man is suffering from lead poisoning?—If caused by an accident he has 70 per cent. of his wages weekly.

15,415. How does he establish his right to that 70 per cent.?—There is the insurance law.

15,416. How does he prove that he has a claim?—The doctor has to do it.

15,417. What doctor?—His doctor. When the doctor says, "You have white-lead poisoning," he has only to write a bill to get the compensation. It goes to the post office; it goes to Amsterdam, to the insurance fund of the Netherlands. Every week he has, on the declaration of the doctor, 70 per cent. of his wages.

15,418. Is it the certificate of his own private doctor?—The doctor of the Government comes and inspects.

The witness withdrew.

Dr. COLLIS in the Chair.

Mr. ALBERT ROBERT RIVET examined.

15,437. Do you attend to-day as the representative of Messrs. T. and W. Farmiloe, Ltd., of Rochester, N. York?—Yes.

15,438. What is Messrs. Farmiloe's business?—We are colour manufacturers and paint grinders, and also merchants, of course.

15,439. Is your firm not represented by the witnesses nominated by the Colour, Paint, Oil, and Varnish Trades Association?—No. We belong to no association whatever in the paint and colour trade.

15,440. Is that why your firm wish you to give evidence to-day?—Yes. We are quite independent of any association.

15,440a. Do you grind both lead and zinc paints?—Yes.

15,419. Does the Government doctor see the man?—Yes.

15,420. If the Government doctor disagrees with the private doctor's opinion, would the man get compensation?—No. There is a court, and he can claim there.

15,421. It goes then before the court in that case?—Yes.

15,422. With regard to compensation, I understand that the Government pays the compensation, and you pay the money back to the Government?—Yes.

15,423. Does the Government issue any figures of the number of cases for which such compensation is paid?—Yes, every five years.

15,424. Do they separate the various trades?—Yes.

15,425. Can we have these figures?—Yes. I will send them to you—of the illnesses.

15,426. Are there other accidents, besides lead poisoning, that compensation must be paid for?—Yes, trade accidents. When a business comes after an accident it is paid.

15,427. Lead poisoning is an accident?—Yes.

15,428. I suppose that mercury, and phosphorus, and arsenic poisoning are also accidents?—Yes. There are accidents and trade illnesses.

15,429. Our law is just the same. We look at lead poisoning as an accident in the same way exactly under the Workmen's Compensation Act. What do you say with regard to arsenic, and phosphorus, and mercury? When we get the Government figures which you will send (I want to know exactly the figures referring to lead poisoning for the Netherlands), will the figures tell whether the lead poisoning occurred in the pottery trade or the house-painting trade, for instance?—Yes.

15,430. Have you looked at those figures at all?—I have them in my home, but it is such a big book that I have not had time to read it.

15,431. You do not know whether, outside your association, there have been cases of lead poisoning amongst house painters?—No. Nearly all the house painters in the Netherlands are members of our association.

15,432. (Mr. Sutherland.) Outside Amsterdam?—Yes, outside Amsterdam.

15,433. (Dr. Collis.) It is possible that those figures may contain casual painters, such as you have spoken of, as seamen painting a ship or some place on the dock?—Yes.

15,434. I want to make that quite clear?—Amsterdam is excepted.

15,435. Since 1903 has your practice in painting been as you now describe, to use zinc chiefly inside and lead chiefly outside?—Yes, always. In my father's shop it was so when I was a boy.

15,436. There has been no alteration since 1903, when the Compensation Act was passed?—No.

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15,444. Both have increased, but, roughly, does the proportion remain the same?—Roughly, it is about the same.

15,445. Are these enamels all leadless?—Not wholly. We make an enamel that is not leadless. It is a white-lead enamel as a matter of fact. It is a comparatively new article with us, but we have done very well with it up to the present.

15,446. Are the leadless enamels mostly built up from zinc oxide?—Yes, practically all the good-class enamels are built up from zinc oxide. A certain number of enamels contain lithopone which is another form of zinc.

15,447. (Mr. Parsonage.) That is a question of cheapness?—It is merely a question of cheapness.

15,448. (Dr. Collis.) That is not lead oxide?—No. It is a double precipitation of sulphide of zinc and sulphate of barium. The lithopone usually used is 30 per cent. That is what is called red seal. Some use the cheaper seals containing 15 and 20 per cent. We only use the 30 per cent. We do not use it so much for oil paint as for water paint. A large amount of lithopone is used for water paint.

15,449. Are you at liberty to say where you obtain your zinc oxide from?—Yes.

15,450. At home or abroad?—Wholly abroad. I only know one manufacturer of zinc oxide in England, and he has not been manufacturing it for very long. He has been manufacturing zinc oxide for nearly two years. The samples he submitted to us we did not think were equal to the foreign.

15,451. You have not used it to any extent?—No. Our impression is that it is not as good. We get samples submitted to us. We are approached by manufacturers of every kind.

15,452. You have not found any manufacturer of zinc oxide in England whose product you considered satisfactory?—They cannot touch the Belgians or the Germans for quality, or the Americans for price.

15,453. Is the price of American zinc oxide below that of the German and Belgian?—Yes, it is below the price of zinc.

15,454. Do you think that if the demand for zinc oxide increased, it would not be possible for America to meet the demand?—Not at the price they sell it at now. At present American zinc oxide is about 23l. 10s. to 23l. 15s. a ton, against German red seal of the fair average quality, at about 30l. That is a syndicate price. There is an international syndicate that controls the price practically.

15,455. In your opinion, if the demand increased, the Americans could not continue to supply the material at the present price?—No; and I do not think they would if they could. If they had a wider market for that, they would probably put up their price. It is the ordinary question of supply and demand.

15,456. Are the American makers in any way controlled by the zinc combine?—That I could not say, but their agent in England is one of the agents of the combine.

15,457. You think that there may be a connection?—There may be a connection. The American zinc oxide is inferior in quality to the German. Sometimes it contains a certain proportion of lead. It is a leady zinc.

15,458. When it contains a certain proportion of lead what is the effect?—That is bad. It spoils the colour and does not improve the body.

15,459. How much lead is there in the American zinc?—It varies.

15,460. Have you an idea of the proportion?—It varies from  $\frac{1}{2}$  to 2 per cent. Sometimes you get American oxides practically free from lead—99 $\frac{1}{2}$  per cent.

15,461. As far as you are aware, 2 per cent. would be an upward limit?—So far as our experience goes. A lot of this stuff goes for export, and we do not do an export zinc trade; 95 per cent. of our trade is home trade with the painters of this country.

15,462. Do you consider the mixing, or knocking up, of paints by the painters to be a dangerous process when they are using lead?—Yes, I think it is open to a certain amount of danger to painters. It adds to the

danger. There is danger in handling lead, undoubtedly, and the more they handle it the greater the danger is likely to be.

15,463. How would you remove that danger?—I certainly think that if the painters were to purchase the paint ready mixed it would minimise the danger to a certain extent. There is a much larger market now in ready-mixed lead paints than ever there was. A good many people have taken them up. We were one of the first to offer a ready-mixed paint for decorators; that is to say, an absolutely genuine paint, and we are selling a very largely increased quantity of it.

15,464. What is the proportion of pigment, either zinc or lead, that you sell in ready-mixed paints, as compared with the amount that you sell dry?—We do not sell any dry. In oil, you mean—in paste form?

15,465. Yes?—At present I should say we sell about 20 per cent. ready mixed.

15,466. Ready for use?—Yes. Two years ago we did not sell more than 10 per cent., but our trade in ready-mixed paint we find has increased very considerably. Taking roughly the figures for the last three years, without giving any amounts, they are as 5, 8, and 11. It has practically doubled in two years.

15,467. The amount of ready-mixed paint has doubled?—Yes, it has doubled. That is largely lead paint, but not wholly.

15,468. Has the sale of paste paint diminished in the same proportion at the same time?—That has not diminished in the same proportion, because our trade has rather increased, taking it all round. You must allow a certain amount for the general increase of trade. Taking two years ago, I should say, speaking roughly, we sold about 12 $\frac{1}{2}$  per cent. Now we sell, roughly speaking, about 20 per cent. We have sold double the quantity of ready-mixed paints, but it has not doubled the percentage, because our general trade has increased also, and that must be taken into consideration. Had the increased sale of ready-mixed paints meant doubling the percentage, the figures would have gone from 12 $\frac{1}{2}$  to 25. I am only giving rough figures.

15,469. Is it your opinion that for certain outside work lead is the most satisfactory paint?—Undoubtedly. Where a white paint is required, without the slightest doubt, in my opinion, white lead is, for outside purposes, for protective purposes, putting the question of decoration on one side, the best paint.

15,470. On what ground do you make that statement?—We base it on several grounds. If you go back to the last committee that was held about 18 years ago, I understand that the opinion of the committee then was that white lead for outside purposes was best. My own experience covers, roughly speaking, those 18 years. I am speaking of the committee of 1893. I have a copy here of the report.

15,471. You mean the Departmental Committee on Various Lead Industries?—Yes. May I read out the findings?

15,472. Yes?—“With regard to all these so-called ‘substitutes’ (this is referring to white lead) ‘the committee have invariably found that on closer inquiry of persons competent to judge, and unprejudiced on either side, the substance in question was in some particulars inferior; and they have come to the conclusion that there is at present no substitute that can take the place of carbonate of lead made by the old Dutch process.’” That was the finding of the committee. I can speak from 1893; that practically covers the period I have been connected with the trade. Naturally, we have our own experiments with white lead and with zinc white. We have experimented very largely.

15,473. What comparative trials have you made?—We made comparative trials on boards on our building at Westminster. One portion was painted wholly with white lead paint; another portion with a mixture of white lead and zinc paint, half and half; another portion with a mixture of 25 per cent. of zinc and 75 per cent. of lead, another with 75 per cent. of zinc and 25 per cent. of lead, and another wholly with zinc. That is to say, five different portions. After

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the work had been exposed for what we considered a considerable time, that is to say 15 months, we examined the building, and in our opinion the white lead had undoubtedly stood the best. This was at the top of our own factory at Westminster, a place which is certainly subject to a very considerable amount of dirt, dust, and smoke. The next best was the pure zinc. The various mixtures we found were bad. They were the worst of the lot. There was not much to choose between the different proportions. The 50-50 was fair, but the other two were bad. After white lead the zinc was the next best.

15,474. (*Mr. Sutherland.*) Zinc oxide?—Pure zinc oxide, mixed with linseed oil and turpentine and the proper driers. We did not use lead driers. The reason why we made these experiments so thoroughly was that eight or nine years ago an interest was acquired by some Americans in two firms in this country, and they put on the market paints which they described as being scientific combinations of lead and zinc. They sold a pretty considerable amount of this. Our travellers heard of this and reported it to us, and we made these experiments accordingly. We found, 15 or 18 months after, that our customers were persistently asking us, where our white lead paint was concerned, whether it contained any zinc or lithopone—mainly whether it contained zinc. They asked the question to such an extent that we ultimately put a guarantee on our white lead paint that it contained no zinc, lithopone or any other admixture. We found that we had to emphasise it, because there was a considerable amount of trouble over these mixed zinc and lead paints, and the customers were continually asking about it. Both these firms that I have referred to informed me (I do not know whether it is fair to give their names, the information being given in conversation) that, so far as their outside paint was concerned, they had dropped the zinc altogether and substituted for it nothing else but a pure white lead paint.

15,475. (*Dr. Collis.*) Would you say that the pure zinc paint and the pure lead paint gave somewhat similar results?—No. I say that the lead was undoubtedly the best, but the next best was the zinc. The pure zinc was better than the mixtures, but not so good as the lead.

15,476. What was the comparative price of the two paints as used by you at Westminster?—Roughly speaking, the comparative price was 22s. a cwt. and 34l. a ton. The difference is accounted for by the question of oil and turps.

15,477. Which is which?—22s. a cwt. lead, and 34l. per ton zinc.

15,478. Could you give us a figure in gallons of paint ready made up? Lead weighs heavier than zinc. Or a comparison per square would suit us better?—Do you mean per square with one coat or the solid job?

15,479. Taking these tests, what do you say?—I could not give the exact figures out of my head.

15,480. They are no good unless they are correct?—I could not give correct figures, but I can answer in this way—that per gallon the zinc would have cost more money, because there was more oil in it. I could not give the exact difference offhand.

15,481. You exposed these for 15 months, you say?—Yes.

15,482. (*Mr. Sutherland.*) From when?—They started in July and finished in October the next year.

15,483. July of what year?—I could not give you the exact year. It covered 15 months. It covered the whole of two summers and one winter. That was our object. We were not testing covering power then, but testing durability.

15,484. (*Dr. Collis.*) Other witnesses have said that it is possible to make satisfactory paints without lead?—Yes, there are plenty of satisfactory paints without lead, particularly if they are not white. Oxide of iron will give very satisfactory paint for ironwork.

15,485. But if you are dealing with white paint, do you think it possible, though not at the same cost?—I think it quite possible, but not at the same cost, and not with the same durability. One of the reasons why zinc white costs more than white lead is, that it is

bound to take more oil. You cannot work zinc white with the same amount of oil as you can white lead. You cannot grind zinc white with the same amount of oil as you can white lead. You can grind white lead with as low as 7 per cent. of oil, but you want from 12 to 14 per cent. for zinc white. At the present time and for many years past now, the price of oil has been considerably higher than the price of lead. I cannot say that it has been above the price of zinc.

15,486. We would like to get, if possible, at the comparative prices of the zinc white paints, such as you say you used in your tests, and the lead white paints; and then we would like to know the respective values of these two paints for protective purposes outside. Could you give us details with regard to how soon a surface painted with pure zinc white and one painted with pure lead white would require renewing?—It would be impossible to give anything like accurate details, because the conditions vary so very, very largely—conditions of position, conditions with regard to sun—whether north, south, east or west.

15,487. Imagine for this purpose that the conditions are the same, how long would good zinc white paint last outside under similar conditions compared with good lead white paint, taking a north exposure or exposure to the south, or whatever you like?—That is beyond my province. I cannot tell you.

15,488. I will not press it. If the Committee should consider the evidence strong enough to justify them in prohibiting or closely restricting the use of lead, how would that affect your firm's business?—It would not affect us.

15,489. Would it not?—I suppose it would at first, if the Committee did that. At first, there would be an internal disorganisation; but so far as the market is concerned, it would not affect us at all.

15,490. Is the machinery required for grinding zinc paint different to any extent from the machinery required for grinding lead paint?—Not to any great extent. There would be a difference in the speed of the rollers, and you would have to use a different kind of pugging mills. An ordinary pug mill will do for white lead, but for zinc white the most satisfactory way is to use an edge runner pug mill. To turn our white lead machinery into machinery to deal with zinc white would certainly cost us a certain amount of money.

15,491. Would it be a large consideration, taking the capital invested in the works?—That depends on what you call a large consideration. It might cost up to 1,000l. to alter the whole lot.

15,492. That may be a lot to some, but not to others; not to you, for instance?—No, I do not suppose that 1,000l. would mean much to us in a sense, but it would cost a certain amount to make the alteration.

15,493. (*Mr. Mason.*) Could you give the percentage, taking the present value of the machinery?—It would mean, roughly speaking, a lot of machinery; I should say 25 per cent.

15,494. (*Dr. Collis.*) Twenty-five per cent. on the present capital value of the machinery?—I should think so.

15,495. Have you studied the relative covering powers of zinc and lead paints?—Yes. It all depends on what you mean by covering power. We do not understand spreading power by covering power, but we understand obliterating power, that is to say, the number of coats or the amount of stuff required to make a solid job. If you treat white lead and zinc white in identically the same fashion as a paint, roughly speaking, in our opinion we reckon five coats of zinc white equal to three coats of white lead. I am not speaking of enamels. The cost of putting on five coats would be considerably more than the cost of putting on three, and the labour is perhaps the biggest item in painting. After a little experience a painter could possibly put on a coat of zinc as well as he could white lead.

15,496.-7. If you cover a surface with a coat of lead paint or with one of the five coats of zinc paint that you are speaking of, coat for coat, which costs the

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more?—Coat for coat, I should say the zinc white costs more.

15,498. Then there is the labour of putting on five coats as against three?—Yes.

15,499. Have you any opinion on the covering power of zinc sulphide?—Absolutely pure zinc sulphide by itself, which is not really a commercial article at present, has a bigger obliterating power than white lead or any other pigment I have ever seen. I could not speak as to its durability. Some time ago a syndicate was formed for the starting of a sulphide of zinc factory in this country, and they submitted samples of the pure sulphide, which we tried and tested in our ordinary manner. So far as the obliterating power is concerned, the zinc sulphide had bigger obliterating power than white lead, but its colour turned very badly immediately. Whether that was because it was manufactured on a small scale or not I could not say, but the sample we tried lost its colour and turned a sort of peculiar grey. I am speaking from information which I have not had long. I have not gone into it.

15,500. (Mr. Mason.) How soon did it turn colour? You say immediately. Was it in two or three days?—It turned to a kind of grey colour in about a couple of days. That is pure zinc sulphide. I know of nobody manufacturing it at all. The only people I have heard of, I heard of from the man who offered it to us. He said that Sollvay, of Belgium, had taken it up. I have heard since that they have dropped it, but whether that is true or not I could not say. I simply say that sulphide of zinc by itself has greater covering power than white lead, but its cost would be considerably higher than that of ordinary zinc oxide.

15,501. (Dr. Collis.) When combined with other things like barium sulphate, what is its covering power then?—It is poor. That is lithopone pure and simple. They generally use 30 per cent. A mixture of 30 per cent of zinc sulphide and 70 per cent of barium sulphate has nothing like the covering power of white lead and the covering power of zinc oxide.

15,502. (Mr. Sutherland.) You are speaking of obliterating power?—I am speaking of obliterating power. At the same time it does not keep its colour.

15,503. (Dr. Collis.) Are you speaking of inside or outside?—Inside only. I have never heard of lithopone being used largely for outside. Some lithopone loses colour very rapidly. That is due to the fact of the free sulphur, I have always understood. Lithopone is found to be a very unsatisfactory article altogether. There are many makes on the market.

15,504. Your experience of mixtures of white lead and zinc appears to suggest that zinc paint does not gain at all by the presence in it of lead?—That is so. In our opinion, if you want to use a zinc paint, you should use a pure zinc paint; or if you want to use lead paint, you should use a genuine white lead. We have always held the idea that a pure article is better than a mixture of any kind, and the object of mixing white lead with zinc white I do not quite see. If you want to use the paint in a place where there is gas or anything of the sort, the presence of white lead will turn it black.

15,505. It has been suggested to us that the presence of lead in zinc paint adds a certain amount of the qualities that lead possesses to that paint without deteriorating it, but your experience is to the contrary?—Our experience is to the contrary, and there is the experience of the two firms that I have spoken of. In both cases they started with scientifically combined mixtures of zinc and white lead, and in both cases they dropped them for outside use.

15,506. If you were preparing paint without lead, would you have great difficulty in obtaining the various tints and colours that are required for decorative purposes?—You are speaking of wholly without lead, doing away with lead chromates?

15,507. For the moment?—You would find great difficulty in getting satisfactory colours, and they would be more fugitive. You can get any colour you like with aniline dye, but it will not last.

15,508. Suppose, however, lead was allowed to be used to the extent of about 5 per cent. solubility. Do

you know the Thorpe test of the solubility of lead?—No, I cannot say that I do.

15,509. Various lead pigments act differently with regard to solubility. Pure lead chromate has only about 1 or 2 per cent. of solubility?—It is fair to take a pure lead chromate.

15,510. Some of them have something else in them?—I am speaking of the best quality. You may get any quality you like with barytes.

15,511. If you were allowed to use a 5 per cent. solubility lead, would you then be able to obtain most of your colours required for decorative purposes?—Do you mean if you use chromes?

15,512. Five per cent. solubility would allow you to use pure lead chrome as freely as you wished. Red lead, on the other hand, has 100 per cent. solubility, and you could only use 5 per cent. of that?—That would bar the reds very largely.

15,513. Orange lead is to a similar extent soluble?—That would make it impossible to produce a range of reds without falling back on aniline dyes. It would mean fugitiveness. All the vermilionettes and Persian reds and permanent reds are made with a basis of orange and red lead. Alizarin aniline colours are rather less fugitive, though they are practically all fugitive.

15,514. The reds would be your difficulty?—A great difficulty. If you could use as much chromate as you liked, that could certainly deal with the yellows and the greens.

15,515. What do you say with regard to the nitrate?—That is used in the manufacture but not in the colour.

15,516. Have you had any cases at all of lead poisoning in your works?—Yes, from time to time we have.

15,517. You are under the regulations for the manufacture of paints and colours?—Yes.

15,518. Have you had much trouble in seeing that those regulations are fully carried out, not only by yourselves but by the workmen?—No, no difficulty at all.

15,519. With regard to the wearing of overalls and the medical examination, does everything run quite smoothly?—Yes, everything runs quite smoothly. All our men employed in the paint and colours, even if it is packing, are provided with overalls, and always have been. The bulk of the workmen are supplied with overalls; the paint and colour men with white overalls; and the others with blue overalls.

15,520. You have exhaust fans to remove all the dust?—Yes. We have had one or two cases of lead poisoning, but nothing very serious for years past.

15,521. You ascribe that to the care with which the regulations are carried out?—Undoubtedly.

15,522. From your knowledge (which, as you are entirely makers of lead paints, may not be large) do you think that it would be possible to enforce a similar code of regulations, modified, of course, by considerations of the trade, to the house-painting trade?—I should certainly think so, if the regulations are not made unnecessarily worrisome, so to speak. I should think that there would be no difficulty whatever in applying regulations, particularly with regard to the periodical medical inspection, which I think is the most important thing of the lot.

15,523. You know how difficult it is sometimes to get men to follow out regulations which are laid down even in their own interests; washing for one thing, and the wearing of overalls for another. Do you think that it would be possible to ensure that these two points were as fully followed out in the painting of private houses as it is possible to do in your factory?—I should think so. If the regulations are commonsense regulations, certainly 99 per cent. or more than that of the men would conform to them without any difficulty, I should think. We find no difficulty whatever with our workmen. They fall into them just as a matter of course once they understand them. One should not necessarily imagine that, because a regulation is made, workmen will kick against it. That is not our experience.

15,524. With regard to such a point as dust removal, do you think that that could also be dealt with?—Do you mean with regard to rubbing down?

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15,525. Yes?—There is not a huge amount of rubbing down done in the painting trade. I do not understand very much about the coach-building trade. In many cases, if it is wet-pumiced, I should think it would produce as good an effect.

15,526. Some of the master painters have told us that they do not see their way to getting rid entirely of dry rubbing down?—That is largely a question of producing a fine job. I do not think that the difference between a job produced by wet-pumicing and a job produced by dry rubbing down is so great that there would be much objection to doing away with dry rubbing down altogether.

15,527. They have rather said that they do not see their way to do it. Under those circumstances, do you think it possible for the dust to be removed under regulations in the same way as it is removed from the atmosphere in your factory?—We use a fan to remove it. I do not think it possible to fix a fan on all jobs to remove the dust. The men might be made to wear a respirator, as our men have to do when they are dealing with dry white lead.

15,528. The men want watching a bit to see that they do that?—Yes; but the number of cases where dry rubbing down is absolutely necessary and cannot be done away with is so small that it would be possible to have a reliable man to do the work, or to have it done under the foreman's eye.

15,529. (Mr. Sutherland.) Your firm have no special interest in either zinc or lead?—No, none at all.

15,530. And except for the internal dislocation of your works, if lead were abolished, you could turn to zinc?—Yes. We naturally have a greater interest in lead in a sense, because we consider it a superior article, and that is backed up by the opinion of our customers. We cater very, very largely, for what you might call the competitive painters' trade. If you take the midlands, or the south, or the east, or the west (not the north, because north of Liverpool we are not very well known) we go into practically every painters' shop in the country. They have to do competitive work. They have to do a job satisfactorily. They get so much for it, and in two or three years' time or four years' time, as the matter may be, they do it again. We have found no tendency on their part whatever to ask for zinc-white paint to replace white lead. If we had found it, we should have catered for it. We do a certain amount of zinc white and always have done, and should be quite willing to cater for any change. If we really thought that zinc was superior to lead with regard to cost and durability we should certainly push it.

15,531. Is not that the common judgment of the trade? Is not that an enormous factor in the case—that they have found and proved by prolonged experience that lead is the best thing?—That is certainly what our customers bear out. I am not speaking of the man who works under the specification of an architect, and who has to do what is put down in the specification, but of a man who has free choice in doing a job in white. He will use white lead.

15,532. Taking it broadly, the architectural profession specifies "Genuine white lead, pure linseed oil, and American turpentine"?—Yes, that is the architectural specification.

15,533. Generally, that is so?—Yes.

15,534. So that the judgment of the painting trade is reinforced by that of the architectural profession?—Yes.

15,535. Does the use of ready-mixed paints add to the cost of paint?—In our opinion, no, particularly where a small job is concerned. If you take the large contractors who have their own grinding mills, and so on, and practically a small paint factory, it probably pays them to make their own paint, but the ready-mixed paint costs the small painter no more if he buys it ready mixed, allowing for the time that it takes to knock-up the paint, than if he buys white lead and knocks it up. In fact, it costs rather less. Our "Nine Elms" paint is genuine white lead, pure linseed oil, pure American turpentine, and the best driers. It is a paint such as the painter mixes for himself with the articles if he buys them. The sale of that has

increased in the proportion of 5, 8, 11 in three years. It has more than doubled in three years' time. That goes to prove that the painter has found it just as cheap to buy the ready-mixed paint as to knock it up himself.

15,536. Do you think that a number of the well-known proprietary paints that are on the market could absolutely displace white lead? I am speaking of leadless proprietary paints?—No, I do not think they could, not without adding very largely to the cost.

15,537-9. When you spoke of American zinc oxide, were you referring to the product of the ————?—I do not know. We only get it on this side through the London agents.

15,540. You do not know if it is the ———— at all?—No. I wrote to America for the information, and I expect it every day, but I have not had it yet.

15,541. With regard to the trials on your buildings, you said that the white lead was the most satisfactory of the lot. Was there any defect, and if so, what was the defect?—There was no defect except the question of discoloration.

15,542. The substance was there?—Yes, the skin was there, the protection was there.

15,543. The experience of the Master House Painters' Association is that lead is the worst for colour in most cases, but the best for preserving?—Yes.

15,544. You say that five coats of zinc are equivalent to three coats of lead?—Yes, that is our experience. Anybody can put on a thick coat, but you do not get a satisfactory job with it. I am speaking of properly put-on paint. There should be a thin coat to begin with so that it binds properly together, and dries thoroughly right through. If you put on a thick coat, you get it all ropy to begin with. It does not dry properly, and with a further coat on it it will not bind.

15,545. That is an axiom in all good painting shops?—Thin coats, and many of them; because they dry thoroughly, and give better protection.

15,546. Now zinc sulphide, you said, is not a commercial article to-day?—Pure zinc sulphide is not offered commercially to the painting trade.

15,547. It is not put on the market?—It is not put on the market at present; whether it will be or not I do not know. A process was talked about, but the only people who took it up were the Belgian people, and they have since dropped it, I understand.

15,548. Did I understand you to say, in reply to the Chairman, that you prefer zinc oxide as a more stable paint without any lead in it whatever?—Yes; pure zinc oxide produces a better result in our opinion than a mixture of zinc and lead. It has its uses as a paint. One or two customers buy it. We sell it. In gasworks, particularly, near a gasometer, where they have an emanation of gas, they use it because it retains its colour better than lead paint under the circumstances.

15,549. We have been told by witnesses that 5 per cent. of lead in zinc oxide gives stability to it?—When you say 5 per cent. of lead, do you mean white lead?

15,550. Five per cent. inherent in the oxide. I am speaking of the direct process?—The Germans put a lot of that on the market, not so very long ago, made from the tailings of the zinc mines. It contained from 5 to 6 per cent. of sulphate of lead. We experimented with the product very largely, and our opinion was that it was no good, or not as good as zinc oxide. It was bad in colour and bad in body too. It was offered at a very low price, but undoubtedly had it possessed the marvellous qualities that they certainly tried to make people believe by the lectures that one or two of the German professors came and gave over here, I do not think that they would have sold it as cheaply as they did. They were selling it then under the price of white lead. They were offering it at 19l. a ton.

15,551. As against what for lead?—Lead is 20l. a ton now. It was then about 18l. or 19l. It was practically the same price. I do not think that there was anything in that lead-in-zinc question.

15,552. What do you think about 5 per cent. of oxide of lead?—The only oxides are the red, the grey, and the orange.

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15,553. So far as I have gathered it has not been the suggestion to add 5 per cent. of lead to pure zinc, but to retain the natural amount of lead that is in. What do you say about adding 5 per cent. of white lead?—The addition of 5 per cent. of white lead is absolutely useless from the point of view of a paint.

15,554. It would not give stability to the zinc oxide?—It would not have any effect at all. With regard to the naturally produced leady zincs, they are bad as regards colour, and bad as paint, as I say.

15,555. In your opinion, is the extra cost of zinc paint over lead paint to be found in the larger amount of vehicle that it absorbs?—It is found in many things. First of all the cost of the dry material itself is larger, and if you remove white lead the cost of the dry material is likely to be larger still.

15,556. I was going to ask you about that?—At the present time linseed oil is very much dearer, and it has been, than white lead or zinc. You have to use a larger percentage of linseed oil to grind the zinc to produce the pulpy state, to produce the paste state, and secondly to thin it. A zinc paint ready for work contains more oil than lead paint ready for work.

15,557. Much more oil?—Much more oil.

15,558. Have you formed any idea what cost the oil would add to zinc paints over lead paints?—It depends entirely on the price of oil.

15,559. In either case the percentage would remain the same?—If oil is 35*l.* a ton at present and zinc is 30*l.*, you have 5*l.* a ton difference. If there is 25 per cent. of oil in the paint, that increases it about 2*s.* a ton. If you took lead paint with only 20 per cent., it would only increase it 1*l.* a ton. The difference between the price of oil and lead, and oil and zinc, being a varying quantity, the percentage would vary with the difference in price between lead and oil and zinc. If oil at any time were to go below the price of zinc (as it was in the old times—15*s.* a cwt.) zinc paint would probably come out cheaper than lead paint, but I do not think that we are likely to see oil down to 15*s.* That is one item. The price of dry zinc is higher, and always has been to my knowledge, than the price of dry lead.

15,560. (*Dr. Collis.*) Weight for weight?—Yes.

15,561. It goes further?—But it obliterates less. One cwt. will not cover so much as 1 cwt. of white lead. The opacity of white lead compared with the opacity of zinc white is greater than the proportion between the specific gravity of white lead and the specific gravity of white zinc. Although the specific gravity has a good lot to do with the opacity, that has not wholly to do with it. In the case of barytes the specific gravity is higher than that of zinc, but it has no opacity at all.

15,562. It is transparent?—Yes.

15,563. What in your opinion would be the position if lead were prohibited? What would be the effect on the paint trade?—If lead were prohibited, we should be entirely at the mercy of the foreigner so far as our raw materials were concerned. We should be entirely in the hands of foreign producers of zinc white. It would kill the English white lead industry, and we should have to depend on abroad for zinc. We cannot get away from the zinc white people. Wherever you turn they hold the mines. They hold the mines in this country. The Vieille Montagne Zinc White Company hold the mines.

15,564. What zinc mines have we?—There are several in Cumberland.

15,565. Not extensive?—No.

15,566. (*Mr. Sutherland.*) We have a source of supply in the Broken Hill Company?—The Broken Hill Company is already in conjunction with the German syndicate so far as the lead is concerned. The lead of the Broken Hill Company is sold in this market entirely by the Agent of the Metall-Gesellschaft in Frankfort. There is a combine, and all the mines are combined together. America is an exception. There is an agreement for working with them. The result of the prohibition of lead, in my opinion (it is merely an opinion), would be to kill the English factories, and would not replace them by anything at all.

15,567. Would it be impossible for us to get what we require for our industry here, unless there was a very long interval allowed between the pronouncement of prohibition and the operation of the law?—There would have to be a pretty considerable interval. Undoubtedly, this country absorbs a large amount of white lead. The figures are given at 68,000 to 70,000 tons a year for this country. I do not know the exact figures. I do not think that the zinc white manufacturers, without considerably extending their plant, could supply the market at once.

15,568. Are you speaking of the import of 68,000 to 70,000 tons?—I am speaking of what is used by the painters and grinders. A considerable amount is exported. I believe that the import is about 18,000 tons a year, the remainder being British production.

15,569. What is it worth?—At the present time it is worth about 300,000*l.* It varies very much.

15,570. The amounts that we get from our British possessions and from abroad practically balance?—White lead?

15,571. Yes?—We get no white lead from British possessions.

15,572. Yes. Statistics supplied by the London Chamber of Commerce show that they practically balance?—They must be wholly inaccurate.

(*Dr. Collis.*) Those were statistics of lead ore.

15,573. (*Mr. Sutherland.*) Yes. The imports of lead ore from foreign countries and from British possessions practically balance. The imports of zinc oxide from British possessions represent 400,000*l.*, and the other figure is about 376,000*l.* That is for 1910. Assuming that prohibition were put into force, what do you think would be a reasonable time to allow to make the necessary arrangements for coping with it?—I should say from three to five years.

15,574. If lead is prohibited, we shall have to have inspection to see that the prohibition is observed?—I should think so, certainly.

15,575. Would it not be better to try regulation and inspection before abolition, to see what effect that has on the mortality and cases of lead poisoning?—Undoubtedly. I think that the experience of lead factories, at any rate so far as we are concerned, is that regulations keep the lead poisoning down to very, very low limits indeed. I would suggest regulations if they are made simple, provided that they include the periodical medical examination, which I think is the most important part, and I certainly do not see very much difficulty in that, particularly as under the Insurance Bill every workman is going to have his own doctor.

15,576. Who were the Committee who issued the 1893 Report. Thomas Oliver was one?—James Henderson was the Chairman. He died. The members were Thomas Oliver, Arthur Pillans Laurie, Edward Gould, Henry James Cameron, and Harold John Tennant. Mr. Henderson died on the 13th July 1893. Mr. Laurie tendered his resignation on the 13th May 1893.

15,577. (*Mr. Rice.*) Do you think that the regulations which have been suggested to you, would increase the cost of the work?—I do not think that they would, to any great extent, once they were thoroughly got working, provided they are made simple. That is the only thing. If they are commonsense regulations, I see no reason why they should not be got to work quite easily.

15,578. You are aware that it is suggested that the expense of the medical examination, to which you have referred, should be borne by the employer?—I do not see the necessity of that. Under the Insurance Bill the man has his own doctor. I should have thought that it could have been grafted on to that.

15,579. (*Dr. Collis.*) That does not cover it?—I know that it does not cover it, but I do not see why it should not cover it. Surely in the case of lead poisoning, in a good many cases, if a man has slight traces and takes no notice of the symptoms, they will get worse. It seems to me that it would be saving money under the Insurance Bill if he went periodically to the doctor. If he had a book, and the doctor certified that he was free from lead poisoning, and he

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went to an employer; the employer could employ him. If he was not free from lead poisoning, he could be put to work where no lead is used. Some men have an absolute tendency to lead poisoning. We know from our own experience that some men, if they are in a factory for a few days, start getting the symptoms at once.

15,580. (*Mr. Rice.*) I understand that your answer to my question, "Are you aware that the expense of the medical examination will fall on the employer?" is that you do not see why it should, and that it should come under the Insurance Bill?—I was not aware of the fact that it was to be borne by the employer, but I say that it could be included in the duties of the doctors who attend the men under the Insurance Bill.

15,581. Are you aware that the employers would be compelled to supply overalls to the men, which the men supply themselves with now?—I was not aware of that. In our own factory we supply the men with overalls free of charge.

15,582. Are you aware that it is suggested that overalls should be supplied by the employer and periodically cleansed at his expense?—I was not aware of that.

15,583. Are you aware that it is suggested that hot water for the washing of hands should be provided on every job where a painter goes?—No. We are under one of the most stringent regulations with regard to the provision of hot water.

15,584. I am speaking of hot water for every job where a painter is working; so if you send him to paint this ceiling, you must make proper provision for hot water?—Or else make use of the existing hot water arrangements.

15,585. Now do you think that if regulations on these outlines were enforced, it would add to the cost of painting?—Yes, if they were carried out as you suggest, they would add to the cost of painting.

15,586. (*Dr. Collis.*) Your answer to me was hardly correct. I took it for granted that you knew that the employer would have to provide the overalls, and provide hot water, and pay for the medical examination and the installation for the removal of the dust. You answered that you thought it possible that these could be applied to the house-painting trade without difficulty. Would not you like to modify your answer?—I was not thinking of the question of expense then, but of the question of the possibility and difficulty. For instance, I understood that the master painters did supply overalls free to the men.

15,587. (*Mr. Sutherland.*) The men supply them?—I have no intimate knowledge of the subject. I never gave it very much thought, but I should have thought that the master painters did supply them.

15,588. (*Mr. Rice.*) It is not the custom to supply them, and it is not the custom to supply towels to any large extent, and soap and nail-brushes?—I believe that some firms do supply towels, and some do not.

15,589. These regulations, as outlined by me, must increase the cost of the work?—Undoubtedly, if you put it that way, they must.

15,590. Does it occur to you that in every case and every circumstance these regulations can be applied, such as the provision of hot water and nail-brushes?—Yes.

15,591. Cannot you conceive any case where hot water cannot be obtained?—That is rather a wide question. There is usually provision made on all jobs for cold water at any rate, is there not?

15,592. But hot water is the point?—I should have thought that if it is possible to have a temporary cold water supply on the place, it would be possible to have a temporary gas supply to provide the hot water.

15,593. And that would mean money?—Yes.

15,594. Then there is the question of a meal room being set apart. You have that?—Yes.

15,595. These regulations provide for a separate meal room for the men, so that they shall not take their meals in the rooms where they work, and shall not put their clothes where they work?—With regard to the majority of jobs, I take it that they are sufficiently near to the ordinary public means of getting food to get their meals.

15,596. That is going out for meals?—Yes.

15,597. Do you think that an employer would be fulfilling the regulations by pointing to a coffee house opposite as a means of complying with them?—I take it that the foreman would have to see the men off the job.

15,598. Does it not occur to you that there might be some difficulty about that in certain places and conditions?—Undoubtedly there would be difficulty in some conditions.

15,599. So that the regulations, now they have been explained to you, are not quite so easy to carry out as you at first contemplated?—I do not think that they offer any insuperable difficulties.

15,600. But my question is, are they quite so easy to carry out as you at first contemplated?—That is rather difficult to say. I say that there is no insuperable difficulty. I said it was possible before. I did not mention any degree of ease at all. Undoubtedly regulations of any kind entail trouble and a certain amount of expense.

15,601. My point is, are they quite so easy as you at first contemplated when you answered the Chairman's question. You have said already that you were not aware that the overalls had to be supplied at the employer's expense?—That is not a question of ease, but of expense. Perhaps I may say that they are not so easy as they seem at the first blush. I certainly think that the cost of painting would be greatly increased if you prohibited white lead.

15,602. (*Mr. Parsonage.*) A great deal of your mixed paint is supplied to retail shops to sell again?—The bulk of our trade is done with decorators. I am speaking now of our absolutely genuine white lead paint with a guarantee on it.

15,603. You supply a great quantity of ready-mixed paint to retail shops?—Yes, but not what we call a genuine white lead paint.

15,604. Do you supply house-painting firms in London with ready-mixed white paint?—Yes, very largely.

15,605. Firms in the West End of London?—Yes, several firms in the West End of London.

15,606. You are not a practical painter?—No.

15,607. And have no knowledge of how painting work is carried on?—I would not like to say "no knowledge."

15,608. Very little?—I have no technical knowledge, or no trade knowledge.

15,609. And yet you say that dry rubbing down is a very small quantity of the work, and can be dispensed with. Is that an idea, or have you any practical knowledge to go upon when you make that statement?—That is the opinion I have had from such painters as I have asked.

15,610. Recently?—Yes, recently. I am speaking of ordinary painting and decorating.

15,611. It is an impossibility to rub down newly-painted surfaces by the wet process. There must be dry rubbing down?—But it is not necessary to rub down in every case, is it?

15,612. In nearly every case for inside work, if it is to be decent work, you glass-paper down between the coats. With regard to regulations, you think that there should not be great difficulty in carrying them out?—It all depends on what you call great difficulty. I do not think that there should be any insuperable difficulty in carrying them out in a large number of cases.

15,613. Supposing that dry rubbing down was entirely prohibited, how would you be able to prevent it?—I take it that it would rest with the master painter to see that the instructions were carried out.

15,614. But it would be to his interest to use it?—You mean that he would break the law?

15,615. It is the master painter we want to deal with?—I see.

15,616. (*Dr. Collis.*) We have different factory inspectors to see that paint and colour people do not break the law?—Yes, but I do not know that they are very necessary.

15,617. (*Mr. Parsonage.*) An inspector could not enter a private house?—Is there no possibility of giving him power to enter a private house?



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Mr. ALBERT ROBERT RIVET.

[Continued.]

15,618. (*Chairman.*) Did you see recently the outcry on the Insurance Bill when it was suggested that inspectors should have the power to enter private houses to see whether any persons were employed there?—Yes.

15,619. You saw the rapidity with which that was modified in the Bill. It was immediately modified?—But still it seems to me that when men are going in and out of premises and work is being carried on, an inspector going there would not be objected to very much.

15,620. (*Mr. Parsonage.*) But in the season in London there are hundreds of painting jobs going on. Some only last two or three days. Sometimes a shop is painted at night after it is closed, ready for opening the next morning. How would the inspector know where work was being done?—I do not say that it is impossible to avoid regulations; it is always possible to avoid any regulations, but if the master painters were under penalty they would see that the regulations were carried out.

15,621. If the master painter has 20 to 40 jobs at a time, he will not go round to see that the regulations are carried out, especially if it is to his own financial interest not to carry them out?—I would not like to express an opinion on that—if he deliberately, for his own ends and purposes, broke the law. I have not such a bad opinion of the master painters as all that. I think that they would do their best to carry the regulations out.

15,622. (*Dr. Collis.*) I would suggest the precedent of factory inspectors. Whenever a law is passed, a great deal of care is taken to see that the law is carried out. It is no good asking Parliament to pass regulations if we do not at the same time say how they can be enforced. The precedent of factory inspectors must be the one to which we turn. Do you think that it would be possible, as I asked you originally, for regulations to be enforced in the house-painting trade in the same way as they are enforced within factory walls? I think you answered my question rather hastily?—Do you mean by means of inspectors?

15,623. Could the whole scheme be enforced in the same way in the house-painting trade as it is enforced within factory walls?—I certainly think that, if everybody did his best, there should be no difficulty in enforcing them. If people deliberately start out with the intention of evading them, it is always possible to break the laws.

15,624. If you are right, the whole of the factory inspection staff could be dismissed to-morrow?—As far as our experience goes, in factories at any rate, regulations go on automatically once the men understand them.

15,625. But prosecutions occur annually, in no small numbers against both employers and men for breach of regulations in factories?—Yes.

15,626. (*Mr. Gardner.*) You expressed the opinion that dry rubbing down could be done away with. Of course, we find it necessary to rub down between coats. Would you say how long, in your opinion, it would take a coat of oil paint to dry so that pumice-stone and water could be applied to it?—No; I am not a practical painter. I could not give an opinion on that. That is a purely technical question.

15,627. You spoke about applying a thin coat of paint. Do you mean by that that it would be thinned up by the medium?—No; I mean brushed out thin.

15,628. I wanted to make that point clear. If we say to ordinary people a thin coat of paint, they think it is thinned paint?—No, I do not mean a thinned-down paint.

15,629. That would kill the body?—Yes. I mean a paint brushed out thin.

15,630. (*Mr. Robins.*) You said that, if lead was prohibited, you thought that three to five years should elapse. In your opinion what time should elapse before the abolition of the use of dry white lead?—Dry white lead is very little used in this country by painters, surely.

15,631. But that will have to be prohibited along with white lead. Would you make any difference in the time for the abolition?—No. I take white lead to cover both the dry and the paste lead. It has to be made dry before it is made into paste, in nine cases out of ten, not in every case.

15,632. It is brought into the painter's shop. Dry white lead is used by the painter?—Not in the south of England, surely.

15,633. It is used by a considerable number of coach-makers?—I was not speaking of them. That is so in the case of flake white, for instance.

15,634. What time should elapse?—The use of dry white lead in a shop should be abolished altogether except under very stringent regulations.

15,635. At once?—Undoubtedly. It is a very, very dangerous thing for anybody to handle unless he has the apparatus that we have ourselves.

The witness withdrew.

## TWENTY-FOURTH DAY.

Wednesday, 13th December 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. O. FELL.  
Mr. O. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary.*)

Mr. ALBERT ROBERT RIVET recalled and further examined.

15,636. (*Mr. Sutherland.*) Your firm have supplied materials to the Office of Works?—Yes.

15,637. I do not know how far your experience goes, but could you inform the Committee what you have supplied during the present year, and where you have supplied it to?—You mean with reference to white lead only?

15,638. Yes?—104 cwt. 1 qr. 3 lbs., equal to 5 tons 4 cwt. It was delivered to the following places:

the Menai Bridge, 98 cwt. 1 qr. 3 lbs.—4 tons 18 cwt. 1 qr. 3 lbs.—and 6 cwt. to their own stores. That is so far as the Office of Works is concerned personally. The general Office of Works contract is held by a contractor, who started (the new contractor) and took over the contract in April this year. The contractors were changed. We obtained the contract from the contractors for the supply of colours, glass, and other things. We supplied them with white lead, 5 tons

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MR. ALBERT ROBERT RIVET.

[Continued.]

15 cwt., between the beginning of April and the end of November. I have not taken the December figures out, because I did not think it was necessary.

15,639. Is that the London district?—The London district pure and simple.

15,640. (*Mr. Parsonage.*) Would this lead be for the Office of Works?—Yes; it was delivered to the Office of Works jobs absolutely.

15,641. The contractors have other works?—Yes. The Office of Works have special forms. We have supplied the contractor with other white lead, but that would refer to his own jobs. This went on to the Office of Works jobs, and was signed for by the foreman in charge.

15,642. (*Mr. Sutherland.*) Have you a list of the places that they were delivered to?—Yes. I will read them out as I have them down: "The British Museum; Horse Guards; Victoria and Albert Museum; Church Street, Islington; King Edward VII. Buildings; Tower of London; Regents Park; Savings Bank; Somerset House."

15,643. (*Chairman.*) Where was the Savings Bank?—I could not say. I thought it was one job. I did not take a note of the address: "Chelsea Hospital; Buckingham Palace; St. James' Palace; the Royal Mews, near Buckingham Palace." That comes under a special job. "Natural History Museum; Hyde Park Store Yard; the General Post Office; the Houses of

"Parliament; Hercules Buildings; Custom House, Greenwich; and Kensington Palace."

15,644. 5 tons 15 cwt. amongst the whole of those places?—Yes—from April to November, it is 5½ tons.

15,645. (*Mr. Sutherland.*) Do you supply the contractor with all his stuff for his jobs?—I could not say. We supply them with a large number of small orders, but whether they get the whole from us I could not say. The preceding contractor used to draw from his own store, and I know we never had the whole of his supplies then.

15,646. You simply deliver to him?—Yes, we simply deliver to him.

15,647. In the orders for these, does the Office of Works operate in special compartments, or does it all come under one administration?—With reference to these contractor's orders?

15,648. Yes. Do they come through the contractor only?—They come through the contractor only.

15,649. On the Office of Works forms?—Yes, on the special forms for the Office of Works jobs.

15,650. (*Mr. Parsonage.*) Can you give us the dates at which these deliveries were made?—They are practically daily deliveries between April and November this year.

15,651. Have there been deliveries in the last month?—Yes, and also in December. I did not include this month, as a matter of fact.

The witness withdrew.

MR. KENNETH WELDON GOADBY, D.P.H. (Cambridge), M.R.C.S., L.R.C.P., examined.

15,652. (*Chairman.*) Are you a consulting pathologist, of Hurley Street, London?—I am.

15,653. Have you devoted special attention to questions of lead poisoning?—Yes, I have, in a number of directions, both from the clinical side and from the experimental side as well, in various large lead industries. In one of the lead industries I am appointed surgeon; and also in the progress of my ordinary professional work, I have had a considerable amount of consulting work to do with regard to lead poisoning in painters, quite apart from the work in connection with the appointment of surgeon of which I have spoken.

15,654. You have practical knowledge, then, of lead industries generally?—Generally.

15,655. To what extent have your investigations been published?—The investigations so far—the first resumé of my pathological work on lead poisoning—was published in the "Lancet" three years ago. I also published papers in the "International Congress of Medicine" at Buda Pesth two years ago, and in the "Congress of Hygiene" at Leeds; and there is a considerable amount of my evidence as appendices and otherwise in the report issued by the Committee on Lead, &c., in Potteries, of which you were chairman. Besides that, there are a number of original papers in the literature, which I do not think I need make a list of. In addition, at the present time I am engaged in the publication of a work on lead poisoning in conjunction with Dr. T. M. Legge, who is H.M. Medical Inspector of Factories. The book, as a matter of fact, is in manuscript at the present time, and I hope that it will shortly be published.

15,656. Have you carried out special investigations as to the causation of plumbism among painters?—I have done so, and these investigations have been carried out both chemically and pathologically.

15,657. Did your inquiry include examination of mixed paints as used by the painter?—Yes.

15,658. What paints did you use in your experiments?—White lead paint, lithopone, zinc sulphide paint, zinc oxide, and basic lead sulphate paints, the latter commonly known as Purex.

15,659. Did you also experiment with the constituents of those paints separately?—Yes. It was found necessary in the course of the experiments to determine, if possible, by direct physiological and chemical experiments, which particular constituent of the paint was responsible for the poisoning that was

produced when paint fumes were inhaled by animals under certain definite conditions.

15,660. Did your chemical investigations deal with the question of emanations?—Yes, most decidedly. The attempt was made first of all to find if emanations were given off at all, from paints generally, and from special forms of paint, that is to say, the paints that I have premised two questions back; and the nature of the emanations given off. There were two main types experimented with lead paint and zinc paint of definite composition.

15,661. Did you also experiment with the metallic bases of paints?—Yes. The base of the paint, that is to say, the metallic salt, as for instance, lead oxide or litharge, hydrated lead carbonate or white lead, zinc oxide, and zinc sulphide, were tested by themselves, and also in combination with each of the constituents of which the paint was compounded, so as to have the experiments as little vitiated as possible by the intercurrent.

15,662. What constituents did you test besides the metallic salts?—Turpentine and linseed oil; various forms of turpentine, in fact, and the driers, turpentine and lead acetate, particularly the combination with lead acetate. I also tried (it comes under the next heading) certain volatile organic compounds which are used as paint removers, and many of which are used also to mix with paint—that is the various types of petrol. It is rather important that they should be mentioned as belonging to the constituents of paint.

15,663. In the chemical investigations, did you attempt to collect any emanations given off in the drying of paint, and to determine if those emanations contained lead?—I did.

15,664. Will you describe the apparatus with which your chemical experiments were made?—The apparatus consisted of a long tube similar to that made use of by Professor Baly—a glass tube 5 feet 6 inches in length, and about 3 inches in internal diameter. This was closed at either end by a tightly-fitting cork. The tube was filled with the substance tested—white lead and oil, zinc and oil, as the two bases of paints. The tube was then put inside a second tube, round which was wound an electric wire, so that the tube could be heated by means of an electric current, and by interposing resistances in the circuit, the temperature could be raised to anything desired. To make quite certain that the temperature was constant, a thermo-couple was inserted into the tube.

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[Continued.]

15,665. (*Mr. Sutherland.*) Did you say a thermo-couple?—Yes, one consisting of two metals soldered to a wire, which, when heated, gives a small current of electricity, and that current is measured by a galvanometer. The galvanometer was specially calibrated, and graduated in degrees centigrade, so that one had an exceedingly delicate thermometer connected with the interior of the tube. With the ordinary method of using thermometers pushed down inside the tube, the temperature is apt to vary, owing to the thickness of the glass and the various local conditions in the tube, and it is quite impossible to read it inside the tube which is coated with the paint. So that the temperatures given are the actual temperatures of the internal portion of the tube. The tube was then set up, the electric current passed, and air was drawn through the tube by means of an exhaust pump (a filter pump).

15,666. Are you speaking of the inner tube and the air drawn over it, or of outside the inner tube?—It is drawn over the lead. I will give you a sketch of the apparatus (*handing a sketch to the Committee*).

15,667. (*Chairman.*) At what temperature did you conduct your experiments?—The temperature of the inner tube was 59 degrees centigrade. Experiments were also made at the ordinary room temperature as well.

15,668. What does 59 degrees centigrade correspond to on the Fahrenheit scale?—138 degrees Fahrenheit.

15,669. How was the chemical examination of the air carried out?—The air passing over the paint was drawn through slowly, or bubbled through caustic potash, nitric acid, sulphuric acid and water, and the solutions used were varied in their order. In addition, alcohol was also used, the idea being that if there was a volatile compound of lead it would be an organic compound; it would not be in the metallic form; as it is known there are organic compounds of lead excreted, in the urine for example, which are very difficult to analyse. It is necessary to break up such a compound first of all by means of very strong acid. To do that, concentrated acids would have to be used, and the air bubbled through at a very slow rate. The solutions were subsequently tested by various methods.

15,670. Will you please explain if the conditions under which you made this experiment were strictly comparable with those under which a painter would work?—No. The test in this case was to determine whether any volatile compound was given off from lead and oil at any temperature, at the normal temperature or at an abnormal temperature. Experiments were also made with paint at the normal temperatures in a similar manner, but, in this particular experiment I am describing, the materials used were merely the lead and oil that are used as the basis of paint, and from which Professor Baly said he had got emanations. I agree with him that there are emanations, but not containing lead; these emanations are given off from a mixture of lead and oil to a much greater extent. These experiments are not the ones which are comparable with painting.

15,671. Have you made experiments comparable with the conditions under which painting is done?—I have made such experiments. The electrically heated paint experiments were devised as a preliminary study and served as the basis of others. It was essential to first determine if the constituents of lead paint themselves react on one another under normal or abnormal conditions.

15,672. (*Mr. Sutherland.*) The conditions of these would be more severe?—Much more severe—60 degrees centigrade. The ordinary hottest temperature that you might get to work with in the sun is not more than 43 degrees centigrade. It was 43 degrees centigrade in the sun on Lake Maggiore this summer. That is the bright Italian sun, so the temperature is far above that of Italian sunshine.

15,673. Sixty degrees centigrade is a tropical temperature?—More than tropical.

15,674. (*Chairman.*) What results did you obtain?—I obtained no lead at all; none whatever. From my original experiments on animals with paint itself, I expected to find lead present, and I set out expecting

to find traces of lead in the solutions through which I passed the air, but I have not been able to obtain any lead. I obtained distinct evidence of organic matter which could possibly be termed emanations. I found substances which had been given off during the drying or the interaction of lead and oil, and the interaction of zinc and oil, but I have not succeeded in getting any lead in the intercepting solutions. I discussed the matter with Professor Baly, who, as you know, has done a good deal of work in this way. Professor Baly stated that he obtained emanations. I agree that emanations are present, and I found, in my experiments, more at the higher temperature than at the lower, but certainly some at the lower temperature—all sorts of organic compounds were intercepted by the various solutions through which the vapour passed. And amongst these organic compounds the presence of aldehyde was demonstrated, a substance which would give absorption spectra when examined with an absorption spectro-scope. The presence of aldehyde is a very important matter. I also demonstrated the presence of formic acid in small traces, and also various compounds, smelling of "paint," and then, later on, in the train of the tubes, rather an ethereal ester-like smell. But I was unable to find lead. In the case of white lead and oil a definite vapour was obtained, using the ordinary mixture such as is manufactured in the white lead works, and in that, at ordinary temperatures, the curious pointy smell was observed even in the water condensation. But when zinc oxide was used instead of white lead the curious pointy smell was scarcely discernible at all. On the other hand, when the temperature was pushed up to 59 degrees centigrade the smell in the lead tubes was pronounced, and it was difficult to detect any increase from that of the ordinary temperature experiment, whereas in the zinc and oil compound the higher temperature gave a very distinct "paint" smell. Then, when the temperature was raised to such a point that charring took place in the lead tube (and that was a temperature of 150 degrees centigrade, which is much above boiling point, and a temperature that might easily be reached in the distillation of lead) acrolin was given off. That is a decomposition product of the glycerine present in the oil. That has a curiously penetrating odour.

15,675. Are we to understand that at a normal temperature a mixture of zinc and oil would produce no noxious vapours at all?—I will not say noxious, but practically no vapour at all condensable.

15,676. No bad smelling vapour?—No bad smelling vapour. Noxious means poisonous, and these were not poisonous.

15,677. How do you account for the fact that white lead and oil gave off this bad smell, while zinc and oil gave off no such vapours?—Because of the chemical reaction that took place between the lead and the oil. There is a degree of chemical reaction that had evidently taken place. Though I am not a technical lead chemist, it is a fact that lead is one of the few substances which form the curious compound known as limonate. Apparently the zinc oxide and linseed oil do not interact at normal temperatures. Carbonic acid gas is also given off, which shows definitely that the white lead has entered into combination with the oil, and has so thrown off carbonic acid, which is an integral portion of white lead.

15,678. But you still assert that there is no lead?—No lead at all.

15,679. Then you differ from the conclusions of M. Breton, Dr. Heim, M. Hébert, and Dr. A. Mario?—Absolutely. Their methods were all improperly controlled.

15,680. Do I understand that you dispute the reliability of the test described by M. Trillat?—That is so. I find in going over his work in the results he describes his quantities show a variation of 60 per cent. in the figures from which he derives his answers, and that the variation is well inside what he admits is the experimental error of his reagent. I have also attempted to use this reagent and failed to find it reliable.

15,681. Would it not be useful to ask the principal chemist of the Government laboratory to give his

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Mr. KENNETH WELDON GOADBY, D.P.H., &amp;c.

[Continued.]

opinion on the reliability of that test and of any results obtained by its use?—I should think it would be a most excellent thing, because if this particular reagent is of any value, all of us physiologists, chemists, and so on, will welcome it. In my hands, when attempting to determine small quantities of lead, I found the reagent (tetramethyldiphenyl-methylen) absolutely useless. I should be one of the first to welcome it. When it was first described I made the reagent. Here is a sample (*producing the same*). I ought to say why the test is unreliable and worthless. The difficulty is this: the substance used to turn the lead into the peroxide condition also gives a blue colouration of the reagent, a blue colouration is taken to indicate the presence of lead, and the limits of the reaction are so close that it is extremely difficult to get rid of the substance which is added—that is hypochlorite—and the amount of the substance that is left is so exceedingly minute that it is practically impossible to eliminate error of non-removal of hypochlorite in dealing with these very small quantities. I should have been very pleased indeed to use the test for the digestion experiments for the estimation of lead. I had a good deal of experience last year in attempting to determine the amount of lead present in the tissues of persons who had died of lead poisoning, and in the tissues of persons who died of other diseases whilst employed in lead works. I have not been able to find that this reagent has given me any reliable information, the test showing the presence of the blue colour in substance free from lead. Further, it is only a test for peroxide, and any peroxide will give the test. It is not a test for lead, and I hope that I make that point particularly clear—that it is in no sense a specific test for lead. It is merely a test for the peroxide of lead.

15,682. And yet the foreign experts, in their investigations, which were very complete and very thorough, assert a diametrically different opinion?—But they did not assert it to be a test for lead, but only a test for peroxide of lead, and I dissent that the experiments were properly controlled.

15,683. Yes, but in the experiments they made they found lead?—Yes, what they considered a lead reaction, and the observer said that lead fumes were given off at ordinary temperatures, that ordinary metallic lead was volatile at ordinary room temperatures, and according to his results the volatility did not increase until quite a high degree of temperature was obtained. On behalf of Dr. Legge and myself (I think I am not committing any breach of confidence) a very well-known chemist in a lead factory made some experiments to determine the temperature at which lead fume is given off. We wanted to know the temperature at which lead fumes rise from the surface of an open bath of molten lead, and from lead which has not been refined, or which contains zinc. Practically nothing at all was given off from the surface of molten lead until a temperature of 760 degrees Centigrade is reached.

15,684. That has a bearing on the question?—Certainly. The point is this: that if metallic lead is heated no fume is given off until very high temperature is reached, and yet, by means of this particular reagent, the investigators in question have claimed to have obtained lead at ordinary temperatures.

15,685. Did you say just now that practically no fumes were given off?—None at all that you can estimate with the ordinary methods, which are sensitive from 1 in 500,000 to 1 in 1,000,000. It has not been tried by the Trillat method, but that is so unreliable that no chemist would base an opinion upon it.

15,686. You said practically nothing; that is why I asked?—No fume that could be detected by the ordinary methods, which are very delicate. It can be heated to 740° C. without finding any trace of lead in the air aspirated over from the surface. 1,000 litres, when concentrated by passing through solutions capable of absorbing lead, gave no chemical tests for the metal, *i.e.*, not 1/500,000 gm. in 1,000 litres. If a metal gives off emanations at ordinary temperatures, the emanations are increased when the metal is heated. That is the function of all metals. If lead gave off emanations at the rate that Dr. Heim says it does, no

ordinary sheet lead would last on the surfaces of houses for more than 50 years, because the rate of discharge would be so great, and yet specimens of Roman lead are common. It would exhaust itself. I am sorry you take a strong view of this particularly uncorroborated and questionable work.

15,687. We are bound to take notice of it?—I am speaking entirely *ex parte* and on scientific grounds.

15,688. The French commission sat for eight or nine years. They investigated this question most thoroughly, and all the medical opinion, or the majority of the medical opinion, is diametrically opposed to yours?—I am very sorry. I was in that position on a previous occasion with the inhalation of lead dust before the Committee on China and Earthenware, and the position I then maintained is now generally accepted. With the organic compounds condensed, from the tube experiments explained above, a blue colour was obtained with Heim's reagent, but this blue colour was given in exactly similar quantity in the control experiments without the presence of lead.

15,689. In your physiological investigations; did you use an apparatus similar to that described in connection with your work for the Committee on Lead, &c. in Potteries?—In part of the experiments, yes; but, in the testing of the emanations direct, the apparatus naturally had to be modified.

15,690. Will you please describe, then, the apparatus you used for your tests upon animals?—The apparatus in the animal tests differed with the particular form of experiment in progress. The present one that we are discussing is the one in which air was passed over lead paints heated or not heated. The first series of experiments were made with the fumes given off from painted surfaces at the ordinary room temperature. The apparatus used in the experiments was the cage that was used for estimating the effect of dust on animals, as described in the appendix to the Report of the Committee on Lead, &c. in Potteries. But as I was not using dust, it had to be modified slightly. Three compartments were used in a large cage, and these compartments were separated from one another. I will draw it roughly (*making a sketch and handing the same to the Committee*). The cage was just a box with glass sides, and the roof of the cage was separated off with galvanised wire netting. The front pane of glass in the glass door was removed for a distance of 3 inches from the floor, to allow of efficient ventilation.

15,691. (Mr. Sutherland.) In all the compartments?—In each compartment.

15,692. (Mr. Mason.) You say 3 inches. What was the over-all dimension? We have no idea?—Each cage contained 9 cubic feet of air. That is about 2 feet 6 inches square, roughly. The glass was cut away 3 inches from the floor. This space was made at the bottom to allow of ventilation. Every morning boards freshly painted with paint were pushed into the cage above the wire netting, where the animals could not in any way get at them to lick them, eat them, or scratch them, and any fumes given off from the paint would be the fumes as given off from ordinary painted surfaces. First of all, white-lead paint was used in the whole three. The painted surface was on the top side.

15,693. (Lord Henry Bentinck.) Where was the ventilation?—From the side at the top—two plugs in each, and the 3 by 2·6 opening along the side.

15,694. It was possible for the smell to have gone out of the ventilating holes?—Yes, quite possible. A good deal of it got into the laboratory.

15,695. Was it possible for the smell to go downwards?—Yes, it did.

15,696. You are sure of that?—I take it so from the results on the animals. The effect on them was the same as in the enclosed cages. I tried later on artificial ventilation entirely, with the whole of the air drawn off from the bottom. The ventilation was perfectly efficient. The difficulty was that unless we had an opening at the bottom, or exhaust ventilation, the animal exhibited symptoms of carbon dioxide poisoning. The boards were put in every day, painted with white lead paint.

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15,697. (*Chairman.*) What results did you obtain by these experiments when the animals were exposed to white lead paint?—The animals became very ill. The first symptoms showed within a few hours from going into the cages. They were only exposed during eight hours a day. They were taken out at night and put into other cages, and put back again in the morning into the inhalation paint chamber. The animals showed salivation, progressive emaciation, and two of them became so emaciated and so ill altogether that it was necessary to destroy them at the end of about two and a half months, or rather less. The third cat did not die. The experiment was stopped, as the other animals were showing distinct signs of poisoning. The animal was removed and allowed to recover, which it did thoroughly, in a very different way from the cats exposed to white-lead dust in the Potteries inquiry. The two animals that were very ill were chloroformed and a *post-mortem* histological examination was made of the tissues of the animals. Certain curious facts were noted. In my previous work I have described the hemorrhagic condition which is found in the capillaries. Microscopical hemorrhages are constantly associated with lead poisoning. The hemorrhagic condition described in lead poisoning was not found in these animals. The hemorrhages present (and there were hemorrhages present) were of a grosser type. There was no hemorrhage, however, in any of the nerves, although the animal was showing generalised emaciation. The animals, further, did not develop paralysis, but they lost a very great deal of their body weight—considerably more than half. An animal weighing 2,900 grammes went down to 1,850, a loss of over 1,000 grammes. So that there was something exceedingly poisonous given off from the white lead paint on the surface. This was the ordinary white lead of commerce. The animals showed distinct changes in the structure of the kidney. The kidneys were inflamed. They had tubal nephritis, differing from the cats which had definite lead poisoning, as reported in the Potteries inquiry, which had interstitial nephritis. It is the difference between the kidney of chronic alcoholism and the kidney of Bright's disease.

15,698. What results did you obtain from paints made with zinc oxide, zinc sulphate and lead sulphate?—Very similar results. The animals showed progressive emaciation and salivation. The rapidity, however, of the effect on the cats was less for the zinc paint than for the lead paint. The symptoms of salivation came on early in both cases. They dribbled and their eyes ran, and they coughed. The emaciation did not commence until a later period than with the lead cats, but when it did commence it went on in very much the same way, and the ultimate effect produced was very much that described with regard to the lead cats. The least damage was produced by the ordinary zinc oxide; the next by the lithopone paint; the next, in order, by the lead sulphate paint; and then came the white lead.

15,699. Was there any difference in the severity of the symptoms?—The ultimate result was practically the same with regard to the emaciation of the cats. They lost over a third of their body weight. On the whole the animals exposed to the lead paint showed severer symptoms than those exposed to zinc paint alone.

15,700. Then if people are in the atmosphere where any paint, whether lead or zinc, is used with turpentine, are they in all cases liable to illness?—It depends on the susceptibility of the individual person, but they may be liable.

15,701. Of course it depends on that, but you are telling us about the effect on the cats?—I think that, as far as the effect of the turpentine from the paint goes, the turpentine effect is produced practically as quickly from the zinc as from the lead. But the later changes, those that are produced by oxidation of the oil and lead, are more pronounced in the case of lead than in the case of zinc.

15,702. Would you say that the vapours that emanate from a mixture of zinc and turpentine and linseed oil would be as pronounced and as dangerous as those which emanate from a mixture of lead and

turpentine and linseed oil?—In the first stages, in the first few hours, yes; but later, no, because changes of a chemical nature take place between the oil and lead, and such compounds as aldehyde and formic acid are given off, although in minute quantities.

15,703. Then, does this turpentine illness affect similar organs to those affected by lead?—Yes, it does; and more so in some instances than lead—more rapidly, particularly the kidney.

15,704. Are you aware that M. Breton obtained different results with guinea-pigs?—With paint or with turpentine alone?

15,705. With paint?—Possibly.

15,706. Do you know that a guinea-pig exposed to vapour from a mixture of linseed oil, turpentine, and zinc, for 27 hours, remained perfectly well?—It is quite possible.

15,707. Although another guinea-pig exposed, under exactly similar conditions, to vapour from a mixture of linseed oil, turpentine, and lead, died after one night's exposure?—Quite possibly. They are not my experiments, and without seeing the full experimental details I can express no opinion on them.

15,708. Is it possible, then, that a cat is susceptible to lead, zinc, and turpentine, in different proportions, as compared with a guinea-pig?—I think it highly probable. I have other experiments which bear on that point, namely, those made originally by Professor von Lehmann in dealing with the turpentine question. He found there that rabbits were much less susceptible than cats, and that the dog was more resistant also than the cat. I used cats particularly because they are animals which are very susceptible to lead poisoning.

15,709. Could you possibly say whether a cat or a guinea-pig is more nearly comparable to man?—A cat undoubtedly.

15,710. What reason have you for saying that?—It is a larger animal; it has larger lungs; its diet is different; one is a herbivorous animal and the other is carnivorous. Perhaps you would hardly call man carnivorous; man is an omnivorous animal. The cat is much more nearly comparable with man for physiological reasons. One uses the tissues of the cat in ordinary physiological work for demonstrating to students, but one would not use a guinea-pig. The guinea-pig has basophile granules in its blood, which in man is a sign that blood destruction has gone on.

15,711. Is that the normal condition of the guinea-pig?—Yes. Guinea-pigs are able to put up with a much larger percentage of carbonic acid than other animals. They huddle together and lie quite close in a position where they get probably very much more carbonic acid gas in ordinary breathing than even a cat would stand.

15,712. (*Dr. Collis.*) Can you explain the difference of the reaction with regard to these two guinea-pigs in the case of the zinc paint and the case of the lead paint? They were both otherwise comparable substances, except one was linseed oil, zinc, and turpentine, and the other was linseed oil, lead, and turpentine, mixed in the same proportions?—You are rather unfairly asking me to give an opinion on what someone else has done.

15,713. No. Can you suggest an explanation?—I offer no explanation, and I am afraid, without reading the experiments myself, I am unable to form a conclusion. You are giving me an idea of the experiments from a lay point of view, and not from the scientific point of view.

15,714. (*Chairman.*) I am giving them from a scientific point of view; I am giving the experiments made by a scientist of great authority?—They differ from mine. I am afraid that we are at issue. I do not understand his results; there may be explanatory circumstances.

15,715. I am sure that you appreciate the position that we are in; we are bound to consider all these investigations?—Certainly. It is a scientific question.

15,716. (*Lord Henry Bentinck.*) How long were the cats kept in cages? Was it three weeks?—About 2½ months. I have a cat now that I have had four years.

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15,717. In a cage?—Yes. These cats come out every day for a run. In the laboratory we used to keep the animals in that way.

15,718. Do not they deteriorate?—Not at all. They maintain a definite weight. If you weigh a cat in a cage every day regularly for a year, you will find that he will go rather steadily up. They are emaciated when we get them first of all. We keep them for two months before using them to get them to the standard laboratory weight. At the end of that time they do not vary 100 grammes a week for a year or two. They remain perfectly friendly and happy. There is one thing, and that is that a cat kept in confinement does not clean itself, which is a great advantage from the point of view of dealing with dusty things.

15,719. (Chairman.) Did you follow up these experiments by examinations of the separate constituents of the paints causing illness?—Yes, I did.

15,720. I will ask you about the effect of the constituents one by one. Will you describe the experiments made with white lead paste and linseed oil?—Yes. It was free from lead acetate. The tube which I have already described in the earlier part of my evidence was made use of, but, as in this case it was necessary to modify the physiological apparatus, a new cage was constructed, with a glass door, zinc lined, and mechanically ventilated. The tube from the apparatus previously described was led into the cage, and discharged at half the distance between the top and the bottom. The cage content was about 9 cubic feet. As it was impossible to aspirate air through the cage by means of a water pump, a bellows driven by an electric motor was made use of, the air passing first of all into a pressure chamber, with which was connected a manometer. The tube passed directly from the pressure chamber into the cage. The pressure was three inches of water, and about 100 c.c. of air was driven through the tube every 10 seconds, at the rate of about 10 c.c. a second. The tube was filled with white-lead paste, as in the chemical experiment, and the animal was placed in the cage. The animal was placed in a cage for about eight hours a day, with slight variations, sometimes it was eight, sometimes it was six; the average was, we will say, six hours a day. At any rate, the animal passed in one case 380 hours, and in the other 370 hours, and in the third experiment 250 hours in the cage.

15,721. (Lord Henry Bentinck.) Were they all subjected to the same treatment?—Yes, they were all subjected to the same treatment. First of all I did one animal with lead in a cage, and then an animal with zinc.

15,722. (Chairman.) Will you please keep to the case of the cat exposed to lead, first?—The animal had 380 hours at daily intervals, and exhibited no symptoms whatever of lead poisoning.

15,723. Did the animal exhibit any symptoms at all corresponding to those given in your previous answer?—It varied a little in weight, as cats will do, some 100 grammes; but the final weight of the cats was in each case the same.

15,724. Did you make similar experiments with zinc-oxide paste?—Exactly.

15,725. What conclusions did you draw from these two experiments?—That there was no emanation given off of a poisonous nature affecting the cat from the lead or zinc pastes when heated to 59 degrees centigrade, or at the normal temperature.

15,726. Was there any difference at all between lead and linseed oil and zinc and linseed oil in this respect?—No, none whatever.

15,727. Did you then investigate the effects of the other main constituents of the paint?—Yes, I did.

15,728. What apparatus did you use for that purpose?—A cage similar to that used in the physiological experiments I have just described. I will call it cage 3. In the first compartment was placed a bottle of linseed oil containing 100 c.c., in the second compartment a bottle containing 100 c.c. turpentine, and in the third a bottle containing 100 c.c. turpentine and lead acetate, which was supplied to me as an ordinary drier, constantly added to paint. The apparatus was further modified in such a manner that air could be

bubbled through the various solutions at a measured rate. The cages were also efficiently ventilated by means of exhaust ventilation.

15,729. What was the effect on the animal exposed to the linseed oil?—It exhibited no symptoms whatever. It went to sleep.

15,730. What was the effect on the animal exposed to turpentine only?—It showed signs of acute illness, and at the end of the two hours was so ill that it had to be removed.

15,731. What was the effect on the animal exposed to lead acetate and turpentine driers?—The animal exposed to the acetate and driers showed signs of illness at the end of four hours.

15,732. Was the illness of the animal exposed to turpentine only as severe in all respects as the illness of the animals exposed to ready-mixed white-lead paints and ready-mixed zinc-oxide paints?—It was much more severe.

15,733. Were these experiments repeated?—Yes. Seven experiments were made with the turpentine on animals.

15,734. What conclusions did you draw from these experiments?—They were quite opposed to my own expectation, and until I had read up the literature on turpentine poisoning I was very astonished at the acute symptoms produced. I found that turpentine acted first of all as an irritant poison to the mucous membranes; that is to say, salivation was produced; secondly that it acted as a most distinct nervous poison, in that it produced what we call ataxia; that is inability to walk straight—practically drunkenness; inflammation, an early and rapid effect on the brain shown by the divergence of the animal's pupils; and finally, that it acted as a distinct irritant on the spinal cord, by the position in which the animal was thrown by the contraction of its muscles, which is known medically as opisthotonos. This was quite an unexpected effect of turpentine, and I took occasion at once to look up the literature on turpentine poisoning, and I found that there had been some experiments on turpentine poisoning by Professor Lehmann. I, therefore, was inclined to attribute the symptoms which I had found in the animals exposed to lead paints and zinc paints to the turpentine content. The animals were only exposed for two hours at a time. It was found absolutely impossible to continue the exposure to turpentine vapour for longer than two hours, as on one occasion an animal was exposed for 2½ hours and it died suddenly.

15,735. I want to ask you, first of all, what was the amount of turpentine in the air of the cage in the case of the animal exposed to turpentine only?—The amount varied from 6 to 10 milligrammes per litre there.

15,736. Would that correspond to the average amount of turpentine that might be given off by the paint of a room which was being painted?—I calculated out about what that would mean. I am unable to say the quantity of turpentine that is used in a room. That is for practicable people to say. It comes to this: that in a room 20 feet long by 10 feet high and about 15 feet wide it would be half a pint of turpentine.

15,737. Used in the paint to cover that surface, do you mean?—No. It would mean that there would be half a pint of turpentine vaporised and filling the whole of a room of those dimensions. It would contain about 8 milligrammes of turpentine per litre. I say "about" because it is difficult to estimate the turpentine. The room I have described is a good big room.

15,738. If you have regard to the smallness of a cat compared with the size of a man, would the amount of vapour that emanated from the cage be a comparable amount with that which might be given off by the paint in a room which was being painted?—I think it would. Both myself and my laboratory assistant suffered from some curious disease, whilst we were doing these turpentine experiments; that I can only put down to the turpentine. I suffered from nausea, and attempted to vomit on two or three occasions. My laboratory assistant had similar symptoms. When exposed to the vapour of the cage I got acute headache.

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15,739. Do you think then that a man, if exposed to the paint in a newly-painted room, would suffer to the same extent as a cat?—No, I do not. That is quite another story.

15,740. That is important for us to know?—I say that the amount in my cage was equal to the amount in a given room, but I do not draw the conclusion from it which you put to me. The concentration of turpentine that an animal breathes, if it gets to 8 milligrammes per litre, is sufficient to produce symptoms of poisoning. It did in myself and it did in the animal. If you shut up a room which has been freshly painted, I believe it is a fact that people suffer from all sorts of queer symptoms which are put down to the new paint. I have done so myself. The special circumstances about the disease that is produced by smelling fresh paint are the headache and also the nausea, and that is exactly what we developed. We also suffered from anorexia. The cats showed this distinctly. They were off their feed after their exposure to turpentine, and they frequently attempted to vomit. The question is concentration. If a man is painting a room, it is not necessary to have the whole of the turpentine volatilised throughout the room, providing the concentration at the point at which he is working is sufficiently high. In putting paint on a surface, turpentine may be vaporised from that surface, and if the concentration at the point at which he is working reaches 8 milligrammes per litre, he is likely to suffer from headache. I am speaking in general terms, of course. I think that my experiments show that the commonly noticed symptoms of headache and nausea, and also colic of a type, that is to say, stomach-ache complained of by people from the smell of paint, are explainable on the turpentine hypothesis.

15,741. Did you make a *post-mortem* examination of the animal which died from exposure to turpentine?—I did. This is the condition found, *post-mortem*, of the animal which died suddenly, which had been exposed for two hours a day for 16 days; it was exposed for 2½ hours on the 16th day by mistake, and died in a fit. It was noticed during the exposure that the symptoms of salivation and divergence of the pupils were always more pronounced when we put fresh turpentine in, and that the older turpentine did not have the same effect. Fresh turpentine was put in the day this animal died. There was bloody mucus round its mouth. It had multiple ulcers in the ileum; it had melena; the kidneys were in a state of acute congestion; the lungs were also in a state of acute congestion, and smelt of turpentine strongly; the liver around the gall-bladder was deeply stained with bile, and also smelt of turpentine, as the lungs did. There were a few patches of local hemorrhages in the lung, and the bases of both lungs were congested; the heart was flabby; there was nothing of note about it otherwise; the blood vessels in the surface of the brain were in a state of acute congestion, and particularly the inter-ventricular plexus. A histological examination was made of the lungs, heart, liver, and kidneys.

15,742. It would be more valuable to have the account of a cat that had not died from an overdose?—This one was exposed 2½ hours. I do not know that you can call that an overdose. It is rather longer. It only had half-an-hour longer of the same thing as the other animals had.

(Chairman.) It had longer to breathe it in, so that it had more than the others, and therefore an overdose.

15,743. (Mr. Sutherland.) Does not that show that that is the breaking point, and that the hurtfulness comes from the turpentine, in that it can be sustained up to a point, but, pass that, and death ensues?—The animal was very bad on each occasion. The point is this: this particular animal had been exposed for the longest time, and had always recovered, if therefore immunity was produced or tolerance to turpentine by regular exposure, it was reasonable to suppose that this animal should have withstood an extra half hour's exposure. One animal died after two-hours' exposure, another after only 75 minutes. Two hours is as much as we find a cat will stand yet.

15,744. From the turpentine?—From the turpentine. The first animal I am discussing had withstood

16 exposures of two hours each—32 hours—so that it had had all along preliminary dosage, and it ought to have been able to stand an extra half-hour, if there is anything in immunity.

15,745. (Chairman.) Will you tell us the number of hours that all these cats were exposed before they died?—One animal had been exposed for 32 hours, and died at the end of an exposure of an extra half-hour. Another animal is still alive, and has had exposure for 30 hours. A third animal died after two hours' exposure. They are roughly the same amounts. The variation was between 8 and 10 milligrammes per litre. I cannot go nearer than that. It is very difficult to estimate. A sixth animal had been exposed for 16 hours, and it is still alive. Those are the times of exposure.

15,746. (Sir Godfrey Baring.) Are we to understand that some cats are more susceptible than others?—Yes, I should think so apparently.

15,747. And that, given that the same quantity of vapour could be breathed by men in a room, they would die equally?—I should think so, but I do not know. You cannot argue absolutely with regard to fatal doses from man to animal. All you can argue is that if symptoms of changes in the tissues are produced in an animal, such tissue changes are invariably produced in man by the same thing.

15,748. If these experiments are not comparable as between cat and man, given the same conditions, they are practically of no use at all?—All I can say is that I got a very uncomfortable headache from breathing the air. I was not inside the cage. I was only outside it. I do not propose to get inside the cage to determine the further point.

15,749. You see my point?—Yes.

15,750. I want to know whether this is comparable?—These cats weigh 2·7 kilogrammes. A man weighs, say, 60 kilos. The relation, if you take it merely on body weight, is 30 to 1, roughly. So that at that rate you would want a very much larger dose for death, but not necessarily for the other symptoms. The turpentine is taken into the blood, where it produces changes in the composition of the blood, and it is excreted by the kidneys. You can smell it. Taking a painter's urine where he has been working for a long time in the presence of turpentine, it smells of violets a curious smell always related to turpentine. And further, in my animals at any rate, I found curious changes produced in the intestine, and a symptom of turpentine poisoning is diarrhoea. Dr. Collis has had the opportunity of examining my histological specimens of the turpentine cat that I have been describing, and he can bear me out as to the very curious hemorrhagic effects. They differ from the effects of white lead. I think he will bear me out.

(Dr. Collis.) They are quite different. The chief symptom which these cats showed even when only exposed for an hour and a half was kidney change. The animal which died after exposure of only one and a quarter hours still showed kidney changes, and the intestine was full of frothy mucus—not blood—whereas the one exposed for a longer time (77) had ulceration, and blood in the motions. This cat showed frothy mucus and acute patches of inflammation starting in the intestine, but to no great extent. That suggests that turpentine is excreted by the intestines as well as by the kidneys.

15,751. (Chairman.) Is it possible that animals might become immune to turpentine vapour?—I have been doing my best to get immunisation, because I see the great importance of that, and the importance of the question of the establishment of immunity in man. If turpentine acts on the kidney as one has shown that it does (and one knows that lead does), it is highly important. So far no immunity has been produced.

15,752. Can you distinguish between a kidney acted upon by turpentine and a kidney acted upon by lead?—Yes, I think so, in the early stages. The turpentine produces tubal nephritis. The inside of the tubules is damaged by turpentine. In lead it starts with interstitial hemorrhage, and the hemorrhage that takes place in the kidney in these animals in the lead is very distinct. There is excessive excretion. My animals so far have broken down that I have been

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attempting to immunise. I have not obtained true immunity yet.

15,753. Did you also make inoculation experiments, and with what result?—Yes, as a control to the experiments which I had previously made with regard to breathing emanations from lead paint and emanations from zinc paint, and the basic compound of the paint, that is the metallic salt. Inoculation experiments were performed to determine the relative poisonousness of the compounds and their absorption by the tissues direct. I found by these inoculation experiments that the metallic constituent of the paint, when inoculated subcutaneously into the tissues of an animal, underwent definite absorption, and in each instance produced some change resulting in a diseased condition of the kidney. Even zinc salts, the oxide and sulphide, produced death of the animal, when only 0.1 grammes per kilogramme body weight were inoculated. This is merely testing the virulence, you understand.

15,754. As a matter of practice, would a painter be likely to get inoculated either with lead or with zinc?—No.

15,755. Then your only point is that inoculation with zinc is dangerous, just the same as in the case of nearly all metals?—Yes. It was necessary to determine this, and the inoculation experiment always gives you the answer to this question: Is the definite salt of the metal experimented upon absorbable by the tissues themselves when it gains definite access to such tissues?

15,756. But are there any metals that would not have that effect?—Yes.

15,757. What are they?—You can inoculate with iron. You may get that effect, but different in degree.

15,758. What are the metals that you can inoculate with that would not have the same effect as zinc?—I have not tried. So far all the heavy metals I have tried have produced the result.

15,759. Then this experiment of yours is only to show whether all metals have the same effect?—It might have been possible that zinc would prove non-poisonous, and differ from other metals. There was quite the chance.

15,760. You did it for that reason?—Yes. This is a question of determining whether or not zinc was poisonous in common with other metals, and it was.

15,761. Did you also expose animals to dust such as painters would be liable to breathe in the dry rubbing-down process?—Yes, I did.

15,762. Did you conduct these experiments in a method similar to that employed in your work for the Committee on Lead, &c. in Potteries?—No.

15,763. Will you describe the apparatus used?—The apparatus was the apparatus described in the experiments for investigating the emanations given off from heated paints. It consisted of a hermetically-sealed cage with a glass door. It was modified so that the air could be blown over the compound to be tested. In the experiments for the Committee on Lead in the Potteries the compound to be tested was dropped into the cage, and it was dropped in in fairly large quantities over a couple of hours.

15,763a. The material in the form of dust?—Yes; as dust. In the case of the experiments with paint materials, the animals were situated in the cage in such a way that they were all breathing dust-laden air. The air was blown over the compound by bellows, and therefore it was possible to leave the animal exposed to small quantities of lead in the cage for long periods, instead of, as we did in our experiments in regard to the potteries, to larger quantities for a shorter period. The animals in this case remained in the cage for the whole of the day, being taken out at night and put in an ordinary cage.

15,764. What dusts did you experiment with?—Two metal salts were used, one of them being white lead, and the other zinc oxide.

15,765. What quantity of dust was suspended in the air during the exposure of the animals?—The quantity in the case of zinc was slightly in excess of the quantity in the case of lead. The average quantity of dust in the air for the lead cases was 0.004 gramme

per litre. It was probably a little less. In the case of the zinc it was at least four times this amount. The lead content was very small, so small that it could only just be recognised.

15,766. Would this make the atmosphere of the cage comparable with that of a room in which dry rubbing-down is being done?—I should think entirely. I have no facts with regard to direct examination of the air from the dry rubbing-down process, but I take it that the dust given off would be of the very finest description, and therefore it would be the finest dust that one would wish to experiment with; that is to say, the dust which would be carried over from a gentle current of air rather than when large quantities of lead are dropped into the cage in front of a fan.

15,767. What was the result of the exposure to white lead?—The animal showed signs of poisoning at the end of a fortnight.

15,768. What was the result of the exposure to zinc oxide?—There was no symptoms whatever except the loss of body weight.

15,769. Notwithstanding that the quantity of dust used was four times as much as in the case of lead?—Quite.

15,770. Have you made *post-mortem* examinations of the animals experimented upon?—I will give you the result of the *post-mortem* examination of the zinc cat as against the lead cat. Both cats were exposed for a month. At the end of a fortnight the white-lead cat was showing symptoms of poisoning, and at the end of a month it had got symptoms of paralysis, so it was quite time to deal with it. The zinc cat at that time showed no symptoms of paralysis at all; it was exceedingly lively; but it was necessary to kill it to examine it as against the other one. The cats were chloroformed. Taking the white-lead animal first: the loss of weight was from 4,050 grammes to 2,050 grammes—half weight again. The *post-mortem* signs were those which I have usually found in lead poisoning; that is to say, there were old and fresh hæmorrhages in patches in the lungs, heart, liver, spleen, and kidney. In the intestines there was some injection, and a number of ulcers (small erosions), quite different from the turpentine effect. The whole of the cæcum (that is the lower part of the intestine) was stained black. In this black staining, I was able to recognise lead by the usual chemical tests. Histological examination of the tissues showed the ordinary typical signs, namely, interstitial microscopical hæmorrhages, discharge of the lead particles from the surface, and the deeper layers of the large intestine; hæmorrhages in the smaller intestine, and ulceration. It conformed in every particular with what I have described in various places as the typical signs of lead poisoning. So that a small dose of lead over periods of, roughly, six hours a day (it is bigger than man gets) is distinctly serious. Now we come to the *post-mortem* on the zinc cat. The zinc cat started at 2,800 grammes weight and it finished at 2,500 grammes weight, so that the difference in its loss of weight was very small. It only lost 300 grammes. At the same time it looked very thin, but it was exceedingly lively. There was no dark staining in the intestine; the heart muscle was rather flabby; the liver was congested and firm; the kidney showed no hæmorrhages. On the other hand, the spleen showed a number of recent hæmorrhages of an ordinary type, rather suggesting that particles of dust had gone into the lung and had passed as solid material. That I have not been able to investigate yet. There were infarcts in the spleen. The rest of the organs were apparently quite normal, with the exception of the lower part of the ileum, which showed congestion. There was therefore some slight evidence, or more than slight, there was distinct histological evidence that the metal which had been taken in by the cat's lungs had been circulating in the blood, and was being discharged. The kidney, on section, showed that there was early inflammation taking place. There was also congestion and a suggestion of recent inflammation in the small intestine. There is very little doubt, therefore, that it is not a good thing for an animal or for a man to absorb even zinc oxide dust.



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15,771. Would you go so far as to say any metal dust?—I am not prepared to say that. I am only prepared to give you what I know, and what I have done. I should be very pleased to try any metal dusts or any dusts that are likely to be met with, and I think it important, but one cannot generalise. I could express an opinion, but it is only an opinion, after all. It is of no value, because it is not based on evidence.

15,772. Exactly; please give only the facts you have ascertained?—The difference between the white-lead cat and the zinc cat is very marked.

15,773. Have you examined the blood of the animals experimented upon?—I have made a large number of examinations. In the case of these investigations particular attention has been paid to the blood examination of the animals experimented upon. The change in the red blood corpuscles, known as basophilic staining, was found—a symptom in both turpentine and white-lead poisoning, and even the animals exposed to zinc oxide and to zinc sulphide showed the presence of a few basophilic granules in the blood.

15,774. Was the basophilia so marked in the case of the zinc as in the case of the lead exposure?—I should think that the lead showed if anything the excess.

15,775. Is basophilia never found in a normal cat unexposed to any poisonous influence?—Unexposed artificially, yes, but it may have suffered from some intercurrent disease which would determine it. Basophilia is not a symptom of blood destruction at all. Basophilic staining, so-called, consists of the appearance of small granules in the red blood corpuscles. This basophilia is the result of the change in the development of the cells which is going on all the time in one's red bone marrow, and it is the remains of the nucleus which is left behind. If there is great and rapid hæmorrhage—if you bleed an animal of two-thirds of its body blood and examine its blood afterwards, you find the same day enormous quantities of basophilic granules present. There are many other diseases which produce basophilia. That was controlled by examining the animals beforehand to make sure that there was no basophilic condition in the animal.

15,776. But is there no case of basophilia whatever in a normal animal?—Yes, it may occur, but basophilia did not occur in these experimental animals.

15,777. But it is possible?—Yes. If you got a cat which had just undergone parturition, you would definitely find basophilia.

15,778. When you examined the cats first of all, there were no signs of basophilia?—None at all.

15,779. And after the inhalation of dust and turpentine you found them?—Yes, very small quantities. The basophilia in the animal, the cat, is less pronounced than in man in lead poisoning. So far, in my experimental work, I have found a small number of basophilic granules in the animals.

15,780. Have examinations of the blood of men exposed to lead dust also been made?—Yes. That does not bear on my answer as to the basophilia in animals. It is rather important as bearing out what I said with regard to blood destruction if you expose an animal to lead poisoning such as the animal exposed to white-lead dust. I examined that cat during the whole of the time and it showed no basophilia whatever, and the animal died without there being any basophilic staining present.

15,781. Neither before nor after?—Yes. The animals exposed to lead poisoning for a short time and then removed from its influence showed basophilic staining.

15,782. As the result of what?—As the result of exposure to lead poisoning for a short time, then being allowed to recover, and I had the same sort of thing in the case of the zinc. It is not an early symptom in experimental animals. It is rather thought that in man it is an early symptom. It may be because the so-called hæmo-poietic mechanism of man is different from that of animals.

15,783. What deduction do you put before us as the result of finding basophilia in both sets of

animals?—It is a symptom of blood regeneration after blood destruction.

15,784. Caused by what?—Caused by the toxic influence of both lead and zinc.

15,785. You have spoken of examinations of the blood of men exposed to lead dust?—Yes, I have, in several directions. The investigations have been carried out with regard to this basophilic staining, which I was explaining a little while ago, and also with regard to other changes in the blood which take place, the important matter being to get some method by which early lead absorption rather than lead poisoning could be recognised, so that such a case could be treated or removed from the influences which were producing the poisoning; and, as often happens in doing so, the man not only is protected from the disease at that moment but becomes more immune than a person who for the first time is exposed to lead poisoning. I think that there is no doubt, from my experimental work and from clinical observation, that persons do become immune to dosage with lead; and I think that Dr. Collis will be able to bear me out in that respect—that immunity may be established by continued exposure to lead.

15,786. Would you say immunity or that some subjects are not so susceptible?—Diminished susceptibility, otherwise what we know in drugs as tolerance. We know quite well that, if a person takes morphia over a long period, he is able to support huge doses which are impossible for a normal person to take; and the same with alcohol. In fact, if it were not so, it would be a very serious thing with regard to all lead trades. Men are frequently met with who have been exposed to lead poisoning to the same extent as others and who never show any signs of it at all, and those people may be regarded either as less susceptible or as having become diminished in susceptibility. One makes use of it from the practical point of view in the ordinary routine treatment of men employed in white-lead works where a man shows early signs of absorption. I distinguish between lead absorption and lead poisoning. They are two very distinct things. Lead absorption may go on for a period without producing any clinical symptoms, and there should be a direction to certifying surgeons to distinguish between those two points. Lead poisoning and lead absorption are not synonymous terms. The literature with regard to the potteries makes the statement that certifying surgeons are to observe that.

15,787. What would you consider to be the difference between the two?—One is ingestion by the lung, or by the alimentary tract of quantities of lead which are subminimal poisonous doses. They are sufficient to produce some change in the body, but that change is one that the body is able to deal with. To carry it a little further, the damage, by stress to the body, is slightly increased; but it is not increased beyond that amount that the body is able itself to deal with and repair. Carry the dose beyond such a point, and the body is no longer able to deal with the quantity, and the whole of the previous quantity of lead which is present in the body may then act as a toxic amount.

15,788. But is it not the case that some bodies are able to resist the influence of lead better than others?—Certainly, and even a susceptible person in many instances may become less susceptible by constant exposure.

15,789. Do you consider the effect of turpentine a matter which calls for serious investigation?—I do, most decidedly, and as it is concerned with lead paints so much (or all paints I prefer to say) I think it comes within the scope of the Committee to consider. From my point of view, although it is not lead, it is undoubtedly a constituent of paint which may operate very seriously.

15,790. Could you tell us whether the symptoms created by turpentine are similar to those complained of by persons who smell fresh paint?—Yes, most decidedly. I have experienced it myself. I have also inquired into and seen cases of poisoning or illnesses produced by inhaling the fumes of fresh paint, and such

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illnesses are always more nearly allied in their symptoms to those of turpentine poisoning than of lead poisoning. In fact, I think it is quite easy to distinguish.

15,791. Then your conclusion is that there is a definite illness from turpentine not easily confused with lead poisoning?—Not easily confused, but I think that it has been confused a good deal, because it has been associated with paint.

15,792. You consider that turpentine produces symptoms which, in a *post-mortem* examination, would be readily distinguished from lead poisoning?—In acute poisoning; but I am not able yet to say what the symptoms would be in the more chronic cases.

15,793. I asked about *post-mortem* examination?—That is obviously acute. It might not be readily distinguished. You might have to distinguish between turpentine poisoning and lead poisoning in a case which had died after exposure to lead for a long period and then to a severe dose of turpentine. Then it would be very easy. I will illustrate by what actually occurred. I had, for an insurance company, to see a man who had been exposed to sand-papery large surfaces of paint for flating, and the question that arose was whether that man's illness was due simply to his sand-papery the surfaces, or whether, as he had been engaged mixing paint previously and stirring it in turpentine, that had predisposed him to a second dose of poisoning by means of the sand-papery. Is that clear?

15,794. Yes, quite. You say, in fact, that turpentine introduces the danger of a new illness?—I think so.

15,795. In addition to the lead poisoning which we are now investigating?—I think so.

15,796. I will not say a new illness, but a new danger of illness?—Previously unconsidered we will say. It has probably existed all the time. These investigations rather suggest that there is such a thing.

15,797. Do you think that this would make the men more prone to take lead poisoning?—That is such a vital point, because from the point of view of the painter it is a very serious matter. Having no direct evidence on it at present, it is difficult for me to give a direct answer. *A priori* (if you wish me to express an opinion) I should say yes, because of the effect of the turpentine on the kidney.

15,798. Let me remind you that you found in your previous experiments for the Committee on Lead, &c. in Potteries that alcohol, given in addition to other food, renders the system much more prone to an attack of lead poisoning?—Certainly.

15,799. Did you attribute that to the fact that both alcohol and lead have to be eliminated by the kidneys, and that these organs are apt to break down under the double strain?—Yes.

15,800. As you have found that turpentine also produces kidney disease, would it not seem probable that the exposure to turpentine would greatly increase the risk of lead poisoning in the same way that alcohol does?—That is a conclusion that it would be fair to make, I think; but without experiment it is impossible to make a definite statement.

15,801. In any case your discovery that turpentine is an additional dangerous element in the work of the house-painter might account in some measure for the high incidence of Bright's and other diseases of the kidneys amongst those workers?—Yes, I entirely agree with that; if you will allow me to say that it is not absolutely my original work in this case, although it was after I had completed my experiments that I became aware that other work had been done on the question. It is original from that point of view, but Lehmann's work was published in the "Archives for Hygiene" in 1899. Unfortunately, I was not aware of that when I did my work.

15,802. For example, Bright's disease causes three out of 100 deaths in the general population, and eight out of 100 deaths in painters?—Yes.

15,803. So there must be some contributory cause for that large increase?—Yes, and turpentine is a

substance which, as a result of my recent examination, I should look on with the greatest suspicion.

15,804. The comparative figures of lead poisoning amongst house-painters are as follows: The average number of deaths during the last 10 years is 30, which is equivalent to about 1,000 attacks each year?—Is that 30 per 100 or per 1,000?

15,805. Thirty is the absolute number of deaths per annum, on the average?—Taking the relation of attack-rate to death-rate, it is quite fair to estimate the probable attack-rate amongst painters as you have done, providing the amount of infection in the two cases is about the same. It is a very fair sort of deduction to make—that, for 1,000 cases of lead poisoning in industrial conditions, you might get 30 deaths.

15,806. (*Dr. Collis*.) That is the usual proportion?—The fatal lead poisoning figure among house-painters, the actual figure being 30, the chances are that that 30 is due to somewhat the same causes, at any rate, as would produce a general attack-rate of 1,000 cases per annum.

15,807. That is a very serious condition of affairs, is it not?—Yes. Are those deaths certified as from lead poisoning?

15,808. Yes, they are taken from the Registrar-General's figures?—What is the total number of deaths from all causes amongst house-painters?

15,809. That is given in the last Decennial Supplement?—What is the relation to the total deaths amongst lead workers? (*Some figures were handed to the witness*.) Using the term in a technical sense, entirely, and not in an antagonistic sense, a crude death-rate estimated upon an assumption is a difficult figure to deal with. That figure might be contributed to by the turpentine poisoning.

15,810. Each death is tabulated on the result of a coroner's inquest, at which expert medical evidence was taken in regard to lead poisoning?—Yes, but I believe it is a fact in the case of the Potteries, that if any disease of the kidney at all is found it is ascribed to lead poisoning at once. If there was kidney disease, that would be taken as evidence. I have noticed that in reading the reports of coroners' inquests which I have been collecting for four or five years. Probably great stress is laid on that question, and I am a little uncertain yet as to how far kidney disease alone is such a serious feature of lead poisoning. That is not only from my own work, I find, with regard to a very large number of persons who have done experimental work with animals, that the difficulty has been to reproduce chronic kidney lesion. It is a matter probably more of scientific interest, but I think it a point to raise.

15,811. Your point being that some of these deaths attributed to lead may be attributable to causes other than lead?—Yes, which it is difficult to distinguish.

15,812. If a few mistakes are made in regarding as lead poisoning what may really be turpentine poisoning, will there not, on the other hand, be at least as many cases attributed to other causes which should be ascribed to lead?—That is an argument. It is not quite as likely.

15,813. It is not as good an argument as yours?—No. There is always a tendency, recently at any rate, to bring in a verdict of lead poisoning if possible. I think that that is the general tendency.

15,814. What makes you say that, because you know there is a medical referee?—Yes, I know. I know several medical referees, and they each of them take this view, and I am not criticising their view—that in a case of doubt where the evidence is almost evenly balanced, and there is evidence of the man having been employed in a lead industry in which he might have contracted lead poisoning, it is common justice to give the benefit of the doubt on the point of lead. I think that is right, but for the purpose of statistics it is a little disturbing.

15,815. But that opinion of yours would not apply to lead industries where turpentine was not used?—I am talking of all lead industries. I think that that is the general point of view that a referee would take. I should take it myself if I was acting as referee. I

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think that it is a fair one, but it is disturbing with regard to statistics, however fair it may be. Thirty deaths is rather a small number to go on alone.

15,816. (*Dr. Collis.*) That is an annual average for 10 years?—There is rather an important point that I would wish to make. I had blood submitted to me by Dr. Collis, who obtained it from persons employed in the painting of furniture, and who were, therefore, presumably exposed to lead dust. I did not know the source of the blood, except that it was obtained from people who had an opportunity of being exposed to lead dust in the air from sand-papery. I found, taking the particular line which I have been laying down as the one to take when estimating changes taking place in the blood probably due to lead, that a number of these persons probably had suffered or were suffering from lead absorption. I have not the figures with me, because I thought they were rather of a private nature, but I sent the results to Dr. Collis, and I think that they bear out rather strikingly the fact that it had been possible by means of this blood examination to pick out a number of men who had been exposed. I picked out all the blanks which were put in. I only had the numbers of the bloods. I picked out all the blank bloods, which were of normal persons, clerks and so on.

15,817. (*Chairman.*) What does "blank bloods" mean?—Blood from a person not exposed to lead infection. They were put in amongst the series. By examining these bloods in the way I have described, I was able to pick out those who were not exposed, and certain people who definitely had been exposed; and some of them in those instances were showing symptoms of lead absorption. That was with regard to sand-papery workers. In a case a little while ago, in which the Home Office was concerned, I had submitted samples of blood obtained from people who had been exposed to lead sulphate dust, or basic sulphate of lead, and again, at my own particular request, the names were not indicated to me. Each was labelled with a number. Numbers 1 and 2 were lead suspected persons; 3 was a normal person, a clerk; 4 was a lead blood; and so forth right away up. The samples were mixed. I succeeded in picking out not only people not affected, but the very ones who were admittedly cases that had been reported as lead poisoning from the works. The only blood which I queried was one of the samples which came from a presumably normal person. He had been suffering from some curious form of anaemia. So that, as far as those samples went, all the persons who were suffering from illness were definitely determined.

15,818. Did all the persons who had had any connection with lead show it in their blood?—Yes. By examining, microscopically, I was able to make a selection and say: "This is probably lead blood; that is 'probably normal blood.'"

15,819. Were you correct each time?—I was correct in every case. The method that was adopted was not only the basophile staining—and that is why I wanted to refer to this question again. A good deal has been done recently with regard to basophile staining, and at the recent exhibition in Dresden a method was suggested which had been adopted for finding out whether the lead workers were affected with poisoning or not, and they used only the basophile granules. I have shown you that basophile staining may occur in turpentine poisoning. It may occur also, presumably, in zinc poisoning. The point is that that curious staining in the red cells is not a symptom of lead poisoning alone, and it must not be regarded as such. It is only a symptom that blood is being formed at a greater rate than the normal, and it is being made so fast that it does not get properly formed, and bits of the process are left in the red cells. At the same time, if a person is also suffering from the effects of poisoning, changes take place in the blood in the number of certain other constituents, namely, the white blood corpuscles of a certain type. The white cells of the body are divided for practical purposes into four main classes (A, B, C, and D). A is generally about 63 to 65 per cent., up to 70, of the corpuscles. If you examined 100, you would expect to find 63 to 70 of one sort, all being white, 15 to 20 of another sort of white, and so on. One of

these types of white cells is apparently always increased in lead poisoning, and that, taken together with the curious staining in the cells, seems to be, and has been in my hands, so far a means of detecting a sample of lead-worker's blood when shuffled with a number of other samples, and I think it is one that might be made use of in the detection of the early absorption of lead, so preventing the more serious symptoms of paralysis and so forth occurring. Paralysis and all these maiming diseases which follow lead poisoning only come on in the majority of cases after very long continued exposure. I do not consider lead poisoning by any means an unpreventable disease. I believe it might be a preventable disease if it were recognised in the earlier stages in which these changes were going on in the blood. It is not enough to take the change in the red cells alone, because it occurs in pernicious anaemia; it occurs in benzol poisoning; it occurs in aniline poisoning; and it occurs in turpentine poisoning, as I have shown. Turpentine therefore comes into relation with other forms of poisoning which are known to show what I have been describing. This is lymphatic leucocytosis, otherwise an increase in the particular form of white blood cell known as lymphocyte. If this is present up to above 30 per cent. in addition to the alteration in the red corpuscles, together with a diminution in the red colouring matter of the blood (haemoglobin), there is very strong presumptive evidence that what is happening is a form of metallic poisoning, and if the person is working in lead it is practically certain that it is related to the trade. Therefore I think it is worth considering that as a method of determining lead poisoning, and therefore eliminating many of the more serious forms. But it is most important that such an investigation should not be undertaken by anyone unless he be a competent person in doing blood examination. It cannot be done, I am afraid, by the man who is in general practice in the ordinary way. He has not the time or the facilities for doing a rather technical operation of that sort.

15,820. What do you mean by facilities?—Facilities in every way—both the apparatus and the manual dexterity of his fingers, and also, what is still further important, the judgment to determine which is the basophile-stained cell and which is not. If Dr. Collis thinks that I have over-stated it or under-stated it, he will tell you. That is purely technical, but it is a thing I thought well to bring to the notice of the Committee. I think that I have under-stated it, if anything. It was a considerable question in the prosecution which was undertaken by the Home Office in the particular instance to which I am referring.

15,821. Would you go so far as to recommend, supposing the Committee decided to issue rules governing the trade, that in the medical examination an analysis of the blood should in all cases be insisted upon?—Always where any question of illness occurs, and, in addition, I would like to recommend that once a year the blood of all persons employed in lead industries be examined, as I suggest, and by an expert.

15,822. (*Dr. Collis.*) With reference to the point on which you have just been speaking, what do you think about the possibility of a painter rubbing down paint composed of a zinc pigment, absorbing by that means sufficient of the zinc to cause alterations in his blood. You have stated that such alterations may occur when zinc is injected under the skin, and I wish your opinion on the possibility of such changes occurring?—If he is breathing a zinc dust, the amount of basophilia produced in such a person is less than that produced in a lead person, and, further, so far in animals (and I have only animal experiments to go upon yet) I have not observed any lymphatic leucocytosis occurring.

15,823. Not from the inhalation of zinc dust?—No.

15,824. I ask this because I want to get clear the position of master painters if lead was restricted, or possibly if they were working entirely without it and one of their men fell ill and made a claim for lead poisoning. Could this test be applied to distinguishing between the form of illness of which he was complaining and any other illness?—In such an instance you would be attempting to lay more stress on the test.

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than I suggested, and I think perhaps in that way if it was used as an absolute test it might break down.

15,825. But it might be of assistance?—It would be of very great assistance, and the absence of any marked basophilic staining and the absence of lymphatic leucocytosis together with the diminution in the red colouring matter of the blood being by no means in relation to the lymphatic leucocytosis would be very strong presumptive evidence that the man was not suffering from lead poisoning, but to make it an absolute test by which to say whether a man has or has not lead poisoning is asking too much for such an experiment.

15,826. It may be of value in helping to distinguish?—Of great value. It would be the very greatest presumptive evidence, I agree, that he was not suffering. I made that statement just now, I think.

15,827. May I try to see if I have understood correctly the position which we now have before us from evidence given by the French report, and by yourself and Professor Baly. I am correct, I hope, in assuming that, if the lead dust alone is used, all the authorities agree that lead poisoning may be produced?—Yes.

15,828. The French have claimed that lead vapours come off lead filings and can be recognised?—At what temperature?

15,829. They do not speak of the temperature being more than ordinary temperature?—That is a French statement?

15,830. Yes, that is a French statement. With that statement at any rate you, for one, disagree?—I absolutely disagree. My researches have negated it in every particular.

15,831. The same French authorities state that, using carbonate of lead, they have found that the growth of microbes is impeded. This is a point that you have not attempted to to prove or disprove?—Not with carbonate of lead, except in conjunction with linseed oil.

15,832. I am coming to that by and by. I want to take the lead alone first?—I have not performed that experiment with lead alone. A number of experiments can be easily devised with regard to micro-organisms that may or may not give you evidence on the subject. The growth of bacteria is notoriously inhibited by variations of an exceedingly minute nature in the composition of the media in which they are grown. I am familiar with bacteriological work, and I have found that a difference of alkalinity in a given solution so slight as the difference of 1 cubic centimetre of normal soda per litre of medium is sufficient to eliminate the growth of certain organisms. Carbonic acid gas might be given off from the surface of lead carbonate at ordinary temperatures—I do not know—and that would certainly have an inhibiting action on some organisms, not all.

15,833. According to the report, this statement is backed by three separate sets of observations, those of M. Heim, M. Hébert, and Dr. A. Marie. I only mention this in passing. I am not holding a brief for any observations which I am at present pointing out. I only wish to get clearly how our evidence goes, so I am asking you if you can give us help on each point, from your point of view. Have you a translation of the French?—No. (A copy was handed to the witness.) 50 grammes of powdered white lead were put under a bell jar. He used fluid media for No. 1, and Agar plates for the typhoid in the other. He found that the typhoid was inhibited in growth. He does not give any controls grown under absolutely normal conditions. He does not give the number of colonies. He simply says that the development was very quick and apparent in No. 1, and it was not so great in No. 2, and it was evidently much decreased in No. 3. Unfortunately for bacteriological work, those experiments are hardly worth talking about. I am sorry to disagree in that way. When one makes bacteriological experiments for determining the inhibition of the growth of micro-organisms, one must control with the greatest of care the actual number of organisms per cubic centimetre growing. He does not even say how his plates were made.

15,834. There were three separate observations made, not by the same individual, but by three separate people, all working on different types of organisms?—All of them suffer from the same defect, that they really do not tell us the number of organisms. My own feeling is, that those bacteriological experiments are ones that would probably give quite a different result if they were made in another way. There is only the general appearance of the plates to go on with regard to whether the things are growing or not. My experience has been that I cannot get inhibition of bacteria, and I have tried, by means of white lead.

15,835. Then, when we come to lead and oil, Professor Baly obtained certain absorption spectra?—Yes.

15,836. The reason for this perhaps he will tell us later. It was an absorption which was not obtained from lead alone or oil alone. The French savants here claim a much more marked effect with regard to microbic and mould growths. Have you yourself any evidence on the point of using oil and lead alone?—No, none at all. They mix the oil and lead, do they not?

15,837. Yes?—They actually mixed the cultures together.

15,838. No?—Then they got a growth of all sorts of other organisms present, which they did not put in to start with. When they used oil, they got the bacillus prodigiosus.

15,839. They were exposing in exactly the same way as in the last case?—Then they got air organisms. Evidently the experiments broke down.

15,840. They got the inhibition of the growth with which they had inoculated the plates?—I am a bacteriologist.

15,841. Yes, I know?—I have not made those experiments. To me, as a bacteriologist, those results are not convincing.

15,842. I quite accept your point, but on the other hand they have not been traversed, have they, by your experiments?—No, they have not been traversed, and I do not think that they are worth traversing, as a matter of fact.

15,843. Then, when we come to the influence of the whole mixed paint, the French again speak of emanations, and they claim that they have found lead in them?—Yes.

15,844. You yourself have produced certain effects upon animals which you consider to be due to the turpentine which the paint contains?—Yes. I could not find any evidence in my animals of lead.

15,845. There was a slightly quicker effect produced when a lead paint was used than was the case with a zinc paint?—Yes; and when the oil thinnings and turpentine alone were used. I forgot to tell you that I exposed a cat to oil thinnings and turpentine without any lead and without any zinc—just with the plain stuff, quite apart from blowing air over.

15,846. (Mr. Sutherland.) Did that have any effect?—It had a turpentine effect.

15,847. (Dr. Collis.) Your opinion on the point (correct me if I am wrong) is that when oil and paint are mixed an emanation possibly of the aldehyde group is given off?—And carbonic acid gas.

15,848. Which may, as far as the French work goes, have been a cause of the inhibition of the growth of microbes?—Yes.

15,849. Do you think that such emanation from the oil would in any way have any effect upon a less delicate organism than moulds and microbes?—What do you call a less delicate organism?

15,850. Higher in the animal scale, and therefore possessing greater power of protection, such as cats and human beings?—It did not have any effect.

15,851. None that you were able to trace?—Yes.

15,852. You examined the blood of these animals?—Yes, and there was no basophilia.

15,853. And no other recognisable effect. Then you come to the turpentine effect, and that you consider to be marked?—Yes.

15,854. Such an effect that it might lower the general resisting power of the organisms, as in the case of alcohol?—It might, undoubtedly.

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[Continued.]

15,855. When you were speaking of your carbonate of lead and oil aspiration experiments, you said that you used carbonate free of acetate?—Yes.

15,856. What lead did you obtain for this?—Three different leads.

15,857. Were they all acetate-free?—No. One did contain acetate, I think, but I am not sure. I am afraid I cannot answer that straight off.

15,858. It occurred to me as possible that lead carbonate, especially as made in France by the chamber process, or by the Stack process, contains acetate, and that the French observers were working with lead carbonate containing acetate?—One of mine was a Brimsdown lead, one was a Millwall lead, and one I bought in a paint shop.

15,859. There may be an agreement after all, if the French contained acetate and yours did not?—The materials may have been the same possibly.

15,860. As most white leads are not acetate free, it is better to work with the lead containing acetate?—Yes. I used lead acetate and turpentine in the animals' cage. They did not show any signs, but they were not exposed for any great length of time. They are still being exposed. I have dealt with acetate of lead in a previous report, but not on the emanation question.

15,861. Turning to the question of turpentine, we expect that there would be a considerable effect from exposing animals to the turpentine vapour; but I am a little uncertain as to whether bubbling air through turpentine is quite a fair test. The point, I believe, that has caused Professor Baly to repeat his work is the possibility of small particles being drawn over mechanically?—That is small quantities of lead.

15,862. When you bubble air through turpentine, it is possible that not merely vapour is coming off in the air, but definite particles of the turpentine are being disturbed; in fact, it is very probable?—Yes.

15,863. I am referring to Dr. Baly's aspiration experiments. The exposure is quite different in that case from exposure to vapour coming off from the painted surface of a wall. Do you think that if the turpentine had been mixed with oil, in the same proportion as is used for paint, and the surface of the cage had been painted with that in the same way as in the first series of experiments, you would have obtained a much better comparative test?—I got the effect from paint with turpentine.

15,864. You were narrowing it down?—I narrowed it down in this way; paint containing turpentine produced salivation and effects which we will call turpentine effects, and which were definitely found ultimately to be associated with turpentine. That produced illness. The various other paints, zinc, lead sulphate, and so on, also mixed with turpentine, produced effects which I came to recognise as turpentine effects. Lead acetate, oil, and turpentine painted on the boards produced the same effect, only it was more pronounced, finally when we vaporised the turpentine, by passing air through it. There was a device at the side of the cage to catch any splashing, but there did not appear to be any marked degree of splashing, and as the apparatus for the turpentine was in one corner of the cage, I do not think that the whole of the air would become impregnated with splashing. It would be only local and high up in the cage away from the animal.

15,865. A witness who is appearing before us tomorrow makes a very great point, in his proof, of this spray in the air, and the way in which it will travel, and the substantial impossibility, having once disturbed the atmosphere by making a spray, of getting it out of the air again?—But the turpentine may be in the form of spray when it is evaporating from the surface—small microscopical bubbles bursting. The whole thing may be a question of fine spray and not gas. That I am not prepared to say.

15,866. Fine spray caused by the evaporation?—Yes. Take, for instance, water vapour in the air, we find it in the form of droplets. The turpentine may be in the form of droplets. It is rather a physiological question.

15,867. I quite agree, but experiment on the last point, with regard to getting exposure to turpentine

and oil in the same way from evaporation off the surface of the wall, has not been carried out?—Yes; I did it with turpentine and thinners, the oil and the turpentine.

15,868. But not the turpentine and oil alone?—Yes, turpentine and oil; oil and turpentine and acetate.

15,869. Did you use turpentine and oil painted on boards?—Yes.

15,870. With nothing else?—Nothing else at all.

15,871. That is the experiment I want to know about?—That has been done. I got the effect so much quicker by using the turpentine alone bubbled. It was the same effect. The more ventilation one gave the animal, the less was the effect, obviously.

15,872. Have the animals exposed to turpentine and oil used in this way and those exposed to turpentine, oil, and lead, and turpentine, oil, and zinc, been respectively subjected to *post-mortem* examination?—Yes.

15,873. Have you details of the three series?—I do not know whether I read the details or not, but I said they were all the same. They all had the same type of symptom with regard to turpentine, varying in degree with the length of exposure and the quantity of material.

15,874. Now, you mentioned that you got your turpentine effects more rapidly if you were using fresh turpentine?—Yes.

15,875. Turpentine is, after all, a complex body; do you think that there are possibly any constituents in turpentine which are more likely to cause ill-effects, other more volatile substances, which might be removed?—It is quite possible. In fact, my observation rather suggests that that is so. My observations would allow of that deduction, but as to what they are and whether it is possible to remove them, one could not tell without further experiment.

15,876. It seems to me a very important point to find out whether there are certain constituents in the turpentine which cause the trouble when inhaled, and which possibly the painter could do quite well without?—If it is the wish of the Committee, I shall be very happy to continue the experiments to try to solve those points. I have the apparatus still.

15,877. You mentioned that turpentine particularly acts on the mucous membrane of the bowel, in places at any rate, did you not?—That is a wrong deduction, I think. I found, associated with turpentine poisoning, lesions of the intestine.

15,878. In all the animals?—Yes, in all the animals. It may be some compound of the turpentine. It looks as if the turpentine or some poisonous substance was being excreted. But I have not recognised turpentine in the intestine.

15,879. I will put it differently. The effect of turpentine on the animal body is to produce lesions of the intestines?—Yes.

15,880. I expressed myself badly?—Yes. It is a question of medical expression. You know quite well what I mean.

15,881. Yes. It is also true, is it not, that lead is largely excreted from the body by the bowels?—Yes, under conditions of lead absorption without illness.

15,882. If an individual were exposed to lead absorption without illness, and then to turpentine vapour, might it not affect the normal path of lead excretion from the body?—Yes, but I think that it would be more likely to produce kidney trouble than bowel trouble.

15,883. For this point it is quite immaterial what trouble it would produce. Would it not, therefore, be liable to precipitate symptoms of lead trouble?—I think so. That is a point that I have been discussing, and it is one on which the Committee require further information than I can give them.

15,884. Looking at the point conversely, if the exposure to turpentine vapour is sufficient to cause transient symptoms, and therefore may be considered to be affecting to some extent the path of excretion through the bowel, if a man is exposed to lead he may suffer from illness which he would not suffer from where the paint that he is using is, let us say, possibly, zinc paint?—That is arguable, but before

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giving an answer I should prefer to have experimental data to go upon. It absolutely suggests itself from my experiments, and you have really put your finger on a very important point. Although one might express an opinion, and that opinion might be correct, it is a matter of such extreme importance that it should be investigated.

15,885. You see my point?—I see your point clearly.

15,886. If we could not get rid of turpentine, but we saw our way to modify the amount of lead in the turpentine vapour which possibly produces the transient and not marked pathological effects, it would be an advantage?—Yes.

15,887. The presence of lead is a large element in the danger?—I think it is, no doubt.

15,888. I quite grant that we want further light on that point?—Yes, I am absolutely in agreement. That is why it strikes me as being a matter of some importance to ascertain whether if the paint, say, be limited to a content of 5 per cent. of soluble lead, as is adopted for glazes, that quantity of lead may be just sufficient in the presence of turpentine to cause disease. I think that is a matter that the Committee would want further evidence on.

15,889. You cannot take the percentage quite as a safe percentage, but an increased percentage is more likely to cause illness?—My point is whether 5 per cent. is a minimal dose.

15,890. Yes. With 5 per cent. there would be a material gain, but whether we should have got to the minimal point is another thing?—Yes.

15,891. It might be necessary to drop below it?—Yes, from the point of view that we are discussing.

15,892. The whole thing requires further light thrown upon it?—It requires further light thrown upon it.

15,893. I only want to get clearly before the Committee the line which such inquiry should take?—Yes.

15,894. (Chairman.) I hope that your experiments may be made comparable with the conditions under which working men come into contact with the risk of breathing lead dust, if it is possible?—That should be done in the way of cutting down the exposure of the animal to such a limit that it will not be exposed to more dust, within reason, than might be expected to be met by a painter. That can be done with a new apparatus.

15,895. I notice you say that in some of your experiments you only used 1 milligramme of lead in 10 cubic metres of air, and it produced poisoning?—Yes; for a long-continued time.

15,896. We had the air in some of the coach-builders' rooms tested by Mr. Duckering, and in the dry rubbing-down process it varied from 3 to 1,000 milligrammes per 10 cubic metres?—Estimated as Pb. O.?

15,897. Estimated as Pb. Dr. Kaup quoted, in evidence which he gave before the Committee, amounts of lead in the air varying from 10 up to 250 milligrammes per 10 cubic metres of air?—I follow.

15,898. (Dr. Collie.) Would you allow that there is a point, with regard to vapour of turpentine, below which the body can deal with anything that is inhaled, in the same way that the body can deal with a sub-minimal dose of lead?—I have not had sufficient experience of turpentine poisoning yet to be able to tell. Turpentine is rather different from lead in that way, being a volatile substance. Excretion through the kidneys sets up rapid changes. These animals that have only been exposed for, at the most, four hours, show well-marked tubal nephritis. They are probably excreting a great deal. It looks as if it was highly irritating.

15,899. The animals exposed to the complete paints did not show such acute symptoms?—No, but the amount of turpentine there was presumably much smaller.

15,900. There might be a sub-minimal dose?—There might be a sub-minimal dose. Whether turpentine vapour is a substance that the kidneys could establish a tolerance for or whether they would break down

under small doses, is a thing one could not say without further experiment. It is a very important point.

15,901. (Mr. Sutherland.) Have you made any experiments with fumes from burning off paint?—No, I have not done so. It is a little too dangerous.

15,902. Is that a scientific answer? Do you wish that to go on the minutes?—Certainly; I am afraid it must. The point is this: that in dealing with all fumes you have to heat up your substance, and you have to get off sufficient material.

15,903. Did you understand my question? I meant burning off paint with a torch?—I have not done it.

15,904. You do not regard that as very dangerous?—I do not know. I should find it exceedingly difficult to find any laboratory method of burning off paint which I should consider safe to employ my laboratory assistant at.

15,905. Are you frightened of the explosion of the lamp or the fumes of the lead?—I am frightened of the Employers' Liability Act.

15,906. Do you think, if considerations should arise that should decide this: Committee to recommend regulations and not prohibition of lead, the promulgation of strict regulations would not have a wholesome effect on the operatives engaged in the trade?—I think that it might be possible to devise regulations for practically cutting down the poisoning to nil, and I think that in examining the men from time to time in the way I have suggested you would put your finger on the weak point—on the men who were careless; and also the susceptible people. That is what we have done in the white-lead works. There are certain people who ought not to be employed in a lead trade, because they are susceptible to lead. There are many intercurrent diseases. There are many men with kidney disease, not due to alcohol, but to old rheumatism or scarlet fever. If such a man presented himself at lead works he should not be employed, because he would be dealing with a poison when his tissues are already half-poisoned with something else. I think that much might be done with regard to painting in that way.

15,907. Did you form any idea with regard to the point at which a painted surface ceases to evaporate or throw off turpentine?—No, I have no evidence yet that will give me any information on that point. That is one, I think, that is rather foreshadowed by the sub-minimal dose of turpentine. In attempting to get the evidence in the way that Dr. Collie suggests we should absolutely cover that point, I think.

15,908. It is a common thing for painters to use wet hay. It is supposed to attract the smell. With regard to the size of room that you mentioned when you spoke of the half-pint of turps, I worked it out that if we get a surface of wall, allowing for windows and openings, of 60 square yards, 12 lbs. of paint would cover that with one coat, and of that 12 lbs. of paint 2 lbs. would be turpentine. We should not evaporate half a pint of turpentine out of that?—You are using 2 lbs. of turpentine, and I used 10 ounces, which is equal to half a pint, as the maximum dose. You are using only in your paint for that size room three times as much turpentine as is necessary to saturate the room, so that if you get a third of your turpentine given off from that surface it is sufficient to bring it up to the saturation point that killed my cats.

(Mr. Parsonage.) In the ordinary way the turpentine would be twice the quantity of the oil, and not the minimum quantity.

15,909. (Mr. Sutherland.) For a flatted surface?—That is only for one coat. If you have four coats of paint it would be more.

15,910. It will not evaporate through the coats that you put on it?—The question is whether you get more evaporation from a zinc surface than from a lead surface. I do not know that yet, I think that on the whole there is more evaporation from zinc paint than from lead paint in that way.

15,911. There is more oil?—You get the skin formed over the surface pretty equally with lead paint. The drying with lead paint is much quicker than with zinc paint, so that you have with zinc a longer interval during which turpentine can be given off.

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15,912. (*Mr. Parsonage.*) There is much more turpentine in lead than in zinc paint?—This is a very important point. If you will let me have the figures I can devise the experiments to correspond exactly.

15,913. (*Chairman.*) Perhaps you will give us the comparative amounts of vapour from each process?—Yes.

15,914. (*Mr. Gardner.*) A flatted room would have no oil except what was in the paste lead?—In Switzerland they have noticed turpentine poisoning. Lehmann says that he has noticed paralysis taking place in industries where no white lead was used at all. He describes the possibility of some of the forms of paralysis that are met with in painters as due to turpentine. He points to the fact that bisulphide of carbon produces paralysis by absorption through the skin.

15,915. (*Mr. Parsonage.*) With regard to the different experiments with painted boards, was one board tried without turpentine?—Yes.

15,916. With lead and linseed oil?—Yes.

15,917. Was there any result from that?—No, none at all.

15,918. (*Mr. Mason.*) Do I understand you to say, with regard to the French experiments, that owing to the reagent being unreliable the whole of these experiments are practically valueless?—The ones that rely on Heim's reagent I should regard with the greatest degree of suspicion. I have myself attempted to conduct experiments on their lines with the reagent. I welcomed it to begin with as a solution of many of our laboratory difficulties, but I found the reagent so absolutely unreliable that I was compelled to give it up; I got such discordant results. When I examined the French results, I found that the figures they gave varied within what they admitted was their own experimental error, so they were hardly worth regarding seriously under the circumstances. Curiously enough, the experimental error given in the physiological experiments and that in the chemical experiments show the same variation of at least 60 per cent., and a variation of 60 per cent. is unthinkable. That is in a published document.

15,919. You exposed one animal to turps and lead acetate, which you represent as liquid driers, I understood?—It was given to me as such.

15,920. That consisted mostly of turps. As a result you found that the animal subjected to this stood it twice as long as the cat subjected to turps alone?—Yes.

15,921. Would not you have expected an equally, if not more, pronounced effect from the turpentine plus lead acetate?—Yes, unless the acetate had had some action on the turpentine.

15,922. Would continued exposure to turpentine, even if the amount of turps was rather less than the amount used with the cats, show the same effect on the human system?—Presumably, yes. I have no absolute experiments. Dr. Collis raised that point just now. I have said that we have not sufficient evidence on the minimal dose of turpentine yet; but, in the smallest doses that I have given so far, effect has been produced. I have not yet got a dose of turpentine which will not produce definite changes in the animal's kidneys, and that is a point I have made a note of for further experiment.

15,923. With regard to the bubbling of air through turpentine, producing turpentine drops, would not you get the same effect from brushing paint on a wall?—I do not know how far paint sprays in that way. If you brushed turpentine on alone I suppose you would

get the same effect, but I do not know the quantity of spray given off; say, from stippling in the corner of a cornice. That is a point of considerable importance, of course. The viscosity of oil paint being so great, the question is how far is it given off in that way—whether fine spray is given from the surface, I do not know.

15,924. You say that you would not like your laboratory assistant to try burning off. Do you suggest that he is less immune than the ordinary painter who does this sort of thing every day in his life?—No; I should say he is distinctly more immune than the ordinary painter, because he has already suffered from lead poisoning on two occasions in helping with experiments. He had definite colic when I was doing the experiments.

15,925. If the more volatile constituents of turps as well as dry rubbing could be got rid of, would the lead itself be comparatively innocuous? May I deduce that from what you say?—I think so, as far as I have gone, but it is a mere expression of opinion.

15,926. (*Chairman.*) Is it not a question of what the other dangers are?—Do you mean from painting alone? Splashing, I presume, is included with dry rubbing down. There is no volatile compound, that I have been able to detect, given off from a painted surface, provided that is not disturbed.

15,927. But there may be other operations where dust is generated?—If you can get rid of the dust and the turpentine, you get rid of the poisoning.

15,928. (*Mr. Mason.*) I intended to include all dusty processes?—That is what I thought was meant. If you eliminated all the dust from lead paint, you would still have turpentine poisoning left. If you eliminated that, I think you would have very little poisoning.

15,929. (*Mr. Robins.*) Have you seen much actual painting done, because in the course of a conversation which was not for the shorthand notes you mentioned the manipulating of dry white lead. I would ask if you have really seen the thing accomplished, or is it imagination, because in over 35 years I have never seen a painter yet manipulate dry white lead with his hands. It is always done with the knife?—I saw it absolutely done by a painter, unfortunately. I have seen a good deal of painting one way or another. I am very interested in painting. I have done quite a lot of amateur painting myself.

15,930. I should think it is the exception and not the rule?—I think it is the exception, but it is evidence of extreme carelessness. A painter can create dust from dry white lead; if he has it to deal with, but if he has not got it to deal with he cannot.

15,931. I have seen hundreds of painters, but I have never seen that?—I am not suggesting that it is the usual method.

15,932. Some stress has been laid on the disastrous effects of lead poisoning from the uncleanly habits of the workmen. You will admit, I suppose, that the workman of to-day is more cleanly and intelligent than he was 10 or 15 years ago; how comes it, then, that there is such a large increase of lead poisoning?—Is there a large increase of lead poisoning, or have we better statistics now of poisoning? The only figures we have had to-day show a difference of between 28·6 and 30.

15,933. (*Chairman.*) The statistics show an increase?—There are many factors. Work is on the increase, and I do not know whether men are more or less careless now than they were. Any opinion I might express on the point would be only a pious opinion after all.

The witness withdrew.

## TWENTY-FIFTH DAY.

Thursday, 14th December 1911.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.  
Mr. A. L. C. FELL.

Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*)

Prof. HENRY EDWARD ARMSTRONG, F.R.S.

Evidence to 15,966 handed in and taken as read; witness then called and examined.

15,934. I am a fellow of the Royal Society and Professor of Chemistry at the City and Guilds of London Central Institute. I am the author of several works on chemical subjects. I have recently made an extensive study from the chemical point of view of noxious vapours of turpentine and other similar substances.

15,935. My attention has been directed to a lecture given on "The Toxicity of White Lead" by Professor E. C. C. Baly, of the University of Liverpool, to the Liverpool Section of the Society of Chemical Industry, on 3rd May 1911, a report of which has been published in various trade journals, but which has not yet been published in the journal of the society.

15,936. The purpose of this communication appears to have been to suggest and prove that volatile matter containing lead is given off from white lead paints in drying, and that white lead paint is specially dangerous on this account. Professor Baly proceeded on the assumption that, "If, as painters insisted, some lead compounds were given off in drying white lead paint, there would be absorption of light when light was passed through the vapour into a spectroscope." It was natural that he should make experiments in this way rather than look at the matter as a chemist, because he has devoted his attention almost entirely to spectroscopic work in the past.

15,937. Professor Baly appears to have taken photographs, with the aid of a spectroscope, across the interval provided by tubes 2 feet long coated inside with various mixtures in such a way that any vapour inside the tube could exercise its effect on light on the way to the spectroscope. There was evidence of light being absorbed when the tube was one coated with white lead and linseed oil, but not when either zinc white or "Purex" (basic lead sulphate) was used. These experiments were repeated in various ways, at various temperatures, practically always with the same result.

15,938. Professor Baly's conclusion, therefore, was that the painter, in using white lead paint, is exposing himself to volatile compounds. He then proceeded to make experiments to determine what these compounds were. To this end he distilled white lead—by which I understand he means the paste of white lead and oil used by painters—in various ways, and obtained distillates containing lead.

15,939. The final conclusion Professor Baly arrived at was that a definite volatile lead compound is given off in the drying of white lead paint. He appears to think that this behaviour is peculiar to basic carbonate of lead, and that it is an explanation of the prevalence of lead poisoning among painters using white lead; he further suggests that it may explain the symptoms often exhibited by persons after sleeping in a room recently painted with white lead paint. According to his statements this objection does not apply to "Purex" (basic lead sulphate).

15,940. I have no objection to make to Professor Baly's statement based on spectroscopic evidence that vapour of a volatile compound is given off during the drying of white lead paint—but his experiments prove

nothing more than this. Almost any vapour of an organic substance would produce the effect he observed and recorded in his photographs. It is well known that the drying of white lead paint is attended with a variety of changes likely to give rise to volatile products. Judging from our knowledge of the chemistry of lead, however, it is eminently improbable that these volatile products contain lead.

15,941. But the statement cannot be disregarded that Professor Baly found lead in distillates from white lead. I do not dispute the accuracy of this statement, having made similar observations on repeating his experiments. But I do dispute entirely the inferences he has based on his observations, and deprecate the haste with which, and the evidence on which, he has assumed that volatile lead compounds can be produced, and are actually produced, in practice when white lead paint dries.

15,942. At the outset of my own experiments on this matter, I not only had Professor Baly's results before me, but also observations made at my request by Mr. C. A. Klein, that when steam was passed into a mixture of white lead and oil mixed with lead acetate, a distillate was obtained which contained lead, though when the acetate was not used lead was not present in the distillate.

15,943. I had no difficulty in confirming Mr. Klein's result, and yet I felt that it must not be interpreted as evidence of the volatility of lead compounds or of the formation of a volatile lead compound, long experience having taught me that the difficulty of preventing materials from being carried forward mechanically during distillation with steam (or what engineers call priming) is very great indeed. It has taken me a long time, however, to satisfy myself that I was right. We tried in my laboratory, in all sorts of ways, to prevent spray from being carried forward, and also to prevent liquid from the still creeping along the surfaces of the apparatus leading to the condenser, but to no purpose; we were at last convinced, however, that lead was carried forward mechanically on observing specks to form in places where their presence could not possibly be accounted for in any other way. I then came to the conclusion that spray was being projected forwards and carried forwards, and that perhaps also liquid films were sometimes forced forwards along the surfaces of the apparatus by the eddies and sharp currents set up by the steam in the upper part of the distilling apparatus. This view was confirmed subsequently on using as connecting and condensing tube a length of block-tin tube, nearly half-an-inch in diameter, simply bent at an acute angle about 1 foot above the distilling flask. Very little lead was detected in the distillate when this was substituted for the elaborate glass head (provided with traps) we had used previously when a very sharp current of steam was passed into or generated in the distilling flask; when a moderate current of steam was used, lead could not be detected in the distillate with certainty. Similar results were obtained with white lead and "Purex."

15,944. I had a similar experience a year or two ago in connection with an analytical process in which



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steam is passed into a solution of caustic soda. It was found that soda always passed over, though elaborate precautions were taken by introducing traps to prevent the spray from being carried forward; satisfactory results were obtained only when the simple arrangement above referred to was used. I may also refer to the well-known fact that sea-water spray is carried long distances inland.

15,945. It is to be noted that lead appears in the distillate only when lead acetate is added to the white lead oil paste before passing steam into it. The acetate appears to act in two ways—it seems to emulsify the paste so that this breaks up into fine particles when steam is passed in; but probably the chief reason is that when a solution of lead salt is present fine particles of the liquid are carried forward as spray with the steam.

15,946. The appearance of lead in the distillate when white lead paste is distilled *in vacuo* may be accounted for in the same way. The distillate consists mainly of water mixed with a little volatile oily matter. When the paste is heated the escape of steam and other vapours, with some carbonic acid gas from the heated mass, involves the production of spray, formed by the bursting of bubbles at the liquid surface, and presumably the lead is carried forward in this spray.

15,947. The change which takes place when white lead is heated, involving the escape of water and carbonic acid, cannot occur when zinc white or "Purex" is used, as gas is not given off from these; but even in their case spray may be formed by the bursting of bubbles.

15,948. No such spraying effect or mechanical separation of particles as is observed in distilling white lead paste can occur during the drying of paint under the conditions of ordinary practice, and therefore these experiments have been carried out under much more rigorous conditions than obtain in practice.

15,949. Passing to the consideration of the question of vapours given off from paint in drying, Professor Baly makes the remark: "Everyone is familiar with the characteristic smell of white lead paint when drying upon a newly-painted surface, which is described by painters as the smell of lead. Painters have long ascribed this characteristic smell to lead, and it is noticeable that there is no such smell from zinc white paint."

15,950. Professor Baly has been at no pains to consider how the smell of paint arises. The paint as used contains not only the lead and the oil in which it is ground, but also turpentine, and boiled or raw oil, which are added to reduce the paint to a proper consistency for painting. The smell described as that of paint is merely that of turpentine modified and increased by that of boiled oil, and there can be little doubt that the smell of which people complain when interior painting is done is principally due to that of the turpentine thus modified. Turpentine is a quite volatile substance, and the first stage in the drying of paint is due to the rapid evaporation of the turpentine.

15,951. Turpentine is also used with zinc white, Purex, &c. All paints containing turpentine, therefore, suffer from the same objection that during the earlier stages of drying they give off vapours of this substance which are productive of headache and other symptoms in persons unaccustomed to them. Painters, apparently, are accustomed to turpentine, and are not, as a rule, affected by the vapour; they usually work in rooms with open windows, moreover, so that the effects are minimised.

15,952. Boiled linseed oil has a distinct and characteristic odour. A mixture of white lead and boiled linseed oil, therefore, has a distinct and characteristic smell, but this smell is nothing like so strong as that of paint proper containing turpentine, and is not productive, I believe, of headache or similar effects.

15,953. A paste of white lead and unboiled oil has a smell similar to but much fainter than that of paste containing boiled oil; in some way the white lead appears to promote changes in the unboiled oil, but these also take place in the unboiled oil alone on exposure to air, though less rapidly than when it is mixed with white lead.

15,954. The smell of a mixture of lead sulphate (oxysulphate; Purex, &c.) with unboiled oil, or of zinc white with unboiled oil, is faint in comparison with that of the white lead mixture, because these substances do not promote changes in the oil to the same extent, if at all, that white lead does. It is well known that when white lead is mixed with linseed oil, especially boiled linseed oil, a product is obtained which dries more readily than any other paint; this is doubtless due to some change which does not take place with an equal degree of readiness, or to an equal extent, when other substances are used in place of white lead; it is on this account that white lead is of such special value. But the changing substance is known to be the oil, and the volatile substances which produce the smell are, I fully believe, nothing more than products from the oil. There has never been reason to suppose that they emanate from the lead, or contain lead. The function of the lead compound is to promote change in the oil, the mixture of lead and oil being one which dries well, and at the same time gives off the vapours which are characteristic of the changes taking place when an oil or paint dries.

15,955. The test used by Professor Baly as proof of the emission of vapour is very costly and difficult to apply, and not practical. In studying the production of vapours from oils I have applied a far simpler test, which anyone can use, and which, moreover, has the great merit that it is a physiological test. In other words, it is one in which the effect observed is that of the vapours on living material, and is therefore akin to that which is produced on the human subject.

15,956. I expose leaves of the ordinary spotted Japanese Laurel or aucuba over the substance to be tested. If vapour be given off which is capable of diffusing through the cell walls, the leaf turns black. This behaviour of the lead has been fully discussed by me in a recent communication to the Royal Society.\* When the leaves are put into a bottle together with a few drops of turpentine, blackening is soon noticeable, especially if the temperature be at all high and approaching blood heat. At this last temperature the leaf is often completely blackened within an hour or so, some effect being visible after very few minutes. The vapour of turpentine is therefore very active in causing what may be termed physiological breakdown within the leaf.

15,957. The leaves may be exposed alone or over water, often during many weeks, without blackening.

15,958. To test the effect in the absence of turpentine three different purchased samples—bought retail in London, genuine in quality—of white lead mixed with oil were put into separate jars with fresh leaves. No change was apparent within 24 hours at room temperatures. The bottles were then kept in a heated chamber at about blood heat; the leaves in all three jars were entirely black after a further interval of about two days, which was clear proof that a volatile substance was given off from each mixture. The leaves were removed and strips of moistened filter paper substituted for them. After six days the papers were tested with sulphuretted hydrogen, but no lead could be detected. Had a volatile lead compound been formed, it is to be supposed that it would have been indicated.

15,959. Jars were then charged with the following:—

1. Linseed oil (the linseed oil used throughout was the best Baltic oil).
  2. Linseed oil and white lead.
  3. Linseed oil and sublimed lead (basic lead sulphate of French manufacture).
  4. Linseed oil and lithopone.
  5. Linseed oil and barytes (natural).
  6. Linseed oil and zinc oxide (free from lead).
- (These pigments had been analysed and all found to be of the best quality.)

15,960. No visible effect was produced during a day at room temperatures, but after two days' exposure at

\* Proceedings of the Royal Society, 1910. Series B, vol. 82, p. 588. See also "Annals of Botany," April 1911, vol. 25, p. 507.

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blood heat the leaves over the white lead and basic sulphate mixture were black; signs of blackening here and there were obvious on all the other leaves except that over linseed oil alone. After two days' further exposure all the leaves were blackened to a considerable extent, except that over linseed oil alone. When leaves were exposed over a similar series of mixtures containing turpentine in addition they were blackened considerably within an hour, showing that all paints made up with turpentine give off vapour readily.

15,961. Mixtures of linseed oil with "Purex," with lime, with baryta, with various commercial driers (including manganese driers) all affected the leaves after more or less prolonged intervals, and even linseed oil alone eventually blackened the leaves.

15,962. After making a great number of experiments such as described, I am convinced that the production of vapour is in no sense special to mixtures of white lead and linseed oil such as are used as paints, but that lead and zinc compounds generally, indeed almost all the various finely divided substances that are mixed with the oil to form paints, have the property of more or less hastening the change, whatever it may be, which takes place in linseed oil on exposure to moist air. Nor is linseed oil peculiar in this. Sunflower oil, crude and refined soya bean oil, menhaden oil, and even olive oil, exposed with white lead, give off vapours moderately rapidly; castor and china-wood oils seem to be much more slowly affected. But I imagine that much depends on the age and purity of the oil. I feel sure, however, that any oil that will dry and can therefore be used in paint will be found to give volatile products as it dries.

15,963. Proof that volatile matter is given off from oils on exposure to air is also obtained when they are placed in open dishes over oil of vitriol in a closed chamber. The colourless oil of vitriol gradually becomes coloured by the vapour.

#### Conclusions.

15,964. The conclusions to which I have arrived are that there is no reason whatever to import any new element of danger into the consideration of the question of paints. Lead paints are to be objected to only in the sense that they may enter into the system through careless handling or in the form of dust such as is produced by rubbing down old paint. There is no reason to suppose that the vapours given off during the drying of the oil are objectionable under ordinary conditions, and further, they are not found to contain lead; they are products formed during the drying and oxidation of oil, and are produced entirely from that source.

15,965. The rate at which vapours are produced (not the total amount) is determined by the rate of drying. Lead paints dry more rapidly than others—the presence of vapours can be detected in less time when lead paint is examined than in other cases.

15,966. The vapours from oil are produced so slowly and in such small quantity that ordinary ventilation is bound to remove them. Turpentine undoubtedly produces marked effects, but the workers seem to grow accustomed to these, and they are transient; moreover they are easily guarded against.

15,967. (*Chairman.*) I note that your proof is largely devoted to criticism of Dr. Baly. Have you been in touch with him, and are you fully acquainted with the methods he used?—I have not been in communication with him in regard to this, but I am fully aware of the methods he used, because a few months ago I was up at Liverpool and saw the apparatus, and I know it from when he was using it in London.

15,968. We have had opinions like yours expressed to us by Mr. Goadby, who said he differed also from the results found by M. J. L. Breton, Dr. Heim, M. Hébert, and Dr. Marie?—Those are with reference to the physiological effects, are they not?

15,969. Yes. Do you think that the various tests used should be very carefully criticised?—Certainly.

15,970. We, of course, cannot enter into polemics between different chemical experts. Would it not be as well to ask the principal chemist of the Govern-

ment laboratory to express an opinion of the various tests which have been used, and to estimate the scientific value of the deductions based upon the different experiments?—Yes. I should see no objection to that whatever.

15,971. You found a material difference in the behaviour of white lead in your experiments, according as lead acetate was or was not present in the white lead?—With regard to lead being carried forward in currents of steam, yes; but not in other respects.

15,972. Is acetate of lead not generally present in white lead as used by a painter?—In some cases it is; and in some cases care is taken to remove it. It is there in small quantity, much smaller quantities than we had present, I think, in our experiments.

15,973. Is acetate of lead, known as sugar of lead, frequently contained in liquid driers as sold to painters?—I do not know enough of the composition of driers to say that, but it is quite likely.

15,974. Your conclusion as to lead particles being carried over in your experiments, was that the detachment from the painted surface was purely mechanical?

—Yes. I want to emphasise that point very strongly, because Professor Baly states that there is a volatile lead compound, not a substance which is carried forward mechanically in any way. There is no mechanical action possible in his earlier experiments when he took photographs through the vapour. The mechanical action was eliminated, and therefore what we were dealing with when we were passing currents of steam was in a sense eliminated. I have been dealing in the one case with the mechanical carrying forward, and in the other case with volatilisation, but those two require to be distinguished very carefully, I think. I do not for a moment question vapour being given off, but the question between us is as to what that vapour is, whether it contains lead or no.

15,975. Exactly; what is your conclusion?—We say that on no occasion is lead vapour given off.

15,976. But have you confined your determinations to lead vapour?—No, but I mean that our experiments show that, if lead is carried forward, it does not go forward as vapour, but is mechanically carried forward, which is quite a different thing.

15,977. Is there not generally some mechanical detachment from newly painted surfaces?—I should think not. I have been in the habit of observing paint, and painting myself all my life, and I do not see how mechanical detachment is to arise, except, of course, splashing from the brush.

15,978. I was going to ask about splashing?—That might arise if a painter is careless.

15,979. In any case, your evidence would seem to point to considerable danger from fine spray, such as we are told arises (1) in the painting of ceilings with deep moulded designs; and (2) in stippling?—For the moment I do not deny that in so far as concerns mechanical distribution of lead paint, whether at the time of application or at the time of rubbing down, it may occur; but I merely wish to be clear on the point of there being any emanation, anything which would affect people who went into the room after the painting had been done.

15,980. You mean in connection with lead vapour?—Yes.

15,981. Now you say that all paints containing turpentine give off the same vapours. How do you account for the absence of the characteristic lead paint smell when zinc paints are being used with the usual mixture of linseed oil and turpentine?—I think that there is a lead paint smell to some extent, but that lead paint smell seems to arise mainly from this oxidising action which takes place much more readily and rapidly when the lead is present. It is a product of the oxidation of the boiled oil apparently—particularly of boiled oil. It takes place in the case of unboiled oil, but so slowly that you do not perceive it. No paint changes so rapidly as lead paint. It is a question of the rate at which the paint changes, I think.

15,982. You probably are aware that practical painters say that they can tell whether a fresh paint contains lead or not, even in the dark?—It may be.

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15,983. Do you think that that is likely?—I think that that is quite likely—with the expert nose. It is a very good judge of small differences always.

15,984. Would you read paragraph 15,953 of your evidence? I do not understand it?—“A paste of white lead and unboiled oil has a smell similar to but much fainter than that of paste containing boiled oil; in some way the white lead appears to promote changes in the unboiled oil, but these also take place in the unboiled oil alone on exposure to air, though less rapidly than when it is mixed with white lead.” The white lead seems to have a very marked influence in hastening the rate of change, the rate of drying of the paint, and you get the peculiar smell produced to a greater extent on that account apparently.

15,985. Now with regard to the distinction you draw between the behaviour of boiled oil and unboiled oil when used with white lead, have you actual experimental evidence bearing on this point?—I have tried mixtures of the two with white lead, and got quicker effects with boiled oil.

15,986. Both as to smell and drying?—I have not done it with regard to the smell in particular, but with regard to the effect produced as tested by those leaves (*producing some leaves in jars*).

15,987. (*Mr. Sutherland.*) It is a commonplace that boiled oil dries much quicker than raw?—Yes; that is the object of boiling.

15,988. (*Chairman.*) But I understand from the paragraph you read out, that you assert that white lead promotes changes in unboiled oil at a more rapid rate than it does in boiled oil?—No; it is the other way. It is the last sentence that has misled you a little.

15,989. It is not quite clear. I will put it in another way: Do you assert that white lead promotes no change in unboiled oil?—It promotes change, but the change is slower. The boiling has the effect of rendering the oil much more sensitive, much more oxidisable. It is a process of atmospheric oxidation.

15,990. In the paragraph 15,966 of your evidence you say that the dangers of turpentine poisoning are transitory, and easily guarded against. Will you tell us first of all in what way they are transitory?—In the sense that the vapour is absorbed, and easily eliminated from circulation, I think. It is not like lead, which is known to be a solid material, and known to be cumulative in its action. It is known to pass out in the urine.

15,991. You further state that the workers seem to grow accustomed to these smells?—Yes.

15,992. In what way do you mean? Do you mean to say they become immune to the dangers?—They do not notice it, and they grow accustomed to it apparently, and it is very much, as I understand, a question of the individual. I had a painter in the house a fortnight ago, whom I have known all my life, and I asked him whether he ever suffered. He said that he had never had a headache in his life. I know myself that I have had headache at times if I have been exposed to turpentine vapour, but it has passed off very quickly. I had a great deal to do with turpentine a good many years ago. I used to watch all the qualities of turpentine that came into the London market for the chief importer.

15,993. But do you think that, though you yourself were partly immune, as you were not affected, it might be serious to other men?—I do not think it is ever serious. I think, at the worst, you get headache from it.

15,994. Is not that a sign that something is going wrong in the constitution?—It is a slight sign, but it is not necessarily serious. I do not think turpentine, in the quantity that can be inhaled, is to be regarded in any way as a poisonous substance. You see, it is very slightly volatile. You do not get much into the air.

15,995. You would not say that it might seriously impair the constitution, and affect the kidneys, for instance?—No, I do not think so.

15,996. Have you any authority for saying that, or is it only your personal opinion?—That is my personal opinion.

15,997. Perhaps you would not like to give a definite opinion on the question with regard to the physiological side?—No. I know that it has been given in quite large quantities to animals, and has been recovered again in the urine in combination. It does not come out as such, but it comes out in combination.

15,998. You finish up your evidence by saying that the evils of turpentine, whatever they may be, are easily guarded against?—Yes.

15,999. In what way do you mean?—Opening the windows.

16,000. Simply that?—Nothing more.

16,001. I notice that you have brought some test glasses with you. Have you any important point which you can illustrate by those?—I thought that you would like to see the way in which these things are indicated. No doubt you are familiar with this leaf. It is a very common garden shrub (*indicating a leaf*). It is the Japanese spotted laurel, the *aucuba*. That becomes black under the influence of all kinds of vapours which can get into the leaf, and one can use it as a test for comparing the extent to which vapours are given off in this case. The first jar contains a mixture of white lead and linseed oil, unboiled oil. The leaf in that jar has been in there 48 hours at blood heat, and it has been left in an ordinary room since.

16,002. Would you describe what you consider the change in the leaf to be?—You see that almost the whole of the leaf there has become black, showing that there has been very marked action indeed. Now the next jar contains simply oil alone (*producing another sample*). No change is visible after 72 hours at blood heat—against almost complete change in 48 hours when the lead is present. That about illustrates as well as one can illustrate the remarkable effect that the lead has in hastening the change in the oil.

16,003. (*Mr. Sutherland.*) In hastening the oxidation?—In promoting drying; and, in the process of drying, there is volatile matter given off, which acts upon the leaves.

16,004. (*Chairman.*) Do I understand that in neither case is there any turpentine in the mixture?—There is no turpentine there.

16,005. (*Mr. Sutherland.*) Is it raw linseed oil or boiled?—That is unboiled oil. The temperature, you will see, is a little above the ordinary. I have quickened it by putting it at blood heat.

16,006. What do you deduce from that?—It simply illustrates the giving off of vapour from the mixture and shows that the rate of change is hastened by the presence of the lead. Now, the next is a similar vessel containing zinc white and oil as a paste—the same oil as in the other. The change is only just beginning to show there after 72 hours. It is very slight indeed.

16,007. (*Chairman.*) This jar contains zinc white plus unboiled linseed oil?—Yes. There is the same weight in each, but you get a greater bulk of mixture in the case of the zinc white.

16,008. (*Mr. Sutherland.*) Is the lead in that one held in solution?—It is merely mixed with it as though it were paint, but there is rather an excess of oil. If I poured off that, the paint consistency would be more at the bottom you see.

16,009. (*Chairman.*) What deduction do you make from this leaf?—That the zinc oxide has much less influence in promoting the drying. One knows that zinc is not good in that respect. Driers are used with zinc white in order to make the paint dry. Zinc white and oil together do not give a good paint. You have to put in driers.

16,010. (*Mr. Parsonage.*) One has been 48 hours, and the other 72 hours?—Yes. The first was exposed for two days and these for three days. *This is another jar with turpentine in (producing the same)*. I put that in only just before coming down here at half-past 10, and it has begun to blacken. In the course of an hour that leaf would be entirely black. The vapour is given off from the turpentine much more readily.

16,011. What is in that glass besides turpentine?—Nothing but a few drops of turpentine. The leaf is in air, of course, and turpentine.

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16,012. (*Mr. Sutherland.*) The point then is the rate of oxidation?—Yes, very much hastened by the presence of lead, and by the lead oxide apparently in the white lead.

16,013. In the carbonate of lead?—Yes.

16,014. (*Dr. Collis.*) Did you expose any leaf to the influence of oil and manganese driers?—Yes.

16,015. What was the effect of that?—Not quite quite so rapid as with the lead. You get the vapour given off much more rapidly in the presence of driers than when no driers are present.

16,016. I presume that you tried the obvious control of white lead alone without the oil?—Yes. There is not the slightest effect produced with white lead, but there is with oil alone after a considerable interval.

16,017. Are you familiar with the bacteriological experiments, or rather the experiments with growths of bacteria and moulds, which were carried out in France on the same point?—Yes, I have read the account of those.

16,018. Do you consider that this test would be more delicate than theirs?—I think that it is quite as delicate.

16,019. They obtained a retardation of the growths of moulds and microbes with lead carbonate alone, you may remember?—Yes.

16,020. Your test does not show that?—No. Of course that sort of experiment has to be made over and over again to be quite clear.

16,021. Theirs were repeated by three independent observers with three independent forms of organism. I do not know whether one can draw the conclusion that their test is more delicate, in that they obtained a result when working with white lead alone, while your test gives no reaction?—I should like to control those experiments. I am not prepared to accept those results without very careful repetition and study. My own belief is that this method is quite as sensitive. It is altogether remarkably sensitive. If there is a very minute quantity of vapour present, the leaf blackens sooner or later.

16,022. Yes, but the blackening of the leaf after all is not of necessity an indication of the presence or absence of lead in the vapour, is it?—No, not at all. It has nothing to do with it necessarily. A very large number of volatile substances, in fact all volatile substances, produce the effect. It is a test of the presence of a vapour.

16,023. Precisely, but it in no way is an indication of the presence or absence of lead in that vapour?—Certainly not.

16,024. After all, that is the point that we have to consider, or rather one of the points. We quite understand that lead has an action upon oil which zinc does not. I think we understood that before. This demonstrates it in a very pretty way, but I do not think that it has carried us any further on the question of the presence or absence of lead in the vapours which come off?—I do not contend that it does, but if there were a volatile lead compound, that would produce the effect, I contend. Therefore, the absence of any change in the leaf is, to my mind, proof that there is no volatile lead compound there.

16,025. But you do get a change in the leaf when you have the lead and the oil mixed?—Not in the case of lead alone.

16,026. The lead alone could not give an organic vapour, could it?—The proof that there is no volatile lead compound has to be got in other ways. It is not got in this way. Given the production of a vapour, then you have to consider what evidence there is to prove that lead is present in that.

16,027. Exactly, but at present (I hope I do not misunderstand the evidence) we do not seem to have got any nearer the point. We are rather working in a circle. The presence of a vapour coming off from a mixture of lead and oil has been demonstrated to us very prettily, but we are no nearer the point as to what the constitution of that vapour is?—Except that it is not producible from the lead alone.

16,028. But you could not expect an organic vapour from lead alone?—I agree with you there. I do not

suggest for a moment that this test gives evidence of lead, but it is material with regard to the fact, that a great deal of vapour is given off. Professor Baly said that vapour was given off, and that that vapour was the vapour of a lead compound.

16,029. But this does not seem to controvert Professor Baly for a moment?—I do not say that it does. I say that he had no right on that evidence for one moment to assume that it was vapour of a lead compound.

16,030. But he did not assume it on that evidence. He only assumed by his spectroscopic analysis that he had a vapour, and you have demonstrated to us in another way, that it is not given off by zinc and oil. After that he attempted to aspirate the air containing the vapour, and to test it, I believe. At present he is repeating his experiments, and is not prepared as yet to give a definite opinion as to the constitution of that vapour; but it seems that you and Professor Baly are really in substantial agreement?—I agree with him as to there being vapour given off.

16,031. (*Chairman.*) If a vapour, as you assert, does come off, may it not assist in carrying off mechanically some of the lead?—No, not under paint conditions, I think.

16,032. Are you quite sure of that?—Yes, I should say so. You see the difference between my experiments and Professor Baly's is this: that I do not agree with Professor Baly that lead alone gives rise to vapour. I say vapour comes whenever you make a mixture with linseed oil, whether you use zinc-white, lead-white, or any of the other substances, and that the only difference is in the rate at which the vapour is given off.

16,033. (*Dr. Collis.*) But Professor Baly did not maintain that he got a vapour from lead alone?—He does practically. He says that Purex did not give any vapour.

16,034. But it is always lead and oil, or Purex and oil, or zinc and oil?—Yes. I say when mixed with oil.

16,035. Just now you omitted that?—I am speaking of the influence of these various materials upon oil—the behaviour of different paints. Whenever you make a paint, whatever material you use, from linseed oil, then that paint invariably will give off vapour sooner or later: sooner in the case of lead; later in the case of zinc white.

16,036. Pursuing the point further, you are doubtless aware of the work that was done in France on the same point. The French observers, after very careful repetition of their experiments, and after being attacked and criticised, and again repeating their experiments, make the extremely definite statement that they have conclusively shown that vapour containing lead does come off. Have you read those?—Yes, but I am not satisfied that that is the case. I cannot myself find any evidence. I can only say that.

16,037. Do you know Trillat's re-agent?—As a matter of fact, I have forgotten it at the moment. I have not read the subject up recently.

16,038. The whole question of the certainty of the French conclusions turns on Trillat's re-agent, and you would hardly like to criticise the French results without having acquainted yourself with the use of that, would you?—I am simply going on my own experiments. I say that, from my own experiments, I am not satisfied myself that there is any volatile lead compound given off. I am not dealing with theirs.

16,039. But some four or five years ago a scientific work, well known in literature, was published, and surely it is necessary for every scientific observer to acquaint himself with work previously done, to test the old observations to show whether they are correct or not, and to show how his new observations, when they do not agree with the old ones, differ. Otherwise it is hardly a scientific investigation. Possibly both sets of observations are right, but they are done in different ways. One may adopt one process and get a certain result, and you adopt another and get a different result?—I am putting this forward as an especially delicate test for the production of vapour. I am not concerned with the other experiments at all. I do desire to take up that attitude with regard to it. I say I have here a test which I desire to bring under

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your notice as a test that can be applied by anyone at all times, which enables you to satisfy yourself whether there is vapour given off or not.

16,040. (*Chairman.*) You see, the difficulty the Committee are in is this: that you, an eminent authority, have made certain experiments, and you have obtained a certain result; but we bring forward evidence from the French, who have also made experiments by eminent men, in a different way, and they have got a different result. What are we to do?—May I be allowed to see that description to refresh my memory. Have you it here?

16,041. (*Dr. Collis.*) Here is a translation, and here is the original (*handing some papers to the witness*)?—I do not think that that test is in any way a test for lead alone. That would be given by many other substances, and especially by a substance which is undoubtedly produced whenever oxidation takes place by the oxidising agent, peroxide of hydrogen.

16,042. Have you used the test?—Yes, I know the test. It is one of the most sensitive materials known for testing oxidation. You get this coloured matter produced from the colourless material. It is very sensitive, but in no way is it a test for lead. It does not distinguish lead from many other things, more particularly from the thing which is there most undoubtedly whenever oxidation takes place.

16,043. But you see our present position as regards the evidence. The evidence you are giving us to-day, and the beautiful method of demonstration you have shown us for vapour, do not indicate to us, for certain, that there is no lead in the vapour. In the French work published some years ago, on authority, it is definitely stated that there is lead in the vapour, and, failing the repetition of those tests by yourself, so far your evidence has not carried us any further than we were before?—I should get the same result as they did with the vapour, but it is not a test for lead. Their test is not a test for lead.

16,044. (*Chairman.*) That is rather an important point. Would you mind explaining that a little more fully. You say you would get the same results as they did?—I should get the same results as they did if I used their test.

16,045. (*Dr. Collis.*) May I read further from their report? They say: "We have, moreover, varied our arrangement by making the air pass up and down over a white lead paint surface in a large glass bulb, and we have been able to establish in this manner the evolution of lead by using simply the ordinary re-agents, sulphuretted hydrogen or sodium sulphide."—That is a very different statement.

16,046. It is all in the same work?—But that is a very different statement. This is a test for lead; the other is not a test for lead.

16,047. (*Chairman.*) That is only one of their tests. It is not the only one. What do you think of that method of procedure?—That method of procedure is one which is the one recognised test for lead—getting precipitate with sulphuretted hydrogen.

16,048. They assert that, with that experiment, they found lead?—Yes, according to that statement. Then we have to consider whether that might be mechanical or not.

16,049. (*Dr. Collis.*) As they were only drawing air over it, and they give us the rate at which the air was drawn over, which is no greater practically than may occur in any room, we come to the question whether ordinary drying paint may not be carried off in that same mechanical manner—the same small particles (they are looked upon as such) containing lead?—Yes; if that test is properly applied, no doubt that would be so.

16,050. M. Trillat is a chemist of some eminence, is he not?—I cannot say exactly; I do not know.

16,051. He is a professor of the Pasteur Institute; I therefore ask whether he is not a man of some eminence?—Anyone attached to the Pasteur Institute, of course, may be so described, but I do not know him at all. I know nothing of his work apart from having heard of it here.

16,052. You see our position—that, before throwing aside this work that was done in France, for the

Government, with considerable care apparently, and by men of considerable reputation, we want that work to be repeated and refuted?—Yes.

16,053. It stands until it is disproved; and no one who has come before us, up to the present, has attempted to disprove this work, although they tell us they are acquainted with it. They give us their methods of inquiry, which carry us no further than we were before?—I quite agree with you there. That work ought to be repeated very carefully. I have not repeated it at present, and I am not prepared to —

16,054. Any attack on the subject, it seems to me, should take that line, as far as we are concerned. This work seems to me sound (I am speaking for myself) until it is controverted?—I cannot get the result myself, using the method that I have used. That is the only point on which I can speak, of course.

16,055. The report definitely states that these experiments were attacked and repeated time after time in France. Speaking for myself, I should not dream of asking for them to be repeated again; but, for those who are taking the opposite point, I think it necessary for them first to repeat those experiments, and to obtain or not to obtain the results, before asking us to consider that they are not authentic. The report on this point is really a very complete one?—Of course, in all this kind of work there is no doubt that very much depends on the way in which you work. You may have the same result over and over again, and yet the result may be due to some accidental circumstance. I, in the beginning, got lead carried over time after time, and I had a great deal of difficulty in separating out the accidental circumstances, so to speak, and showing myself that there was no lead volatilised that I could detect. In this sort of work, you see, we are dealing with small quantities at the best, and it is very difficult, as I say, to be sure that you are working under conditions which would not give rise to mechanical distribution of the material—very difficult.

16,056. Of course the points on which you differ from Professor Baly I must leave entirely to Professor Baly. It is not for me to take up the cudgels on behalf of anyone else, especially when he himself only professes to be in the middle of the work and has suggested that he be allowed to give further evidence; so that I must leave all those points to him. But there is a further question. On the matter of turpentine, I am rather astonished to hear your expression of opinion that turpentine as a vapour is not a dangerous thing. We consider it to be so, and have done for a long time. Work has been done abroad on the subject as well as at home, and we know that turpentine poisoning is a very serious thing. It does not pass through the body without injuring it?—It depends entirely on the amount. It is just like the case of chloroform. You may give quantities of chloroform which produce very little effect, and of course you may give quantities which produce death. It is all a question of quantity. That is true in the case of any volatile body.

16,057. Do you, as the result of your experiments, think that, if you have paint made with lead, oil and turpentine, and, let us suggest, zinc white, oil and turpentine, the evaporation from the lead paint will be slower or more rapid, or about the same as will occur from the paint made up with zinc?—Evaporation of the turpentine, do you mean?

16,058. Evaporation of anything; evaporation from the paint as a whole?—So far as the turpentine is concerned, I take it the effect would be very nearly the same.

16,059. Is it as the result of experiment that you make that statement?—You cannot make the experiment easily.

16,060. I thought you could, with the leaves?—That does not give you the measure of the quantity.

16,061. It gives the measure of the rapidity with which the leaves change?—Whatever paint you put into those, if it contains turpentine, you will find that it will act very rapidly. It is not so rapid that one cannot distinguish between them, so long as turpentine is present. The remainder of the process, the drying

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of the oil, takes place more rapidly in the presence of lead.

16,062. Could not you retard the action by cooling?—Of course. It is all a question of temperature.

16,063. Would not you then have the opportunity, by retarding the action, of seeing whether there was any difference?—That might be done, if you cooled considerably.

16,064. The point is one, I think, of some importance?—You mean the relative rates of evaporation of turpentine from different paints?

16,065. It would suggest itself to me that, since lead has such a profound action upon linseed oil, and promotes the emanation of vapour when mixed with the oil, that emanation coming off from the surface would assist in carrying off any other volatile substance that is mixed with it, such as turpentine?—That is correct, if the emanation took place at a really measurable rate. The quantities concerned, in my tests with leads, are so small that that does not mean very much in point of quantity. Theoretically you are right, of course; but practically the difference, I take it, would be so slight as to be barely appreciable, if appreciable at all.

16,066. But in practice, it is appreciable. It is the whole question that makes lead paint dry quicker than zinc paint, is it not?—No. It is the thickening and the setting of the oil which makes the difference. It is not the disappearance of the turpentine, which is there merely for thinning.

16,067. But this action that we see demonstrated in your leaf tests, demonstrates the action of the lead upon oil which promotes what is known as "drying," by which I mean oxidation of the oil and the drying of the paint?—But the drying mainly involves the absorption of oxygen and the formation of a solid compound. It does not involve, so far as we know, the emission of much vapour. It is practically impossible to get that. You find a big increase in weight due to oxidation, and you know that something goes off.

16,068. But knowing that something goes off and that oxidation is taking place, is it not reasonable to conclude that the two things have an intimate relation one to the other, and that the chemical change shown in the oxidation is an indication of the emanation of the vapour? Knowing that vapour is given off, the two interchanges, one being the taking up of oxygen, are associated with the evolution of the vapour?—But the amount of vapour given off is probably very small, I contend.

16,069. My point is: have they a direct relation?—The more rapid the oxidation, the more rapid must be the evolution of vapour; if there is vapour given off; but the quantity of vapour, I should say, is so small that it will not materially affect the rate at which the turpentine goes off, which was your point.

16,070. That is my point?—I quite agree with the point theoretically.

16,071. Accepting the point that the amount of emanation given off is too small to hasten the evaporation of the turpentine to any extent, we yet have the point that lead paint does dry over quicker than zinc paint?—Yes, owing to the influence that the lead has on the oil.

16,072. Do you think that there is any indication there that the turpentine may have come off more rapidly or not—either one way or the other?—No, I do not think so, one way or the other.

16,073. Your only suggestion with regard to the method of guarding the worker from the fumes of turpentine when they come off, should they get too much in the air, is a mere question of opening the window?—Yes.

16,074. But that cannot be done where good paint work is being done, because of the dust?—It usually is done; is it not, whenever possible.

16,075. I must leave that to the practical painters, but they assure us to the contrary, and that they are afraid of opening the windows too much, because the dust which comes in settles on the paint and spoils the work?—It appears that you must have some

diluent to thin the paint. Now what will you use in place of turpentine?

16,076. That is not the point, at the moment. I am on the point of its being easily guarded against?—I quite agree, but I want to point out that you must use a substitute, and the substitute will probably have the same effect. All these coal tar oils which are used are more volatile, and, if anything, they have a worse effect.

16,077. (Chairman.) We want to establish whether turpentine is dangerous, and, if we establish that, we must seek for some way to protect the workmen, if possible?—Turpentine being so dear, they would have been glad to substitute something for it if they could.

16,078. (Dr. Collis.) At any rate, the less turpentine in the air, probably, the better for those working in the room?—Yes, it is a question of temperature, of course. You cannot get a very large quantity.

16,079. The paints which contain less turpentine, from the turpentine point of view, are likely to be less troublesome to the workmen than those that contain more?—I do not think that the quantity matters much. It is a question of the time during which the man is exposed to it. If there is turpentine there, it will not make much difference whether you put 10 or 20 parts of turpentine into the paint. The rate at which it was given off would be practically the same. I do not think that the amount of turpentine would make much difference. Using practical quantities—minimum practical quantities—I doubt if it would make much difference what amount of turpentine you had there. It is a question of temperature, just as it does not matter how much water you have present. It is a question of the pressure which the water vapour has, and that depends on the temperature. The quantity of evaporation is independent of the quantity of water.

16,080. But a wall which contains a small amount of moisture, compared with one which is covered with it, will, under similar conditions of warmth and pressure, give off the less amount of vapour?—I think not. If there is beyond a certain amount there which is not held back by the wall—I mean if the wall is really wetted.—

16,081. We come to the point of the amount that is held back. A certain amount of turpentine will be held back by the paint, you agree?—No, I do not think there will be much. I think you will find that the vapour pressure over paint would be practically independent of the amount of turpentine, so long as there is a reasonable proportion there. If I were to put five grammes or ten grammes into two cylinders, it would make no difference to the amount of vapour.

16,082. I quite follow that point when you once get the vapour saturated, but when your vapour is not saturated surely the wall will continue to give up its turpentine to the air, and as long as there is turpentine in the wall it will continue to give it up until the air is saturated, and if there is not enough turpentine in the one paint to saturate the vapour, and there is in the other, you will get more off from one than the other?—You never get that condition in a room, I think. The conditions are very different. It depends on the temperature and on the air current. Turpentine vapour flows very slowly. The amount you would get off would vary very much in practice according to the conditions of temperature and otherwise.

16,083. I quite agree?—I do not think that, as long as the wall is wet with turpentine, as it would be if you applied paint, it would make very much difference—not a practical difference—I agree with you that, theoretically, there might be a small difference, but in practice, I think, if you had turpentine in the paint it would not very much matter. Of course it would be given off over a longer period if you used more.

16,084. That is what I mean. That is obviously the point?—But the painter is subjected to it only during a certain period.

16,085. If a painter is painting that part of this wall, and slowly works round the room, by the time he gets to this side of the room, which may take a practical

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painter a day, it will be a material point to him whether that has ceased to give off any turpentine, because it did not contain much to commence with, or whether, having contained twice as much, it is still giving off turpentine, and the whole room is giving it off instead of half the room?—It would be a question of ventilation. Suppose it were a shut-up room.

16,086. It is not a question of ventilation, surely. You are getting away from my point. I ask whether the amount of turpentine is not a material question in the amount that comes off, given similar conditions?—You are putting the question of increasing the surface, which is a very different thing from increasing the amount of turpentine in the surface.

16,087. I am taking the conditions of practical painting. That wall is painted with paint which contains more or less turpentine. First let us take a small amount of turpentine. That turpentine ceases to be given off, roughly, in half a day or four hours' work. By the time the man comes to this side of the room, which will take him a day, it has ceased to be given off for several hours, the room being closed to keep out the dust. In the second case, with twice the amount of turpentine, the paint is continuing to give off turpentine at the time the man comes round here?—The more turpentine there is the more it comes off.

16,088. It seems an obvious point, does it not?—My point was that if you had two mixtures it would not make much difference to the condition at the moment whether you had twice as much in the one case as in the other. If you accumulate it all in the room, the more you accumulate the more must be there.

16,089. That is the obvious point, but your first answer hardly seemed to agree with that?—I did not think you were putting the obvious point. I thought your question was the immediate influence on the painter of a mixture, according as it contains five or ten parts of turpentine. That was my understanding of your question.

(Dr. Collis.) I am sorry I did not make myself more clear.

16,090. (Mr. Sutherland.) I suppose that laboratory tests deal with small quantities; do they not?—Yes, as a rule.

16,091. And the French tests would be on the same scale in respect of quantity as yours?—You mean they would have made their experiments in the kind of way that we should make ours—yes.

16,092. What do you wish to prove to the Committee from these leaves?—Merely to illustrate the relative rates at which changes takes place with these various paint mixtures.

16,093. Would the rate have been accelerated if the stoppers had been off? Were they off?—No; they were just as they are now, so as to expose the leaves to the vapour that comes off. I do not think that that would make much difference.

16,094. Would it not?—If you had a current of air going over a surface, the change would be more rapid.

16,095. But would not the air go in and out of those?—There is such an excess there that I do not think it makes much difference. Those are not airtight; the air would get in.

16,096. What do you deduce from that, as applied to a painted surface?—That the rate of change would be greater with the lead mixture than with the zinc mixture, if there were no driers used. By adding driers, the zinc is brought up to the same point, about, as the other.

16,097. There is no drier in either of these?—No.

16,098. Merely the pure lead in the oil, and the zinc in the oil?—Yes.

16,099. Do you think that the smells you find in a newly painted room arise from the action of the oxidation of the paint on the air, and do not proceed from the lead?—The first impression you get, I think, is mainly from the turpentine. You get a very strong smell when you go into a newly painted room, if the painting is going on. The more permanent effect is given by the boiled oil and lead, and that is, I think, simply due to the volatile substances, whatever they

are, which come off from the oil during the process of oxidation.

16,100. The most nauseous smell (I think Mr. Parsonage and the other gentlemen will confirm me) is from boiled oil and lead paint that has been locked up in a workshop on a job. When you go in there first thing in the morning, the effect of that is very offensive and sickening?—There has been an accumulation of product, I take it, in that case.

16,101. Yes. Does the fact that all paint gathers weight when it is applied to a surface in the first period, and some paint loses weight in the second period, and sometimes regains it in the third period, prove that, in the first instance, at all events, the paint is absorbing rather than emitting?—Both may be going on, you see, simultaneously. It is a question of difference. You have something given off, and you have more absorbed, and therefore you get increase of weight.

16,102. You know Professor Baly's lecture that he delivered at Liverpool?—Yes, so far as it is in the "Oil and Colour Trade Journal."

16,103. It practically covered the ground, I think, of his evidence here.

16,104. When he was here he expressly guarded himself from definite conclusions on the subject; so we cannot really deduce anything serious from either the lecture or his evidence in relation to the emanation of lead?—His evidence is rather definite, is it not, in concluding that lead is given off? His statement in the lecture is conclusive, is it not?

16,105. Yes, but he guarded himself here by saying that he would not stake his reputation on it. It is your definite opinion, professor, that lead paint does not give off an emanation of lead?—So far as I am able to detect it at present.

16,106. (Chairman.) You mean as far as your experiments have gone at present?—Yes; I cannot go beyond that.

16,107. (Mr. Sutherland.) So far as your own tests are concerned?—So far as my own tests and so far as my knowledge of lead compounds go. It is a new thing for us to be told that there are volatile lead compounds producible under conditions of this kind, apart from other statements that we have had. It is in connection with this whole paint inquiry that the suggestion of volatile lead compounds has been brought forward.

16,108. (Mr. Parsonage.) Have you tried turpentine and lead in a jar with leaves?—You cannot distinguish the difference.

16,109. It has the same effect as turpentine only?—But it would make no difference whether you had turpentine and lead or turpentine alone. You get the effect of turpentine, and one cannot distinguish by this test any difference between turpentine alone and turpentine plus lead.

16,110. You have not tried turpentine and lead?—Yes; I have made mixtures of the two. You get the same turpentine effect.

16,111. No effect from the lead?—One cannot say. The test does not enable you to draw any distinction.

16,112. Have the turpentine and the lead mixed together not had any effect on the leaf at all?—Yes. Whenever turpentine is present, whatever it is mixed with, it is always a volatile substance which comes off and affects the leaf.

16,113. But the effect of turpentine and lead mixed is no more than the effect of turpentine by itself?—So far as that test enables you to distinguish, it is not, but I do not contend that that test would enable one to distinguish in such a case as that.

16,114. (Mr. Sutherland.) Lead and turpentine in combination do not produce the conditions that lead and oil do?—No. Taking the materials alone, oil alone produces no effect, lead alone produces no effect, turpentine alone produces a big effect and a still bigger effect when mixed with something else, whatever it is mixed with: and you cannot say that what it is mixed with influences it.

16,115. Oil itself has no effect on the leaf?—No.

16,116. The oil mixed with the lead has a great effect?—Yes.

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16,117. Would not that mean that the oil was setting the lead compound free, and that was the reason of the discolouration of the leaf, not the oil, but something in the lead that was set free by the mixture of the oil with it?—It might be, of course, assuming that lead did volatilise, but that experiment simply shows that there is a production of vapour from the mixture. It does not show you what it is from, except that it is from the mixture. Neither alone gives the result. The mixture gives it.

16,118. You would not assume that the discolouration was caused by anything that came from the oil?—I do assume that, because I have no evidence of lead being there.

16,119. Is it not more reasonable to assume that it arises from the mixture of oil with the lead, and that it was the setting free of volatile compounds in the lead, rather than that the action of the lead on the oil was causing it?—No; it is quite the other way. Driers and oil give just the effect without any lead.

16,120. What driers?—Manganese driers.

16,121. Containing no lead whatever?—No lead whatever.

16,122. Would that have exactly the same effect on the leaf?—Yes, plus the oil. The oil changes and dries. You do not need the lead to get the oil to dry if you have the driers there. You may have a neutral substance, sand or chalk.

16,123. (Mr. Sutherland.) Does not that prove that it is the oxidation that is taking place that affects the change on the leaf?—It is the products of the oxidation of the oil which produce the change.

16,124. (Mr. Parsonage.) Linseed oil mixed with whiting, say, would have the same effect on the leaf that the lead and oil would have?—Yes, with driers. Without driers you can get the action from the oil alone if you wait long enough. The oil will oxidise even when left to itself, but very slowly. All these things hasten the rate of oxidation very much.

16,125. (Mr. Sutherland.) Even the zinc, as I understand you, slowly oxidises?—Zinc sometimes, in one or two cases, acts almost as rapidly as lead. I have known that. It may be a matter of a small difference in the oil. You do not know what it is. Something promotes the oxidation. It may be a little manganese. Anything that promotes the oxidation of the oil produces the effect.

16,126. (Mr. Parsonage.) Would that lead and oil, and the zinc and oil, be mixed in exactly the same way?—Yes; they were just rubbed up together.

16,127. The oil in these jars is separated from the lead, but it is not separated from the zinc?—There is known to be that difference, of course. Lead is a very heavy substance. There is too much oil there. The oil was adjusted to give a paste with the zinc, and the same quantity was taken with the same weight of lead.

16,128. The oil mixes more readily with the zinc than it does with the lead?—It takes a larger quantity of oil to get your paste.

16,129. But does the oil mix more readily with zinc than with lead?—I do not think so. It is held in suspension better in the case of the zinc. In that sense it mixes more readily.

16,130. It is held in suspension better?—Yes.

16,131. The two substances really keep together better?—Yes, that is the expression; they keep together better.

16,132. Now you know that boiled oil is very little used for interior work?—Yes.

16,133. In fact, the main constituent is turpentine more than oil?—You use a very thin paint for interior work as compared with the other, of course.

16,134. With regard to working in rooms, painting, you could not reasonably work in a room and have the windows open to admit currents of air?—I have seen it done often in my own house.

16,135. But it is not generally done, and in many cases it would not answer on the work. For instance, if you painted that wall, and had that window open, and were flattening that wall, you would spoil the whole thing because of the air from the window?—Yes.

16,136. In your evidence you said that the windows should be open?—I know perfectly well that for flattening you have to avoid currents of air. I know that it is a very delicate business to flat a large surface properly.

16,137. My point was this: in flattening, it is turpentine, and practically all turpentine, that is used. I want to know whether the air has an effect on the turpentine. Would the air blowing on to the wall bring the turpentine more out into the room?—It would hasten the evaporation of the turpentine.

16,138. (Mr. Sutherland.) The opening of the window, do you mean?—Any air current that passed it would have that effect.

16,139. (Mr. Parsonage.) That would mean that there would be more vapour set free?—Yes, if there were a current of air.

16,140. That would make it worse for the painter?—It would depend where it was carried. If you had a current of air, you would probably carry the vapour somewhere.

16,141. If it passed the painter it would be better if you were lucky enough to get it carried past him. It would have to be carried past him to be any good. The effect of air being admitted would not make it any better for the painter if the air only set more vapour free?—No, but as a matter of practical experience one knows that that does not amount to much. I have been in rooms over and over again with painting going on, and I know that it does not amount to anything serious on the average.

(Mr. Parsonage.) It would have a marked effect on the surface in some way or another, and if the result of that is that it sets the vapour free it is worse for the painter.

16,142. (Mr. Gardner.) In your conclusions you say that turpentine undoubtedly produces a marked effect. As there are a great many substitutes, petrol and naphtha, used in the trade, would not these produce much more marked effects?—Some may. I do not think that there will be very much difference, because you would probably select material of about the same degree of volatility, whatever is used. I take it that it would not differ very much from turpentine in its physical properties, and there would not be very much difference. Some few of the benzine things are distinctly likely to be more dangerous, and some would be less dangerous, than the turpentine. I should think that, on the average, it would make very little difference.

16,143. Naphtha, for instance?—Naphtha is not good, it does not mix well, petroleum naphtha does not. Coal tar naphtha mixes well, and that would certainly be about as bad as the turpentine. If you could use petroleum naphtha it would not be quite so bad, but practically you cannot use much of it.

16,144. I did not quite understand your answer to Dr. Collis with regard to the amount of turpentine vapour which would be set free in a room. Am I to take it that you mean, no matter the quantity of turpentine in the paint, only the same amount of vapour will be given off in a certain period of time? If I took a paint made up with three parts oil and one part turpentine, and another paint with no oil but four parts turpentine, would there be much more vapour given off from the second paint than from the first?—There would be more. I think that that was made clear by Dr. Collis. On the other hand, there being more in the room to come off, you will get more off.

16,145. There would be much more, at any rate?—I do not think, if you compare the rates of evaporation from two equal surfaces under equal conditions, the amount originally present would make much difference; but if you have more in that paint and apply more to the wall there must be more coming into the room.

16,146. (Mr. Fell.) I want to know whether, if you had two surfaces painted, one with lead and the other with zinc, with those mixtures, and you made the zinc dry as quickly as the lead, you would get the same effect of vapour given off?—I imagine that the change would be very much of the same order, but those are



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matters we can only give an opinion about, because they are so very complicated. We do not know what the changes are in the least.

16,147. Do you think that it would be possible to practically reproduce these experiments with actual painted surfaces, so that you could tell what the effect was?—In what sense reproduce them?

16,148. I mean a board painted with lead and with zinc, endeavouring to get the effect under actual working conditions?—Tested by what means do you mean?

16,149. Tested in a confined place like you are testing them in the jars?—Yes, you could do that. It would be possible to build a box, say a foot square, and paint the bottom foot of it and test. You could do that.

16,150. We want to demonstrate whether there is any difference really if you use zinc white instead of white lead?—That can be done in that sort of way. It is all a question of the character of the mixture that is made; but I imagine that the quantities given off in these extreme cases, after all, are so small that, apart from the turpentine effect, the effect is not considerable.

16,151. Would the temperature of the room affect the rate of the giving off of this gas?—Yes; the higher the temperature the more rapid the action.

16,152. (*Mr. Mason.*) I did not understand your answer, professor, to Mr. Fell's first question. I understood from what you had previously said that, if you made a paint composed of zinc and manganese with oil, and a paint with lead and oil which would dry equally rapidly, it would have the same effect upon the leaf. Is not that so?—Yes.

16,153. Could that not easily be proved by your apparatus?—You have of course to adjust, first of all, so that you get equal rates of drying. If you do that, I have no doubt that you could do it quite easily.

16,154. I understood you to say that it was simply a matter of opinion as to whether it would affect the leaf?—No.

16,155. Then I misunderstood your answer?—I said it was a matter of opinion as to the changes that went on in the oil. All we know is that the oil changes, that it oxidises, and that volatile things are given off, but what happens to it we do not know.

16,156. Are we to understand that the action on the leaf shows that a similar action would occur on the human system, or a noxious action?—Suppose you take, for instance, blood corpuscles, one knows that they respond in the same kind of way. The things which affect the leaf affect the blood corpuscles, and, therefore, one assumes that. This is an effect on a living material. It is nervous.

16,157. I notice from your evidence that you have made an extensive study, from a chemical point of view, of the noxious vapours from turpentine. Mr. Goadby, in telling us of his experiment, mentioned that fresh turpentine was very much more noxious than turpentine which has stood for some time, and it was suggested that aged turpentine, if I may call it so, would be equally useful to a painter, but less noxious?—I am afraid that that depends entirely on the age, and what you have done with it—what change you have allowed it to undergo. If you allowed it to get oxidised much, it would not be fit for use in paint any longer. But I do not quite know what Mr. Goadby has done. There are certain small quantities of very volatile substances in turpentine which are not turpentine, and those come off quickly, perhaps, and I

expect that that is what he has observed. I expect if we gave him purified turpentine, the pure material, he would not get those differences. I think it is some small quantity of very volatile material there, more volatile than the ordinary turpentine, that he is dealing with.

16,158. Can you suggest what the turpentine might be?—It depends on the kind of tree. Turpentine is a complex mixture. It is not a single substance. It varies according as it is Russian, French, or American. It varies with each. Each oil is different slightly. He has been applying, I think, a very quick delicate test, has he not, which enables him to make a distinction of that kind; but I do not think that it is a distinction to be made with turpentine as used in practice.

16,159. (*Mr. Kinggate.*) With regard to the vapour given off by lead painting, and also by zinc painting, in the drying of lead paint, which dries quicker, would not a larger volume of vapour be given off than there would be in painting with zinc?—Yes, in a given time, if it dried quicker.

16,160. A larger volume?—If it dried quicker.

16,161. Assuming that both vapours were harmful to the worker, would it not be much more harmful to the worker where lead was used than it would where zinc was used?—If there were a practical difference, yes, but it would all depend on the kind of difference.

16,162. In the coach-making trade frequently there is a very high temperature in the shops, and no ventilation, because varnishing is going on in the same shop as the other work, and there is fear of getting dust on it. I take it that drying quickly with lead would have a very injurious effect on the workmen?—I doubt it. It is mainly the volatile turpentine which is given off there, is it not?

16,163. But as it is quicker with lead, and there is a larger amount of turpentine loss with lead than with zinc, would it not necessarily be more harmful to the worker?—There is no doubt, if the change takes place more rapidly, and is given off, then, in so far as the vapours are harmful, it will be more harmful. That is the common-sense conclusion. There is no question about it.

16,164. Seeing that there is more volatile matter in new turpentine, is that one of the essential properties?—In no way.

16,165. (*Mr. Sutherland.*) Are the changes produced on the leaf due to deterioration of the air produced by the oxidation, and not to any emissions?—They are due to volatile substances given off during the drying of the oil and lead mixture.

16,166. Not to withdrawing from the air of certain properties?—No; that has nothing to do with it. It is quite independent of the air. If you put a drop of chloroform in it produces an effect.

16,167. (*Chairman.*) Do you think that it might be easy to remove the most highly volatile portions of the turpentine which, it seems, may possibly also be the most poisonous?—I do not think that that would make any practical difference from what I know of commercial turpentine. I do not think that you could do anything to it which would really essentially modify its properties. You will allow me to report later on on with regard to these experiments which have been referred to?

16,168-9. If you would, we should be very grateful?—I ought to have done it before, but my time has been taken up a good deal with the experiments I have made, and I have not directed myself particularly to that.

The witness withdrew.

## TWENTY-SIXTH DAY.

Wednesday, 17th January 1912.

PRESENT:

LORD HENRY BENTINCK, M.P. (*Acting Chairman*);

Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GAEDNER.  
Mr. J. PARSONAGE.  
Mr. A. L. C. FELL.

Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WEBNER (*Acting Secretary*).

Mr. E. L. COLLIS, M.B. (*in the Chair*).

Mr. A. VILLEMOT.

Evidence to 16,186 handed in and taken as read; witness then called and examined (through an interpreter).

16,170. I am the President of the Colour and Varnish Manufacturers' Association, and I have carried on business in Paris for 40 years. In both my personal and representative capacity I have taken great interest in the questions of the prohibition of the use of white lead, and twice appeared before the French Commission and gave evidence on behalf of my Society.

16,171. As a grinder of colours and colour manufacturer it is immaterial to me whether I make paints with a basis of white lead or of zinc white; in fact, owing to the greater durability of white lead, it is more to my interest to support the use of zinc white. As a practical man, however, I am strongly of opinion that there is at present no effective substitute for white lead paint where the surface to be covered is exposed either to atmospheric variations, to moisture, or to strong sun. I am not an enemy of zinc white. It has its place beside white lead, but cannot replace it. Impartially comparing the two products, I say, as an expert, as follows:—

16,172. White lead is a hydro-carbonate of lead. Its chemical composition varies with the process by which it is manufactured. It is always a neutral body, neither acid nor basic.

16,173. Zinc white is a protoxide of zinc. It is a weak acid, and produces salts with certain metals, e.g., zincate of sodium, or barium, or potassium, &c.

16,174. The two articles are employed in painting as oil pastes, which pastes are delivered to the consumer at about the same consistency.

16,175. White lead paint contains about 10 kilogrammes of oil per 100 kilogrammes. Zinc white paste contains 18 to 22 kilogrammes of oil per 100 kilogrammes of powder.

16,176. In order to use these substances the painter dilutes the paste with linseed oil and essence of turpentine sufficiently to make it run freely from the brush. Both products are easy to use, and a competent workman can obtain with each of them a very good finished surface.

16,177. There is, however, a great difference in the result. First as to covering power, one coat of white lead completely hides the painted surface, but the zinc white allows it to be seen; and to arrive at the same result it is necessary to add a second coat of zinc white. The quantity employed to cover the same surface with a single coat is about equal in weight, but since twice as much zinc white is required to arrive at the same result, one may say that white lead has a covering power of nearly double that of zinc white. This term has been very much misunderstood by those who are not actually acquainted with the products and the trade. I define the meaning of the term as follows:—The covering power of a paint is the capacity, more or less, which that paint has of causing to disappear the surface which is painted and the differences of colour and faults which are found upon the object to be painted. The covering power of an oil paint is measured by the volume of solid matter deposited on the surface. My experience is that in order to cover a black surface I have to employ

75 grammes of dry white lead and 75 grammes of liquid, 65 grammes of zinc white and 35 grammes of liquid, so that there is 10 per cent. less solid matter and 10 per cent. more liquid matter in zinc white, and consequently its capacity is less.

16,178. The difference in covering power is not the only instance of inferiority of zinc white. Oil paints, in drying, transform their components in the following manner:—First, the spirit of turpentine evaporates, leaving a very small deposit of resin, of which the action is secondary. The oil oxidises rapidly and is partially transformed by the white lead or zinc white to linoleate of lead or zinc. These products serve as intermediaries for the oxidation of the oil, oxidising on contact with the air and contracting on contact with the oil, and so on until the complete transformation of the oil into linoline. This linoline is an almost elastic product insoluble in water, turpentine, or benzine.

16,179. The dry paint is then composed of an excess of white lead or zinc white, of linoline and linoleate of lead or zinc, but the linoleate of lead is elastic even though of old manufacture, and the linoleate of zinc is brittle and flakey.

16,180. The excess of zinc white being acid, attacks the linoline little by little and transforms it into powder, which falls and leaves bare the painted surface. The excess of the white lead being neutral has no action, and does not produce the same inconvenience.

16,181. This action of zinc white on the other constituents of the paint is also a grave inconvenience in the preparation of a number of the colours; in fact, the colours prepared with zinc white change very rapidly under the action of the sun, which assists the reactions. Hence the practical impossibility of matching up any portion of the painted surface which may be damaged. This inconvenience does not exist with white lead, and for that reason zinc white should never be employed for painting carriages, naval constructions, or any article where it is absolutely necessary to obtain a durable surface.

16,182. White lead furnishes, with minium, a steam-tight joint, very stable and very easy to use, and this is of considerable importance for contractors, railway companies, &c.

16,183. Zinc white (which has been on the market for upwards of 60 years) is well known to all painters. A very powerful company supplies the greater part of this material, and they have never ceased to make great efforts to increase their clientele. They have neglected no method of pushing their product, and if the consumer persists in using white lead it is because he recognises its qualities; and that it is impossible to employ any substitute for it in many cases.

16,184. While zinc white is said not to be dangerous, white lead is accused of great crimes; but since it has been delivered mixed with oil, it no longer gives off dust or smell, and under ordinary working conditions it offers no danger either to the workman who uses it or to the occupier of the houses where the work is done. The paste, mixed with oil, is now obtained in the factories by the harmless process of grinding the white

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lead whilst wet and mixing with oil. By this process the lead is never dried, but the water is driven out by the assimilation of the oil. Mixed with oil and spirit it cannot have any deleterious action, and in the accusations against white lead I have never found any serious charges which do not apply equally to all paints. The rubbing-down of old paint is very injurious, but since the introduction of potash and caustic soda solution, which completely removes the old painting without dust, one can see that in all paint work, if the workman does not neglect ordinary care, he runs no danger.

16,185. I will go further, and say that the danger presented by metal colours with bases of lead, zinc, or antimony has been very much lessened by the use of white lead in oil, and becomes negligible as soon as they are perfectly dry.

16,186. Finally, I do not think that white lead is so dangerous that its use ought to be prohibited, and my view is that proper regulations strictly enforced are sufficient to protect house painters. Without proper care there is always danger in the manipulation of industrial products, even the most innocent.

16,187. (*Dr. Collis.*) In paragraph 16,170 you state that you gave evidence twice before the French White Lead Commission?—Yes.

16,188. Notwithstanding your evidence, the French Government resolved to prohibit the use of lead. Is that so?—Yes. The law was voted, but it does not come into force until 1915.

16,189. Is it not a proper inference to draw, then, that the French Government had much stronger evidence on the other side?—No, it is not a necessary inference to draw, because the whole of the French agitation was based upon the desirability of suppressing the use of white lead, and not on the existence of another pigment which might take its place—a thing which was never proved.

16,190. We have had another witness from France, who spoke very strongly about the findings of the Commission, but he produced no new evidence. Unless you can lay before us some new facts, it will be impossible to give your personal opinion preference over the decision of the French Government?—As I have already said, the Government decided upon the suppression of the use of white lead, but a delay of five years was given in order that the scientists might during that period find a pigment which might adequately take the place of white lead. Up to the present time nothing has been found.

16,191. We are bound to assume that the French Government was serious in passing the law of 1909 in the form in which it was accepted by both Houses of Parliament. We cannot therefore allow the views of one gentleman, however eminent, to weigh much with us, when he is in opposition to the settled decision of the French Government?—The opinion that I am expressing is not entirely my own. It is also the opinion of all my colleagues in the trade, and also of the *Chambre Syndicale*, of which I am the President.

16,192. You will understand that if we are to go into all the circumstances on which the French Government arrived at their decision, it would be necessary for us to hear the whole of the evidence which was presented to them?—The agitation in France lasted some 10 years, and the interests were considerable, and of an opposing nature. At first it was a personal question; subsequently it became a political question, and then it transformed itself into a question of competition between the various interests. I cannot, of course, go into all the details of the agitation; the hard fact is that lead was suppressed, but nothing was created in its place—no pigment and no factories for the manufacture of a substitute, and so on, and this I can affirm as being the opinion, not only of myself, but of all my colleagues in the trade in France.

16,193. Of course, we are acquainted with the evidence that was presented to the French Government, and the replies that were made on both sides. In the evidence which you have presented to us, which will be printed, you have not introduced, as far as we can see, any new facts, since the closing of the dis-

cussion which finally resulted in the French Government passing the law. If you have any new facts to bring to our notice, we shall be very pleased, and thank you very much for the information which you can give to us, but we cannot open the whole discussion that took place anterior to the passing of the Act?—I would point out that, whilst there are perhaps no new facts, at the time of the agitation the question of the suppression of white lead was taken up by a number of politicians. At the present time there is no longer any question whatever of the suppression of white lead in political circles, or indeed in the trade. Everything is going on exactly as if the law had never been passed.

16,194. Then am I right in understanding that you are attending to-day not to present to us new facts, but to present to us the position of those who were in opposition to the French Government when the law of 1909 was passed?—The principal fact in the actual situation is that at the present time, as I have already said, nothing whatever has been done in order to make ready for the enforcement of the law at the beginning of 1915, which means that the Government will not be able to put it into operation when that time comes.

16,195. Then, except for the fact that in your opinion nothing further has been done to enable the carrying out of the law which comes into force in 1915, no new facts have transpired to your knowledge on the white-lead question?—No, there are no new facts. I simply repeat what I have already said.

16,196. (*Mr. Sutherland.*) You speak, from a long personal knowledge, both of lead and zinc?—Yes, from an experience of 50 years.

16,197. It is immaterial to you as a colour grinder whether you grind lead or zinc?—Yes; I am indifferent. We can prepare either the one or the other without inconvenience to ourselves or our customers.

16,198. Your judgment is not affected by the decision of the French Government to prohibit white lead?—No. It is based entirely on practice.

16,199. The decision of the French Government was arrived at, not on the merits of zinc as compared with white lead, but on purely humanitarian grounds?—It was principally based upon the question of the health of the workmen.

16,200. That is on humanitarian grounds?—Yes.

16,201. Your opinion as a manufacturer is sustained by most of the colour manufacturers and the master painters in France, is it not?—Yes. White lead is not only cheaper, but is more easy to apply, and the same amount of work can be done with it in a shorter time. In addition, work with white lead lasts much longer, and the workman who applies it need not necessarily be a specially clever workman; he need not have any special knowledge; whereas with zinc oxide a workman of the same calibre would do poor work.

16,202-3. Do you mean to imply that to use zinc oxide successfully, special knowledge is required in the ordinary painter?—What is necessary is more practice, a longer experience of it. All cannot do it.

16,204-5. The Chairman asked you if you had any new fact to bring before us since the decision of the Government to prohibit white lead. Now is there any new fact? Is it possible for any new fact to transpire in reference to a substitute for white lead?—Besides zinc oxide, lithopone has come, and also pure sulphide of zinc.

16,206. That is not since the prohibition?—No. Possibly some compound of zinc might in future be found, which would take the place of carbonate of lead, but I cannot say. But one of the unfortunate sides to the question, as decided by the French Government, is to be found in the fact that it brought about a number of trials on the part of manufacturers to manufacture substitutes. Three factories, for instance, were established for the manufacture of lithopone, with a capital of three million francs, and three factories were also established for the manufacture of oxide of zinc; and all these institutions have gone into liquidation.

16,207. That is since the report of the Government, is it not?—Yes, since the adoption of the law.

16,208. Is it true that white lead is still largely used by the Government departments in France?—

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The Government has forbidden the use of white lead in the Marine Department and other departments, and in addition has recommended the railways to give up its use; but all have been obliged to come back to the use of white lead and red lead—not generally, but in certain cases—just as in ordinary painting in France at the present day, white lead is used generally, and zinc oxide for certain special work.

16,209. May we take it that the latter part of your statement qualifies the first part. You said that the Government were not using it generally, whereas you say that the trade are using it generally in domestic work, qualified by the special use of zinc white for interior work?—That is so. I would point out as an illustration that in the painting of ships of war, the engineers have the custom of using white lead and red lead in all parts which are difficult of access, whilst using zinc oxide and oxide of iron for those parts which can be easily got at, and consequently can be re-done more easily.

16,210. That points, does it not, to this: that where they want permanency and stability, they use lead; but where they have good access, and the painting can be easily renewed, they use zinc oxide or oxide of iron?—Yes, and red lead.

16,211. Do you know the practice of the Maison le Claire?—Yes, the Le Claire firm uses probably only zinc oxide.

16,212. How is it that they have solved the question? If they have succeeded in using zinc oxide only, how is it that other firms have not been able to do so?—The Maison le Claire has a clientèle quite special. It only does work of the very highest class, which, of course, is well paid. Their workmen are selected workmen who only use zinc oxide, and therefore are well qualified to apply it. But this could not be done in the general mass of work which is paid at lower rates—the ordinary competitive rates.

16,213. The Maison le Claire still use red lead, do they not?—Yes, but only in small quantities, because they do principally work on buildings, whereas red lead is chiefly used for iron.

16,214. Then may we take it that their experience, being special, does not justify the use of zinc for general painting?—No, and much less, because the quantity of zinc which would be necessary does not exist. If England suppressed the use of white lead, it must be remembered that, whereas in France the consumption of white lead is something like 20,000 tons, in England it would be about 100,000 tons: that is including export; and there are no factories, and there are not sufficient men with the actual knowledge to produce the quantity of zinc oxide that would be necessary to replace it.

16,215. (*Dr. Collins.*) Do you mean import into England, or export of white lead out?—Imports into England from other countries. The price has already gone up very considerably. It has gone up by 10 per cent., and in the presence of any diminution of its use, it would go up 20, 30, or 40 per cent.

16,216. I gather from your statement that there is no visible source of supply of the manufactured zinc sufficient to meet the demands even of France, if white lead was prohibited?—Up to the present, no. We are at the present time dependent on the New Jersey Company, which scarcely suffices, even at the present time, when the demand for zinc oxide is relatively restricted. We have the Veille Montagne Company in France and the Rocour firm in Holland, but these firms only produce a relatively minimum quantity, which under present conditions could not be sufficiently expanded to meet an entire-replacing of white lead.

16,217. Is it your opinion that the law will not be enforced at the end of 1914 in France?—In order that it may be put into operation it is necessary by a fairy enchantment or some such method, for a number of factories to suddenly spring up. I ought perhaps to say that there are at present two small shops for the manufacture of zinc oxide, one in France and one in Tunis, but they have been in existence for some considerable time, and their output is much too small to affect the market in any way.

16,218. (*Mr. Gardner.*) When you speak in paragraph 16,171 of being a practical man, I presume you mean practical as a manufacturer, not as a house painter?—As a merchant, a commercial man who has relations both with the producers of the various materials and the actual users. I might perhaps take this opportunity to mention that I myself manufacture white lead to a small extent, and certain colours, but I am principally a merchant.

16,219. Your practice is as a maker, not as a user?—I am a merchant, something between the two.

16,220. When you say that the experience of the Maison le Claire with regard to the use of zinc cannot be applied to the general trade of France, you are really giving a personal opinion based on no real practice?—I am not a painter.

16,221. Why did the politicians take up the question of the suppression of white lead in France?—That is an exceedingly difficult thing to reply to, because there are a good many things that everyone knows and that one sees, but which naturally one cannot talk about. It commenced by two political men taking up the question.

16,222. May we not put it that it was because of the evil effects of white lead upon the health of the workmen?—I think that at the commencement of the campaign, the question of the health of the workmen had absolutely nothing to do with it.

16,223. Does it not seem rather strange that politicians should attack a certain material without any tangible reason?—There is a reason, but it is precisely that reason that we cannot say. We can know many things without saying them.

16,224. It is rather singular. Do you think that white lead exerts injurious effects upon the health of the workmen?—Yes. White lead is a poison, but it is not necessary for everybody who uses a poison to poison himself. There is certainly need of precaution, and regulations already exist in France at the present time; such, for instance, as the prohibition of the transport of dry white lead, and the prohibition of dry rubbing down. In addition, every day the workmen use utensils which could be improved, and the various ways in which the workmen can be dangerously affected could be obviated by special precautions. When the regulation is properly enforced lead will be able to be used without inconvenience.

16,225. Then are we to understand that the French Government took action with regard to the use of white lead without having had serious complaints from the workpeople?—The question arose entirely from private initiative, and the condition of the workmen, the number of accidents, and so on, has actually very much improved during a number of years; that is to say, cases of illness.

16,226. (*Mr. Parsonage.*) Did not the French Government have expert evidence that five years would be a reasonable time for a substitute to be found when they fixed the period of five years for the abolition?—The Government had two motives in giving a delay of five years. The first was to give a certain time in which to replace white lead, to transform the factories and so on as might be necessary without having any special point in view. The second was in order to give something in the nature of an indemnity to the manufacturers of white lead. I would repeat what I said before about the six attempts that have been made to manufacture zinc oxide.

16,227. You ascribe the origin of the inquiry into the use of white lead in France to personal motives. How would you explain the fact that the same inquiry has taken place on the continent, in Germany, Austria, and Holland?—The inquiries in the other countries followed, and were originated by the inquiry in France. Owing to the press agitation and the enormous prominence that was given to the whole question during the agitation in France, other countries began to look into the question. Of course a good deal of what was said was very much exaggerated. I would point out that in Belgium the result of the inquiry is regulation; in Germany the result of the inquiry is regulation, and even a recommendation in certain instances of the use

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of white lead. In Austria the use of white lead for interiors only has been forbidden, and so on.

16,228. It is a wonderful thing that the political activities of two men should have led to such great results. There must have been some good ground to go upon before this was started. It seems to have been a fine selection?—Great things have small beginnings, and stupid things very often lead to great results. The manufacturers of white lead at the commencement of the agitation did not thoroughly realise the largeness of the question, and consequently they, without having looked into the matter seriously, thought in general that it did not matter to them much one way or the other, that they could manufacture white lead, or they could manufacture something which should take its place. In general they did not give sufficient thought to the whole question.

16,229. (Mr. Sutherland.) Do you mean the corroders?—The manufacturers. They are not all corroders.

16,230. Are you speaking of manufacturers of paint?—Manufacturers of white lead; I, for instance, am not a corroder; I am a manufacturer. I make a small quantity—say 500 tons a year—of white lead by the chamber process.

16,231. (Mr. Fell.) You stated just now that the French railways had been recommended to give up white lead, but had had to return to it. Can you tell us whether there are any railway carriages at the present time painted with any substitute for lead—zinc white or anything else?—I do not think so. The first coat, the filling is a base of white lead and the other colours, the future colours, so to speak, are also lead colours, that is to say, they contain white lead. My principal reason for saying that I do not think so is that very little railway work is white, and the only reason for using zinc oxide is to get a really good white finish. The filling is done with a base of white lead, because it is necessary to have something with a very good body in order to properly prepare the surface.

16,232. But did the railways never test zinc white in place of lead?—No, as filling, never.

16,233. Are not some of the railways owned by the Government?—Yes. There is one system.

16,234. Can you say why they do not carry out their own recommendations?—In order to comply with the recommendation, they ceased to buy white lead for the purpose of jointing, but not for painting, in which it plays a very unimportant part, because it is mixed with a number of other materials. But I would point out that the law does not affect carriage painting and coach painting at all.

16,235. (Mr. Sutherland.) It is only applicable to buildings?—Yes, it is only applicable to buildings. Coach painting was not brought under the law.

16,236. (Mr. Kinggate.) With regard to the firms that you mentioned that went into liquidation, I understood you to say that three firms were established for the purpose of making zinc oxide, and all went into liquidation. I presume that was not for want of material, but for want of customers?—They only succeeded in producing a very small quantity of zinc oxide of very poor quality. Speaking generally one might say that they went into liquidation before they got to the stage of producing on a reasonable scale a reasonable article.

16,237. But was there any shortage of ore?—No; I do not wish to say by any means that there is a lack of ore. That is not the reason. But take, for instance, the manufacturer in Tunis whom I have already mentioned. The principal interest of the firm being in zinc ore, the manufacture of zinc oxide being a supplementary branch, so to speak, of the firm, and having every facility from the point of view of ore, they only succeeded after a number of years of experiment in producing a small annual quantity of 150 tons, which is grey or black, and they are still continuing to make experiments with a view to the production of a good zinc oxide. The point is, that they are not inconvenienced in any way by the lack of ore.

16,238. But it is impossible, according to that, to produce zinc oxide of a good quality?—No. I mean that it is a question of knowing how to manufacture.

16,239. (Mr. Sutherland.) There is a great difference in ores?—Yes.

16,240. (Mr. Kinggate.) You conveyed that the reason of these companies going into liquidation was the want of material?—No.

16,241. You say that the consumer persists in using white lead because he recognises its qualities, and it is impossible to employ a substitute that will suit many of the house painters in France. Does the old conservative idea exist with many old firms that no substitute can be found, and, therefore, they never attempt to find one or rise one?—Trials have, of course, been made. A large house in Paris, which I do not recollect the name of, went in very heavily for zinc oxide, but found that at the end of four years its lasting properties were over, so far as its protective qualities were concerned. In France the exterior of a house has to be re-done every ten years. It must be done. In this particular case which I was mentioning, the results were negative, because, whilst white lead lasts for ten years, it becomes dirty, and so on. So far as a damp-proof coat is concerned, it keeps to the end of the ten years its preserving property with regard to the wood, or whatever is underneath it, in spite of the fact that it becomes dirty, and so on. But with regard to zinc oxide, they found after four or five years that the work had to be done again.

16,242. Presuming that zinc oxide had a good coat of varnish on it, would it last as well?—The varnish would last for one year, and consequently it would prolong the lasting properties of the zinc oxide for something approaching that time. In other words, the zinc would not be open to the effects of the atmosphere until the varnish had been destroyed; that is to say, as I have said, in about a year's time. From the moment that the varnish began to disintegrate, it would contribute to the disintegration of the zinc oxide paint, and the effect from the point of view of decoration would be very poor.

16,243. We have had before us a master painter from Vienna, who, in reply to questions with regard to painting exterior doors, said that he should never think of using white lead; that zinc white was far preferable, and made a better job on account of its being varnished. Do you agree with that?—No, it is not my opinion at all. The painting of doors—I am speaking of large doors—is a special work, and is of the same nature as carriage work. They are very rarely painted white which is the only case in which I should use zinc oxide, but the filling, the under-coats, would be of white lead. It might be that the finish would be of some such enamel as Ripolin.

16,244. I am not speaking of enamels. There are a number of doors that are painted white, especially in Belgium. If a practical painter makes the statement which I have put to you with regard to using zinc white in place of white lead, what do you say? Suppose that the doors are varnished?—You could, of course, use zinc oxide where work is to be finished with varnish, but the work would not last for more than two or three years.

16,245. With regard to the law of 1909, does that also apply to shipbuilding as well as to house painting?—Only to buildings, not to shipbuilding. Ships use zinc oxide for interiors, and that is indeed the principal employment of zinc oxide in France; but for exteriors they use lead.

16,246. (Mr. Robins.) You, not being a painter, laid great stress upon the fact that there was great difficulty with regard to using zinc white, whereas it is easy to use lead. What ground have you for saying that, you not being a painter?—I have already stated that I have been in constant relations with painters and master painters for half a century. I have heard them discuss these questions; I have seen the work, and I am quite certain that they all have special men for applying zinc oxide.

16,247. Seeing that that is so, and that five years elapse from 1909 to when the law comes into operation, are special classes being held to educate the painters to

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use zinc white when that law comes into force, if it is so difficult?—No, there is nothing of the kind. There is even a great lack of apprentices.

16,248. Knowing the difficulties that exist, or are supposed to exist, with regard to the use of zinc white instead of white lead, no preparation is being made in France for a change?—No. There is great difficulty in France at the present day in obtaining workmen, and master painters have to employ in the season a number of men who know more or less about their work. If only really expert workmen were employed, then the large majority of the work could not be done, because the number would be nothing like sufficient.

16,249. You would not imply by that that the majority of the work done in France is of a shoddy nature, and that there is only a small proportion of expert workmen to do the first-class work, would you?—No, that would not be the case, because in everybody of workmen there are a few really good workmen who finish the work. In regard to the De Claire firm, of which I was speaking a little time back, and in regard to which I said that their workmen were of a very high class, they have a scheme of profit sharing, by which a workman who has been in the employment of the firm for at least five years obtains a certain percentage of the profits every year, and consequently they have, if one might so call it, the *élite* of the workmen in Paris.

16,250. Seeing that no action is taken to educate the workmen, we may take it that this difficulty is not such a great difficulty after all?—I do not follow.

16,251. Seeing that no technical education has been applied to training the painter up to the future use of zinc white, which he will have to use under the new Act, then the difficulty is not so great as has been made out?—In view of the great lack of apprentices, the change from white lead to zinc oxide would have very little effect. The good workman of the present day knows how to apply anything, speaking generally, but the good workman is not in a majority. The majority do not know how to apply a finish to first-class work, and if the law were put into force the work done would be done presumably less well. I may add that if the law is put into force, and zinc oxide only is used after 1915, where 100 workmen are employed at present it would be necessary to employ 125 for the application of zinc.

16,252. (Dr. Collis.) Do you yourself use all the white lead which you manufacture?—I am a merchant.

16,253. Yes, but I understood that you said that you make a certain amount of white lead?—Yes, I manufacture it and sell it to the master painters. I manufacture paint.

16,254. That was not brought out quite plainly. Do you use up in the manufacture of paint all the white lead that you manufacture, or do you sell it as such?—We sell white lead as ground white lead, and we also use a certain part of it for the manufacture of colours.

16,255. Do you sell all your white lead in France?—A small amount we export to the French colonies.

16,256. Has the price of white lead risen at all recently?—Yes; there has recently been a rise equivalent to the rise in the price of lead, which would be about six francs per 100 kilos. The price follows the price of lead.

16,257. In the case of zinc white, has the increase of price followed the increase in the price of zinc?—Not as much as lead, because although a certain amount of it is made from the metal, and that would

follow the price; a good deal is made from the result of galvanising works—bye-products, and so on—and that is obtained much cheaper than the actual metal would be.

16,258. You have suggested that the price of zinc has risen, apparently due to the demand, but you have also said that there has been no alteration whatever in France in the use of white lead and zinc; therefore, it must be due, surely, to the increase of trade, and not the increase of demand?—I might say, to be as brief as possible, that the price of zinc itself has increased from 24*l.* to 28*l.*, but no doubt the increase in the price of zinc oxide has also something to do with an increased demand.

16,259. But you have assured us that there has been no increased demand in France. It cannot be both ways?—Yes, I think it has increased. The consumption of zinc oxide has certainly increased during the last few years, but the consumption of paint, in general, and white lead, has also increased. In other words, the consumption, generally speaking, has increased all round.

16,260. You have not placed before us any figures to show that the increase in the consumption of zinc white is less than the proportionate increase in the consumption of white lead?—It is impossible to give figures, because it is impossible, from my point of view, to say how much of the increased consumption of zinc oxide goes to painting, and how much of it goes to other industries, such as rubber, and so on.

16,261. A certain amount of white lead goes to rubber. Then you have not proved your point when you say that there has been no effort at all, as far as the manufacture of zinc oxide goes, to prepare for the carrying out of the Act of 1909?—In taking the manufacturers of oxide of zinc one by one, you would find that the increase in output is insignificant.

16,262. Figures should be given to support a statement like that. I want to place before you the value of the evidence which you have given to us to-day. It practically is that since the passing of the law nothing has been done in France, and consequently the law will not be able to be carried out. To substantiate that evidence you should place before us figures showing the exact amount of consumption of white lead and white zinc to-day in France. A personal opinion cannot be depended on in such a case?—There are no figures.

16,263. I want to give you the opportunity of substantiating the evidence which you have given us to-day, that is all?—I cannot give figures, but I refer to the fact that in 1910 and 1911, during the painting season, there was an utter lack of zinc oxide, and then also I refer again to attempts which have been made to manufacture zinc oxide, and I mention particularly the firm of Rocour that I mentioned before, saying that they are actually in communication with the Government. They are afraid to put in a large capital, and to make further endeavours to manufacture zinc oxide until they know actually whether the law will be put into force. I cannot bring figures.

16,264. With regard to the value of your evidence on that point, your statements are rather vague. You have nothing further to say?—No.

16,265. (Mr. Parsonage.) You said that there was an utter lack of zinc oxide during the busy painting season?—Yes, a shortage of supply.

16,266. Then there was a greater demand than the supply could meet?—Yes.

The witness withdrew.

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Evidence to 16,277 handed in and taken as read; witness then called and examined (through an interpreter).

16,267. I am a master painter of Cologne employing about 100 hands. As a young man, soon after my apprenticeship to the trade, I had to grind all my lead colours by hand. This would be between the years 1868 and 1872, when the white lead was supplied to us in cakes and we had to grind it down on the stone. A considerable amount of dust was caused in this process,

some of which we no doubt breathed into our lungs, but I was careful always to scrupulously wash, and it was our practice to take a spoonful of sweet oil prior to eating our midday meal.

16,268. I have come across very little lead poisoning among workmen in my long experience. Some years ago, before the new rules came into operation, a work-

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[Continued.]

man would occasionally come and say that he was being treated for colic, but even when the dry white lead was used the cases were few, and nearly always it was the careless workmen who suffered. I personally have never had any lead illness, notwithstanding the very large amount of lead which I have handled.

16,269. The regulations now in force in Germany amply protect the workmen, who are quite well acquainted with all the new requirements. We have to hand each new man a copy of the enclosed book, and the half-yearly medical inspection brings home to them the care which is requisite. We also supply the nail-brushes and towels to workmen who are working at private houses. I think that the printed instructions to the workpeople might be made more simple.

16,270. It is a matter of common knowledge in Germany that since the regulations there has been a notable decrease in lead poisoning, and the figures for lead poisoning among painters collected by Dr. Kaup show more exactly this marked decrease both in the number of cases of lead poisoning and in the days of sickness in respect thereof. In my opinion the decrease is principally due to the prohibition of the dust-producing process of dry rubbing down and to the improved personal cleanliness of the painters.

16,271. No additional factory inspectors have been appointed to superintend the carrying out of the new regulations in this district.

16,272. There is nothing so good as white lead for exterior use. Also, in the interior of a house, where the paint is exposed to moisture or much wear, white lead gives the best results. Even in the highest class of house painting we usually give the first two coats of white lead to rooms, and finish with a coat of zinc white where a pure white colour is required. White lead is liable to go yellow inside, but it has a far greater covering power, and our workmen prefer to use it for the priming coats. In exposed situations, or where durability is of the first importance, zinc white and lithopone require far oftener to be renewed than white lead. Indeed, where the sun has dried out the large quantity of oil in the zinc white, the colour can easily be rubbed off by hand, or is washed off by the rain.

16,273. The inquiries addressed to all users of paint when legislation was in contemplation in Germany in 1903—i.e., to shipbuilders, railway carriage factories, and to master painters—which are published in two volumes of *Gutacliten*, showed a universal opinion that for exterior painting white lead could not be replaced by any other material, and also that it was necessary as a ground colour for interior painting, and that uncleanness was the chief cause of lead poisoning.

16,274. I regard white lead mixed with oil as practically innocuous as a paint. In the preparation of the old surface, however, the rubbing down (whether with pumice or glass paper) should be done wet, and the products removed before they are dry.

16,275. The *Königliche Preussische Eisenbahnverwaltung* issued a circular in September, 1907, prohibiting the use of zinc white, lithopone, &c. for exterior use in consequence of tests which showed that white lead alone was satisfactory for this purpose.

16,276. I agree with the article in the "*Kölnische Zeitung*," of 7th October 1903, written at the time of the regulations for white lead factories, that whilst the easiest course is to prohibit the use of an article which causes industrial poisoning, carried to a logical conclusion this method would affect very many industries besides white lead painting. Taking lead alone, its uses are manifold, and thousands of workers would be breadless if its use was entirely prohibited. There are very many trades, such as printing, electrical accumulator making, &c., where the workmen are liable to lead poisoning, but it has not been suggested that the use of lead should be interdicted in them.

16,277. To summarise my views, I am of opinion that there is no efficient substitute for white lead where the durability of the paint is important, and that so long as it is supplied mixed with oil, and the old paint is rubbed down wet, there is no more danger to the workmen in this industry than there is in many other trades.

16,278. (*Chairman*.) You say in your proof that the new regulations in Germany are amply sufficient for the protection of the workmen?—I think that these regulations are quite sufficient to protect the worker.

16,279. Have you any statistics to bear out this statement?—I have no statistics.

16,280. Dr. Kaup supplied certain statistics of lead poisoning for Berlin and Prussia, based on hospital records. These are necessarily incomplete statistics, but, for what they are worth, they show a very slow rate of improvement; for instance, in the case of Berlin, only 5.5 per cent. per annum, and for the whole of Prussia even less, namely, 3.8 per cent. per annum?—Yes.

16,281. Other tables based on records of sickness insurance fund show a similar improvement?—Yes.

16,282. Under these circumstances, do you still consider the new regulations in Germany amply sufficient for the protection of the worker?—I still think that they are sufficient protection for the workers.

16,283. Do you not consider that lead poisoning need be considered?—Would you make your question more clear? In what way do you mean "need be considered"?

16,284. There was a certain amount of lead poisoning before the regulations. The utmost up to the present that the regulations have done is to reduce that total amount of 5.5 per cent. per annum?—I think that all lead poisoning is due to lack of cleanliness on the part of the workers, apart from regulations.

16,285. Then why do you state that you think that the regulations are sufficient for the protection of the workmen, if they do not protect the workmen?—Personally I do not know of a single case of lead poisoning, and I do not quite see the connection between the lack of cleanliness and the regulations. Since these regulations have been in force, cleanliness amongst painters has very much improved.

16,286. Yes, but Dr. Kaup's figures shows us that 94.5 per cent. of the lead evil still remains after each year of the regulations?—I think that a good many of these cases of lead poisoning may be explained in this way: that the painter feels unwell, goes to the medical man, and says that he has a pain; the medical man inquires, "What is your profession?" and the painter says that he is a painter. Thereupon his pain is pronounced as lead poisoning. I myself have worked in the trade for upwards of 35 years, have handled great quantities of white lead and other paints, and I have never myself suffered, nor have I known of any serious or genuine cases of lead poisoning.

16,287. We have had Dr. Kaup before us, and he has told us how the statistics are biased from a medical point of view?—I have no opinion either way concerning the statistics. I have simply wished to quote my own personal experience.

16,288. How are the German regulations enforced?—By control and by police regulations and industrial inspectors also.

16,289. Do you think that there is necessity for preventing dust, and, if so, how can you do this in house painting?—Does your question refer to inside painting or outside painting, or house painting generally?

16,290. To house painting generally?—I think that the question should necessarily only apply to inside painting, because for outside work no grinding or polishing is ever done—no rubbing-down.

16,291. Do you consider that there is any necessity for preventing dry rubbing down?—I think it very desirable.

16,292. It is prohibited in Germany, is it not?—Yes.

16,293. How is this regulation enforced?—It is contained in the regulations of every business.

16,294. Yes, but what happens if the painter rubs down dry? Who stops him?—There is an organisation amongst the men. They always inform each other of everything that is going on which may be against the regulations.

16,295. Do you know whether anyone has ever been prosecuted for dry rubbing down since the regulations came into force?—No, I do not know of any such case.

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16,296. Does not that suggest that the regulation only exists on paper?—I think that the law is still young, but it is to be carried out very strictly. It has been in force for five years, and during these five years my work has been inspected twice, once by an industrial inspector and once by a police inspector.

16,297. Does that mean that two pieces of work have been inspected in five years?—No, my own private workshop, my central workshop.

16,298. How many times has the work been inspected on the spot, at the houses where it has been done?—It has never been inspected in that way.

16,299. So that as far as you are concerned, the regulations are not enforced, although they be carried out?—It has never been controlled so far, but the men in carrying out the work act as controllers by informing the trade unions in cases of irregularity.

16,300. Is there no danger of a man by so informing his trade union possibly losing his place?—Yes, that is the usual course. The man gives information to the trade union; the trade union informs the authorities, that is the police or the industrial inspector; the employer is fined and the man is dismissed.

16,301. Is that the only way in which the regulations are enforced?—I know of no other method of controlling the enforcement of the regulations.

16,302. Perhaps you cannot speak for others, but as far as you are aware is this the experience of other master painters in Germany?—You could not say that generally. If a man were a very capable worker he might not be dismissed.

16,303. Might not. We have been told by many witnesses that some dry rubbing down is indispensable. Do you agree with that?—I think that it is possible to dispense with dry rubbing down.

16,304. In all cases?—In all cases you can dispense with it.

16,305. After the application of the first coat, how long do you consider it should be left to dry before wet rubbing down is done?—It depends on the composition of the colour, but it may be anything from 12 to 15 hours.

16,306. After the paint has been put on, in from 12 to 15 hours, it can be wet rubbed down with pumice?—Yes.

16,307. The first coat?—With sand-paper, not with pumice. It can be done by sponging down the surface, and then rubbing down with sand-paper. Doing it with pumice is a totally different method.

16,308. If you rub down a sponged surface with sand-paper, is not that something like dry rubbing down? The surface will not keep damp?—No; the surface is continually kept wet. You sponge down a small piece, rub that with sand-paper, and then another small piece, and so on, always sponging down small pieces.

16,309. Is that the way in which it is done, or the way in which you think it should be done?—That is the way in which it is done in the work that I carry out. It is generally known to be carried out everywhere in that way.

16,310. Can you ensure adequate lavatory accommodation being available at every piece of painting work?—Every man on entering the employment is supplied with a basin, towel, nail-brush, and a piece of soap. He is compelled to carry those always with him to any painting work that he does.

16,311. Is hot water always provided?—No; hot water is not provided at all.

16,312. Do you think it practicable that it should be?—I think it impossible.

16,313. Is it always possible in buildings in course of construction to obtain water?—Yes, it is always possible to obtain water, because finished houses are compelled to have water laid on, whilst houses in course of construction are bound to have water present for the work of the masons.

16,314. How do you ensure that the men use their basin, towel and sponge, when they have got the water?—It is the duty of the foreman to look after that.

16,315. Do you ever dismiss the men if they do not use them?—No, they are not dismissed for that. We

simply give them a warning. In cases of disregarding cleanliness, men are dismissed.

16,316. Have you ever had any of your own men dismissed, because they did not wash?—No, I have never, myself, dismissed men for that.

16,317. How many men do you employ?—Between 80 and 100; at present only 80.

16,318. So that during five years, employing 100 men, you have never found the necessity for dismissing any of them for uncleanness?—No, I have never had occasion to dismiss for that.

16,319. In regard to overalls, are these worn regularly?—They must wear special blouses and trousers for the work.

16,320. Do they always wear clean ones?—Yes they are always as clean as possible.

16,321. How often are they washed?—That depends on the nature of the work.

16,322. Who provides them?—The men themselves.

16,323. Do the men have to undertake the washing?—Yes, the men themselves again.

16,324. Has a man ever been dismissed, because he has not carried out the regulation in regard to keeping his overalls clean?—No one has ever been dismissed on that score.

16,325. Do you think that it is possible to enforce regulations of this sort?—I do not think that the regulations can be enforced, but the welfare of the men is considered as far as possible.

16,326. Are not the regulations drawn up in the interests of the welfare of the men?—They are not always observed, but I quite acknowledge that they are drawn up for the welfare of the men.

16,327. And you do not consider that the regulations can be enforced by inspection?—It is impossible to control it by inspection.

16,328. (Dr. Collis.) You understand that if in England it was decided to establish regulations for painting operations, we should make an effort to have the regulations enforced?—I wish to impress upon you that although there is very little control as to the regulations in Germany, as a rule, the regulations are very well carried out, particularly because the men are very keen on their being carried out well, and the trade unions do their best to control it.

16,329. Notwithstanding the fact that the men who give information are dismissed?—I think that this control by the trade unions is carried out very strictly, because the trade unions are very fond of worrying the employers as much as possible, as the larger trade unions are controlled by the Socialist party.

16,330. If a large number of employers of labour in England themselves prefer prohibition of the use of lead to a cumbersome and irksome code of regulations properly enforced, would that cause you to modify your views as to the practicability of establishing such regulations?—I think it impossible to prohibit the use of white lead.

16,331. And you think it also impossible to enforce regulations?—I do not know the English conditions. I think it might be possible in England.

16,332. Are you aware that all the precautions which you advocate are strictly enforced in our Government dockyards, say at Portsmouth?—I do not know anything concerning dockyards, but I think it is essential that the regulations should be carried out.

16,333. Notwithstanding the carrying out of these precautions, the reduction in the number of cases of lead poisoning amongst painters employed in the Government dockyards has been very slow, and the necessity for restricting the use of lead has been recognised?—I think that the reason of the slow reduction of cases of lead poisoning does not lie in the white lead, but in the cleanliness of the workers.

16,334. Is it likely that we should find the workers more cleanly outside the Government dockyards?—I think that it would be very much the same outside the dockyards. They might be, perhaps, a little laxer outside, but the whole result might be the same.

16,335. If it is your contention that cleanliness is the main point, and the men cannot be made cleanly, is not that an additional reason for greatly restricting the



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use of lead, rather than putting on regulations which are not effective?—I think it impossible to do without white lead in my trade, and I think that in time it will be possible to educate the workers up to the necessity of keeping clean, but you cannot force them to do so.

16,336. If it is impossible to use anything but white lead with satisfactory results, how is it that paints which do not contain lead have been successfully used for six or seven years by the Midland Railway Company in England for all their carriages and wagons, and for various shorter periods by other railway companies?—I think it quite possible that they have used it for six or seven years, but I think it unlikely that the paint can have lasted for any length of time, and I would like to know how often the paint has been renewed.

16,337. It is the custom to go over the coaches and carriages for the purpose of re-varnishing and touching up once every year so that they have had ample opportunity of getting experience of how the paint wears?—I think that this proves my contention, because the Midland railway carriages have to be varnished every year, whilst with white lead that would not be necessary.

16,338. It is the custom, whether white lead or any other paint is used?—If there is a varnish coating, it is quite a matter of indifference what material is used below the varnish.

16,339. That would also explain why the Bradford Corporation has been able for several years to use similar paints on their trams, and the Daimler Motor Company and other motor car firms for the whole of the paint work on their cars, and also one of the leading firms of perambulator makers for their body work, and so on?—Yes, that would be the only explanation. I want to point out that even in that case it would be essential to have a ground of white lead, even if there is a lead-free paint used on top.

16,340. That is not usual in the places which I have mentioned?—I use white lead invariably for filling out crevices (for puttying as they call it) and I do not know how it is possible to do without it.

16,341. If lead has such marked advantages as you suggest, for exposed positions, how is it that leadless painting has been successful in the following cases: the Savings Bank buildings in London—painted in 1906, inside and outside with zinc paints, and reported as in excellent condition in 1910, when they became due for repainting; a large number of Post Offices and Sorting Offices in the London district, similarly painted with zinc paints; the top structures of the Orient Steamship Company's liners; the Royal Yacht "Victoria and Albert"; the "Medina," the P. and O. liner, on which their Majesties are at present settling out on their return from the East—these are all painted with zinc white—various gasometers and other ironwork painted with zinc and iron oxide paints; the exterior of the Stock Exchange painted with leadless paints, which are reported by the official architect as very satisfactory?—Firstly, I think that lead would be durable for a much longer period than four years, as given for the Savings Bank from 1906 to 1910.

16,342. But it is the regular custom always to repaint at the end of that period?—In the case of the other instances quoted, I think it highly probable that varnish was used on top of the zinc white paint, and I would like information on the point, whether or not varnish was used in addition to the zinc paint. Also it may be possible that they have not been exposed much to the weather, and I would like to be informed in what way these paints were exposed.

16,343. In the case of the yacht they have been exposed to the weather?—Then they must have been coated with varnish. Have you any information on that point?

16,344. Some were varnished and some were not. I suppose the reply is that it is contrary to your experience?—I cannot very well judge the point without seeing the paint in question. I think it rather peculiar that paint should be covered with varnish in some cases and not be covered in other cases. In my own experience I have never known zinc white to be as durable as white lead. For interior work I frequently

give a grounding of white lead, and then put on a top coat of zinc white.

16,345. Have you ever done it by giving a grounding of zinc white?—I have carried out some experiments with zinc white, using a zinc white grounding and a zinc white top coat. In those cases the paint was spoiled by rain and wind and was washed away by the rain.

16,346. But for interiors?—For exteriors. I am referring to windows. I have carried out experiments with zinc white exclusively for inside painting, but I find that an exclusively zinc white paint cannot be washed. If it is washed, the paint is ruined. Particularly I would mention the case of kitchens, which have to be washed frequently. There I found zinc white quite unsatisfactory.

16,347. But has the zinc white been used with a varnish coating?—In some cases varnish was used.

16,348. Could they not wash that?—If it was varnished you could wash it, and it would stand washing, provided that good varnish was used.

Lord Henry Bentinck (*in the Chair*).

16,349. (*Mr. Sutherland*.) Is there much outside painting done in Cologne?—Large quantities of outside painting are done in Cologne.

16,350. How often do you paint the outside?—Extremely frequently.

16,351. But they have no specified time?—About every five or six years.

16,352. Have you had any experience of zinc oxide for outside painting?—I have tried to use zinc oxide paint for outside work, but it did not last.

16,353. Can you tell us what is the average duration of zinc paint outside, compared with lead?—The zinc white will become bad in appearance very quickly, and must be renewed at the latest within two years, whilst white lead paint will last perfectly well for from five to six years. It is difficult to give average figures, because a great deal depends upon the nature of the atmosphere.

16,354. I am speaking of Cologne?—These figures relate to Cologne.

16,355. In your opinion is there any substitute for white lead which would give as good results, and at the same cost?—No, I think it quite impossible to obtain a substitute of equal efficiency and at an equally low price.

16,356. In your opinion, should not regulations be tried before resorting to prohibition?—I think it desirable first to try to stop lead poisoning by regulations before going to prohibition.

16,357. You would not place railway carriage work, which is highly varnished, and frequently washed and varnished, with ordinary painting on buildings?—No. I think that the two types of painting cannot be compared in any way, firstly, because the paints on railway wagons are renewed so frequently by varnishing, and, secondly, railway wagons are exposed to heat, steam and sulphurous gases from the engines and smoke, and all sorts of exposure, increased draught, and all sorts of weather, and the two cases are quite incomparable.

16,358. You have heard of the Bradford Corporation, but they have only had two years' experience with zinc paint, and the trams are constantly being washed and touched up. That does not compare with ordinary house-painting work?—No; I think that that cannot be compared with house painting in any way.

16,359. Do you know that the Admiralty is the largest consumer of white lead in this country, and that since March of last year their contracts have exceeded 1,700 tons of white lead?—I am not aware of the fact.

16,360. That being the case, do you think that if the Admiralty knew of anything better than lead they would not use it?—I am quite certain that the Admiralty would not use white lead if they knew of any efficient substitute.

16,361. And is not that a very strong argument in favour of white lead?—Most certainly.

16,362. Do you have to guarantee your paint to last a specified time outside?—I am always compelled to guarantee that the paint will last some five or six

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years. Generally, if it is not treated at all during that time, at the end of the six years it will have to be renewed entirely, but the general practice is to leave the paint on for four years, wash it down, and then give it only one coat of fresh paint.

16,363. Would you undertake to guarantee work done with zinc oxide?—No, I would not be prepared to guarantee that.

16,364. (Mr. Parsonage.) You say that the men are very keen in carrying out the regulations, and at the same time you say that all lead poisoning is due to the men's uncleanness. How do you reconcile those two points?—The men are particularly keen on carrying out the regulations with the intention of annoying their employer.

16,365. Are we to take it then that the men and the employers are always in antagonism to each other in Germany?—The relations between employer and employed are extremely bad. All the workers are Socialists, and whenever they can do any harm to the employers they do so.

16,366. In carrying out the regulations the workman would be allowed time to wash his hands, and it would be to his interests to study his own health before it would be the employer's interest to see the regulations carried out in any other way?—He is given time to wash, but the washing time is outside his working time, and he is not paid for the time spent on washing himself.

16,367. It is in his own time?—It is in his own time, after working.

16,368. The employer then does not allow time for washing?—No; strictly speaking, there is no time for washing during the working hours. The time used for washing is outside the working hours, and the man receives no pay for that time.

16,369. And that is the reason why he does not trouble to wash?—That may be so.

16,370. You have used zinc oxide for interior work. Do you find any difficulty in working with it?—The only difficulty in using zinc white is that the covering power of zinc white is less, and that generally an additional coat of paint is required.

16,371. I am speaking of the ability of the workman to use the white lead paint or the zinc white. Does it require any special training on the part of the workman to use zinc white?—No; there is no special skill required for applying zinc white.

16,372. The man who can apply white lead paint can apply zinc white equally well?—Certainly.

16,373. I entirely agree with that. With regard to rubbing down wet with glass-paper, you wet the work

with a sponge, and then apply the glass-paper to it. Do you put anything in the water when you put it on the paint?—Nothing whatever.

16,374. You know that water will not take a grip on fresh paint, unless you put something in it to make it grip. On the oily surface of fresh paint the water will not spread; it will lie on it in beads?—You must wait until the first coat of paint is dry and that will not take place. Then you wet it with a sponge, and rub it down with glass-paper.

16,375. But even when the paint is dry it may be dried hard, and water of itself will not apply to the fresh paint. There must be something put in the water before the water will take to the oil in the paint?—No; I think it is unnecessary to add anything to the water. The mechanical action is quite sufficient to spread out the water over the entire surface.

16,376. It would be a very easy matter to give a practical illustration of that. I believe even on the paint here on that wall water would not apply, and that has been done perhaps for years?—I am quite prepared to give you a practical demonstration if you desire it.

16,377. It is not my experience that water will spread on fresh paint?—It is only necessary to damp the surface, and the mechanical action is quite sufficient to spread out the water so that the entire surface is sufficiently moist.

16,378. Is it not the sponge that spreads the water; it is the glass-paper afterwards that spreads the water which stands in beads over the surface?—Certainly.

16,379. Then it does not differ much from dry rubbing?—I think that there is a very essential difference, because if carried out by this method, rubbing down first with a sponge, and then with glass-paper, does not cause any dust whatsoever, and a surface polished in this way is much smoother than one polished without water. I think that, generally, surfaces painted in Cologne are very smooth and very excellent in general condition.

16,380. You say that all lead poisoning is due to the uncleanly habits of the workmen. I would like to know if you give them sweet oil before they take their meals, or what is the reason that you put it down only to the dirty habits of the workmen?—Olive oil.

16,381. Yes?—No. Olive oil is not taken at all now. That was only necessary in the days of dry white.

16,382. There is no necessity for it now?—There is no necessity for it now, because there is no more dry white, and dry white is now unobtainable in Germany.

The witness withdrew.

Mr. HANS LEYENDECKER.

Evidence to 16,398 handed in and taken as read; witness then called and examined.

16,383. I am President of the German White Lead Manufacturers' Association. I was for many years a commercial judge.

16,384. I and my family have devoted great attention to the question of lead poisoning. As long ago as 1876, W. Leyendecker, who was my father, published a brochure entitled, "Treatise on the Injurious Influences of Lead upon the Health of Workers occupied in White Lead Factories, and upon the Most Effective Means of Remedying this Evil," which was presented to the First International Exhibition of Hygiene held in Brussels in that year. That publication dealt with the causes of white lead poisoning among workers in white-lead factories and the means of prevention, and was founded upon his experience and the method of prevention adopted by him in his factory. Again, in 1892, the same work was published by the firm of W. Leyendecker & Co. for the Exhibition of Hygiene in Berlin in an extended form, comprising the results of further experiments and preventive means adopted by the firm since 1876. These works advocated the general adoption of means of preventing dust; of ensuring cleanliness by providing lavatories and overalls, and encouraging a good nourishment.

16,385. In 1903, elaborate regulations for the white lead factories were passed by the Bundesrath, in the drawing up of which I and a number of other white lead manufacturers and workmen were consulted by the Government. These rules provide for the prevention of dust, for the cleanliness of the workrooms and the workers, separate washing rooms and meal rooms, periodical medical inspection.

16,386. The white lead manufacturers have in many cases gone beyond the requirements of the regulations, and have adopted special arrangements for making the workrooms healthy and dustless; have provided milk, coffee, &c., for the workers, and cheap dinners of fatty foods, special medical preparations, and in some cases light baths, &c.

16,387. The result of these methods of prevention has been a marked diminution in the case of lead poisoning in white lead factories. The figures published by Kaup in the "Archiv für Soziale Hygiene" (September 1910) show a large decrease.

16,388. In 1905, the Department of Commerce and Industry caused extensive inquiries to be made of the master painters and users of white lead with a view of extending the white lead regulations to the painters, and

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[Continued.]

the white lead manufacturers were frequently in communication with the Minister in charge of the matter. We also caused independent inquiries to be made. A set of questions was addressed to the Guilds of Painters (Malerinnungen) in 60 cities and towns throughout the German Empire, and to the chief shipbuilders and railway carriage works.

16,389. The answers to these questions were published under the title of "Gutachten," which I now produce. From a perusal of it there will be seen to be an almost complete unanimity upon the following answers by the Guilds of Painters:—

1.—Q. What material is the best for a good and durable paint for the outside of buildings and other objects?—A. White lead.

2.—Q. Can white lead be replaced by any other material of equal efficiency for outside painting; if so, by what?—A. None, especially for durability and covering power.

3.—Q. Is the use of white lead to be recommended to obtain a good cover for the first and second coat of woodwork and walls for interior work?—A. Yes; zinc white can only be used for the last coat.

4.—Q. What experience have you of the use of zinc white with lithopone for outside painting, and are these materials to be considered for outside painting?—A. Various unfortunate experiences of zinc white and lithopone were given, as to durability, &c., neither being fit for outside use.

5.—Q. What is the position of these two materials (zinc white and lithopone) for inside painting, and which of them is to be preferred, and on what ground?—A. Zinc white was preferable to lithopone for durability, good colour, &c.

6.—Q. What experience have the masters of your guild in respect of lead poisoning among workmen, and what means are to be recommended in order, if possible, to prevent lead poisoning in painting?—A. Varying experiences were given. Cleanliness was the best means of preventing lead poisoning.

16,390. The shipbuilders stated that they preferred lead pigments for use whether above or below water.

16,391. The railway carriage works also emphasised the necessity of the use of lead pigments, especially for iron, and their great superiority over zinc white and lithopone.

16,392. Prohibition was not seriously contemplated, as all the evidence showed that the principal danger was in the use of dry white lead and in dry rubbing down.

16,393. Finally, in June 1905, regulations\* were made.

16,394. The inspection is carried out by the ordinary sanitary or factory inspectors in the usual course of their duty, and no additional inspectors have been appointed for this special work. The carrying out of the regulations is facilitated by the fact of their having to be communicated to every workman, and displayed at the shops, and the trade unions and Social Democrats also keep a keen watch for any infractions.

16,395. The regulations provide that the employer shall hand to a new workman a copy of instructions as to the danger and the way of avoiding lead poisoning. It is generally felt that the effects of the regulations might be even better than they have been if these instructions were made somewhat simpler.

16,396. Since the introduction of the 1905 Regulations, practically all the painters in Germany buy their white lead mixed in oil, and very little of it is supplied to them in the dry state. In order to obviate the objection that when white lead is mixed with oil it is more difficult to detect any adulteration, our association has introduced the system of certifying as to the quality of each package of white lead. In addition to the manufacturers' marks, we put on each cask or box the association's trade mark, with description of the goods. White lead pure is marked "genuine white lead." If intermixed, the percentage of admixture is denoted—e.g., 20 per cent, or 40 per cent.—as the case may be. The painters are quite satisfied with this, and when they order through their colour merchant,

they specify exactly what they want, and see that the delivery is in accordance with their order.

16,397. My firm supply white lead to the railway department, and I annex a copy of a circular addressed by the central office in Berlin to the provincial offices in September 1907, prohibiting the use of mineral white, zinc white, lithopone, &c., for exterior use, as after practical tests extending over two years they found that white lead gave the only satisfactory results. The provincial offices were given the option of buying the white lead (dry or mixed in oil), and during the last three years they have been buying chiefly the paint mixed with oil. The circular is as follows:—

"After lengthy experiments, it has been established that no satisfactory substitute for white lead can be found in non-poisonous pigments, in particular, lithopone and mineral white. We, therefore, request you to discontinue for the future the use of these pigments for the painting of wood and the other parts of railway carriages. The remaining stocks of lithopone and mineral white may be used up."

16,398. I have only recently heard of the theory that noxious emanations arise from newly painted surfaces where white lead is used, but as a practical man, I cannot understand how under ordinary working conditions the white lead can be volatilised, any more than I can see how the burning off process can produce emanations except of the oil. It is true that the lead saponifies when mixed, but the ordinary painters' lamp would not, in my judgment, develop sufficient heat to set free the lead compounds in the form of lead fumes.

16,399. (Chairman.) You are a white lead manufacturer?—Yes.

16,400. As your business depends on the use of white lead, your natural desire is to protect the industry in which you are engaged, is it not?—Of course.

16,401. You tell us that the elaborate regulations in force for white lead factories in Germany have been effective. This has also been the case in England. In the course of 10 years the number of cases in English white lead works has fallen from 358 in 1900 to 34 in 1910, and 41 in 1911. Can you give statistics for German white lead manufactories?—The practical statistics I have not with me, but I think I have given quite a lot of single data; I have put in my evidence all our experience as manufacturers in the course of 10 years.

16,402. It is possible in the manufacture of white lead to have such regulations and enforce them. Do you think the same is possible in the case of house painters?—From the experience we have had in Germany since our new regulations in 1906, I think it possible.

16,403. For example, in paragraph 16,384 you refer to the necessity of preventing dust. How can you do this in house painting?—In Germany in house painting it is strictly forbidden to use the system of rubbing the walls.

16,404. Dry rubbing down?—Dry rubbing down.

16,405. How is this regulation enforced?—It is put under certain punishments. It is under the control of the police or inspectors of factories.

16,406. We have been told by many witnesses that some dry rubbing down is indispensable. If they are right, how would you protect the worker from the danger of inhaling dust containing lead?—I think there will be no other means than respirators or wet sponges, just as we have in our white lead works. We have some points where dust cannot be entirely avoided, and in these places our people must wear wet sponges or respirators, but I must mention the fact that in Germany all rubbing down is done with water and pumice stone, and I think what is possible in Germany cannot be impossible in England on this practical point.

16,407. Are respirators used in Germany in house painting?—I cannot exactly tell.

16,408. The next precaution you mentioned is the provision of lavatories. Can you ensure adequate lavatory accommodation being available at every

\* See Appendix VI.

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[Continued.]

painting job?—I think it possible. I cannot exactly judge these questions from the practical point, because I am only a manufacturer, and I have not a very great insight into the regulations or the manner in which the painters do their business. Those who have a dozen people to employ, and more, I think, might do it very easily; but if only two people are employed it would not be so easy.

16,409. Is hot water always provided in Germany?—Yes, it is.

16,410. How can the lavatory regulations be enforced?—By the same means, by control.

16,411. And overalls—how can the wearing of these be enforced?—All these places are under the control of the police in the first instance, and, besides, the best control are the painters themselves.

16,412. You also allude to a very interesting and important point, namely, the need for “encouraging a good nourishment.” How can you apply this to house painters? You mention that the white lead manufacturers have in many cases provided milk for the workers, cheap dinners of fatty foods, and so on. Do you recommend that this should be introduced for house painters also?—I think it would be very good for these people, but I think it is very difficult to enforce it.

16,413. With regard to the questions given in paragraph 16,389, the answers to these were all *ex parte* statements, were they not?—Yes.

16,414. Were the witnesses whose evidence was taken in this manner and which you quote in your evidence, cross-examined in any way?—No, there was no cross-examination.

16,415. We have precisely similar statements made by English master house painters, but many of these witnesses admitted that they had not thought out fully the details of the necessary regulations and the inspection requisite to enforce them. After these points had been put to them, many said they would prefer prohibition to these strict regulations. Are you aware of that?—It may only be difficult for these people to carry these regulations out at the beginning, as it was in our country, but very soon they became accustomed to them.

16,416. You mean in Germany it is difficult to carry them out?—Not difficult. Our people carry them out, but of course they found difficulties at the beginning in the first one or two years.

16,417. Can you produce any statistics as to the decrease in lead poisoning consequent on the introduction of regulations for house-painters in Germany?—I think in Dr. Kaup's evidence the statistics are given, and he has collected them from official sources.

16,418. Yes, he has. They are necessarily incomplete, but for what they are worth they show a very slow rate of improvement. Are you aware of that?—Yes.

16,419. In the case of Berlin, only 5·5 per cent. per annum; for the whole of Prussia even less, namely, 3·8 per cent. per annum. That is a slow decrease, is it not?—That is a slow decrease, but it is only relatively slow, when you remember that from year to year the painting work, especially in Berlin, is increasing rapidly. That must be considered.

16,420. The tables based on records of the sickness insurance fund show a similar slow improvement?—I am not aware of that.

16,421. If regulations are to be adopted and enforced it will obviously necessitate a body of inspectors to see that the rules are observed. Such inspectors would have to enter every place where painting operations were carried on, even private houses?—No, that would not be possible, but in the case of new buildings, for instance, it would, and the best and most effective control is exercised by the painters, who know the regulations and who can go to the police if they are not observed.

16,422. Not other places when painting is renewed?—No.

16,423. If a large number of employers of labour themselves prefer prohibition of the use of lead to a cumbersome and irksome code of regulations, would

that not cause you to modify the views you have expressed?—No, it would not alter my views.

16,424. In paragraph 16,397 you quote a circular of the German Railway Department which implies that white lead is the best pigment for vehicles?—Yes.

16,425. If it is impossible to use anything but white lead with satisfactory results, how is it that exclusively leadless paints have been used successfully for six or seven years by the Midland Railway for all their carriages and wagons?—I cannot understand this, and think there must be particular reasons. At least thousands of practical experiments in Germany are in perfect contradiction with this.

16,426. And by other railway companies also for shorter periods, and by the Bradford Corporation for their tramway cars, for four or five years by the Daimler Motor Car Company and other motor car firms, for the whole of the painting on their cars?—I am not aware of that.

16,427. Leadless paints have been used by all these firms?—I did not know that.

16,428. And by one of the leading firms of perambulator makers for body work, and so on. Now, if lead has such marked advantages as you suggest for exposed positions, how is it that leadless painting has been successful in the following cases for outside work: the Savings Bank buildings in London—painted in 1906, inside and outside, with zinc paint, and reported in excellent condition in 1910, when they became due for repainting; a large number of post offices and sorting offices in the London district, similarly painted with zinc paint; the top structures of the Orient Steamship Company's liners; the royal yacht “Victoria and Albert”; the “Medina,” on which their Majesties are at present returning from the East—all painted with zinc white; various gasometers, and other work, painted with zinc and iron oxide paint; the exterior of the Stock Exchange, painted with leadless paints, which are reported by the official architect as very satisfactory?—With regard to those points, I may say that we have made many painting experiments in Germany, dozens and dozens, hundreds I might even say, and always with the same result—that lead colours are the best to protect iron, wood, and brick work against atmospheric influences.

16,429. (*Dr. Collis.*) How many men do you employ in your own factory in the manufacture of white lead?—250.

16,430. Have you had any cases of lead illness and sickness among those men?—Certainly, but relatively few.

16,431. Do you know at all how many?—It differs. You have one year only four or five, and another year eight or nine. It depends in many instances on the condition of the people themselves. A weak person becomes ill sooner than a strong person.

16,432. You have in your factory all the regulations in strict force?—Yes.

16,433. And yet you get a percentage of about four?—Not a percentage. It is four people among 250.

16,434. You get 13 over two years, and 6·5 on 250 is very close to 2½ per cent.?—I do not know if you understood what I said.

16,435. They vary in different years, but taking one year with another you get 6½ cases among 250, which is about 2½ per cent., working it out?—Yes.

16,436. So that with all the regulations in full force within factory walls, where you can look after the men very carefully, there still remain 2½ per cent. of cases?—Yes, 2½ per cent. of cases, but the 250 is the average number we employ, and during the year they change.

16,437. This is the work of 250 men, and I understand that this is the way in which your statistics are taken in Germany; so I use it in that way. So that regulations, even though strictly enforced, do not get rid of lead sickness?—Not perfectly.

16,438. You say that you think the regulations in the house painting trade are well enforced?—Yes.

16,439. How many visits do the inspectors make to places where work is being carried on? I do not mean paint-shops?—I cannot tell you.

16,440. It is rather necessary to know that, is it not?—Yes, but I am not acquainted with the painting

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business. That is a question you should put to the master painters.

16,441. But I am bound to put it to you, because you have made the statement that the regulations are properly enforced?—I am not acquainted with this line of business.

16,442. Then you should withdraw your statement that the regulations are properly enforced, because you have no information as to whether they are?—What I have told you is simply what I have from the master painters themselves, but I refer to my former remarks of the control exercised by the painters.

16,443. German master painters have told us that the inspectors never visit these work places. In five years one has never had a visit to the work place, but only to the paint shop. He has never known such a thing as a visit. You follow my point, that there seems to be a discrepancy?—Yes.

16,444. In your white lead works the men wear respirators, I suppose, in the white lead beds?—We have no white lead beds; it is the chamber process.

16,445. Taking the corrosions out of the chamber, then?—They wear wet sponges.

16,446. Do you find any difficulty in getting them to wear them?—None at all.

16,447. They always wear them quite regularly?—Yes.

16,448. In Germany do the men chew tobacco?—Sometimes.

16,449. Do you have prohibition of that?—We have it in our works.

16,450. Do you ever discover a man chewing?—We find no difficulty.

16,451. Have you ever looked in their mouths to see?—If I see a man chewing, I tell him that if I see it a second time he will be punished or dismissed.

16,452. We have exactly the same regulation in our English white lead factories, and I have found the men not wearing respirators, or if they have seen me coming in, the respirator has been put up very quickly, and on looking inside to see their teeth, I have found chewed tobacco in their mouth. Is it the same in Germany?—Sometimes, but very seldom, because they risk their position.

16,453. That being so within factory walls, how is it possible to enforce regulations in the painting of houses if you cannot control the men when they are actually under your personal supervision. If they are 20 miles off painting a house, could you enforce regulations?—It would be impossible. You would require thousands of persons to control them, but such control is not necessary.

16,454. That is our feeling. I presume the same condition of things obtains in Germany?—Yes.

16,455. In Germany you probably have better possibilities of carrying out regulations, because your men have all been through the army, and have learned to do what they are told, perhaps better than here, where we have not got conscription. You cannot enforce regulations?—Not to the point which would be necessary to prevent this lead poisoning entirely. I think that is really impossible, but you can improve the situation considerably.

16,456. That probably will account for the fact that the regulations you now have in Germany have not had a greater effect in reducing cases of sickness and illness?—There is an improvement from year to year.

16,457. The improvement is not accelerating. The employment has been more considerable, I agree, but the improvement has become stationary, and in years when trade has been slack, and there has been no increase in trade going on, we have had a similar reduction as shown by Dr. Kaup's figures of lead poisoning in England in the same years; but when trade has increased, as it did last year, lead poisoning increased with it. The big fall occurred simultaneously with slackness of trade, and I drew his attention to the fact that slackness of trade was simultaneous with the coming into force of the regulations, and he agreed that it would be necessary to wait to see what was the effect of the increase of trade before he could really say that the regulations had had a marked effect. You

follow my point?—Yes. I think it is always in some way dependent on the condition of trade. If you have very much to do, and you change your people many times, it has always a bad influence. If we can keep our people, we have much more influence than if we are changing them, but in the years of Dr. Kaup's statistics the white-lead business in Germany was rather regular and without much fluctuation.

16,458. That is our experience too; I quite agree with you. So that the evidence with regard to regulations in Germany is not very strong. First, they cannot be enforced, and secondly, such enforcement as you have obtained of those regulations has not brought the lead poisoning cases yet as low as we have got in England to start with. You see our difficulty in taking Germany as a help to us?—Of course I cannot judge of English conditions on this point.

16,459. Of course not?—I can only say what we have in Germany. We are comparing our former figures with what we have reached in consequence of regulation, and we think we are in such a position now that they will improve much more in future. With regard to painters, it is awfully difficult from the beginning to force them to be clean, and they must be forced to cleanliness.

16,460. Personally, as a medical man, I do not think that is the main thing that causes lead poisoning. We know that it is in the opinion of the occupiers, but I think from your own experience you will agree that cleanliness does not produce so much good as making the men wear respirators and so on, so that they cannot inhale the dust. The washing of the hands is a minor point, is it not?—I thought that both measures must come into effect.

16,461. I do not wish to ignore cleanliness, but would not you agree, from your experience as a manufacturer, that the dust question is very much more important?—Certainly, but cleanliness is nevertheless important and necessary.

16,462. So that the point which has been so frequently raised as to the cleanliness of the painter is not the most important we have to consider, and therefore the enforcement of the regulations as regards removal of dust and such like must come first?—Yes.

16,463. And those regulations, where they have been tried, seem to fail with regard to enforcement?—Yes.

16,464. So far as we can get the conditions in Germany to help us, that seems to be the difficulty we have to face. I do not know whether you can throw a different light upon it. That is why I am presenting the case to you just now?—No.

16,465. (*Mr. Sutherland.*) In your opinion, apart from your interests as a lead manufacturer, is there any basic material that, for white and like paints, can take the place of lead?—I think it is possible, like all things may be possible, but up to now we have not yet found anything.

16,466. You have no knowledge of anything?—No.

16,467. How long did the Prussian State railways give to their experiments?—As far as I know, three or four years.

16,468. Do you know the nature of the materials they employed?—They have employed all these different colours which are considered substitutes for white lead: zinc white, lithopone, brilliant white, and many others. I have seen at least 20 different whites.

16,469. Do you know what vehicles they mix them with?—Linseed oil and varnishes.

16,470. The experiment would be very carefully conducted, and the question would only be determined by the merits of the paint?—Yes.

16,471. There is no desire to keep lead if they could get anything equally good?—Certainly not.

16,472. And you think there are no alternatives to the use of white lead?—Not at the present time.

16,473. Is it possible, unless at enormous cost to the public, to substitute any other white for white lead for outside painting?—I do not think so.

16,474. How do the white paints have to be strengthened to make them last like white lead lusts

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[Continued.]

with ordinary linseed oil?—I think the reason why white lead lasts better than any other colour is just that it combines chemically with the linseed oil.

16,475. Yes, but that is not quite my question: I am asking you, how would substitutes for white lead have to be strengthened to make them approximate to white lead in durability, with what material?—I know no material.

16,476. The general opinion amongst master painters in the trade in Germany is that white lead is the best base for oil paint?—Yes.

16,477. Do you know that the general opinion of the trade in England is exactly the same?—Well, I have heard it many times,

16,478. It is so: Now, does not this point to the fact that white lead is the best base for light paints?—Yes, I think so.

16,479. The trade have not supported white lead because of a love of white lead, but because they cannot get anything to equal it?—Yes.

16,480. Do not you think that a strong argument for its maintenance?—I think so.

The witness withdrew.

## TWENTY-SEVENTH DAY.

Thursday, 18th January 1912.

### PRESENT:

LORD HENRY BENTINCK, M.P. (*Acting Chairman*).

Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (*Acting Secretary*).

Mr. DE MORSIER.

Evidence to 16,549 handed in and taken as read; witness then called and examined (through an interpreter).

16,481. I am editor of "Le Signal de Genève," and was formerly a *Deputé* to the Grand Conseil of the Republic and Canton of Geneva.

16,482. In the month of February, 1904, the question of the prohibition of white lead in the work of painting was first raised in our Chamber by Dr. Wyss. After consideration by that Chamber, a draft of a law was prepared by the Conseil d'Etat, which was referred to a Commission to examine thoroughly and report.

16,483. I was appointed a member of and reporter to that Commission, who set themselves the following questions:—

1. Does the use of white lead in Geneva create a danger of lead poisoning to house painters?
2. If yes, what is the comparative importance of that danger in the Canton of Geneva?
3. If that danger is found to be a social danger, what measures are necessary to avoid it? and
4. Lastly, is the use of white lead necessary, and, if so, to what extent in the work of house painting?

16,484. The Commission decided to examine the whole question, and studied it scientifically, in order to ascertain the facts and to draw accurate conclusions.

16,485. We could not, however, altogether lose sight of the fact that the war against white lead was more particularly of French origin, and also that the question seemed to have been specially studied in that country. We felt that we must examine what had been done in France with the utmost care. Accordingly, I read word for word, and examined in detail the French proceedings, which form a book of some 2,300 pages, and I have had interviews in Paris with various persons interested in the subject.

16,486. The Commission decided to publish a resumé of their enquiries, which were conducted under the following conditions:—We took the evidence of 31 persons, including a number of employers and workmen (the majority of the employers being, or having been themselves painters), and two doctors, a chemist, and members of the Trade Union of Painters and Plasterers. We also made enquiries by circular, of the benefit societies, the doctors of the Canton, from building contractors, and master painters, and from architects, and altogether received about 125 replies.

16,487. The fundamental question being to find out whether prohibition ought or ought not to be recom-

mended, I divided the replies into two classes—those who asked for prohibition, and those who did not.

16,488. The following are the figures resulting from our enquiries:—The Commission heard 28 persons of special knowledge—that is to say, workmen, employers either having themselves been workmen, or, in fact, working with their workmen, and one manufacturer.

16,489. Of these there were—

In favour of prohibition by law—

8 trade union workmen.

2 employers.

16,490. Against—

8 workmen.

9 employers.

1 manufacturer.

16,491. Of the 8 workmen in favour of prohibition, 2 recognised that the danger is much lessened by hygiene, and 1 recognised that white lead was necessary.

16,492. Five employers and 1 workman approved of zinc for the interior.

16,493. Two trades union workmen recognised that zinc had less covering power.

16,494. As a result of the inquiry by letter, there were 5 employers in favour of prohibition, making, with the 2 heard, a total of 7; and there were 46 against prohibition, making, with the 9 heard, a total of 55.

16,495. One architect was in favour of total prohibition, and 1 in favour of prohibition for the interior; 9 architects were against prohibition.

16,496. Of the 43 replies from doctors, 2 only asked for prohibition, the remainder pointing out that regulations appeared, in their judgment, to be sufficient to meet the danger.

16,497. With the exception of the workmen representing the trade union, and those whose names were supplied by the trade union, all the witnesses declared that the use of white lead in the form of paste for painting would reduce the danger of lead poisoning to little or nothing at all.

16,498. The following were the general conclusions arrived at by the Commission:—

- (1) The employment of white lead in Geneva does not create a danger of lead poisoning for house painters. White lead is a poison when absorbed in certain quantities and in certain doses, but the inquiry shows that the use of the product for house painting in Geneva

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- does not constitute a social peril necessitating a measure so radical as the prohibition by law.
- (2) Oxide of zinc is capable of replacing carbonate of lead in a large number of cases. The use of zinc white is already practised, but white lead remains a product of which the trade has need, and which cannot be replaced completely by zinc. This is the general opinion of the trade, and results from experience.
  - (3) White lead is not dangerous when applied by the brush in painting, provided that the painter does not absorb it by the mouth. Consequently, the operation of painting with white lead does not constitute a real danger when simple precautions are taken.
  - (4) White lead dust is dangerous when taken in with the breath for a long time or in too large quantities.
  - (5) The use of white lead in the form of paste does away with the production of dust in ordinary painting, and the mixing with oil does not offer great danger.
  - (6) The dry scraping off of old lead paint produces a large quantity of dust, which it is difficult, if not impossible, to avoid breathing. Burning off is equally bad.
  - (7) The dry rubbing down of old paints, or those which have been recently made, is not dangerous unless it is prolonged in rooms without proper ventilation, or if the workman does not take elementary precautions, such as keeping his face a certain distance from the paint to be rubbed. The rubbing down in Geneva does not form an important part of the work of the house-painter. In certain ordinary work it is indeed insignificant. When it is necessary to make a good job, or for especially fine work, precautions ought to be taken against prolonged or intensive rubbing down, which is otherwise not used amongst us.
  - (8) The trade fear an increase in the price of zinc, and the general increase in the cost of painting work which would necessarily follow upon a complete prohibition of white lead.
  - (9) In the absence of regulations, precautionary measures of cleanliness and general hygiene do not at present seem to be carried out with sufficient thoroughness in all workshops.
  - (10) In general, lead poisoning is an illness uncommon in Geneva. The proportion of sufferers reported to the Commission is very small, and these cases are not generally dangerous, and it seems probable that certain precautions of elementary cleanliness have not always been taken by the sufferers.
- 1) There does not exist in Geneva among the workmen any special demand for the total suppression of white lead. That measure would, we are convinced, cause very great surprise among the great majority of working painters.

16,499. Our report proceeded to discuss the matter from various points of view, viz. :—(A) *Medical*: Upon this part of our inquiry we had the advantage of the learned and exhaustive report of Dr. Roch, presented to the Société Médicale, of Geneva, and of his conclusions, which were unanimously approved at a meeting of that society. We found that white lead was absorbed by (a) the digestive system—from eating with dirty hands, &c.; (b) the respiratory—from breathing dust, especially in dry scraping off and rubbing down; (c) perhaps by the skin—although this is doubtful except in the case of wounds. The poisonous action arises from the gradual accumulation within the system of small quantities. The quantity requisite to cause damage varies with the individual, some show a predisposition to lead poisoning, especially alcoholics. The causes are chiefly uncleanness and the dust from dry rubbing down, &c.

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16,500. As to the question of poisonous emanations from surfaces painted with white lead, the results of the experiments conducted by Prof. Trillat, of the Pasteur Institute, and by M. M. Heim and Hébert showed us that at ordinary temperatures these are infinitesimal, the discomfort caused by fresh paint being mainly due to turpentine.

16,501. By reason of the special interest of the French investigations for Geneva we determined to examine carefully the multitudinous statistics and medical opinions contained in the French reports. We found that the French statistics had in many respects no application to Genevan circumstances. In the first place the practice of painting is very different in France, because of the large amount of dry scraping off of old paint, and also the custom much more frequent there of mixing the dry paint in the workshops. In the next place the Commission found that a great number of the French statistics related to conditions of work which have passed away. The cases of grave lead-poisoning were largely to be attributed to workmen working before the introduction of modern methods of grinding white lead by the wet process and painters working before the introduction of white lead in the form of paste, and others who performed the operation of *enduisage* (putty filling in) by hand and the use of essences which have now been abandoned.

16,502. The Reporter of the Commission was surprised and astonished at the gross inaccuracy and recklessness displayed in a large number of the statements appearing in the French reports. Such statements as the following appeared to be far apart from the truth: that "white lead sends hundreds of painters to death yearly and cripples thousands"—that "for Paris with 30,000 house painters there must be reckoned about 1,500 more or less infirm and professionally incapable, and a rate of mortality of 150" (the true figures being, according to the careful figures of Prof. Gautier for 1902-1905, about 137 annual hospital cases of lead poisoning among 30,000 workers in lead (not merely house painters), with 13 deaths; or, again, the calculation that as the number of lead-poisoning cases on one day in the Paris hospitals was 43, therefore the number of cases for the year was 365 times 43, or 15,000; nor was there anything to corroborate Dr. Laborde's statement that "there were 3,000 permanent victims of white lead in France." I found that many statistical calculations on fine problems of science and medicine became distorted and falsified as they passed from citation to citation, from pamphlets to lectures, and so into the Press, a process which is natural where polemics take the place of the objective discussion of facts. It is to such causes that we attributed statements such as that "from the moment when an individual is poisoned by the lead the whole of his physical organisation is attacked, his liver, his kidneys, heart, and arteries," or that "when a workman feels the first attacks of the trouble he is already terribly affected by the disease," or the statement of Dr. Labbé, that "an individual who works at painting becomes poisoned by small doses after four or five years, and ends by acquiring the terrible malady of lead poisoning and dying of it," or, lastly, the declaration that "there is not a painter who is not poisoned more or less seriously;" and that of Dr. Layet, "Every member of this body is a sufferer from lead poisoning, either patently or latently, and will die sooner or later of disease of the brain, of the kidney, the heart, or the arteries," and that "the poison takes the mask of every disease." We answer that if these were facts they were not to be verified in Geneva, unless it were from the point of view that we were all more or less suffering from latent lead poisoning, inasmuch as we are all daily exposed to lead and are all exposed to death by disease of the brain or the kidneys, the heart or the arteries.

16,503. It became clear to us from the report of Dr. Roch and from the works of first-rate authorities, such as Dr. Gautier and Meillère, that the diagnosis of lead poisoning, apart from cases shown by colic, is often of great difficulty, as there is no symptom which is characteristic of lead poisoning and nothing else. We were also impressed by the statements by each of

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these authorities that in the genesis and development of all the diseases attributable to lead poisoning a very important part is played by alcoholism, and the Commission quoted in its Report from Prof. Gautier: "Again, is not a great part of the misery due to the alcoholism and tuberculosis, which carry off these unfortunate workmen, the larger part of whom are badly housed, badly nourished, badly advised, careless of the rules of hygiene, as little economical of their health as they are of their purse, which chiefly goes to enrich the wine merchant. It is a deplorable state of things. Ignorance and alcoholism are two causes which are responsible for much more sickness than lead poisoning."

16,504. So far as we felt it necessary to come to any conclusion upon the French statistics, the Commission considered as proved the figures of Prof. Gautier and of M. Treille. According to Prof. Gautier, of 28,000 to 30,000 workers in lead in Paris (of whom 15,000 were reckoned as house painters), the figures for the annual average in the hospitals and the average of days in hospital for each case were:—

| —          | 1876-1881. | 1882-1901. | 1902-1905. |
|------------|------------|------------|------------|
| Cases - -  | 557        | 275        | 137        |
| Days - -   | 126        | 166        | 165        |
| Deaths - - | 5          | *16        | *13·2      |

\* Hospitals and City.

the cases having dropped from about 600 to 400 in 1882 after the French regulations of 1881.

16,505. The figures of Dr. Treille were on a different basis and were slightly higher, showing 10 deaths per annum for the whole of France for lead poisoning, or 1 for every 7,000 or 8,000 painters, and an annual average of 160 hospital cases of lead poisoning for the 15,000 painters of Paris. In quoting these figures the Commission stated that, in their view, lead poisoning is an evil which diminishes in quantity and importance with measures of precaution and hygiene; that the introduction of white lead in the form of paste has considerably changed the situation, and that the fall in the number of cases after the regulations of 1881 made it probable that if these regulations had been perfected and better enforced the condition of things would have continued to have improved.

16,506. In regard to the whole of the French evidence the Commission remarked the fact that the controversy about white lead became somewhat of a political question, and was conducted on both sides with all the strategy of an impassioned warfare, a state of things which explains the journalistic incidents to which it gave rise. The Reporter also had to ask himself whether the campaign was not stimulated by undertakings interested in fighting competitors in this way.

16,507. (B) *Can zinc replace lead for all purposes in painting?* This is the fundamental question. A great majority of the trade in Geneva reply, No!

16,508. They informed the Commission that, given the same conditions, precisely those works which are exposed to variations of temperature, alternations of sunshine and shade, to moisture, to wind, &c., are unquestionably better when painted with lead than with zinc paint, and that is the conclusion arrived at by the Commission. Upon consideration we did not feel that the assurances of a minority of master painters that they could dispense entirely with white lead would justify us in depriving a majority of a product which they state to be indispensable. For this reason the Commission abandoned the idea which they at first entertained of conducting difficult experiments with surfaces painted with zinc white. Our studies led us to the conclusion that (when there is no question of price) either zinc white or oxide of zinc can replace white lead in a great number of cases, particularly where a pure white colour is desired, which will not be affected by sulphuretted hydrogen

or ammoniacal vapours, and will not go yellow with age. Pure zinc white is preferred for the highest class work for the interior, and it forms a last coat of such works, but is rarely used for the first coats.

16,509. Two points of great importance had to be examined on this question, first the solidity of the paint and then its covering power. As to the constitution of white lead, it was demonstrated to us that the oil mixing with the powder of lead carbonate gives at the end of a certain time, after drying, an homogeneous paint very stable and resistant. It may be an oleate of lead, or it may be something else, and this can be discussed interminably; but practice proves that the powder of zinc oxide and the oil never form an homogeneous paint. It is a chemical problem not completely demonstrated, perhaps, in theory, but which seemed to us to be absolutely demonstrated in practice. White lead and oil form together a sort of varnish, hard and impermeable. The formation of this varnish is complex. White lead is an hydrated oxide of lead, and is a combination of hydrate of lead and carbonate of lead. When a fatty body is mixed with a metallic oxide they produce what is called a saponification such as the soaps of potash or of soda, for example, and the same phenomenon seems to be produced by the mixing of linseed oil and white lead. The hydrate of lead and oil form a soap (salts of lead), solid, insoluble, hard and elastic, which one may compare with a varnish offering great resistance to external changes. The other part of white lead, viz., the carbonate of lead, plays no part in forming this varnish, but communicates to the varnish its covering power. There is thus a combination between the white lead and the oil under the form of a lead salt, which being oxidised is formed into a hard varnish which can be applied in very thin and solid coats. This theory was first propounded by the great Belgian chemist, Stas, in 1855, and has since been confirmed by Professor Thibaut, of the School of Industrial Arts and Sciences at Lyons.

16,510. Zinc white absorbs more oil than white lead, that is to say, in order to obtain a paste sufficiently fluid it is necessary to use more oil. Painters estimate, in order to obtain the desired fluidity, 40 per cent. of oil for white lead as against 85 per cent. with zinc. The zinc and the oil do not seem to constitute a varnish as do the white lead and the oil. It is this essential difference between the two products which determines the comparative lasting power of the paint. The zinc white thinned with oil dries less quickly and requires a drier, which is usually litharge mixed with the oil or sometimes manganese salts. Some colours, for example, vermilion, would be better employed with zinc than with white lead. Zinc does not blacken when affected by sulphuretted hydrogen and ammonia. It remains indisputable that in the present state of science a stable chemical composition cannot be obtained between the oxide of zinc and the oil.

16,511. The question of covering power is very complex. It is a problem of physics and molecular chemistry in which one has to consider the density of the powders employed, the quantity of oil incorporated (both for manufacture and thinning), the quantity of spirit, the degree of fluidity, &c. The question of the thickness of the coats is equally important, because a painting composed of a number of thin coats is much more lasting than one composed of less coats applied thicker. Without going into all the dissertations upon the comparative covering power of zinc and lead, the Commission pointed out that by "covering power" is meant the capacity which a paint possesses with a coat of a given thickness to render opaque the surface to which it is applied. The problem presents itself thus:—In order to make a given surface, how many grammes of zinc white or of white lead it is necessary to mix with how many grammes of oil, spirit and drier? The Commission were much struck with the opinion of Professor Thibaut upon this subject, and accepted his statement that the covering power of oxide of zinc is inferior to that of white lead, when considering its capacity for masking or rendering opaque a given surface. It is true that oxide of zinc covers a greater surface than white lead, because with



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the same weight of powder there is in effect more zinc powder than white-lead powder, the specific gravity being about 5.40 for zinc and 6.57 for lead, so that zinc is less dense than white lead. For the same weight there is more in bulk of the zinc white, so that it can be spread over a larger surface, and the more so, because, before it is thin enough to be spread, it takes up a larger quantity of oil than does white lead. But the true covering power is the power to render opaque. Given an equal fluidity, zinc white is in this respect inferior to an equal weight of white lead, because the opaque matter is absorbed in a larger quantity of oil. As is indicated by theory, and above all by the actual practice, in order to obtain the same opacity with an equal fluidity it is necessary to paint one coat more of zinc to obtain the same opacity as with white lead, that is to say, the same opacity is obtained by two coats of white lead as from three coats of zinc white.

16,512. Another product, however, is used in the painting industry, viz., minium or red lead. Its manufacture is dangerous as is its use, seeing that it is nearly always employed in the form of powder and not as an oil paste. According to expert and medical advice minium is more dangerous than white lead, but this product cannot be replaced in all places by oxide of iron any more than white lead by zinc. Minium is especially used for painting iron. Like white lead, it is also employed in numerous other industries as in the colouring of paper and in the manufacture of flint glass and crystal. It appeared to the Commission that the same methods of cleanliness and dust prevention would sufficiently protect workers with minium as workers with white lead.

16,513. Litharge is used principally in small quantities as a drier, particularly with zinc white. The other driers which have been tried with zinc do not give equally satisfactory results, such as the peroxides, sulphates, nitrates, borates, acetates, and oxalates of manganese which have been tried by the trade. The best of them appears to be the oxalate of manganese. Boiled oils and varnish also contain litharge, and it is difficult to suppose that their use could be prohibited.

16,514. Minium and litharge are not the only toxic lead products which are used in house painting. There are also sulphate of lead, orange lead (oxide of lead), French red (bichromate of lead), mineral yellow (chlorure of lead), English green (arsenate of copper), vermilion (oxide of mercury), chrome red, Prussian blue (ferro-cyanide of potassium), and the various mercurial colours, zinc greens, and other dangerous colours.

16,515. In the course of the Commission's enquiry, we learned that cases of poisoning occurred in other trades than that of house painting, and found that the question of white lead is only a very small part of the industrial use of lead.

16,516. The Commission also considered various other proposed substitutes for white lead, such as sulphate of lead, lithopone, but found that none of these was so satisfactory even as zinc white.

16,517. In conclusion, the Commission recommended to the Conseil d'Etat a law to regulate the use of white lead, which was passed on 26th October, 1907.\*

16,518. Further, in pursuance of the recommendation of the Committee, regulations were issued on 21st December 1907.†

16,519. The following is a chronological paper from the Protocol of the Swiss Federal Council for 5th January 1904, and 30th June 1908, in order to show what has taken place in Switzerland generally apart from the Canton of Geneva, with which I am identified with reference to this subject, from which it would appear that although the Federal Council prohibited the use of white lead in all Government departments for four years from the 1st January 1904, with a view to general prohibition, at the expiration of that period, on the evidence of the Factory Inspectors and Dr. Roth, the prohibition was removed except for inside work.

\* See Appendix XIX.

† See Appendix XX.

*Proceedings of the Swiss Federal Council,  
5th January 1904.*

16,520. 1st October 1902.—Memorial by Council of Central Union of Painters, Plasterers, and allied workers:

That the Master Painters avoided their responsibility for lead poisoning by not employing workmen who had been once attacked by it; that the proved dangers to health of white lead made it a duty to effect the removal of this stuff from use—especially as there were no technical difficulties in the way. They wished that the use of white lead and its preparations in painting might be prohibited, but recognised the difficulty of immediately effecting such a prohibition, and petitioned that as a first step towards such a measure the Federal Government should exclude the use of white lead and its preparations in the specifications for its works.

16,521. 6th October 1902.—Swiss Labour Department requests opinion of Union of Swiss Master Painters.

16,522. 15th June 1903.—Answer of Union of Swiss Master Painters.

16,523. Statistics of German Swiss (the Union does not include French) showed that for a period of 40 years in 318 businesses, accounting altogether for 5,207 years, and an annual employment of 2,236 there had been 188 cases of lead colic with 5,451 days of illness and only four deaths.

16,524. The amount of sickness, which was now small, had formerly been much more. Uncleanliness and improper food were often the causes.

16,525. The Union had no objection to prohibition of white lead for Government works. Apart from cost and durability, zinc white, lithopone and others can be substituted where there is no exposure to severe weather. For outside exposed work white lead is the most durable.

16,526. The Union were against a general prohibition of the use of white lead.

16,527. 7th January 1903.—Two white lead manufacturers protested against injury to trade, stating that the present means of preparing and using white lead wet are dangerless.

16,528. 12th November 1903.—Report of the Federal Factory Inspectors and Dr. O. Roth (Professor of Hygiene, Zurich).

16,529. The statistics of both the painters and the master painters were unreliable.

16,530. Foreign experience, especially France, showed that there were substitutes, especially zinc white; but it was doubtful whether zinc white is sufficiently durable in exposure to weather.

16,531. Regulations for the prevention of lead-poisoning would not be effective owing to lack of effective control.

16,532. They recommend exclusion of white lead in specification for Government contracts for three years, and recommendation by Federal Council to Cantonal Governments of similar action.

The decision of the Federal Council was as follows:—

16,533. General agreement was expressed with the report and recommendations of the Inspectors.

16,534. They were not prepared to prohibit all use of white lead and compounds, because—

- (1) On the basis of the existing law it would only affect a limited number of businesses.
- (2) In other industries than painting, the use of white lead is indispensable, e.g., potters, printing, electric accumulators, and
- (3) The protection of home industries must be considered.

16,535. No State had pronounced a general prohibition, but there were precedents for various kinds of legislative interference both in Switzerland and abroad.

16,536. As a check upon the discrepant estimates of the amount of lead-poisoning given by the painters and the master painters, they took the factory in-

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spectors' statistics for factories and employers' liability for five years' illnesses, which were:—

| —          | Painters. | Others. | Total. |
|------------|-----------|---------|--------|
| 1898 - - - | 9         | 16      | 25     |
| 1899 - - - | 24        | 15      | 39     |
| 1900 - - - | 12        | 17      | 29     |
| 1901 - - - | 5         | 13      | 18     |
| 1902 - - - | 7         | 13      | 20     |
|            | 57        | 74      | 131    |

16,537. The figures were not comprehensive, as many small businesses were not included.

16,538. Finally, the Federal Council considered that the best course would be to prohibit use of white lead in Government works for a trial period of four years.

16,539. The question of further and general prohibition to be considered upon experiences gained.

It was therefore resolved that—

16,540. In all Federal departments for four years from 1st January 1904, only leadless materials to be used for painting, and a condition for leadless materials to be inserted in all contracts.

16,541. During the trial period materials to be collected by the Department of Labour useful for consideration of general prohibition.

*Extract from Protocol of Federal Council,  
30th June 1908.*

16,542. 5th June 1908.—Report of Factory Inspectors and Dr. Roth:—

- (a) For outside work white lead is indispensable—at least at present.
- (b) In accordance with the general opinion of the trade there was nothing to prevent prohibition for inside work. Cost of a substitute would be higher.
- (c) For moving materials (e.g., railway rolling stock) and iron constructions in the open, leadless materials give unsatisfactory results.
- (d) Red lead especially cannot be prohibited—its use for painting iron (grounding) and other purposes is indispensable.
- (e) Generally, a considerable increase of the use of lead is indicated.

16,543. The Federal Council therefore considers that:—

16,544. The discussion of the question in all its bearings is not yet possible, because there is no effective substitute for lead—apart from inside work.

16,545. In any case any enquiry would extend over many years and have to be on strictly scientific lines, and would have to take into account the general industrial circumstances. Such a commission was not recommended, as there had been unfortunate experiences in foreign countries.

16,546. Further practical developments would give further information.

16,547. They did not consider feasible the legislative prohibition of the inside use, as in the present state of the law it would only affect a limited number of businesses, and it would not be expedient to make a special prohibition for inside work.

16,548. The only effective step to be taken was the restriction of the use of white lead in Government works.

It was therefore Resolved that:—

16,549. The use of white lead for inside work be prohibited in all the works executed by or contracted for by the Federal Governmental Departments.

16,550. (Chairman.) Can you tell us if there are any statistics showing the amount of lead poisoning among painters in Switzerland?—There are no very exact statistics, because the painters in Switzerland mostly consist of a floating population, chiefly Italians, who come and go, irregularly, and have no fixed abode for any length of time.

16,551. Are there any statistics for Geneva?—The same holds good for Geneva with regard to the majority of painters in Geneva. There are only some 300 painters who work continually in Geneva.

16,552. Do the Italian workmen come in in the summer time?—They generally come in in the summer, and stay, as a rule, only two or three months. They go as soon as there is no more work.

16,553. If these Italian workmen suffered from lead poisoning, they would not come under the cognisance of the Geneva doctors and the authorities?—They do not really come into the statistics, because, although they are treated at the hospitals in Geneva, they have travelled about such a great deal that it is impossible to ascertain the origin of their illness.

16,554. If there are no reliable statistics showing extensive ill-effects of lead, this fact may account for half the workers consulted being against prohibition of lead?—The chief reason is that there was in Geneva at the time of our inquiry no properly-constituted trade union of painters. There is a trade union, but it consists chiefly of foreigners, and it is impossible to obtain an accurate account of all the painters working in Geneva, and the trade union cannot obtain a proper vote of all its members.

16,555. The general conclusions arrived at by the Commission, as quoted by you in paragraph 16,498, are doubtless based, to a large extent, on the fact that you have extremely little evidence of lead poisoning in Geneva?—They have never found in Geneva a real danger in the case of proper or clean painters. There are a number of painters who have been in the trade for some 50 years who have grown up in the trade, and who have worked originally with white lead in the form of dry powder, and they have all said that as far as they themselves were concerned they have never known of a serious case of lead poisoning.

16,556. If the Commission in question had had to consider the question of house painting in a country where large numbers of cases of lead poisoning occurred every year, their conclusions might have been modified, I suppose?—It is not at all certain that they would have arrived at the conclusion of prohibition if they had found a large number of cases, because they carefully went into the causes of lead poisoning. If they had found a large number of cases of poisoning, they would have found as the principal reasons the lack of cleanliness, and the danger of dust from dry rubbing down and scraping, and they would have introduced regulations, but they would not have come to prohibition.

16,557. In paragraph 16,501, you refer to a difference between painting in France and painting in Geneva. In what respect are the circumstances different? You draw attention to the great difference there is between the Geneva conditions and the French conditions?—The chief reason is that Geneva is a small place, and there is only a comparatively small number of master painters, who are all known to each other, and they exercise on each other a sort of mutual control. Further, the Geneva painter is much more advanced than the French painter, and is generally more prudent in his work, and takes more precaution in regard to his health.

16,558. (Mr. Sutherland.) More advanced in what way?—In his education as a worker.

16,559. Do you mean technically in his trade, or general education?—Technically, the French painter is quite as efficient as the Geneva painter, but the Geneva painter seems to be more careful in regard to the effect of his trade upon his health. For instance, a thing never known in Geneva is for a painter after work to go straight away to the bar without washing or changing his clothes, whilst the French painter no doubt does not take the same precautions.

16,560. (Chairman.) There may be different conditions in England, which account for a large number of cases of lead poisoning among house painters, as compared with a very small number in Geneva?—That is very probable, but I do not know anything of English conditions.

16,561. In your proof you have gone somewhat into detail regarding *ex parte* statements bearing on the

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French reports. We cannot discuss individual French witnesses unless we are going to hear the whole of the evidence which was placed at the disposal of the French Commission?—Can you give an instance of my having quoted a French witness?

16,562. Yes, there are a great many here: "The reporter of the Commission was surprised and astonished at the gross inaccuracy and recklessness displayed in a large number of the statements appearing in the French reports." You will understand that unless we can sift all these statements thoroughly, it is very little use considering these sorts of statements?—I am quite prepared to give you a supplementary report proving all the self-contradictions contained in the French inquiry. That, of course, will be a very lengthy piece of work.

16,563. We have, however, before us the fact that France has resolved to prohibit the use of lead after sifting all the evidence on both sides?—The fact that the French Government has decided on prohibition does not prove anything, either for or against white lead. The conclusion of the report of the French inquiry was that part of the witnesses were in favour of white lead and part of them against; and it was simply debated in the Chamber of Deputies, and the majority voted for the witnesses against white lead, but I think that this does not prove anything either way.

16,564. But why did the majority vote in favour of prohibition? You have not explained that yet?—My chief point is, that the French Chamber of Deputies arrived at conclusions on a divided report, and not on the report of a finally settled result.

16,565. Do you maintain that the French Deputies were incapable of sifting the evidence and arriving at a conclusion themselves?—The majority of the French Deputies do not seem to me to have considered the question from a scientific point of view, and they would be unable to sift the evidence given by technical men. Thus have rather decided in accordance with a wave of opinion and on principle.

16,566. But how do you suggest that the general current of opinion arose on this subject?—The point is, that there are two currents of opinion, the opinion of the workers, which is in favour of prohibition, and the industrial and employers' opinion, which is against prohibition. The point is simply this: if you accept the report of Mr. Treille, you are bound to be against prohibition. If you accept the report of Mr. Breton, you are bound to be in favour of prohibition.

16,567. (Mr. Sutherland.) Were there two reports?—Yes, the report of Mr. Treille, and the report of Mr. Breton.

16,568. (Chairman.) This is the report of two doctors, is it not?—It is expert evidence by two doctors. They were two members of the Committees of Inquiry. Mr. Treille was a Senator, and drew up the Senate Report; Mr. Breton was a deputy, and drew up the Chamber of Deputies' Report.

16,569. The reporter of the Chamber of Deputies was Mr. Breton?—Yes.

16,570. As a result of the Swiss Commission a law was passed in October 1907, and regulations applying to the use of lead were issued in December 1907. It is clear, then, that the necessity for some action, either prohibition or regulation, has been recognised in Switzerland?—That law applies only to the Canton of Geneva, not to Switzerland.

16,571. Are you speaking also of the regulations of 1907?—Yes. The regulations of 1907 apply only to Geneva.

16,572. Then it is clear that the necessity for some action, either prohibition or regulation, has been recognised in Geneva?—It has been added here, that the Geneva inquiry had a report before it, which made it impossible to decide on prohibition. There was the report of the minority, but that report did not disprove anything contained in the other report.

16,573. If the Geneva workmen have been so free from lead poisoning, why was it that the necessity for regulation was generally recognised?—Though there were very few cases of lead poisoning, one recognised that there were certain methods of working that might

give rise to danger to the workmen, such as dry rubbing down and scraping, and also lack of cleanliness amongst workers. There is in Geneva a considerable number of apprentices, unskilled workers, and they might be poisoned; but on the other hand, there are very few cases of poisoning, because the majority of the workers were careful.

16,574. These regulations prohibit the use of white lead in powder, they prohibit dry pumice-stoning, dry scraping off and burning off of paint; they prohibit the direct use of fillings with the hand; and they require the provision of washing accommodation, overalls, and places for clothing put off during work. How are these regulations enforced?—Firstly, all men have to be informed of the regulations by means of a poster (*producing a specimen*). The remaining part of the regulations applying to the provision of overalls and places for clothing is put on a similar poster, and the police are charged with the enforcement of the regulations. Also the Works Department or the Police Department are entitled to receive complaints from workers, if there are any.

16,575. Do the police enter houses where jobs are being done?—The sanitary police generally try to obtain their information from the contractor, or from the person owning the house, but they very rarely actually enter a house, unless they receive a complaint. They enter a house directly without notice only as the last step, if it becomes absolutely necessary, if they find that they cannot otherwise obtain the information they want.

16,576. From whom do they receive complaints?—It may be either from one of the workers or some person interested in the proper enforcement of the regulations.

16,577. Do the workmen often complain?—Since the coming into force of these regulations, there has not been a single complaint from the workers.

16,578. How can dust be prevented in house painting?—First, all dust-raising operations have to be carried out in the wet way, that is sweeping, pumicing and scraping off have to be done in the wet way. In the case of scraping off, the paint is moistened with a solution of soda and then scraped off. The paint comes off in the form of a length of scraping, somewhat like rubber. In the case of rubbing down, it is simply moistened with a sponge, and then rubbed down. Exceptions are allowed in regard to dry rubbing in certain special cases. In the case of white new surfaces freshly painted, it is permitted to rub them down dry, and in the case of luxury work, dry rubbing down is permitted, but in that case the worker may not spend more than half of his whole time on this class of work.

16,579. Are these regulations made by the police?—Regulations have been drafted by the head of the police, but he had sanction from the Government, as the head of the police cannot set out regulations which apply to the whole of the Republic, that is to say, the executive authority.

16,580. Are the regulations in Geneva made by the police always faithfully obeyed?—It is very hard to say whether regulations are always obeyed, because the people of Geneva are very individualistic, and they are very like the English in their respect for their own liberty. There is always a certain struggle between the authorities and other parts of the community to enforce respect for the police.

16,581. We have been told by many witnesses that some dry rubbing down is indispensable. If they are right, how would you protect the worker from the danger of inhaling dust containing lead?—There is never any necessity for dry rubbing down, because dry rubbing down is only required for very fine work, and in the case of very fine work, for interior painting; what is generally done is that the first two layers of paint are of white lead, but the last layer of paint is of zinc white, which is much whiter and smoother than white lead, and keeps its whiteness better than the other, and the final coat, which consists of zinc white, is rubbed down.

16,582. But in Geneva do they never rub down on the first two coats?—If the plaster on which the paint is applied is absolutely smooth, it is unnecessary to

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do any rubbing down of the first and second coats, and masons generally take great care to obtain a very smooth plaster to work on. In the case of painting on wood it is always possible to obtain a smooth surface to paint on, and it has constantly been found that one can quite well dispense with dry rubbing down entirely. The regulations which have come into force for Geneva were made by the police only after consulting a number of master painters.

16,583. Your regulations lay down that adequate lavatory accommodation should be available. How can these lavatory regulations, and the provision of hot water, be enforced?—There is no mention of hot water in the regulations.

16,584. The provision of hot water is not laid down, but lavatory accommodation is, is it not?—It is not necessary to provide actual lavatory accommodation. It is only necessary to have a continuous supply of water for the men.

16,585. Next with regard to overalls. How is the wearing of these enforced?—This is controlled by the sanitary police. They frequently inspect work on new buildings, and they would always see at once if the workmen were wearing their blouses. The chief point concerning overalls is that the master painters are compelled to see to the washing of the overalls, because the men themselves do not have them washed sufficiently frequently.

16,586. (*Mr. Sutherland.*) Do the master painters wash them?—Yes; it is the duty of the master painters.

16,587. (*Chairman.*) If regulations are to be adopted and enforced, it will obviously necessitate a body of inspectors to see that the rules are observed?—That is perfectly true, but if you come to prohibition you will have to appoint a still greater number of inspectors to see that prohibition is carried out.

16,588. Inspectors to enforce regulations would have to enter every place where painting operations were carried on, even private houses?—These new inspectors would certainly have to have the right to enter any house they thought fit to inspect, but at present there are no special inspectors for this work in Geneva. The inspection is carried out by the police authorities. However, Geneva hopes to have soon a new organisation of inspectors, and in that case the police will be relieved of that work.

16,589. The duty would also have to be laid on the employer of notifying every place in which painting operations are carried on?—In Geneva it is not permitted to carry out any type of work on buildings without informing the authorities previously.

16,590. Even painting work?—It applies to all.

16,591. Repainting of private houses?—Yes, because all painters come under the heading of contractors, and all contractors are compelled to have a general licence for working, and consequently can be controlled with regard to where their workers are.

16,592. Does the fact of having a licence compel the employer to notify every job of repainting a private house?—The licensed contractor is compelled to keep a list of where all his workers are, and he is compelled to show that list on demand. It is necessary to have that list in order to carry out the federal law of labour and also that of insurance.

16,593. (*Mr. Sutherland.*) Has the master painter in Geneva to be licensed?—All professions have to be declared.

16,594. But have they to take out a licence before they can undertake work?—It is not exactly a special licence, but a general licence for working. It is an information given to the local authorities of his having set up in a certain undertaking. It does not necessarily imply any definite skill.

16,595. (*Chairman.*) You say that the employer has to declare where his men are working, on demand. Will you tell the Committee on whose demand? Whose duty is it?—The Board of Trade authorities if the employer is subject to the laws just mentioned.

16,596-7. The Board of Trade authorities are not the inspectors under the regulations? Have the police authority to demand where the workmen are working?

—No, they have no authority apart from the authority of the Board of Trade.

16,598. If a large number of the employers of labour themselves prefer prohibition of the use of lead, to a cumbersome and irksome code of regulations, would not that cause you to modify the views you have expressed?—Is the supposition that they have a preference?

16,599. The supposition is that the majority of employers who have hitherto appeared here, prefer prohibition rather than cumbersome and irksome regulations?—In Geneva the majority of master painters were in favour of regulations rather than prohibition, because they all decided that it was impossible to dispense with white lead for most of their work.

16,600. Have these regulations been successful? Has there been any improvement in the number of cases of lead poisoning since they have been enforced?—Before the coming into force of the regulations there were extremely few cases of lead poisoning, and at present there are still very few, or possibly a less number of cases of lead poisoning, because these statistics only deal with the workers fixed in Geneva.

16,601. Then if there never have been any complete statistics, how is it possible to say whether these regulations have any value at all?—It would be possible to prepare statistics of nomad workers, but in such case I think it unfair to apply these figures obtained for nomad workers to estimate the result of these regulations, because these regulations are in force only in Geneva, and therefore one should count only the cases of lead poisoning which have been caused in Geneva, and since the coming into force of these regulations there has been only a single case of lead poisoning amongst Geneva workers—a case of dry rubbing down in spite of the prohibition.

16,602. But we understood, at the opening of your evidence, that in Geneva there were no reliable statistics, and that it was not possible to say how much lead poisoning did occur in Geneva?—Even if there were statistics for the nomad workers they are not very valuable, because they only register the number of cases and the duration of the illness when they have been in hospital. They do not take cognisance of the origin of the illness. It is never possible to ascertain whether the man fell ill from lead poisoning as the result of dry rubbing down or painting, or bad working, or any such thing, and that is also difficult enough in the case of permanent Geneva painters.

16,603. Can you give the Committee the statistics as to nomad workers?—No, but Dr. Rochi, who will be before the Committee later to-day, will be able to give these figures.

16,604. If it is impossible to use anything but white lead with satisfactory results, how is it that leadless paints have been successfully used for six or seven years by the Midland Railway for all their carriages and waggons?—I cannot judge the conditions holding good for the Midland Railway, and I have no opinion on that point, but in France they decided to do away with white lead, and decided to do iron work free of lead paint. It was done in this way: they gave the iron first a coating of red lead; and then afterwards zinc white on top. This was called leadless paint. In the case of the Metropolitan Railway of Paris it has been used considerably, but they always used a thick layer of red lead and zinc white on top of that. I do not know of any case where zinc white has been put directly on iron where the paint has lasted. In France minium (red lead) has not been prohibited.

16,605. (*Dr. Collis.*) Other paints can be used, without lead, which are not zinc white. Graphite paints, for instance?—It is possible.

16,606. (*Chairman.*) Leadless paint has also been used for a shorter period by other railway companies; for several years by the Bradford Corporation for their tramway cars; for four or five years by the Daimler Motor Car Company and other motor-car firms, for the whole of the paint-work on their cars?—It is quite possible to obtain good results with leadless paint, but then you have to put on one or two or several more coats of paint to obtain a satisfactory result. That

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has been admitted by a number of painters before the Geneva Inquiry. They do not wish to put on these extra coats of paint.

16,607. (*Mr. Sutherland.*) It costs more?—Yes.

16,608. (*Chairman.*) The Savings Bank buildings in London were painted in 1906 inside and outside with zinc paints, and reported in excellent condition in 1910, when they became due for re-painting?—I quite agree that it is possible to obtain satisfactory results with zinc white, but only under certain special conditions, provided that you put on a certain number of extra coats of paint. They had the same question before them in Geneva, and they had to decide between the right to use white lead or not, and they came to the conclusion that they should permit the use of white lead, because it was possible to reduce the danger of painting to a minimum, provided that the painting took place under certain conditions. They felt they had no right to interfere with an industry which might be put under such conditions that the danger would be sufficiently reduced.

16,609. Are you aware that the Office of Works has stated that it is not necessary to put on extra coats of paint, and that painting with zinc white paint does not entail any extra cost?—In Geneva they did not obtain the same result, but they obtained a different result.

16,610. Are you aware that the top structures of the Orient Steamship Company's liners and of the Royal yacht "Victoria and Albert" and of the "Medina" are all painted with zinc white?—I was not aware of it.

16,611. Are you aware that various gasometers and other iron work have been painted with certain proprietary paints—zinc and iron oxide paints?—I am strongly in favour of the use of zinc white instead of white lead, and I hope that it will be possible to replace the use of white lead entirely by zinc white in a few years, when we have more experience on the subject. But I speak as a legislator. My colleagues felt that they had no right to suppress the use of white lead, as they were convinced that white lead could be used without any danger to the individual.

16,612. (*Dr. Collis.*) Do I understand that in connection with the inquiry in Geneva there was a minority report?—There was a report of the minority, and it is affixed to the other report. The report of the minority does not refute any of the statements made by the report of the majority. There is no single point dealt with scientifically. It simply makes general statements. The report is appended. This report was made by a single member on the Committee of Inquiry, and it was that member who had started that inquiry and who had moved for a law of prohibition of white lead in the Chamber, and, in my opinion, this report was very feeble in all its arguments.

16,613. It was the report of one member only?—It was the report of one member only, the member who had originally moved the prohibition.

16,614. (*Chairman.*) Was Dr. Wyas in a minority of one?—Yes, he was the only person in the minority.

16,615. (*Dr. Collis.*) How many were there on the committee?—At the beginning of the book the constitution of the committee is given.

16,616. What number were there?—I believe that there were eleven, but I cannot say for certain without referring. I think I can furnish you with the exact number, and also the names of the members on the Commission.

16,617. Have the police kept any list of the number of private houses which they have inspected with regard to the question of house painting since the law for the Canton of Geneva was passed?—There is a list of all the works carried out in the hands of the police, and I was informed by the chief of the police before I departed for England that they had never been able to find a single case of contravention of the regulations.

16,618. The factory inspectors in Switzerland publish the number of visits they make every year, do they not, not necessarily inspection of house-painting, but factory inspection?—There are three kinds of inspectors; first, Federal inspectors—those inspectors who are in the pay of the Federal Government, and

who do one kind of inspection. They have the right to control the Cantonal inspectors (the inspectors of the counties, so to speak) to inspect, and those Cantonal inspectors further have the right to instruct the police to go on an inspecting visit. The Federal inspectors make a report of all inspections every two years, and I have here the reports of 1908 and 1909.

16,619. Will this report include the work done by the police on behalf of the Federal inspectors, in house painting?—This does not contain the report of police inspection, but it contains the report of inspections done by the Cantonal inspectors, who hand in their reports to the Federal inspectors. The chief reason for this is that the majority of painters do not come under the inspection of the Federal inspectors, because they do not come under the Federal factory law.

16,620. It appears to me that the regulations laid down require a certain amount of skill to enforce. The individual must have a knowledge of the trade. Have the police in Switzerland the skill, and have they the knowledge of the painting trade to enable them in their ordinary work to enforce these regulations?—No. I think that the police do not have any such knowledge, which I think extremely necessary, and I therefore think it desirable that the inspection of painting should be placed entirely in the hands of the Cantonal inspector, who always is a technically trained man.

16,621. You say that the Cantonal inspectors have power to give instructions to the police to make certain inspections. I presume that is only to places which are under the Factory Act, and does not include house painting?—No. The police have the right and the duty to inspect those painters who do not come under the Factory Act, but I desire that it should be taken from the police and placed exclusively in the hands of a technically trained man, the Cantonal inspector.

16,622. You do not think it satisfactory to leave the inspection in the hands of the local authorities, such as the police?—I think it most undesirable that it should be in the hands of the police, because I think it is likely to scare the painter if he is visited all of a sudden by a policeman, and I think it much better that it should be in the hands of a technically trained man. You cannot possibly obtain good results of control by control through the police.

16,623. Do you know how lockers and places sufficient to keep free from poisonous dust clothing which the workers take off during their work, can be supplied on work in private houses done away from the factory?—In the country wooden boxes can be used.

16,624. Who provides the wooden boxes?—It is the duty of the master painter to supply such a box. The master painter has done his duty if he provides a special room where the clothes are kept, and that room must be closed, of course.

16,625. Yes, but in the case of boxes, are these boxes never used for anything else?—If there are boxes they should not be used for anything else, but I have no proof that they are not.

16,626. (*Mr. Sutherland.*) You said that the report presented to the French Chamber was a divided report. What do you mean by that?—There were two reports handed in, one by the senator, Monsieur Treille; it was against the prohibition of white lead; and there was another report handed in by Monsieur Breton, a deputy, which was strongly in favour of prohibition. There was an additional report, supplemental to the first report, by Mr. Pédebidou.

16,627. These gentlemen were all members of the same profession, were they not?—There were certain alterations in the composition of the committee during the inquiry.

16,628. But one of these did not report to the Chamber, and one to the Senate?—Monsieur Treille was a member of the Senate, and Monsieur Breton a member of the Chamber of Deputies.

16,629. There was a conflict of opinion, was there not, between the two bodies on the question?—Yes. The report for the Senate was by Monsieur Treille, and the Senate appears to have decided against pro-

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hibition, whilst the report for the Chamber of Deputies was the one by Monsieur Breton.

16,630. Your complaint of the inaccuracies of the report is sustained, is it not, by Professor Gautier's figures as given?—Dr. Armand Gautier is the medical man whose duty it is to make an annual report on lead poisoning. There is also a statistician, Bertillon, and both their figures bear out my opinion that the figures given in the French report are not in agreement. I am of the opinion that the French inquiry was not held in a scientific or in an impartial spirit. Some of the statistics given are quite meaningless. For instance, Armand Gautier quotes all the cases of death from lead poisoning amongst painters, and compares them with the total number of deaths occurring in France amongst all classes of people, whilst Mr. Bertillon compares the number of deaths from lead poisoning with the total population, and I think it a most absurd comparison. I think the only way you can obtain comparative figures is to compare the death rate per 100 of painters with the death rate per 100 in other professions. I could quote a number of other instances in which the figures compiled in the French inquiry are incorrect or useless.

16,631. Did the French Government make any practical tests of different paints?—The French Government did not carry out experiments, but all these experiments were carried out under different conditions, and consequently they do not prove anything, and have no right to be called scientific experiments.

16,632. Would you be surprised to hear that a witness in this room stated that there were hundreds of painters suffering from lead poisoning walking the streets of a certain English town, and yet a certifying surgeon in the same town, giving evidence to this Committee, stated that they had only had 15 cases in two years?—I am not in the least surprised, because before French inquiries I have frequently found similar discrepancies. Dr. Roch, who will be before this Committee this afternoon, states that it is frequently very difficult to identify a case of lead poisoning, and it may be confused with alcohol poisoning, and altogether the cases of poisoning which have been put into statistics have frequently been badly observed or not properly classified.

16,633. In paragraph 16,511 you state, "The question of the thickness of the coats is equally important, because a painting composed of a number of thin coats is much more lasting than one composed of less coats applied thicker." Is not that a very strong argument in favour of white lead? Will you tell the Committee why you can spread white lead into a thin serviceable coat, and why you cannot do the same with zinc?—The chief point is that the durability of paint depends not on the number of layers of paint, but on the thinness. The maximum durability of paint is obtained if you have a great number of extremely thin layers, and it is possible to obtain much thinner layers with white lead, because the white lead itself forms a more solid coat than zinc white; the reason for this being that lead carbonate forms with the linseed oil a soap, whilst zinc white does not do so.

16,634. Your evidence confirms the evidence of master painters whom we have had before this Committee?—That is the opinion of all the master painters in Geneva.

16,635. The National Association of Master Painters of England and Wales have passed a resolution which they have sent to this Committee that they prefer that a trial should be given to regulations before resorting to the prohibition of white lead. Do not you think that a more reasonable attitude?—I think it is extremely difficult to judge the conditions in a country which I do not know; but, generally speaking, I think that regulation is a far more reasonable course to take than prohibition, because first, I am convinced that by means of proper regulation you can reduce the danger to painters to the same degree of danger occurring in any other trade, such as, for instance, roof builders or

railway employees, or any other profession. The only point necessary is to stop the creation of dust in painting, and the absorption of white lead by the mouth. I think it not just to try prohibition, and I think it also impracticable. I think it will be much easier to control the enforcement of the regulations than to control the enforcement of prohibition. It is very rare that you obtain zinc white which is absolutely free of lead, and it will be very difficult to control all the time how much lead is to be allowed in the zinc white. Then you would have to decide whether you are to bar a paint containing  $\frac{1}{2}$  per cent., or 1 per cent., or a higher percentage of lead. I would very much like to see the way in which England proposes to carry out the enforcement of complete prohibition.

16,636. So that prohibition would not release the Government from instituting a staff of inspectors. They would have to have a staff of inspectors to see that prohibition is carried out?—Exactly.

16,637. The Savings Bank and other buildings named by the Chairman were all painted with proprietary paints; that is paints in which there is a large element of varnish to strengthen the zinc and other ingredients. Now can we compare paint made in this way, at a largely increased cost, with ordinary white lead paint in the ordinary operations of building?—I think it unfair to make a comparison of varnish paint with a pure oil paint.

16,638. Are not experiments made by the Federal Council extending over four years and leading up to the conclusion that they can only dispense with white lead for inside work, a very strong argument for permitting the use of white lead?—The prohibition of the use of white lead on inside painting is not a law in Switzerland. It is simply a decision of the Administrative Council or Federal Council to use zinc white for the present on interior work, and they may return at any time to the use of white lead.

16,639. But is it not the law so far as the Federal Government is concerned?—It is not a law which has been passed by the Government, but it is purely an edict of a department, something corresponding to an edict, say, of the British Office of Works.

16,640. The Admiralty and the War Office of this country are the largest consumers of white lead in this country. They use thousands of tons a year. Now is not that an argument as to the value of white lead, because if they could get any efficient substitute they would be anxious to remove the dangers arising from its use, but they still use it?—Zinc white was discovered some 50 years ago; for fifty years they have tried to substitute zinc white everywhere for white lead, and for fifty years it has been found impossible to replace white lead efficiently by zinc white. I think that the British Admiralty must have come to the same conclusion. I think it impossible, and an error of judgment, to try the prohibition of white lead, because it will not be practicable. There are always certain purposes for which lead must be used, and prohibition will have to contain numerous clauses of exemption in which they will be permitted to use white lead, and the control of these exempted cases will be far more difficult than regulation. You will also have to permit possibly paints containing certain maximum limits of lead, and these will be extremely difficult to control.

16,641. (Mr. Gardner.) As the house painting industry in Switzerland does not come under the Factory Act, the figures which have been given in paragraph 16,536 are of no service?—Those figures given in paragraph 16,536 are certainly outside the scope of the federal inspectors of factories, but the cantonal inspectors, who have the right to inspect painters, have given these figures for the purpose of statistics to the Federal inspectors.

16,642. Then they apply to house painters, and not to factories under the Act?—The latest publication by the Federal inspectors contains this statement: "We have sent round an inquiry to the departments of cantonal inspections and have from them obtained figures concerning painters", and the figures for painters are published. These figures are later figures than those given in my evidence above.

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16,643. Can you tell us if the Swiss workmen are better nourished than the French workmen?—It is impossible to say. It is a question of locality.

16,644. If the workmen in Switzerland said in 1902 that the proved dangers to health of white lead made it a duty to effect its removal from use, and that there were no technical difficulties in the way of removing it from use, should not a great deal of weight be given to the opinion of the men who are always using the material, as opposed to the opinion of those who merely go into it from a scientific point of view?—I think that you have to take into account also the opinion of the master painters, as most of the master painters are former workers themselves.

16,645. The factory inspector's report that regulations would not be effective owing to lack of control. If that is the case, of what use are regulations?—I have never stated that it was impossible to control. What I said was that it would be far more difficult to control prohibition than to control the enforcement of regulations.

16,646. Do you agree that an unskilled man may be able to apply white-lead paint much more easily than a zinc paint?—It is generally the custom, for interior work in houses where zinc white is used, to have painters who do nothing but painting with zinc white. If you get a new man on this kind of job, you have to explain to him the necessary conditions very thoroughly, and with white lead a new man requires very much less training than with zinc white.

16,647. But that is scarcely an answer to the question. I will put it in this form. A man who is not a painter can apply a white-lead paint when he could not apply a zinc paint?—I think that in both cases, whether he uses white lead or zinc white, if he has not learnt the trade he is quite certain to commit great errors.

16,648. Possibly why the Admiralty use so much white-lead paint is that they have unskilled men applying it, viz., the ordinary sailors. Probably the ordinary sailor could not apply zinc paint. That is the point I want to make?—The only difference is that with zinc white it is more difficult to obtain a thin layer of paint.

16,649. Then you will agree with me that when work is finished with a leadless paint it has to be applied just as thinly as a lead paint?—I certainly think that it is far more difficult to apply a finer coat of zinc white, because zinc white is generally mixed with a very much larger proportion of oil than white lead, and when a paint contains a less solid base than another, it will show far more marks of the brush than a thicker paint, and consequently it requires far more work and skill to obtain a thin smooth layer of zinc.

16,650. I suppose you are aware that a man may be suffering from lead poisoning, and yet not be so disabled as to be able to claim compensation from his employer?—I have no definite view on that point. I would prefer that you should put that question to Dr. Roch. But, generally, I think that the first symptom of lead poisoning is invariably colic, which would not necessarily prevent a man from continuing his work, and would not necessarily enable him to obtain compensation.

16,651. (Mr. Parsonage.) Do they pay compensation for lead poisoning in Switzerland?—Lead poisoning is considered a professional accident. In all cases of professional accidents the employer has to pay compensation, whether his employees come under the Factory Act or not.

16,652. If an employee suffered from lead poisoning, the employer would not give him work again after he had once paid him compensation?—He would certainly find a second job with the same employer.

16,653. He would certainly find one?—Yes.

16,654. With regard to the enforcing of regulations, we were told that it is left to the workmen to complain, but the workmen never make any complaints. If a workman made a complaint, would he be discharged?—Very frequently the man giving information against his master will be dismissed, but that depends on the mental attitude of his employer.

16,655. The same thing applies all round. With reference to the number of cases of lead poisoning, would you be surprised to hear that a surgeon who examines candidates for admission into the trade union, stated, that if he had to reject all candidates who showed traces of lead poisoning, he would have to reject over 50 per cent. of those who applied to him for admission into the trade union?—That question never occurs in Switzerland. Whenever a workman is ill, his trade union will show the greatest possible interest in him, and they will always be ready to admit a workman in need of support.

16,656. But they will not admit a workman and pay him sick benefits if, at the time he is applying for admission, he is suffering from a disease, will they?—It is impossible to give a general reply to that question, because a number of Swiss trade unions have different regulations applying to the admission of sick workers in particular cases of illness. Some of them admit workers who are in a bad state of health, and others do not.

16,657. With reference to its being easier to enforce regulations than to prohibit the use of lead, do not you think it would be much easier to pass a law to prohibit the sale of white lead to employers, than to carry out regulations where they have to enter private houses and make inspections?—If you prohibit and prevent the production and sale of white lead, then, of course, the white lead question is settled.

16,658. But the question is, would it be easier to do that than to enforce the many regulations that would be required?—Certainly. I acknowledge that it would be easier to do it in that way.

16,659. That disposes of the previous answer, that it would be easier to impose regulations?—Of course, that would be very much simpler if you could do it in that way, but you would have to make certain that no white lead was imported, and that other paints, which really are white lead were not sold under some other name.

16,660. Yes, that would be the position, and we could easily do that?—The French law does not deal at all with the production of white lead. It simply deals with the use of white lead, because the French law has assumed that there will always be cases where it is absolutely necessary to have lead carbonate.

16,661. (Mr. Kinggate.) Have you any practical knowledge of painting, either as a workman or as an employer in the painting industry?—I have no practical experience whatever of painting. I am a newspaper editor, and the only way in which I came into contact with lead poisoning is that I formerly heard of lead poisoning amongst printers; but now that they are cleanly and have to obey certain regulations, lead poisoning amongst printers has been entirely stamped out.

16,662. I take it, then, that all your information comes from the fact that you were secretary or reporter to the Commission that sat to inquire into the question of lead poisoning?—I gained all my experience by being secretary and reporter, but whilst I was secretary and reporter I felt that it was my duty to inspect personally some of the buildings where painting was being carried on, and I personally studied the craft in a practical way.

16,663. You have no practical knowledge of painting at all? We have to take it that your information is taken from the facts placed before you on the Commission and your own figures?—I beg your pardon. I myself went to new buildings and tried my hand at painting work.

16,664. We will take that for what it is worth. With regard to the evidence given before the Commission, there is rather a remarkable feature connected with it. Sixteen workmen altogether gave evidence. Eight trade union representatives are unanimous in favour of prohibition; but the others, who are not trade unionists, are in favour of the retention of the use of lead. May we take it from that that the organised workers of Geneva are unanimously in favour of the prohibition of the use of lead?—One cannot assume that the whole of the trade union is in favour of prohibition. First, at the time of the inquiry the

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trade union of painters was quite a small union, not registered and not properly organised, and the workmen who appeared before the Commission were asked to inquire from other workers whether they were in favour or against prohibition, and they all of them were unable to point out any large number of painters who were in favour of prohibition. It was also found that some of the members of the trade union who had appeared before the Commission were not resident workers, but were nomad workers, and consequently their opinion is not representative of the workers of Geneva.

16,665. Is it not rather a remarkable fact that eight of the workmen, the trade union workmen, are in favour of prohibition, and the other eight workmen are not? Does it not also point to the fact that the workmen might have been used by the employers for a certain purpose?—One cannot assume that these eight painters, who were not members of the trade union, were under the influence of the master painters in giving their evidence. On the contrary, one must assume that all the witnesses before the Commission were in every way uninfluenced. They were all of them well-known workers, who had lived there for some time—that is, the non-trade union men. They were fathers of families, and were men of long standing in the place; whilst the members of the trade union, who were in favour of prohibition, took that attitude simply because the painters' trade unions of all countries have always been in favour of suppressing white lead, without going at all into the scientific reasons why it should be suppressed.

16,666. It is very evident, then, that they know the danger attached to it. Would you be surprised to know that there are hundreds of cases of painters in England suffering from lead poisoning which are never reported. They are only reported to obtain the benefit of compensation generally, and the workmen often fear to apply for compensation because of the risk of losing their employment. We have had before us an employer witness who definitely stated that, if he knew a man was suffering from lead poisoning he would not employ him?—That may be the case in England, but it is not the case in Switzerland.

16,667. Mr. Sutherland put his point, so I thought the point should be put on the other side. That only shows that the statistics that are given in England do not in any way convey the evil of lead poisoning, and, further, insurance companies also as far as possible get employers not to employ men who have been suffering from lead poisoning?—That is totally different from the case in Switzerland. There is a compensation Act there which compels the master painters to pay compensation. That is always done quite independent of all insurance companies.

16,668. Seeing that there is great danger attached to this, as we know in England, if a substitute can be found to take the place of lead, do not you think that lead should be prohibited?—I think that, as soon as you find a paint which can efficiently take the place of white lead, white lead should be prohibited straight away, but that day has not yet arrived.

16,669. (Mr. Fell.) Do you know of any process in connection with carriage painting that could not be carried out with leadless paints?—The coach-painters who have given evidence before the Geneva Inquiry have all stated that they would refuse to guarantee the paint on a carriage painted without lead,

but they also asked to be permitted to do the rubbing down of the paint without water, provided that the paint was fresh, and for that reason an exception has been put in permitting the dry rubbing down of quite fresh paint.

16,670. What was their objection—weather conditions?—Because they considered that carriage paint is more exposed to bad weather than the outside paint of houses.

16,671. Yes; but the paint on carriages and on motor cars and railway carriages is thickly covered with varnish, and therefore is not so much exposed?—It may be a question of the contact between the varnish and the paint, but generally the coach-painters before the Geneva inquiry said it was impossible to do without white lead.

16,672. Do the coach-painters come under the same regulations as the other painters in Geneva?—The regulations apply only to public work, and to work on private buildings. The only regulation which also applies to coach-painters is that they are prevented from using white lead in the form of dry powder.

16,673. Is not dry rubbing down prohibited?—Only within the limit of Article 4, saying that the coach paint must be quite fresh. I would like to make another statement: These remarks, I wish to be understood, are purely confined to Geneva and Switzerland. I do not attempt to make statements concerning England. Generally, the question between lead and zinc is based on this: lead will form with the oil a soap that is a compound which is perfectly durable and stable, while zinc does not form such a compound with oil. Further, zinc is far more difficult to apply in thin layers, and zinc has very much less covering power than lead. When the inquiry was started in Geneva at first, Dr. Wyss moved in the House that white lead should be either prohibited, or its use should be saddled with certain regulations. Before this could be put into law or could be voted on, it was necessary to institute a public inquiry. Before this inquiry was instituted, I was strongly in favour of prohibition, because I thought there was a danger, and that it would be possible to do without white lead. I was elected to report on the doings of this Commission, and while on that Commission I gathered a good deal of information concerning white lead. I found out firstly, that it was impossible to replace white lead by any other article; secondly, that it was perfectly possible to suppress the danger by regulations, and I considered that to suppress white lead simply by prohibition would be an abuse of legislation. I had the instances of a good many old painters, who had been in the profession for a great many years, who knew how to carry out their work, and who had never suffered from lead poisoning, and I felt consequently that it would not be right to go to prohibition. Finally, the statistics of M. Bertillon have clearly proved that there are five professions in which lead is used, and in which there is greater danger of lead poisoning than in painting, but because in these professions lead cannot possibly be replaced by anything else, they have never been attacked. The five professions are accumulator making, printing, pottery, glazing, and polishing. In all these five professions lead is used, and the danger of lead poisoning is greater than in painting; but, because one cannot do without lead there, one has never attempted to legislate.

The witness withdrew.

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Evidence to 16,705 handed in and taken as read; witness then called and examined (through an interpreter).

16,674. I am Chef de Clinique at the Cantonal Hospital at Geneva.

16,675. In February 1906, a Bill for the prohibition of the use of lead compounds for painting having been presented to the Grand Conseil of the Canton of Geneva, a Commission was appointed by the Conseil to prepare a report upon the subject, and in the course of their inquiry that Commission requested the opinion

of the Société Médicale of Geneva. I was requested by the College of Medicine to prepare a report for discussion at the special meeting held on the 16th of January 1907, and in order to enable me to prepare that report I made a very exhaustive study of the subject from the purely medical side.

16,676. I desire to explain, in the first instance, that the Canton of Geneva being situated on the



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French frontier, a large number of French and foreign workmen migrate to Geneva during the spring and summer months in order to work at their trade, and among these are included a large number of house painters. The hospital serves a resident population of more than 130,000, without taking into account the surrounding district; the average annual number of patients treated being 2,200. Additional provision is made for treatment of the sick poor by a dispensary, or Polyclinique, which gives advice to some six or seven thousand patients annually.

16,677. I took out the statistics of cases of lead poisoning treated during the seven years preceding 1906 at the Cantonal Hospital of Geneva, and I found their total was 44, of whom 24 were house painters and 20 followed other trades. Upon inquiry of Professor Mayor, of the Polyclinique, I ascertained that not more than three cases of lead poisoning had been treated at the dispensary per annum during that period, and among these all the patients who were seriously ill had been sent to the hospital, and consequently had been included in their statistics. I went carefully through the medical history of each of the cases treated, and embodied the results in my report to the College of Medicine published in "la Revue Médicale de la Suisse romande," 20th February 1907, and in a review which I wrote with Dr. Edouard Long for the "Bulletin Médical of France" on the 27th of April 1907.

16,678. I ought, perhaps, to premise that I entered upon this study without any preconceived idea other than that of the great danger which since my early youth I had attached to the use of white lead, which I had been taught to consider a terrible poison. I need hardly add that I side neither with the workmen nor with the employers, and that neither the alleged action of the Vieille-Montagne zinc mine in Belgium, nor the contra efforts of the white lead manufacturers has been allowed to affect my judgment. I arrived, however, at a very definite opinion at the end of my studies.

16,679. I made a careful study of the medical literature on the subject and also of the then recent enquiries in France, Belgium and Germany before writing my report, which I sub-divided into headings as follows:—

16,680. (a) *The fight against white lead* (in which I set out the short history of the movement).

16,681. (b) *The comparative importance of lead poisoning*.—All poisonings are there classed under the one title of "Intoxicants." In going through the records, I was struck by the very large number of patients treated for alcoholism (which, of course, falls under the heading), and the small number of those who suffered from lead poisoning. For 20 cases of alcoholism, I came across scarcely one of lead poisoning. When there is taken into consideration the number of those suffering from alcoholism who refused to enter a hospital so as not to be deprived of their favourite poison, and when there are also considered all those alcoholics whose cases are classed under the titles of tuberculosis, pneumonia, gastritis, neuritis, &c., it becomes apparent that this proportion is still far from corresponding with the brutal facts. I found, however, that the registers of the Polyclinique appeared, even more strongly than those of the hospital, to support the relative insignificance of lead poisoning.

16,682. (c) *Lead poisoning and its gravity*.—My studies soon led me to the conclusion that so far as concerns the chronic lead poisoning which appears to me to alone merit the French name of "saturnisme," there can be no doubt as to its reality. Lead is a poison for which there is no immunity derived from habitual use—that is to say, all those who absorb appreciable quantities of lead become poisoned. It would appear, however, that various individuals are more susceptible than others.

16,683. It is rare that a case of saturnism escapes the attention of the doctor; in fact, one may say that the diagnosis is often of saturnism when in reality it is something else, for it is often sufficient for a house painter to have stomach trouble for his doctor to immediately diagnose lead poisoning.

16,684. Of the 24 house painters treated at the Cantonal Hospital in the seven years preceding 1906, 17 were simple cases of colic, and the others were more serious. Of the cases whose history was traced, six were engaged on rubbing off old paint, four cases were from neglect of elementary cleanliness, in three cases the man prepared the white lead in powder; himself, in three cases there was alcoholism, and one was of weak intellect.

16,685. (d) *Trades liable to Lead Poisoning*.—My investigation showed that everybody is exposed to lead poisoning, and that the ordinary person absorbs a milligramme of lead per diem. The number of workers exposed to lead poisoning in their trade is enormous. One list that I read showed 138 trades; and it grows with the progress of civilisation.

16,686. (e) *Prophylaxis of Lead Poisoning*.—Lead poisoning is brought about by the absorption each day of small quantities of lead, which accumulate in the body and eventually produce sickness. The greatest danger arises from dust and dirty hands; and undoubtedly from a medical point of view the most certain course would be to simply prohibit the employment of lead and all lead salts in all industries. Very little reflection shows that such a prohibition would affect the whole civilised world, and if this metal were prohibited there would appear to be no logical reason why a similar restriction should not be made against the use of petrol, benzine, and alcohol, which cause many more accidents and deaths than lead.

16,687. (f) *Etiology of Lead Poisoning among House Painters*.—I next ascertained which of the products of lead were used by house painters, and found that the following were used:—

- (1) Litharge, which acts as a drier by oxidizing the oils;
- (2) Minium, which is used for the first coats to iron work; and
- (3) Chromates, yellow and red, which are toxic, but relatively little used.
- (4) Sulphate of lead, which is claimed to be a substitute for white lead.
- (5) White lead or hydrocarbonate of lead.

16,688. Absorption takes place through: (a) the digestive organs; or (b) the respiratory organs, or (c) possibly through the skin, but the absorption by a healthy skin may be disregarded; the absorption by the respiratory organs is either by means of gases or dust. Upon the question of emanations at the ordinary temperature, it seems to me that having regard to the small volatility of lead compared with that of mercury, for example, the emanations arising under ordinary working conditions are negligible. The dust undoubtedly is a very great danger, whether the absorption be by way of the respiratory or the digestive organs.

16,689. The influence of alcohol upon poisoning is, I believe, very great, although indirect. It is the case that neuritis may be due to lead or to alcohol; and so also with sclerosis and cerebral troubles; alcoholism is one form of intoxicant and lead poisoning another. Nevertheless, I cannot say with Professor Treille that lead poisoning is only a branch of alcohol poisoning. The predisposing and aggravating influence of alcoholism appears to me to be exercised upon a house painter who is addicted to drink (amongst other ways) through his often stopping work to quench his thirst, without washing his hands or rinsing his mouth. As such a man is usually a rolling stone, he travels from town to town, often being put to the most dangerous tasks of rubbing down and flatting by different employers, in order to spare their good workmen.

16,690. (g) *Prophylaxis of Lead Poisoning among House Painters*.—All the authorities agree that lead poisoning is often a very serious intoxication and that it is necessary to take measures to limit it as much as possible. Different opinions prevail as to the best means of dealing with it, some being for regulation and others for abolition. Personally I advocate regulation, for the reasons I will indicate.

16,691. According to Professor Armand Gautier, the most toxic products of lead utilised in painting are first the chromates, secondly minium, and thirdly white lead.

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16,692. Although I am not competent to give any opinion upon the industrial side of the matter, it appears to me that salts of lead, white lead in particular, form with the acids of the oil metallic soaps, which cannot be produced either with zinc-white or barium, and that it is to this chemical property that white lead painting obtains those special qualities of solidity and durability which result from its use for exterior work.

16,693. I observe that the Belgian Government, who prohibited the use of carbonate of lead for their railways, have recently reversed that decision, and that the originators of zinc-white in France, the Leclair Company, also employ some 15,000 kilograms of white lead. These facts seem to show that white lead is indispensable for the exterior work, and that it is therefore also a great advantage for interior work.

16,694. Before prohibiting it, therefore, it is necessary to ascertain whether it is possible to do away with its toxic effects, and to ascertain whether it is really so terrible as one is led to believe. My own view is, and I think everyone else will agree, that the life and health of the workman is far more important than the question of the durability of painting. It appears to me, however, that not only is it possible, but at the same time it is easy, to prevent the poisoning, and I see no reason for a prohibition which would be regrettable from an industrial point of view.

16,695. Litharge, which is employed by reason of its oxidising properties, can, I believe, be replaced by oxide of manganese, but minium appears, for the moment at least, indispensable for the first coating of iron work.

16,696. To summarise, it seems industrially very difficult to prohibit all lead colours. Prohibition could only be partial, and partial prohibition is always difficult to supervise. It seems to me that proper regulations carried thoroughly into effect would be sufficient. In my view those regulations should include:—

- (a) Prohibition of dry-grinding and mixing.
- (b) Prohibition of the importation and supply of lead colours not already mixed with oil and ready for use.
- (c) Prohibition of the handling of white lead by the workmen when filling or making fillings.
- (d) Dry rubbing down with glass-paper which produces dust should also be prohibited, as should the burning off with a spirit lamp of old paint which is likely to produce toxic emanations.
- (e) The cleaning down of old paint should be done wet and with a liquid solvent.
- (f) Workmen should be prohibited whilst at work from smoking (especially cigarettes). They should be compelled to wear working clothes whilst at work, to take them off immediately they have finished and before eating their food, and the working clothes should be regularly washed.
- (g) A strict regulation should be made for the washing of the workmen's hands with soap, and the use of nail brush and clean towel before they partake of food. Perhaps, also, it would be advisable to have a medical examination of all painters once or twice a year.

16,697. If these precautions were carried out my opinion is that they would be very efficacious, and it seems to me before considering the question of prohibition, which would only be partial, and therefore hygienically insufficient, and might also give a false sense of security to the workmen, a lengthened trial should be given to the regulations which I have indicated.

16,698. I am told that workmen become so accustomed to the dangers that they neglect the precautions which they took in their early career, but because of that alone it does not seem to me that sufficient ground is made out for a complete prohibition.

16,699. The above is a resumé of the report which I submitted to the Extraordinary Meeting of the College of Medicine on the 16th January 1907, at which there were 48 members present. A considerable discussion ensued, in the course of which my colleague,

Dr. Long, pointed out that in his professional experience in Paris lead poisoning was more frequent and grave in France than in Switzerland, partly because of the practice in France of dry scraping of old paint, and partly because of the mixing of paint in the form of powder in the course of work. Dr. Mayor, the Chief of the Policlinique, also pointed out that none of the three workmen who had been treated at his dispensary had been in the habit of washing their hands before eating, and he opposed prohibitive measures and favoured regulations. Mr. E. Ador, a well-known chemist, also informed the meeting that workmen using zinc white were also subject to lead poisoning, because they used driers containing lead.

16,700. I submitted the following propositions or theses to the meeting, which were carried:—

1. In comparison with other causes of illness and mortality, such as alcoholism and insanitary dwellings, against which it is urgent to take energetic legislative measures, white lead poisoning is only of small importance in this country.
2. White lead poisoning shows itself frequently in the first instance by symptoms which are very alarming but not really dangerous in themselves. The dangerous complications nearly always ensue where people have not, owing to the force of circumstances, or their own negligence, taken notice of these first warnings.
3. There are a great number of trades and circumstances in which workmen are exposed to lead poisoning, and even if a law could completely suppress lead poisoning among house painters, this would not diminish by more than one-half the number of persons suffering from lead poisoning.
4. In a large number of trades in which workmen use lead and its compounds, and in which there is no possibility of replacing these products by others less dangerous, it is necessary to take simple but strict hygienic measures in order to diminish if not entirely prevent the poisoning of which they can be the cause.
5. The trade of a house painter, which permanently exposes the operator to the danger of lead poisoning, can be made one of little danger by minute attention to cleanliness, particularly before meals, and by the prohibition of the handling of the colours in a dusty state and of dry rubbing down.
6. It is desirable to suppress as much as possible the industrial employment of lead substances. So long as this prohibition can only be partial, it is necessary to take steps to protect workmen called upon to handle these products, and not only house painters, but also plumbers, enamellers and typefounders, &c.

16,701. The Commission having made their report, regulations were made on the 21st December, 1907, largely on the lines suggested by the College of Medicine, and I have been very interested in studying the effect of those regulations in the *interim*. In March, 1910, I wrote a further paper on the subject of "Lead Poisoning as an Avoidable Sickness" *appropos* of the cases treated at the Cantonal Hospital, Geneva, 1907, 1908, and 1909; published in "la Revue Suisse des Accidents du Travail" (March, 1910).

16,702. In this paper I set out that during those three years 20 cases of lead poisoning had been dealt with in that hospital, of which 10 were patients who were employed as house painters. 16 of the patients had slight attacks of colic, and, in fact, 18 of the patients had merely preliminary symptoms which although not really in themselves dangerous to the patients, were indications to him that he ought, if possible, to either change his trade, or take extra precautions in exercising it. During those three years, I was particularly careful to question each of the patients as to the steps he had taken to protect himself from the dangers of his trade. I found that in nearly every

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instance the sickness was due to some want of care on the part of the sufferer. The lack of precaution is almost incredible.

16,703. The experience I have had during the last three years entirely confirms the propositions which I put forward in 1907, especially having regard to the small number of cases of lead poisoning in my country, compared with those of tuberculosis and alcoholism.

16,704. Further, I am influenced by the fact that, from a medical point of view, the first attack, which is a sort of warning that the sufferer should take care, and the fact that house painters only constitute a portion of the patients affected by lead poisoning through their trade, and, lastly, that many of the trades subject to lead poisoning can be carried on without danger, so long as elementary and simple rules of hygiene are carried into effect.

16,705. As corroboration of the statement, that if ordinary care is taken in the matter of personal cleanliness, there is no real danger, I may mention that I have under my care at the present time a patient 70 years of age, who has been exercising the trade of a house painter since he was 15 years old, and has used little else than white lead, but who has never had any illness from lead. Everywhere one meets many of these old workmen, respectable, orderly, and cleanly, who have handled white lead all their lives without ever having any trouble.

16,706. (Chairman.) You state that you have found that all who absorb appreciable quantities of lead become poisoned. What authority have you for that statement?—I think that, in all civilised countries, all men absorb continually certain minute quantities of lead, but only if they absorb considerable quantities of lead will it lead to poisoning. This is a common opinion amongst medical men.

16,707. That everyone in a civilised state absorbs lead?—Yes, and that all those who absorb considerable quantities of it are poisoned.

16,708. (Mr. Sutherland.) Does that mean every inhabitant?—Yes, every inhabitant.

16,709. (Chairman.) Can you produce reliable statistics of lead poisoning in Switzerland?—Only for the Canton of Geneva.

16,710. Will you give them?—Yes.

16,711. If you hand them in that will be sufficient. Can you summarise them?—During seven years, that is from 1900 until 1906, in a population of 130,000, there occurred 44 cases of lead poisoning. Of these 44 cases of lead poisoning, 24 cases were painters. For 1907, 1908 and 1909, there were the following cases of lead poisoning: ten house painters, two coach painters, two plumbers, two enamel workers, a gas fitter, one stone worker, one colour maker, and one picture restorer.

16,712. Could you give the figures for the last two years since the regulations came into force?—In 1910 there were three painters, and one enamel worker; in 1911 there were two house painters, one enamel worker, one plumber, one tinsmith, and one baker.

16,713. (Dr. Collis.) Could you give us the figures for 1908 and 1909?—I can send the figures, but I have not got them here.\*

\* The witness has since forwarded the following table:—

Cases of Lead Poisoning treated at the Geneva Hospital.

| Country or Canton. | Age. | Profession.  | Illness.        | Remarks.                                 |
|--------------------|------|--------------|-----------------|--|
| In 1908:—          |      |              |                 |  |
| Italy              | 28   | Housepainter | Colic           | Does rubbing down.                       |
| Geneva             | 31   | "            | "               | Does rubbing down and bites his nails.   |
| France             | 32   | "            | Enteritis       | Works in Paris.                          |
| Tessin             | 44   | "            | Colic           | Works in France and rubs down and dusts. |
| Schwytz            | 45   | "            | " gout          | Very alcoholic.                          |
| Italy              | 21   | Coachpainter | "               | Rubs down dry, eats while working.       |
| France             | 46   | Lapidary     | Gastritis       | Cuts diamonds.                           |
| Italy              | 52   | Tinner       | Colic           | Does not wash his hands before eating.   |
| In 1909:—          |      |              |                 |  |
| Switzerland        | 33   | Coachpainter | "               | Alcoholic.                               |
| France             | 50   | Housepainter | Entero-neurosis | Neuropathic.                             |
| Italy              | 29   | Labourer     | Colic           | Uses red lead.                           |

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painting is done?—One would have to consider in this not only white lead but all the other lead colours such as red lead, litharge, and any other lead colours.

16,727. Would it not be more easy to supervise the mixing of those paints than to carry out regulations which would refer to every job in every single house?—It will be only easier if you make absolute prohibition of all the compounds.

16,728. Not, for instance, if a percentage of 5 per cent. of lead was allowed?—I do not think that it would be more easy in that case, because then one would not only have to superintend the manufacturer but also the workers, the painters.

16,729. Have you considered the possibility of restricting the use of lead to not more than 5 per cent. of lead compound soluble in dilute hydrochloric acid, a limit which has been found to give immunity from lead poisoning in the pottery industry?—I consider that a man who uses a paint containing 5 per cent. of lead would be more exposed to the danger of lead poisoning than a man who uses pure white lead with proper precautions.

16,730. What reason have you for thinking so?—In all cases where I have visited a painter suffering from lead poisoning, I have found invariably that the reason of the lead poisoning was the lack of the necessary precautions.

16,731. You are aware that in the pottery industry 5 per cent. is allowed without the full precautions, and that no cases of lead poisoning have been found traceable to the use of those glazes?—In those cases did they take any precautions against the creation of dust?

16,732. The provision requiring the use of fans in ware cleaning was set aside in that case. The use of 5 per cent. of lead in paints would allow a very wide range of colours, because, first, many lead colours such as chromates are not very freely soluble, and, secondly, in a mixed paint ready for use, a comparatively small proportion of lead colour is added?—I cannot answer that question from an industrial point of view; but I think, as long as you have any soluble lead whatever present, it will be necessary to take precautions as though you had lead alone present.

16,733. But if it could be demonstrated to you that 5 per cent. of soluble lead is allowed in pottery work, and allowed with immunity, would you be inclined to modify your opinion?—I am not prepared to admit that, as I do not know the conditions of work in a pottery.

16,734. In paragraph 16,696 you state what provisions should be included in regulations. The first of these (a) is the prohibition of dry grinding and mixing. Are you aware that the dry grinding and mixing by painters in England is practically unknown?—I am quite aware that dry grinding and mixing has almost died out, because generally white lead is now sold in the form of paste, but in 1911 I had two cases of lead poisoning among painters. One of them was due to the use of white lead in the form of dry powder. That was an Italian painter.

16,735. This provision, then, would not lead to any material alteration in the incidence of lead poisoning?—No.

16,736. Then (c). The prohibition of the handling of white lead in making fillings. Do you consider that this could be enforced?—I have no practical experience on that point. I simply conclude this from experience I gathered in France. In Geneva the handling of white lead for that purpose is practically unknown. It is generally done by a process, "enduisage," which is filling in with a pallet knife.

16,737. But how do you know that it is an almost universal custom to fill in by that process?—I have obtained my information by enquiring from sick workers.

16,738. Another provision is (d). Prohibition of dry rubbing down and rubbing off. You have stated in paragraph 16,686 you consider the danger from dust one of the most serious. Is it possible to prohibit all dry rubbing down?—That is a technical question, not a medical question, but I am quite convinced that all forms of dust of lead are particularly dangerous.

16,739. You draw up certain suggested regulations but you do not suggest how they should be carried out. Is that so?—I think that I, as a medical man, have done my share of the business if I have proposed the regulations necessary to protect the worker. The enforcing of these regulations is not my business.

16,740. But if the regulations cannot be enforced, what is the use of them? If they are so difficult to enforce, would it not be better to prohibit the use of white lead altogether?—If it is impossible to prevent the formation of dust, then prohibition would be better; but, from the information which I have received, I think it quite possible to prevent the formation of dust in painting work.

16,741. We have been told by many witnesses that some dry rubbing down is indispensable. If they are right, how would you protect the worker from the danger of inhaling dust containing lead?—One could have the work carried out by different workmen, so that one man should not always be kept at the work, and also one could insist on his wearing a wet mask or respirator.

16,742. Now, you say that old paint should be cleaned down with a liquid solvent. How would you enforce this regulation?—The only possible way of controlling is to punish or fine every painter who does dry breaking off of paint.

16,743. You say that smoking should be prohibited, and overalls insisted upon. How could this be enforced?—Simply by inspectors.

16,744. Lastly, you advocate strict regulations for the washing of the hands with soap, and the use of nail-brushes and clean towels before partaking of food, with possibly also medical examination of all painters once or twice a year. How can you ensure adequate lavatory accommodation being available on every painting job?—I think it advisable that the working men should be allowed five minutes before the closing of the working time to wash their hands, and this five minutes' washing time should be included in the working time, and they should receive payment for the five minutes as working time.

16,745. Is that the regulation in Geneva now?—I do not know.

16,746. If regulations are to be adopted and enforced, it will obviously necessitate a body of inspectors to see that the rules are observed?—Yes, that would be necessary.

16,747. Such inspectors would have to enter every place where painting operations were carried on, even private houses?—Yes, that would be necessary.

16,748. Is there a body of inspectors in Geneva?—The inspection is in the hands of the police, but it is practically inoperative. There is very little inspection carried out.

16,749. Are the workmen content that the inspection should be inoperative?—I think that the workmen are indifferent on that point.

16,750. The duty would also have to be laid on the employer of notifying every place in which painting operations are carried on. Do you agree?—Yes, I agree.

16,751. And if a large number of employers of labour themselves prefer prohibition of the use of lead to a cumbrous and irksome code of regulations, would not that cause you to modify the views you have expressed?—Yes, I quite agree; but for me the question of white lead is only a small part of the question, because there are so many other lead compounds which are used and which are dangerous.

16,752. You allow that lead is dangerous?—Yes.

16,753. Would you not agree that, if it is possible to prohibit the use of lead in paint, it would be a very desirable thing?—Yes. But even if in Geneva the use of lead paints were prohibited and that prohibition were strictly carried out, the total number of cases of lead poisoning would be only half.

16,754. Surely it would be much easier to supervise the mixing of paints than it would to follow every job in every house, as I said before. Do not you agree?—Even then it would be difficult to control the observance of these regulations, because it would be

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necessary to take samples of paint everywhere where painting is carried out, and have these samples analysed.

16,755. (*Dr. Collis.*) How many house-painters are there in Geneva?—It is a very varying figure, and I do not know whether you will find the figure given accurately in the depositions of M. de Morsier.

16,756. No?—(*After referring*) 300 to 400.

16,757. You say that the 24 cases of lead illness among painters were hospital cases and therefore severe cases?—Generally they were more or less grave cases.

16,758. In England we know that a proportion of lead cases die without ever having been admitted to any hospital. Is not this also possible in Switzerland?—It is possible. I think that it may be possible, but I think that there have been no such cases during the last ten years, because a movement against white lead was started by the workers and by the trades unions, and also all the medical men in small villages were influenced by these trades unions, and whenever they came across a case of lead poisoning they informed the other medical men of their medical society, and those cases were generally handed over to the hospital.

16,759. Is there any law calling upon a medical man to notify the authorities of cases of lead poisoning under their care?—No.

16,760. We have such a law in England for the factories?—That applies only to factories.

16,761. And all cases which die of lead poisoning are the subject of an inquiry by a coroner, that is to say an inquest is held, and information of all such cases is sent to us at the Home Office. We know that, over ten years, in the factories only 28 per cent. of the cases were severe. If we apply the same argument to the cases in your hospital in Switzerland, we should obtain for seven years not 24 cases, but at least three times 24 cases, namely 72 cases of lead illness among 300 to 400 men, which gives us an attack rate per year of 3 per cent.?—How can you decide in cases which are not lead? How can you identify cases as lead poisoning?

16,762. In all factory cases which are notified to us, we have a report from a certifying surgeon to us on the severity of the case. In England we consider an attack rate of 3 per cent. as very high?—I have difficulty in accepting your figure of 3 per cent. incidence amongst Swiss painters, because according to my experience the incidence is only 1 per cent.

16,763. M. de Morsier gives 3 per cent. in his report?—The figure of 3 given is the result of personal enquiries by M. de Morsier. My figures do not agree with his. According to my experience, the incidence is only 1 per cent. I have found an average of 1 per cent. of incidence amongst the four hospitals which I visited in Geneva. I do not know under what heading these 8 or ten painters mentioned there come.

16,764. I have asked you about the percentage in the hospitals. They are severe cases. We find that the severe cases are only 28 per cent.; therefore you must multiply by three, and you have still to make allowance for cases which do not go into hospital and which we know from experience in England die without ever going into hospital; therefore it is a low estimate to multiply by three?—I am quite willing to acknowledge

that your method of arriving at the total number of lead cases is quite correct.

16,765. It would appear, then, that the number of lead poisoning cases in their total in Switzerland, viewed as case incidence, is high?—I think that the incidence may be rather high compared with other professions, but there are certainly a good many other professions a great deal more dangerous than painting. I consider the danger of accumulator work much greater.

16,766. But have you exact figures? Our case incidence in regard to electric accumulators is not high?—I have not those figures.

16,767. Three per cent. case incidence is, in our experience, very high for any occupation in which lead is used in factories. The regulations which were brought into force were brought into force, I believe, at the end of 1907. So that there are now four years' experience, and there has not been, according to your figures, any reduction, so that we are hardly, from your experience, justified in trying to use the same method in England?—I hope that if you have regulations in England, these regulations will be a great deal better observed than they are in Switzerland. In Switzerland there is hardly any control to enforce these regulations, and they exist only by the good will of the master painters and of the workers.

16,768. We foresee similar difficulties in trying to get them enforced in England. Do you not think that any law which prevents so much lead being used in paint will affect others besides the painters, such as the manufacturers of lead paint, the manufacturers of white lead, the smelters of lead from the ore, and the getters of the ore from the mines?—The industries which you refer to do not exist in Switzerland, but it is, of course, self-evident that all these industries would be affected by the diminution of the use of lead.

16,769. Now you have drawn attention in your evidence to the fact that you have known individuals of 70 years and over who have been exercising their trade all their lives, and who have never had any illness from lead. Is not this a usual experience—that lead poisoning is more frequent among those who are first employed and first exposed to the influence of lead than among those who have been for a long time employed and who have escaped illness in the early years?—Yes.

16,770. Do you not think that there is some evidence to show that the worker can become to a certain extent immune against the influence of lead by long employment?—My experience is that generally these old men who have been referred to have not suffered from lead poisoning, and they do not show the blue line in the gums.

16,771. (*Mr. Robins.*) As a medical man, seeing that the use of white lead in painting is a dangerous occupation, do you consider that the hours of work should be restricted to a certain number of hours per day?—It is chiefly important in dangerous work that the painter should not have to finish his work as quickly as possible. Therefore I think it is desirable that painters should not be paid by piece-work. It is quite certain that the less a painter works the less he will be exposed to poisoning.

16,772. Then I take it that excessive hours, over the ordinary day, are dangerous?—Yes, I quite agree.

The witness withdrew.

**TWENTY-EIGHTH DAY.**

Thursday, 22nd February 1912.

## PRESENT:

LORD HENRY BENTINCK, M.P. (*in the Chair*).

Sir GODFREY BARING, Bart., M.P.

Mr. E. L. COLLIS, M.B.

Mr. W. G. SUTHERLAND.

Mr. F. G. RICE.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

Mr. A. L. C. FELL.

Mr. C. L. MASON.

Mr. C. KINGGATE.

Mr. W. ROBINS.

E. A. R. WEBNER (*Acting Secretary*).

Mr. CARL ADOLPHE KLEIN.

Evidence to 16,842 handed in and taken as read; witness then called and examined.

16,773. I am a technical chemist, and was educated in the Honours School of Chemistry, Victoria University, and was afterwards demonstrator in chemistry at Sheffield University College. Since that time I have had eight years' experience as technical chemist.

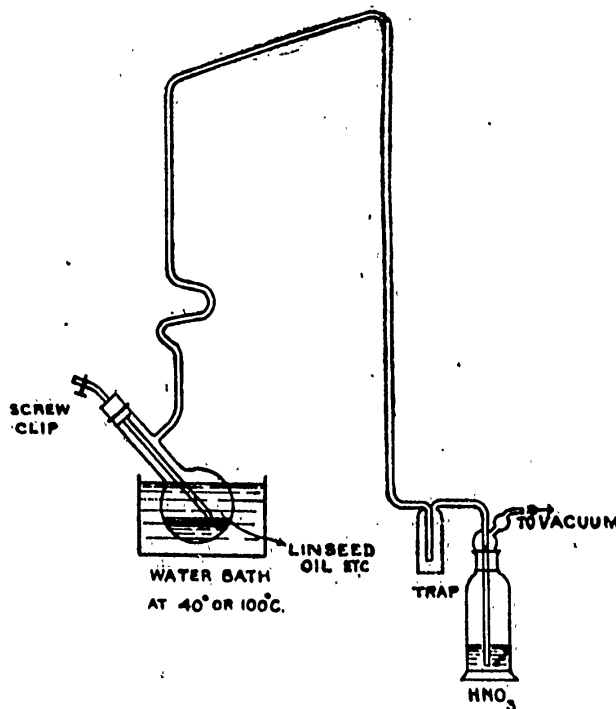
16,774. At the request of the Chemists' Committee of the White Lead Corroders' Section of the London Chamber of Commerce, I have conducted certain

experiments, the details of which are as follows. I may premise that, in order that the conditions should be free from the possibility of interference from external surroundings, a private house was taken at Enfield Highway, and this was fitted up as a laboratory and no redecoration of the house was permitted; all the apparatus used was new and was carefully examined for lead before being used.

## EXPERIMENT No. 1.

Volatile Products obtained from Paint.

An apparatus as per sketch was used.

**APPARATUS USED IN SMALL ASPIRATION EXPTS****@ 40° OR 100° C.**

16,775. Certain experiments had shown that when air, which had been aspirated through white lead and linseed oil, was bubbled through nitric acid, the acid became yellow, and sometimes red in colour. It was, therefore, decided to use this method to ascertain whether other paints produced the same effect.

16,776. The paints to be examined were contained in a 200 c.c. distillation flask, provided with a tube

dipping into the liquid, through which air was aspirated, thence through concentrated nitric acid contained in a wash bottle. Precautions were taken to guard against the possibility of solid matter being carried over, by bending the tube leading from the flask, also by introducing a trap before the nitric acid wash bottle.

16,777. A series of experiments were carried out at

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[Continued.]

40° c., but it was found that after 27 hours' aspiration (intermittent) the changes were slow—consequently a 5 hours' continuous aspiration at 100° C. was made.

16,778. *Results.*

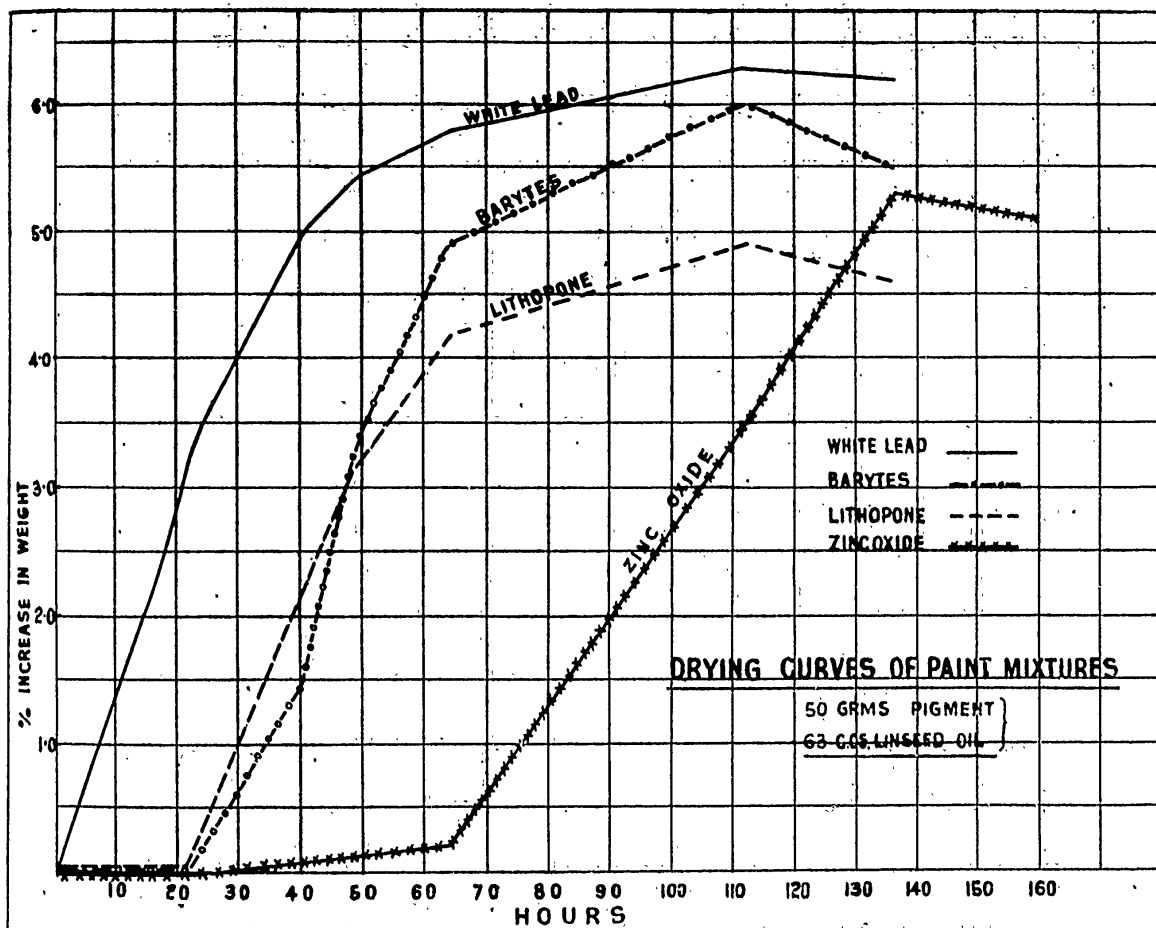
| <i>Substances in flask.</i>   | <i>Appearance of HNO<sub>3</sub> at end of trial.</i>              |
|---|--|
| White lead and linseed oil<br>5 gr.            50 cc.                 | } Coloured yellow in 80 mins. Small amount of red tar on tube.     |
| Ground native and linseed barytes and oil<br>5 gr.            50 c.c. |  |
| Lead acetate and linseed oil<br>5 gr.            50 cc.               | } Coloured yellow in 70 mins. Small amount of reddish tar on tube. |
| Linseed oil<br>50 c.c.  |  |
|   | } Coloured pale yellow in 70-mins.                                 |

*Order of Intensity of colour.*

|              |         |                     |
|--------------|---------|---------------------|
| Lead acetate | - - - - | } Yellow.           |
| White lead   | - - - - |                     |
| Linseed oil  | - - - - |                     |
| Barytes      | - - - - |                     |
|              |         | } Pale yellow.      |
|              |         | } Very pale yellow. |

16,779. These experiments showed that at 100° C. in five hours all the samples yield volatile products which produce a change in the nitric acid, although the amount of change varies with different pigments. A series of experiments was then carried out, using the foregoing bases, but adding manganese borate as drier to those of poor drying properties, and under these conditions they were found to behave more nearly alike, thus confirming the conclusion that the vapour is a drying product, and that when drying is hastened, this vapour is given off more rapidly whether lead is present or not.

16,780. The comparative rates of drying of different paints have been determined, and are shown on the curve below, in which the increase in weight is taken as an indication of rate of drying. The spectroscopic experiments of Baly were carried out, using a tube entirely coated with pigment; therefore the effect of light was absent. It has long been established that light is of great assistance in the process of drying, but in order to be exactly comparable, I carried out these experiments in a dimly lighted-box. In order, however, to illustrate the influence of light on rate of drying, I also show comparison curves. The experiments were made by painting out equal weights of oil and pigment in each case.



EXPERIMENT No. 2.

*Nature of Volatile Products formed when Linseed Oil is dried.*

16,781. The process of drying is a complicated one, and its exact nature is by no means clear. The oil increases in weight owing to saturation with oxygen,

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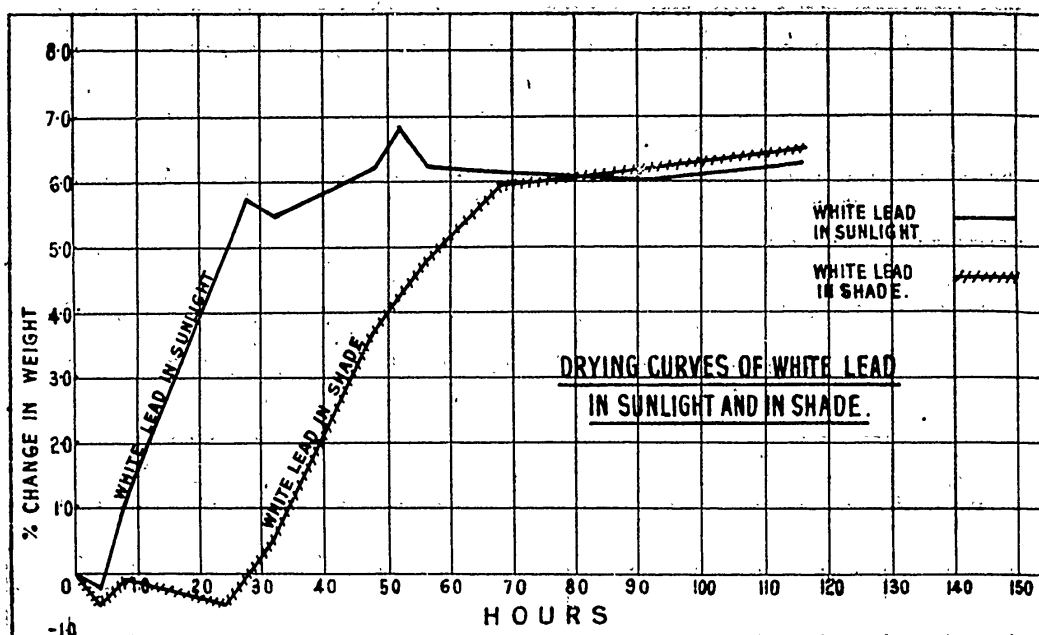
and the ultimate oxidation to linoleyn, but although an absorption of about 25 per cent. of oxygen takes place, the increased weight obtained in linoleum work is only about 10 per cent., the difference being due to 15 per cent. loss of volatile products. The volatile products are complicated in character, and contain principally the volatile lower fatty acids formed by the

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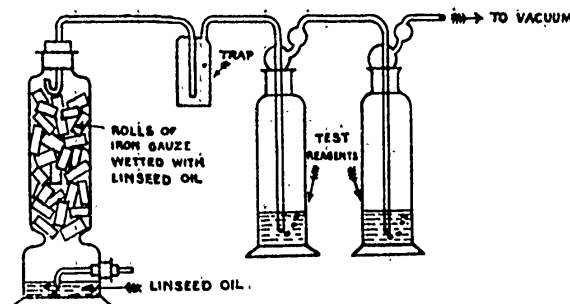
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[Continued.]



oxidation of the glyceryl radicle in the oil. The volatile fatty acids are of considerable importance, as these unquestionably contain formic acid, and the

mixture of oil and lead salt to be steam distilled were put in the 800 c.c. flask, the steam being blown through a tube dipping below the surface. The steam was



influence of such products in mould or bacteriological experiments must be borne in mind when considering results so obtained.

16,782. Experiments, using an apparatus as per sketch, by bubbling the air through ferric chloride, silver nitrate, mercuric chloride, gave definite reactions for acetic and formic acids.

### EXPERIMENT No. 3.

#### Distillation Experiments.

16783-4. Although chemically the existence of a volatile compound of lead composed of lead and the linseed oil fatty acids appeared improbable, I suggested that a small amount of lead acetate present in white lead might give rise to lead in the distillate, and I therefore carried out a number of steam distillation experiments, and as a result of these, stated that I considered lead acetate to be slightly volatile when steam distilled with linseed oil, as traces of lead were always found in the distillate. The amount of lead found was quite minute, yet its presence demanded the strictest inquiry. Professor Armstrong suspected that priming was the source of the trouble, and has since proved this to be the case. A large number of experiments were necessary to establish this, but at last definite proof was obtained that such was the cause. Professor Armstrong has also established this point by using an entirely different apparatus. The apparatus finally employed by me is shown in the sketch. The

then passed through a trap, two distillation flasks, a tower and another trap—then condensed. Experiments were made using.

- (1) White lead,
- (2) Litharge,

linseed oil and lead acetate being added in each experiment. No lead was found in the final distillate, but the contents of the first distillation flask contained lead, whilst the second distillation flask and the tower were quite free from lead.

The presence of lead in the first distillation flask could be due to one or both of two causes:—

- (1) Volatile lead compound, soluble in water, volatile in steam, but not volatile at the temperature of No. 1 flask.
- (2) Spraying over of lead compound.

16,785. In order to decide the cause, the experiment with litharge was repeated with the following alterations:—

- (1) Flask No. 1 was heated by boiling water bath so as to drive off any volatile lead compound in solution, it being obvious from the previous experiment that if a volatile compound was formed, it was volatile at this temperature.
- (2) Flask No. 2 and tower exposed to the air.

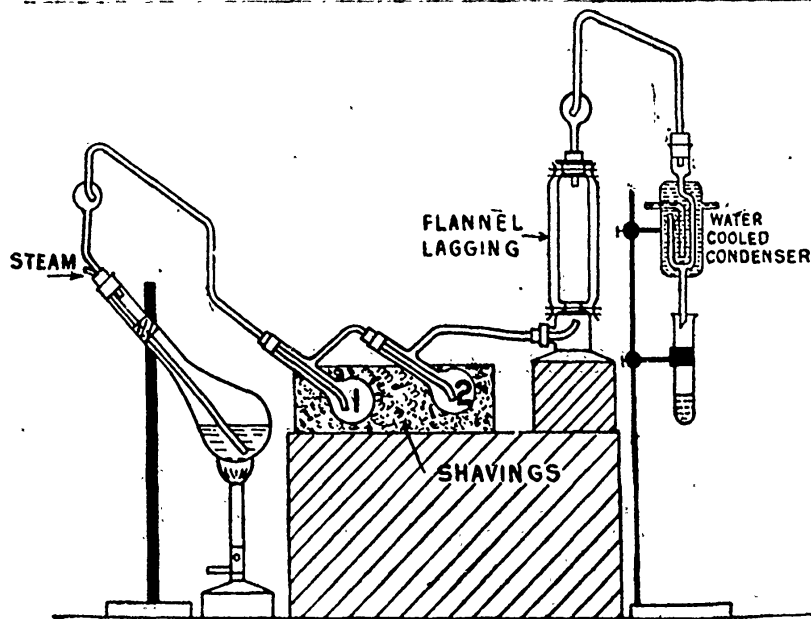
16,786. Distillation was continued for half an hour, and the flask contents examined. Lead was found in the first flask, but no traces in the second flask, tower, or distillate, showing that lead had been carried from



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[Continued.]



Distillation Experiments.

the distillation flask mechanically into Flask No. 1, but although this was maintained at the boil, the lead compound travelled no further, showing that the lead compound was sprayed over from the distillation flask.

## CONTROL EXPERIMENT No. 3.

16,787. A confirmation of this conclusion was obtained by steam distilling the condensate from Flask No. 1. No lead was present in the distillate, showing that the concentration of lead in the distilling flask was so low that the priming did not carry over sufficient amount of lead to give an indication.

16,788. The significance of these experiments lies in the fact that the priming is a serious source of trouble in distillations or in aspirations, and that the greatest caution must be observed in interpreting results so obtained. In this connection it must be noted that white lead on heating gives rise to carbon dioxide and water vapour, whereas none of the other substances examined give rise to gaseous decomposition products. The disengagement of such gaseous products in the form of bursting bubbles would assist priming to a large extent, and in vacuum distillations this effect is exaggerated.

## EFFECT OF AGE ON WHITE LEAD GROUND IN OIL.

## EXPERIMENT No. 4.

16,789. It has been suggested that the formation of volatile lead compounds in white lead and oil takes place during the period of nine months. This suggestion was based on a comparison of the results of vacuum distillation experiments with the observed freedom from lead poisoning amongst those engaged in grinding white lead in oil. In order to experimentally investigate this suggestion, I have examined a sample of white lead paste ground in September, 1907, which means a period of 51 months between time of grinding and examination. The white lead was broken down with pure linseed oil to a liquid paint and then steam distilled exactly as in Experiment No. 3 and Control No. 3. The results obtained were exactly the same as those obtained from new white lead and linseed oil, showing that it is impossible to detect any volatile lead compound in white lead paste which has been stored for 51 months.

## EXPERIMENT No. 5.

## Painting Experiments.

16,790. None of the experiments so far described, or, indeed, few other reported experiments, can be said to be exactly comparable with the practice of painting, therefore the following experiments were made to

ascertain whether under ordinary painting conditions, using an ordinary white lead paint, a volatile lead compound could be isolated. It must be pointed out that these experiments are quite comparable with the conditions under which the painter works, and I submit are of value in consequence.

The apparatus used is shown in sketch (p. 516).

16,791. "A" is an air-tight box, 10 ft. long by 9 in. broad by 2 in. deep, arranged so that the air which was aspirated through should travel over the surface of the box by means of channels, the air thus travelling the length of the box four times, as shown. The box was fitted with a glass top, in order that the paint should dry under normal conditions as regards light. The joints between the top of the channels and the glass were made by laying rubber tubing on the top side of the partitions, and tightly screwing down the glass cover, so as to render air-tight, and thereby compelling the air to travel 40 ft. of channel. The box was painted, using an ordinary linseed oil and turpentine paint, at once closed, and aspiration commenced, the air passing through the various devices shown in order to obtain, if possible, any compound which might be formed. The outlet tube was fitted through a cork into the box, and arranged so that the tube was above the painted surface. Where possible, all joints were fused glass, otherwise they consisted of paraffined cork.

## 16,792. Details of Apparatus :

- (1) Condensers at approximately 20° C.
- (2) Bulbs at 0° C. (ice and water).
- (3) Traps at -12° C. (ice and salt).
- (4) Washer containing water.
- (5) Wash bottles containing KOH  
HNO<sub>3</sub>  
H<sub>2</sub>SO<sub>4</sub>.

Area of painted surface, 20·89 sq. ft. = 1·94 sq. metres.

Weight of paint used for each coat, 190 grs. approx. = 67 grammes per square metre.

Time of aspiration :

|          |   |   |           |
|----------|---|---|-----------|
| 1st coat | - | - | 48 hours  |
| 2nd coat | - | - | 12 hours  |
| 3rd coat | - | - | 18 hours  |
|          |   |   | 78 hours. |

Rate of aspiration, approximately 300 c.c. per minute.

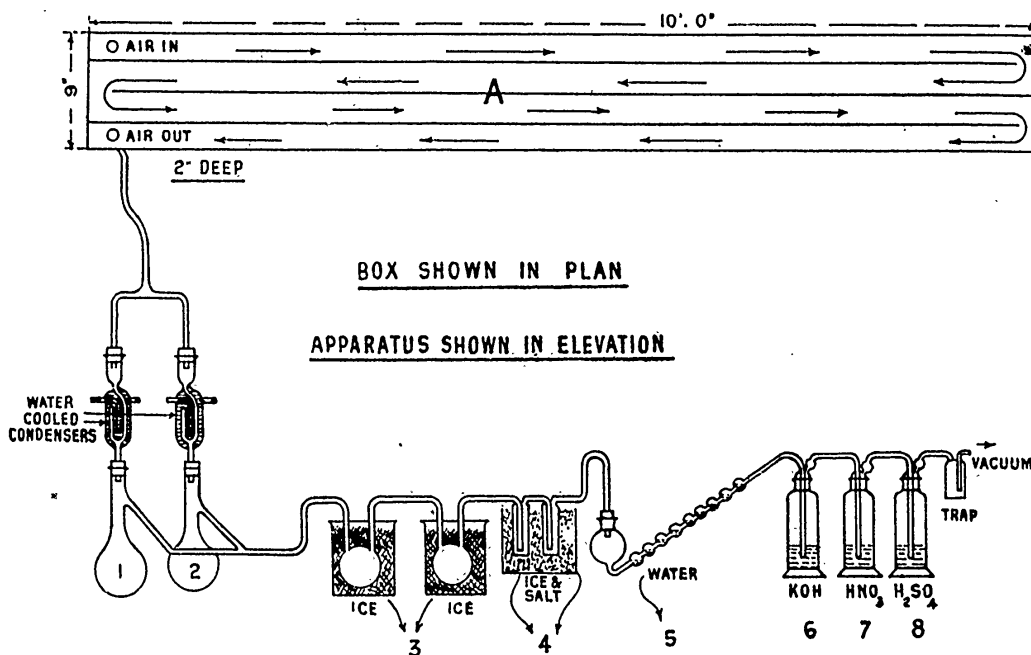
Volume of air aspirated through, at least 1,406 litres.

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[Continued.]



APPARATUS USED IN PAINT DRYING EXPERIMENT.

16,793. Three successive coats of paint were applied before the apparatus was disconnected, and contents of washers examined. Therefore the apparatus had received the paint fumes from 390 grammes of paint and total single-coated area of 62.5 square feet.

16,794. *Flasks 1 and 2*: Empty—odour of paint.

16,795. *Bulb 3*: Contained 5 c.c. of colourless liquid, smelling of turpentine. Boiled with  $\text{HNO}_3$ , yellow colour; added  $\text{AmHO}$ , no change; added  $\text{AcH}$ , no change; colourless when cold; added  $\text{H}_2\text{S}$ , very slight straw discoloration.

16,796. *Trap 4*: 3 c.c. colourless liquid, smelling of turps. Tested as above, very slight straw discoloration; quantity, if any, is too small to be positive.

16,797. *Washer 5*: Colourless liquid. Pb absent.

16,798. *KOH Wash Bottle 6*: Yellow liquid. Crystals on bottom; soluble in water. Sweet ester-like smell. Pb absent.

16,799.  *$\text{HNO}_3$  Wash Bottle 7*: Brownish-yellow liquid. Evaporated to dryness and ignited. Left a large quantity of carbon residue. Extracted with  $\text{HNO}_3$ . Pb absent.

16,800.  *$\text{H}_2\text{SO}_4$  Wash Bottle 8*: Very pale yellow. Pb absent.

16,801. *Conclusion*: Volatile lead compounds are not produced in detectable quantity when a freshly painted surface is dried under normal conditions.

*A repeat experiment gave exactly similar results.*

#### EXPERIMENT No. 6.

*Attempts to Prepare a Volatile Organic Lead Compound from Linseed Oil and Various Lead Compounds.*

16,802. The following experiments were made for the purpose of discovering whether any volatile lead compound could be prepared as above, but all efforts failed to give any indication of such a compound, though there was very clear proof that linseed oil gives rise to volatile organic compounds when air is aspirated through mixtures of oil and lead compounds.

The apparatus used is shown in sketch (p. 517).

16,803. The method of experiment was to aspirate air through mixtures of white lead and linseed oil at  $20^\circ$  and  $100^\circ$  C., and of litharge and linseed oil at  $100^\circ$  C.

(100 c.c. linseed oil and 100 grammes lead compound). Three sets of experiments were carried out, of 6, 12, and 48 hours' duration respectively. The air was aspirated through the mixtures of lead compound and linseed oil, and then passed through

(a) A bulb surrounded by ice.

(b) A bulb surrounded by a freezing mixture.

In the 48-hour experiment, a wash bottle containing strong nitric acid was added to each apparatus.

16,804. *Method of testing contents of bulbs, &c.*—The bulb contents were rinsed out with distilled water, and boiled with nitric acid, neutralised by  $\text{AmOH}$ , acidified with acetic acid, and  $\text{H}_2\text{S}$  water added. The contents of the nitric acid wash bottles were evaporated to dryness, ignited carefully, extracted with  $\text{HNO}_3$ , neutralised with  $\text{AmOH}$ , acidified with acetic acid, and  $\text{H}_2\text{S}$  water added.

16,805. The latter method was adopted for any liquids containing oil, since many of these contained a substance which was turned red or deep yellow on adding  $\text{HNO}_3$ , the colour disappearing on boiling. When made alkaline the colour was increased, acetic acid reduced the colour, and in some cases made the solution almost colourless, but still yellow enough to prevent the detection of small traces of lead.

#### SUMMARY OF RESULTS.

16,806. *White Lead and Linseed Oil.*—Experiments at  $20^\circ$  for 6, 12, and 48 hours showed no visible change in appearance of aspiration flask contents. Bulbs 1 and 2 contained from 0.5 to 2.0 c.c. of a colourless liquid, which, on evaporation with nitric acid and subsequent examination for lead, gave no reaction.

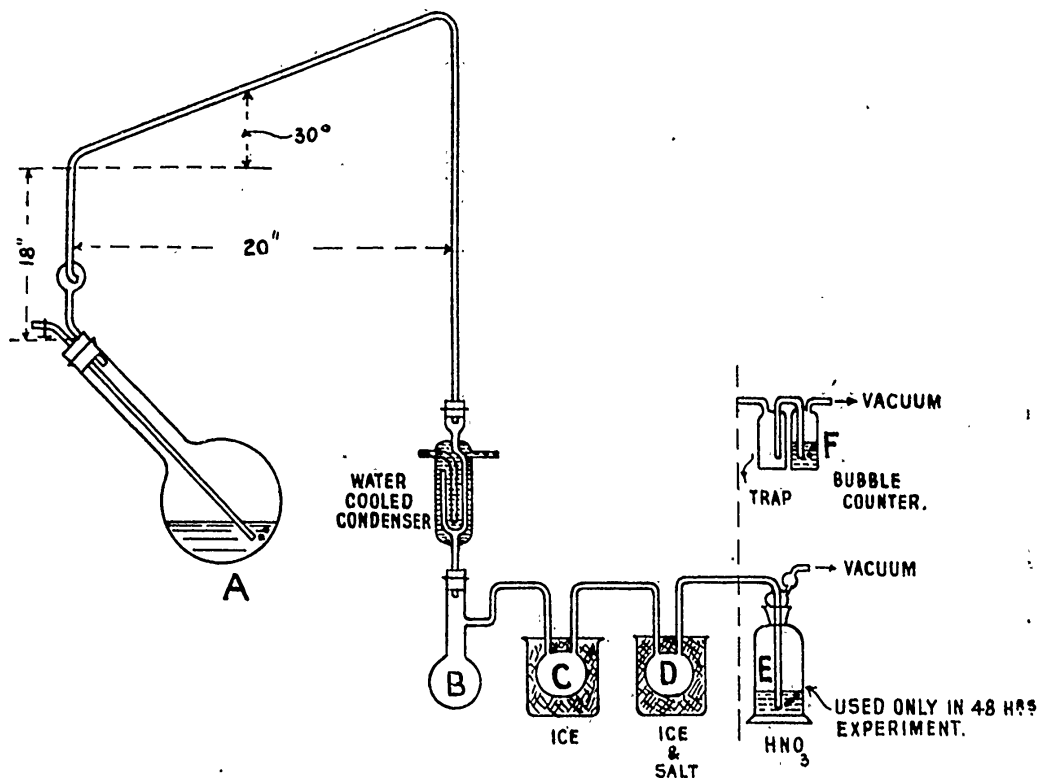
16,807. In the 48-hour experiment, a nitric acid washer was introduced after the condensation bulbs, this became yellow in colour at the end of the experiment but no lead could be detected in the liquid.

16,808. Experiments at  $100^\circ$  C. for 6 and 12 hours showed considerable change in the aspiration flask, the contents smelling strongly of boiled oil. The colour of the oil was dark, and its viscosity was considerably increased. Bulbs 1 and 2 contained 5.0 to 7.0 c.c. of yellow liquid, in which no lead was found, whilst the nitric acid washer became yellow, then red, and finally deposited a brown coating on bottle.

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[Continued.]



Apparatus used. (6, 12 &amp; 48 hours 20° &amp; 100° C.)

- A.—Flask containing lead compound and linseed oil, through which air is aspirated. Heated to 100° C. on water bath, or not, according to conditions of experiment.  
 B.—Flask to collect volatile products; liquid at 20° C. (approximate temperature of condenser water).  
 C.—Bulb cooled in ice to collect volatile products; liquid at 0° C.  
 D.—Bulb cooled in ice and salt to collect volatile products; liquid at -12° C. approximately.  
 E.—Wash bottle containing HNO<sub>3</sub>, to absorb volatile products uncondensed in B, C, or D.  
 F.—Safety trap for pump.

16,809. *Litharge and Linseed Oil*.—Similar experiments were carried out at 100° C. for 6, 12 and 48 hours. The changes in the aspiration flask were more marked, the oil becoming brown, and in the case of the 48 hours the oil was almost solid. The volatile organic products were increased, and in the 48-hour trial, red nitrated clots floated about in the nitric acid. No lead was present.

16,810. I have therefore found it impossible to prepare a volatile lead compound as above, and under conditions much more favourable than those obtaining in painting practice.

16,811. It appeared to me that a possible source for these emanations might be found in the process of pugging white lead with oil, as much water vapour is given off, and one might expect to find volatile lead compounds present if any were formed. In conjunction with the Home Office officials, I have condensed the vapours from Fug Mills, and the liquid has been tested by them and found to be free of lead.

#### VAPOURS OF THINNERS.

16,812. In view of the animal experiments of Dr. Goadby, I considered it advisable to make experiments with a view of determining the rate of volatilization of turpentine from a paint film. The following diagram represents change in weight of films of paint applied on glass (p. 513).

16,813. The immediate decrease in weight owing to the evaporation of turpentine is apparent, and the induced drying effect is also shown in some of the curves.

16,814. The paints were made up so as to contain an exactly equal quantity of turpentine, though the same decrease is not observed. This, I am of opinion, is due to the volatilization of the turpentine producing

oxidation of the oil, thereby reducing the induction period during which organic auto-catalysers are produced, and thus assisting oxidation, thereby decreasing the apparent loss in weight. This is most apparent in the case of white lead, which by slight interaction with the oil forms a ready acceptor or drier. In short, turpentine by volatilization and consequent oxidation hastens the formation of an organic drier in the oil, and when this takes place oxidation proceeds alongside volatilization, so that loss in weight is to some extent compensated by the increase accompanying oxidation.

16,815. After a period of one hour it appears that practically the whole of the turpentine is removed, and there is little difference in the behaviour of any paint, whatever its base. So that the effect of turpentine remains the same, whether white lead, zinc white, or lithopone is used.

#### SUBSTITUTES FOR WHITE LEAD.

16,816. The use of white lead as a pigment is of great antiquity, and for many years past numberless attempts have been made to replace it. The files at the Patent Office show an enormous number of processes, but so far as I have been able to ascertain substantially the only substitutes which are at present on the market in active competition with white lead are the following:—

1. Lead oxysulphate.
2. Zinc oxide.
3. Lithopone.

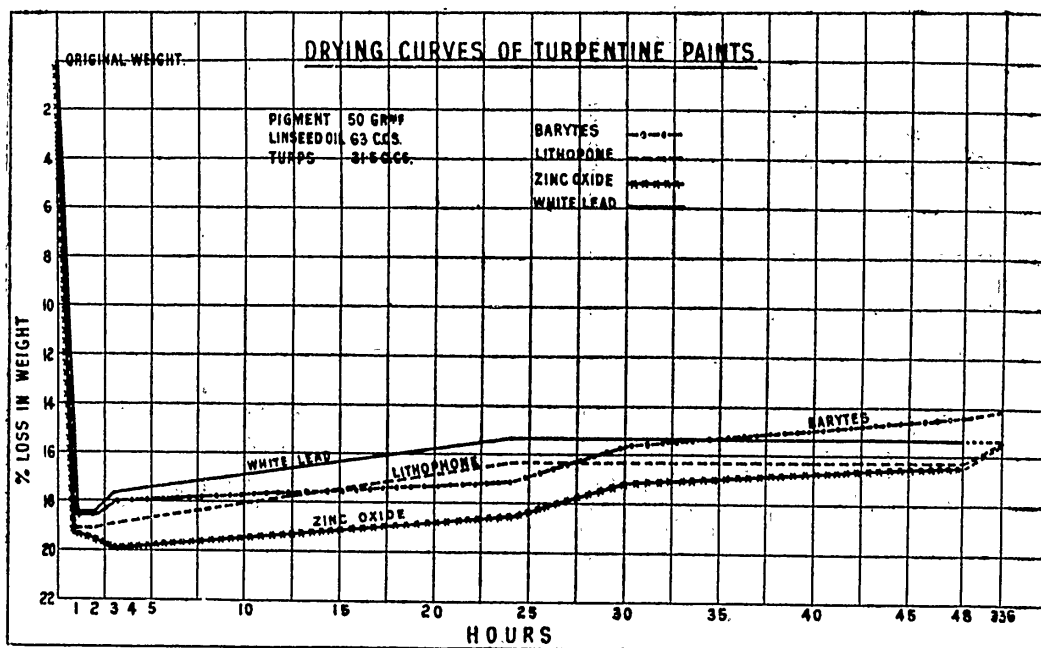
16,817. Their chief characteristics are briefly:—

1. *Lead Oxysulphate*.—A basic sulphate of lead (of variable composition) introduced by Bartlett in 1866. It has had extensive use in the United States of America for some years. Lead oxysulphate is

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[Continued.]



blackened by sulphuretted hydrogen gas, and, further, being a soluble lead compound, is poisonous, and must be considered as a dangerous product of exactly the same nature as white lead. My authorities for these statements are:—

Experiments of Dr. Goadby detailed before the Departmental Committee on the Dangers attendant on the use of Lead, &c., in the manufacture of Earthenware and China, 1910, and reported page 49 (Appendix XXIV.) of the Volume II. (Appendices) of their Report.

16,818. I produce:—

- (a) Specimen of wood painted with lead oxysulphate which has been exposed to sulphuretted hydrogen gas.
- (b) Photomicrographs showing a section of such paint films after exposure to sulphuretted hydrogen gas.
- (c) Analytical figures showing that oxysulphate can be completely decomposed by  $H_2S$ , giving rise to free sulphuric acid.

16,819. 2. *Zinc Oxide*.—Zinc oxide is a pigment the use of which was first suggested by Courtois in 1780. Its commercial introduction dates from 1846, when Leclaire established it practically, and since then many improvements have been made, both as regards its method of manufacture and its quality, with the result that it now occupies a definite position as a pigment. There are two types of zinc oxide on the market, one known as "indirect" viz., almost pure zinc oxide prepared from spelter, and a somewhat impure product prepared direct from the ore, termed "direct."

16,820. The latter product usually contains lead in the form of basic sulphate in varying proportions. The lead is not intentionally added, but is consequent on its presence in the ore treated.

16,821. Certain continental specifications admit of 4 per cent. of lead in zinc oxide. There would appear to be no generally-accepted opinion as to the superiority of one type over the other, though it is claimed by the makers of the direct product that the presence of a small amount of lead increases the stability of the resulting paint film. In America, products known as leaded zincs are sold these contain between 20 and 30 per cent. of lead sulphate, together with 70 to 80 per cent. of zinc oxide.

16,822. The merits of zinc oxide can be said to lie in its lesser poisonous effects, its good colour, and further, it is not discoloured by sulphuretted hydrogen, though the latter has only decorative value. Its real

value as a pigment considering its cost, cost of application and wearing properties, is much less than that of white lead; by such a value I mean a comprehensive value, taking into consideration all the factors which go to make up the provision of a well-protected painted surface.

16,823. 3. *Lithopone*.—This is a generic name applied to white pigments of somewhat varying composition, but generally approximating to an average composition of 75 per cent. barium sulphate and 25 per cent. zinc sulphide. The pigment is prepared by mutual precipitation so as to obtain a homogeneous product; subsequent furnacing operations which are necessary in order to improve the physical conditions often oxidise some of the zinc sulphide to oxide, and frequently a little is found to be present in the finished product.

16,824. Lithopone has not generally a good reputation, and is not extensively used alone as a white pigment for oil paints for decorative work. The curious effect of light on the paint is an objection, as also is the vulcanisation which sometimes occurs.

#### READY-MIXED PAINTS.

16,825. The above covers practically all white pigments in use as bases for oil paints. Many additions are made when ready-mixed paints are prepared, but, generally speaking, the principal base consists of one or more of the above.

16,826. The purchase of ready-mixed paints by the painter is established on a very large scale in the United States of America, and many of the products are composite, being often admixtures of two or more of the following components:—Zinc sulphide, white lead, zinc oxide, lead zinc, lithopone, gypsum, talc, silica, alumina, barium carbonate, barytes (natural and artificial), calcium carbonate, magnesite, china clay, French chalk, asbestos. The direct sale of ready-mixed paints is increasing in England, though the bulk of the white pigments are as yet sold in paste form. It has been found necessary in certain States of America to introduce legislation with regard to the labelling of such paints, whereby the chemical composition of a paint is stated on every package so as to guard against fraud. In England a number of white bases are stained by means of aniline colours being developed on same. This applies to fairly cheap products.

16,827. I have personally examined a large number of suggested substitutes covering all ranges of white substances which the ingenuity of man could suggest,

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but none so far have been worthy of recognition when viewed from any standpoint other than that of the inventor.

16,828. It then appears that there are at the moment four reasonably practical materials available for use as white paints, and I am of opinion that no pigment is ideal; further, that a well organised and carefully carried out enquiry would be necessary before any definite ruling could fairly be enforced in connection therewith.

16,829. State trials have been carried out in countries other than Britain, and the results have possibly been of value to the particular countries concerned, but the results are not exactly applicable to any other country. In North Dakota trials are being made, and results will doubtless be obtained which will be of value in indicating the respective merits of different pigments or mixtures for different purposes. These results are of little or no value to Britain, owing to different climatic conditions, *e.g.*, wide ranges of temperature and humidity.

16,830. The merits or demerits of any paint can only be determined by practical trial in combination with organised observation. It is futile to examine the subject from any one standpoint whilst so many factors are necessary to arrive at any definite conclusion.

16,831. The value of a paint is not the result of any one factor, either chemical or physical, but is necessarily a combination. In dealing with pigments, the nature of the vehicle is of great importance, and the fact that pigments other than lead require an increased quantity of oil, is of fundamental significance in view of the well-known porosity and shrinkage of linseed oil films.

16,832. If one considers the chemical aspect of the question, the real merits of white lead are more prominently brought to light. The charge is frequently made against white lead that exposure to sulphuretted hydrogen gas produces discolouration, a statement which, of course, is obviously true, yet it is seldom recorded that an exactly similar change takes place when zinc oxide is submitted to like conditions, though, of course, this is not so apparent, owing to the absence of colour change. I produce photo-micrographs in support of this statement. I submit that the chemical changes are of great importance because of atmospheric influences—air, water, heat; and further, the oxidation products of the two sulphides are vastly different. In the case of lead sulphide there is produced lead sulphite and sulphate, both practically insoluble in water; whilst with zinc sulphide a water soluble sulphite and sulphate is formed which crystallises and is fatal to the painted surface. It is therefore obvious, so far as sulphuretted hydrogen is concerned, that zinc oxide is inferior to white lead when the whole of the interactions are examined:

16,833. In spite of the foregoing, zinc oxide is better than white lead from a decorative standpoint, when applied in places where sulphuretted hydrogen is present, as, for instance, in chemical laboratories; but this raises another point, which is not frequently realised when discussing the merits and demerits of the two pigments. It is generally considered that sulphuretted hydrogen is the destructive agent to which painted surfaces are exposed, yet this is entirely untrue. Sulphuretted hydrogen is a minor evil except under special conditions, such as in the vicinity of chemical works, where it is the product of chemical operations. Sulphur dioxide is by far the most important agent, and it is the action of this gas which must be considered.

16,834. The effect of sulphur dioxide is apparent on historic buildings in London, and Sir A. H. Church\* in discussing the "conservation of historic buildings and frescoes" (Royal Institution, April 12th, 1907) states that the amount of sulphuric acid poured yearly into the London atmosphere is estimated by Rideal as being between one half and one million tons.† This, there-

fore, is the factor of great importance, and its effects can shortly be stated to be the production of a water soluble compound with zinc oxide as against the production of an insoluble compound in the case of lead. I must also point out that the same holds to no small extent for internal painting, in consequence of the sulphur dioxide produced by the combustion of the coal gas; water and sulphur dioxide are produced and effect the changes previously outlined. The relaxation of the sulphur rule has made the position worse, inasmuch as the sulphur contents of the London illuminating gas has increased, according to official figures, to three or four times the previous figure. Lithopone contains zinc sulphide, and is affected by these gases.

16,835. The superiority of the spreading power of white lead is explained by the changes which take place between the oil and white lead. During the time of its storage as paste, chemical reaction takes place to a small extent, resulting in the solution of some lead in the oil, which materially assists in the subsequent drying operations. With zinc or allied pigments, little or no change takes place whilst the mixture is in a paint form. When applied as a paint in both cases the drying takes place by oxidation, although physically the products obtained differ considerably between the two pigments. In the case of lead, there is obtained a film having considerable elastic powers, so that the contraction and expansion produced by climatic conditions do not result in fracture of the film, whereas with zinc the oxidation product has a hard brittle surface, having no elasticity, and consequently does not change in unison with the surface on which the paint is applied. The ultimate product is hard and finally blisters and cracks, or becomes translucent and peels off. The final result is a surface which is not so suitable for repainting as is obtained when lead is used.

16,836. The physical condition of a pigment must also be considered in relation to its powers of lasting. White lead is not a powder of uniform size, it being invariably graded to some extent, as is apparent when the product is elutriated. This gives the film mechanical stability, and the condition is imitated to some extent in what are termed "reinforced" paints which consist of the previously named white lead substitutes ground together with asbestos or other inert materials of larger size, in order to as closely as possible obtain the condition naturally obtaining in white lead. The substitutes of white lead are invariably in an extremely fine state of division and regular in size; therefore, the reinforced effect cannot be obtained with these pigments *per se*. A practical result of this is the defect observed when the mouldings on doors are painted with the substitutes of white lead. It is quite useless to attempt to determine the painting value of any pigment on what might be termed straight painting. The intricacies of moulding and similar effects are the most conclusive test.

16,837. I am, therefore, convinced that on chemical and physical grounds white lead is, for most purposes, the best pigment of to-day. I do not claim that it is the only pigment of value, because I know that there are purposes for which some of the substitutes are equally valuable. The ideal pigment would be an absolutely inert pigment possessing otherwise the properties of white lead.

#### Lead Poisoning Amongst Painters.

16,838. At the outset I must point out that my observations have been quite general in character, and not confined to the manufacture of lead products, though I submit that experience in a lead works proper is of value when considering the use of its products. In a lead works, although the operations are carried out inside four walls, it should be realised that the risk of danger is immeasurably greater when a man is handling tons instead of pounds, and this is particularly important when it is stated that in eight years handling an aggregate of probably 50,000 tons, no single case of poisoning could be attributed to white lead in the form of oil paste, in spite of the fact that the paint grinder is exposed for 10½ hours per diem to white lead at a temperature of 50° to 60° C.

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\* "Chem. News," 96, p. 102.

† See also Cohen and Ruston, "Journal Society of Chemical Industry," 1911, p. 1364, on conditions in Leeds; and Baskerville *re New York vide Modern Permanent Painting Materials* (Toch), London, 1911.

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conditions which are obviously more severe than those to which the painter is subjected.

16,839. Lead works experience clearly indicates that dust is the source of practically all their trouble; and efforts have been, and are still, concentrated towards dust prevention. It is impossible to emphasize this too strongly. Dry rubbing should be prohibited as far as possible amongst painters, not only because of the lead effect, but because of the effect of dust *per se*, and this feature is present when any paint is rubbed down. I understand that wet rubbing down is already considerably practised. If dry rubbing is ever carried on, the painter ought to be compelled to wear a respirator or hood.

16,840. The other principal source of danger is the handling of dry lead colours, and this point is one of supreme importance; many colours containing lead, e.g., Persian red, chromes, vermilionettes, Brunswick green, &c., are handled by the painter in a dry state.

16,841. The danger of such bodies is dealt with (as regards the precautions necessary in their handling by the manufacturer) in the report of the Chief Inspector of Factories for 1910, where Mr. Shaxby (East London) states that it was shown in the 1909 report that the handling of these dry products by the manufacturers resulted in as many cases of poisoning as could be ascribed to both the oxides and carbonate of lead, and that the dust removal plant insisted on and erected during the following year had reduced the total number of lead poisoning cases to one-fifth, proving therefore the dangerous nature of the products.

16,842. Such sources of danger could be avoided by means of regulations prohibiting their use except in the form of an oil paste, and there appears to be no practical difficulty in this.

16,843. (*Lord Henry Bentinck*.) You state in your proof that you are a technical chemist. Will you give the shorthand writer a note of your degrees?—I have no degrees. I am a member of several societies, but I do not carry any degrees.

16,844. You say that since leaving the Sheffield University College you have had eight years' experience as a technical chemist. Would you please say exactly in what capacity?—As chief chemist of the Brimsdown Lead Company, who are manufacturers of white lead.

16,845. In paragraph 16,810 you state that you found it impossible to prepare a volatile lead compound?—May I read the whole of the expression? "I have therefore found it impossible to prepare a volatile lead compound as above and under conditions much more favourable than those obtaining in painting practice." In order to explain that, I must refer you to paragraph 16,802, where the method is described. "The following experiments were made for the purpose of discovering whether any volatile lead compound could be prepared as above,"—namely from linseed oil and various lead compounds. That statement merely outlines that I am quite unable to prepare any volatile lead compounds, using linseed oil and any of the lead compounds stated there. There are volatile lead compounds, but not produced from linseed oil or any of these compounds described in my proof, and these compounds are those used in painting. I know of lead compounds which are volatile at extremely high temperatures, but those do not enter into the question under consideration.

16,846. Do I also understand that you hold that there is no mechanical carrying off of lead particles from a newly painted surface?—May I describe the experiments that I have made?

16,847. Yes?—You will find details in paragraphs 16,790-1. All the experiments which I have read of, or had carried out myself prior to this experiment, could not be compared with painting conditions, because in many cases they were carried out in the dark. In many cases a bell jar made of glass was painted with a paint. In many cases turpentine was left out, which, of course, renders the thing at once not comparable with ordinary painting conditions. Therefore I took a box. That is a twelfth the size of the box (*producing a box*). It was divided up into four partitions. The exact size of the box was 10 ft. long by 9 ins. across; and 2 ins. deep. Everything was got ready so

that a painter could paint it. I myself was not the painter. A man who was a professional painter was called in. He was given white lead of the normal composition; he was given turpentine, he was given linseed oil, and he was given a drier in some cases; in others not. He was told to paint the large box exactly as it was. Immediately it was painted a joiner was in readiness, who sealed the box by means of screws running along the edge. It was provided with india-rubber tubing, so that a rubber joint was made between the two surfaces. That was accomplished within five minutes of the box having been painted. The whole apparatus was put on a shelf over a bench, and air was aspirated through one hole and drawn along all the channels. (*See illustration of apparatus, paragraph 16,790.*) The air which had passed over the white lead was then passed through a series of condensers, the first one an ordinary water condenser, the second ice and water, the third ice and salt. It was afterwards bubbled through water. It was afterwards put through caustic potash, nitric acid, and sulphuric acid, and a trap was inserted to see whether anything came over. I wanted to give the thing a chance and I think that anybody will agree with me that I have tried to be fair towards it. Aspiration was continued on the whole of this apparatus. In the first experiment you will find I took a long time, because I wanted to make quite sure that the paint was dry. After the first coat the top was taken off, and another coat put on. This was repeated, and a third coat was applied and allowed to dry before I dismantled the apparatus. I want to point out that the whole of the joints in the apparatus were either fused glass or, where that was not possible, they were made of paraffin cork. Before use, the apparatus was tested to see if it would stand a considerable amount of pressure. I felt that one must make perfectly sure that none of the products of drying could follow any path other than that I desired, namely through my apparatus. You will find a description in paragraphs 16,794-801 of what I found on dismantling the apparatus. The total amount of paint applied to the box in the three coats was 390 grammes, rather more than  $\frac{3}{4}$  lb. A single coated area of 62½ square feet was painted, and that I consider to be the most important feature of the whole experiment. In this experiment I have not painted little squares. I have done away with test tube experiments. I have tried to cover a surface which at least might be compared to actual working conditions. And furthermore, in order that nothing abnormal should obtain with regard to the action of light on it, the box was fitted with a glass top. Too many experiments have been carried out where the effect of light has been ignored. I feel very strongly about that, because in certain experiments which have been made, not only in this country but on the continent, that effect has been totally left out of sight. In paragraph 16,780 you will find two curves which I have drawn out, showing the difference which is observed between white lead when it dries in sunlight and when it dries in shade. Those who have actually handled paints on a large scale know very well that it is quite impossible with ordinary paints to get them to dry within a reasonable time in the dark, and therefore I submit that all experiments, which have been made where the effect of light has been ignored, are rendered invalid. This has been brought home to me not by laboratory experiments but from a study of painting conditions generally. Like all white lead makers one is called on at times to advise with regard to paints, and on several occasions I have been called in. Where the paint has been wet for some days the explanation is that there was no light getting to the paint in the process of drying. I can quote you a less exaggerated instance than that from a house in Park Lane, where it was almost impossible to dry the paint under ordinary conditions, at the ordinary rate, because of the lighting of the room. Therefore I think that I have made out my case that this box was treated fairly.

16,848. Yes?—With regard to the contents of the bulbs, the whole of the method of examination is detailed, and if there are any chemical questions on it I shall be very glad to answer them. I think they are

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quite the usual methods, and I think I might mention here that during the whole of my work the apparatus I used was perfectly new, and in order that I should have no interfering influences from a lead works laboratory, we took a private house. That house was half a mile from the works, and during the whole of the experiments there, or before the experiments, I would allow no redecoration, so that I should not get any interference from outside conditions, and if I found lead then I would know that the lead had come from the paint.

16,849 In paragraph 16,811 you refer to certain tests of vapours from white lead pug mills. Would you please state the names of the Home Office officials to whom you refer as having tested the condensed vapour?—The Home Office official who took the sample was the Factory Inspector for the district, and the sample was divided with me. One half was examined by myself, and the other half was taken away by the official to the Government chemist. Afterwards, on enquiry, I was given the information stated.

16,850. Are you acquainted with the published reports of Professor Baly's work on this subject?—The only published reports that I am acquainted with are two reports, one of which appeared in the "Chemical Trade Journal," and the other in the "Oil and Color Trades Journal." There have been no official publications to my knowledge of any work of Professor Baly. Professor Baly originally read his paper before the Society of Chemical Industry (Liverpool Section), but up to to-day it has never yet appeared in their official journal. Therefore anything I may say with regard to that would be only what I heard at the lecture myself, because I attended the lecture. Professor Baly has a perfect right to repudiate any reports taken by a reporter, because his official paper has not appeared. I should like that point clear.

16,851. Do you wish us to understand that you dissent entirely from those conclusions?—I could not reply to you in one word. If you will allow me to qualify I should be glad. Professor Baly's first experiments were carried out, as you know, by using tubes of glass, which were coated on the inside with white lead and other paints. Light from a cadmium, or iron arc (I am not certain which), was sent through the tubes, and photographs were taken after the light had traversed the whole length of the tubes. He found by the photographs that some absorption took place in the passage of the light through these tubes. His conclusion was that certain volatile compounds were given off. I submit, gentlemen, that I have shown, and that everyone else will be able to show, that volatile compounds are given off, but Professor Baly's spectroscopic experiments prove nothing more than that volatile compounds are given off, and they do not, and cannot be presumed to indicate the presence of lead in such compounds. He has carried out certain distillation experiments under vacuum. From those experiments I absolutely dissent. I have tried more severe conditions than Professor Baly, and I am unable to find lead in my distillates, provided that I take some care to avoid what is known as mechanical priming.

16,852. Are you aware that results entirely similar to those which Professor Baly claimed to have obtained were published by various observers in France?—I am not aware that any results at all similar to those of Professor Baly have ever yet been published in France.

16,853. Do you know that those French experiments were repeated again and again by M. Heim, M. Hébert, and Dr. A. Marie?—I am aware of the work of Heim and Hébert and of Marie and of Trillat. I would like to point out that the experiments of Professor Baly have never yet been reproduced in detail in this country or any other except by Professor Armstrong and myself, who have tried to repeat them. The experiments of Heim and Hébert were carried out under conditions quite different. There was no vacuum work at all in Heim's experiments. The experiments of Trillat, which you have not mentioned, were carried out, using his own indicator, and he failed to confirm the work reported by Breton. The reference for those experiments is the Comptes Rendus, 1903, page 1215, where he says that although he was able by means of

his reagent to detect very small quantities of lead, he was quite unable to detect any volatile lead compounds coming off from white lead painted on the inside of a cloche.

16,854. Do you wish it to be taken as your definite conclusion that those observers and their observations were wrong? I would not make a statement so slashing as that, but I would like to discuss in detail, if you will allow me, the results which have been obtained, and I think that I shall be able to show you that the results which have been obtained by Trillat in his growth experiments, and by Marie, in his typhosus experiments, are quite capable of explanation, when the thing is viewed from an aspect in which lead does not enter, because, in the case of Marie's experiments with zinc white and linseed oil, he found a distinct retardation of growth. The evidence is here if you wish to have it. With regard to the Heim and Hébert experiments, I am prepared to discuss those to the slightest detail, because I maintain that the whole of those experiments are based on a presumption with which I cannot agree, and with which Duckering in the appendix to the Pottery Report also could not agree. The whole of the experiments of Heim and Hébert depend on the efficiency of a certain filter. Duckering\* himself has stated that it is impossible to prevent the passage of air between glass and cotton wool. I have a full discussion of Heim and Hébert's results here. I might point out to you that some of the figures, some of his final figures, differ to the extent of 66½ per cent. in their accuracy. With regard to the reagent they used, I can discuss that in detail with any of you, because I have made it and I have carried out a good deal of work here. It will be quite a big business to discuss the whole lot, but I am very willing to do it. It will be quite necessary for Heim and Hébert to be able to substantiate, in any statement they made, that their materials were quite free. In the first place, experiments of this delicate nature would depend on their being able to prove by photographs or other things that the laboratory itself was free from lead compounds lying about. Furthermore, the rate of volatilisation given by Heim and Hébert does not differ between 0° and 100°, a feature which it is quite impossible to reconcile with scientific observations on any other substance.

16,855. Can you give any reason for believing that all these observations were wrong, other than the fact that your experiments did not produce similar results? Yes, if you will allow me. It will take a long time. I will go into detail and show you how this can be explained.

16,856. You stated that you did not consider the Trillat test reliable?—Yes. I do not want to go into detail, but I will give you one or two statements which support that.

16,857. Do please?—In the first place the Trillat reagent is not a test for lead. It depends entirely on what is known as an oxidising reaction, and before you can get that oxidising action you must convert your lead into one of its oxides, which will produce that effect. Therefore that reaction is not peculiar to lead. Moreover, chlorine, water, bromine, iodine, and many other oxidising reagents will give you that result. I will try to avoid technical detail as much as I can. I have carried out Heim's test in exactly the method described by him in his report, and he states that it is necessary to oxidise his lead to lead peroxide, and for that purpose he uses sodium hypochlorite. He then states freely that it is necessary to remove that before the test is carried out. He gives, as a method of testing, heating. I have not found it possible in ten experiments to remove it by heating. If you have sodium hypochlorite *per se* and heat it and then apply the Trillat test to find lead present it will indicate that. But there is nothing of the sort; it is simply an oxidising phenomenon.

16,858. In paragraph 16,842 you state that the dangers arising from dusty operations should be

\* Departmental Committee Report re Potteries, Cd. 5278, Vol. II., Appendix XLIX., page 93.

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avoided by regulations. Among these regulations you would include the prohibition of dry rubbing down?—Yes; dry rubbing down should be prohibited as far as possible amongst painters, not only because of the lead effect but because of the effect of the dust *per se*, and this feature is present when any paint is rubbed down. I understand that wet rubbing down is already considerably practised. If dry rubbing down is ever carried on, the painter ought to be compelled to wear a respirator or hood.

16,859. Can you tell us how such regulations could possibly be enforced?—I think by quite straightforward application. My own experience of the painter is that he is not aware of his sources of trouble. I think that regulations have been applied with excellent results in white lead works.

16,860. That is different from painting?—Yes exactly. I would like to go on with my answer.

16,861. Certainly?—Seven or eight years' experience of the application of these regulations has brought them down to practically a fine art. The conditions in white lead works are very intense; they are much more intense than those to which any painter is ever submitted.

16,862. You have told us that you are acquainted with the regulations which have been found necessary in other lead industries, such as the manufacture of white lead, to reduce the incidence of lead poisoning to its present figure?—Yes.

16,863. To effect a similar reduction in the attack rate and death rate from lead poisoning amongst painters, similar regulations would be necessary?—Regulations would necessarily have to be framed to meet the particular conditions of a painter.

16,864. Have you thought how it would be possible to apply and enforce any such regulations in the scattered house-painting jobs?—By one method only, and that is by first a study, if possible (you may have the figures—I have not), of the rate of attack amongst painters. It is quite necessary. Further analysis would be necessary in order to see whether casual employees suffer at a much higher rate than regular employees. Dr. Legge has shown very conclusively, in the 1893 report, that that holds with regard to white lead works, but my own experience is that that is true in all cases. In the painting industry in the last few years my own experience is that a lot of jerry men have come in, a lot of men who are not skilled painters, and they are the men who will suffer. They are the men who, unless you can get their sympathy and educate them to a sense of their danger, I think, you will find will suffer. It seems to me a perfectly reasonable thing that regulations should not be too harsh, because I know exactly the feeling of the British workman towards regulations, and no one knows that better than those who are engaged in white lead works. Would the Home Office go so far as to send out a very carefully-worded, plain, blunt English, statement of the sources of danger? There is one, but I have never seen it amongst painters. The average painter whom I have struck is not aware of his sources of danger. I have carefully cross-examined them for the last three years, and they have given some very weird and wonderful channels of lead poisoning.

16,865. Can you explain to the Committee how it is possible to educate a man who is perhaps only taken on for a fortnight in the summer?—I think that such men are few and far between. The man who only works for a fortnight in summer is quite the exception.

16,866. There were plenty of them during last summer?—But a fortnight is rather a short time.

16,867. I will say a month then. There is undoubtedly a great deal of casual work in the painting trade. Perhaps I exaggerate when I say a fortnight, but it was a short time. The painter is unfortunately affected by seasons; there is no question about that?—In summer he works long hours, and that usually means that he has more money to handle. He is not always the most abstemious man in the summer.

16,868. You will allow that it is more difficult to educate the casual man than the regular worker?—

But if those men are painters, whether they are casual or not, the education would hardly be wasted on them.

16,869. If a considerable number of employers of painters state that they prefer restriction of the use of lead to the irksome system of regulations, would that weigh with you?—I should like the position with regard to my evidence here to be perfectly clear. I am a chemist in a white lead works, but my living does not depend on white lead, and therefore I have attempted to come before you as a perfectly impartial witness. I can certainly say that I am not consciously biased. If bias has been shown in any of my evidence it has been unwittingly on my part. The question is one for you to consider. You know whether the painter would rather be restricted. That I am afraid I could not express any opinion upon.

16,870. (Sir Godfrey Baring.) I understand that you are the Chief Chemist of the Brimsdown Lead Company?—Yes.

16,871. They are engaged in the manufacture of white lead?—White lead and litharge.

16,872. Chiefly for the purposes of the painting trade?—Yes.

16,873. Therefore the prohibition of the use of white lead in painting would have a serious effect on the company's business?—It would simply close the doors.

16,874. (Dr. Collis.) In paragraph 16,783 of your proofs you use the word "priming." By "priming" do you mean drawing-over?—Mechanical spray.

16,875. The word has a technical meaning, has it not?—Yes.

16,876. Perhaps all the members of the Committee would not be acquainted with its technical meaning. I only want to bring that out. We have had it used as meaning a first coat on wood?—I am sorry that I used the word in that connection. It means the priming which is often observed in boilers where steam carries up spray with it. It does not mean the first coat on wood. I have driven steam through liquids, and in consequence a small spray has come up, which I have called "priming." It does not mean the priming of paint.

16,877. Referring to tests carried out upon bulbs and traps, with regard to bulb 3 (paragraph 16,795) you used certain tests, but you do not definitely state that no lead is present?—I summarise in paragraph 16,801:—"Conclusion: Volatile lead compounds are not produced in detectable quantity when a freshly painted surface is dried under normal conditions." I use the words "bulb 3, very slight straw discoloration." "Trap 4, very slight straw discoloration." I recorded that because I observed it. I am strongly of opinion that it was not lead, but as I observed it I recorded it. The efficiency of the test is quite well known. If you calculate out the amount of lead that that might show, I think it would be less than one part per million.

16,878. If it was lead, would you put it down to the priming?—No not here. You are talking of experiment 5, the box experiment.

16,879. Is there any possibility that in the process of the drying of ordinary lead paint some very small bubbles may burst on the surface—infinitesimally small?—Unless I made an experiment I would not like to pass any opinion on that. I might say that I have attempted for some time past to contrive an experiment which would show that, but if you will think it over you will find it an extremely difficult thing to do.

16,880. It is extraordinarily difficult I imagine, but theoretically it suggests itself that fluids pass into the air by some such method?—That is a thing I can say nothing on. I have not tried the experiment, and therefore any answer I gave you would be only an opinion of my own. I have not come here to give opinions; I have come here to give you the results of experiments which can be repeated or refuted.

16,881. You consider that there is very clear proof that linseed oil gives rise to volatile organic compounds when the air is aspirated through mixtures of oil and lead compounds?—Yes. My experiment gives tangible proof of it.

16,882. You do not suggest that if zinc, or one of the non-lead bases which are used for paints, like oxide of iron, was substituted for the lead compound, you



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would get these volatile organic compounds coming off?—Whatever you substitute, if you have linseed oil in any form in which it will dry, you will get a volatile organic compound over.

16,883. Without adding the drier. I am dealing with it in that way for the moment?—Yes, without adding the drier. You have your question answered by the experiment described in paragraph 16,783, where I have examined the nature of the volatile compounds given off where no drier was added.

16,884. But is this volatile compound precisely the same when lead is present and when lead is not present?—As far as my experiments go they appear to be the same. It is impossible to carry out a detailed analysis; it is too complicated.

16,885. Does this compound come off more rapidly in the presence of lead than in the presence of the other bases?—It does, because lead paints dry quicker than ordinary paints, but if you have zinc paint and add to it any drier—

16,886. I want you to deal with it without the drier at present. It comes off more rapidly in proportion to the rapidity of the drying of the paint?—Yes.

16,887. It is purely the rapidity of the drying of the oil, or the paint; of which it is a part, which determines the coming off of the volatile compounds?—Exactly.

16,888. You used turpentine in your experiment with fully made lead paint?—Yes.

16,889. Have you determined whether the same is true in the presence of turpentine and oil and any base pigment. Does the statement hold true that the evaporation of the turpentine and oil bears the same relation?—You will find that experiment described.

16,890. I should like to follow it?—It is described in paragraphs 16,812-5, "Vapour of thinners." It appeared to be of very considerable importance in view of the animal experiments which had been carried out, showing that some of the symptoms in animals were comparable to those obtaining in lead poisoning. I carried out that experiment to see whether white lead, lithopone, zinc oxide, and barytes lost their turpentine at the same rate when they were applied, and I found very clearly that that took place. Exactly the same thing took place. There is an immediate drop, and within an hour 90 per cent. of the turpentine has gone. The white lead is the most prominent of the lot. It does not lose so much, but that is because where the turpentine dries you get compounds produced, which arise in the drying of the oil. I have pointed that out. It conditions the formation of an organic peroxide, which hastens the rate of drying.

16,891. I follow the point as regards the drying of the turpentine, but I rather wanted to get at this: does the turpentine have any effect as regards the rapidity of the drying of the oil in the presence of lead as a base or of other bases?—That is a question I cannot answer.

16,892. You cannot say whether if more or less turpentine is present in the paint it will make any difference to the rapidity with which these volatile compounds are given off. That is the point?—No, I am not able to say.

16,893. Referring to the test which you speak of in paragraph 16,811, on the condensed vapours from the pug mills. You remember, I daresay, why these were carried out?—No, I really do not. Perhaps you have information as to why they were carried out.

16,894. I happened to be present at an investigation. A number of cases of lead poisoning occurred in the Brimsdown works. In that department all the lead was damped in filter presses, and we tried to find out how the lead poisoning occurred. We found no lead in the air or in the vapours that were aspirated. That did not help us; it remained a mystery how these cases of lead poisoning had occurred when all the lead was damped?—Have you details here as to the number of cases?

16,895. I regret that I have not the actual details, but between five and seven occurred within a short period in that department, I think. I am speaking from memory, but I think that that is not far wrong?

—I could not discuss it at the moment, because I have no books with me at the present time.

16,896. It is a minor point?—If it is a point of any importance I would like to deal with it. What is the year?

16,897. 1905 I think?—Unless you could give me more detail I could not discuss it. I thought that possibly I might have the detail with me but I have not.

16,897a. It remains a mystery after all?—I think you were fairly satisfied from your own tests that that was not a source of trouble; at least you never asked us to do anything, so I presume that was so.

16,898. Now have you questioned some of the French work?—Yes.

16,899. I do not wish to enter into a long discussion of all that hangs on that. Perhaps it is hardly fair to ask your opinion upon Marie's work on retardation of growth. That is rather for bacteriologists to answer?—I happen to have studied bacteriology, so I am on familiar ground with regard to that.

16,900. He got a retardation of growth with the zinc oxide, but it was not so marked as the one he got with the carbonate of lead?—His exact expression is: "less retardation than with lead, but distinct."

16,901. Yes. So that some compound apparently comes off from the lead mixture which does not come off from the zinc oxide, or not so rapidly?—It is exactly compatible with the explanation tendered—that an organic compound not necessarily containing lead comes off more rapidly from white lead than from zinc oxide in the absence of added driers.

16,902. After all, what we have to consider is not so much whether this compound contains lead or does not contain lead, as whether there comes off from lead paints a compound which is inimical to life, and which does not come off so rapidly from zinc paints, so that the people who are using lead paints may possibly be thereby harmed. It becomes a question of entirely theoretical and scientific interest to say whether the compound contains lead or does not contain lead?—My reply to that is that you do not apply zinc and white lead to dry at different rates.

16,903. What do you mean by that?—You would make your zinc dry as nearly as you could in the same time as your lead paint. That being the case, the same amount of objectionable vapour would be given off—if it is objectionable. We have shown this. The Committee, I take it, as you say, are not considering the scientific aspect of the case anything like so much as the practical side, and therefore my reply to you is, that to have the thing from a practical standpoint you must take paints which dry in the same time. Therefore, I say, there is not a pin to choose between them with regard to these organic volatile compounds. Moreover, I think it is rather a stretch of imagination on the part of Marie or the other French people. The organisms treated were particularly susceptible, and you cannot compare them with the human system.

16,904. I do not think that they intend to?—But I think it is put rather in that way. When you come to practical conditions and leave the laboratory, then you have two paints which will behave in the same way.

16,905. Do you explain in the same way their experiments with the guinea pigs?—They are physiological experiments, and I would rather that some physiologist dealt with them, because English physiologists do not agree.

16,906. You stated, with regard to rubbing down, that, even in the absence of lead, it should not be done dry, because you consider all dust *per se* to be dangerous?—Yes.

16,907. Why?—That feature presented itself largely in the Pottery Inquiry. In the Pottery Report issued by the Home Office dealing with lead compounds it is shown that the rate of mortality per 1,000 workers is between seven and eight times higher than that amongst lead workers, and I think it is fairly stated there that the rate of poisoning is increased by dust *per se*.

16,908. I think not. I think it is pointed out there that the dust to which pottery workers are exposed renders them liable to chest diseases, but it does not say that all dust does?—It says that pottery dust does.

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16,909. The dust to which those pottery people are exposed?—Exactly.

16,910. It does not say that the dust which is rubbed down from the zinc paint is the same dust that the pottery worker is exposed to?—No, I quite agree, but I cannot follow you into medicine.

16,911. But I cannot let your statement in your evidence in chief pass, that all dust *per se* is dangerous; not only so, but there is the kind and the amount of dust to be taken into consideration. Are you aware that no chest diseases have been found associated with men working at plaster of Paris burning, and that is extremely dusty work. I do not want to put you to trouble on the point, but simply to ask whether you have any reason for thinking that dust coming off from paints which do not contain lead is sufficient in amount, or of such a nature with regard to chemical composition, as to be likely to cause disease?—I ought to have mentioned in dealing with dust *per se* that I am thinking of those zincs which contain lead.

16,912. We come back to lead and we have to deal with the lead problem. Now with regard to the regulation of the trade, I tried to follow closely the suggestions, which you made, and I have come to the conclusion that you do not advocate any special regulations, but instructions and education, which are very different things?—If I led you to that opinion I am afraid I gave you a wrong impression. It was hardly what I intended to say.

16,913. The whole trend of your observations was that the worker should be instructed and educated?—And that education should take the form of regulations.

16,914. But you cannot educate a man by regulation?—Pardon me, I differ from you there.

16,915. You may send him to school, but you cannot make him learn?—I do not know. I am certain that the experience in white lead works is that you can educate a man by regulation and very very much so.

16,916. You can only make him do certain things by regulation?—That is education.

16,917. Excuse me. You can compel him to do certain things under penalty, but that is a very different thing from appealing to his reason, so that he in the future shall not always take risks if he is not watched?—But my own experience in white lead works (and I cannot go outside my own experience, and I do not presume to) is that you can educate him. May I roughly describe what we do? You know it probably, but other members of the Committee do not. We have a foreman who instructs and initiates new workers as to the dangers to which they are likely to be exposed, and for about a week, sometimes more, he goes along and gives them little tips as to how to avoid dust here and how to avoid getting dirty there. That is what I call education combined with regulation. This foreman has the power of dismissal, which is rather an important feature when you have a works manager and staff. The fact that the power of dismissal should be vested in a foreman (not solely) because of breaches of Home Office rules is an important one. That foreman we look to as being responsible for the health of the place, because he is in and about. He goes to the mess room, and when washing is carried out, if he finds a man dirty he turns him back. That is the education I mean, combined with regulation.

16,918. But surely the regulations are at the back of it all, because if these things are not done and the factory inspector finds the regulations broken, the employer is liable to penalty. And, moreover, he is bound under the regulations to use due diligence in seeing that those regulations are carried out?—Exactly. I would not like you to think that I am posing as a philanthropist; I am not.

16,919. My point is that there is a *vis et ergo* at the back. The *vis et ergo* is the presence of the factory inspector at odd times?—I quite agree, but you will also agree that manufacturers have gone beyond the Home Office regulations in their own interests.

16,920. Yes, but what we find difficulty in understanding is how we can get that same *vis et ergo* behind any regulations we establish for the house painting

trade?—I think you will find that you can, but do not make them too irksome.

16,921. In Austria, where they have regulations for external painting, they are practically a dead letter, we have been informed?—You have had Austrian and Prussian witnesses I cannot enter into that. It would not be right for me to discuss it because you have had their evidence.

16,922. Exactly; but you suggested in your evidence-in-chief that you are prepared to stand by the value of education, so that I am bound to ask you about some points to see whether you have any regulations to suggest, or any way of cutting the gordian knot, which has certainly not been done abroad, where they have already tried the line which you are at present advocating?—I can only express an opinion. I am confident from the success which has attended the application of regulations in white lead works, that the same success would attend their application amongst painters. If you ask me for a method of application; then we shall have to go into much more detail, and it will be necessary for me to outline some regulations in giving my opinion.

16,923. We should require that, if we are to consider your opinion as one that should stand. We have had nothing placed before us which seems practicable, as regards regulations which it is suggested should be established, differing from those which have been tried abroad. Now you have mentioned the point of casual employees, and their tendency to lead poisoning: Do you think it is due to the fact that they are casual men, and, as you, I think, rather suggested, more careless, that they get lead poisoning. Is it not due to the fact that it is fresh exposure to the influence of lead. Our experience is not as you have suggested, that it is the casual type of the person employed, but the fact that he is more likely to take lead poisoning when first exposed than after more prolonged exposure, which is a very different way of looking at it?—I am afraid I do not quite follow you there, because my own opinion in regard to casual labour is that you have a man coming to you who is a casual worker, and who has been probably out of work for quite an indefinite period, and his resistance is thereby reduced. You do not know how long he has been out of work.

16,924. Yes, but let me instance your own trade, when the employment of women was stopped. Women as a whole in that labour were worse paid and worse fed than the men who replaced them, but you know as a matter of history that the lead poisoning which occurred on that substitution was enormous?—Such substitution necessarily having the effect of introducing a large number of new workers to work which they had never yet been engaged in. You will agree with that.

16,925. To a certain extent, yes, but looking at it medically (and Dr. Goadby, I think you will find, entirely agrees, if you speak to him) it would appear that the chief cause in the case—I will not say the only one—is the fresh exposure, and that men by long exposure become salted and less likely to get poisoning?—Then would you suggest that the so-called "salted" men have initially or within a short time of their first employment undergone lead poisoning. It more or less follows, I think.

16,926. No, it certainly does not. If they have lead poisoning, they get more prone to have it again and again?—Yes, I quite agree. Perhaps I have misunderstood your argument, but I take it that what you just said was this: that fresh exposure, or first exposure, might I say, to lead is the dangerous feature. There must have been a first exposure for the older workers. The older people may be viewed as people who have passed through the ordeal of first exposure. Now this is only my understanding of what you mean: do you consider that you have found them by experiment resistant? That I take to be more or less roughly what you say. Can you work out a ratio between the people who fall and the people who do not fall? That you may know but I do not know it.

16,927. That is the curve of exposure (*handing a paper to the witness*). I put it to you that the number of cases which occur within the first two years of

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employment is nearly equal to the number of cases which occur during the next 48 years?—I follow.

16,928. The number of cases which occur in the first six months is double those which occur in the next twelve months?—I follow, but it is hardly applicable to painting conditions.

16,929. I do not say painting conditions. I am talking of lead poisoning now?—Those men have had prior exposure to lead in a number of cases.

16,930. You see the influence with regard to intermittent employment, like house-painting, where for many months of the year they are away, and may lose some of their immunity by—?—Ill nourishment?

16,931. By pure absence from the exposure, to which when they return they are more liable. Now have you any evidence that the house painter is not abstemious?—Well, if you want statistics, I cannot give you those, but my own experience of painters who have been engaged in and about houses which I have occupied and works in which I have been engaged is that they are not.

16,932. You think that they are not abstemious?—I do not think they are.

16,933. Do you think that any regulations would make them abstemious?—Regulation combined with education. Do they know themselves how serious the question of lead poisoning is amongst them? I submit to you that they do not. The average painter that you come across is proud, as you will find if you discuss it with him, of what he considers to be his own power of resistance to lead.

16,934. One is fully acquainted with the British working man and his pride in his own health, but can you suggest any way in which we can make these men more abstemious, as you maintain that they are not abstemious?—Yes, by issuing Home Office Regulations showing them how excess is deleterious to their health.

16,935. You agree that if they do take alcohol, it adds to the risk of lead poisoning?—Certainly I agree. I do not know whether you think so, but I certainly do.

16,936. You are not prepared to give us a regulation by which you can stop their taking alcohol?—No, I do not see how you can; I should like to know how.

16,936a. (Mr. Parsonage.) Or cigarettes?—No.

16,937. (Sir Godfrey Baring.) Would you issue temperance pamphlets to them?—No, I am not a temperance man. I hope I am temperate, but I am not a blue-ribbon man.

16,938. But would you issue that sort of recommendation to workmen?—Yes, I think so—not of the type of the German regulations, because they are far too complicated. They suggest all sorts of diseases, and after the men have read them they think they have got them.

16,939. (Mr. Sutherland.) I have the diagrams here of the Dutch Commission. I do not know whether they confirm your experiments as to evaporation (*handing some diagrams to the witness*). It would be interesting to get your evidence on this point. They seem to have taken great pains upon the point, which is an interesting one; and I thought that I would take the opportunity of getting your opinion upon it?—I think that these are of substantially the same type as my results. I had not seen them before, but I think they agree quite well.

16,940. Do you think that the absence of any intimation to the workman as to the danger of the material he is using has made him indifferent to it?—I certainly do.

16,941. Do you think that insistence by the employer on the observance of certain rules would of itself put the men on guard against the danger, and tend to mitigate the danger?—It could only have a salutary effect. From start to finish it could only be for good.

16,942. That is, I take it, what you mean by the educating effect of regulations?—Yes; it could only be for the good of the painter.

16,943. Would not the abolition of dry rubbing down enormously reduce the danger?—I think so, from my own experience, I may say that I have known of no case where lead poisoning in white lead works has been caused by anything other than dust. In my

own cases it was an accident. I am certain that if dry rubbing down were stopped, and washing appliances provided, you would see an immediate decrease in lead poisoning.

16,944. I think that the Home Office admit that other causes are very slight compared with the danger from dry rubbing down?—That seems to me to point very distinctly to the salvation of the painter if he requires salvation.

16,945. Can you give me any explanation of this very important fact: that the two large centres of lead poisoning cases in England are London and Manchester, and in Scotland the Glasgow area; but outside these areas the effects are very slight, taking the country over. Generally in Scotland, where the proportion of white lead used per man, so far as my knowledge goes, would be more than in England, the number of cases, including the Glasgow area, is very small?—I could not explain that.

16,946. Does that indicate that the attacks are conditioned by other things than lead?—It certainly has that look, because if you view the painter as being rendered easily attacked by outside conditions (which I think is the case) stretching one's imagination so far as to apply that to paint itself, I think you will find that the rate of decay of paint itself when atmospheric conditions are bad, agrees fairly well with what you have stated.

16,947. Does it not point also to the fact that bad housing conditions make the painter much more susceptible in the large congested areas than in the open country?—I would not like to express an opinion on that. It is rather beyond my depth as a chemist.

16,948. But speaking as a layman, it points that way, does it not?—Yes. I would like to say that I have meant to state from start to finish of my evidence that good home conditions are the key to the whole situation. Take a man whose conditions at home are good, and who is careful in his habits. You will know whether he will be likely to be lead poisoned or not if you examine the food he brings to the works.

16,949. Dr. Leggo admits the comparative immunity of Scotland, and he ascribes it to the prevalence of stone buildings. Do you think that that has any effect?—No. I am afraid that one would have rather to consider a painted area.

16,950. Are you quite of opinion that there is no poisonous emanation from a lead painted surface?—I am, distinctly.

16,951. Have you considered the question of fumes arising from burning off?—I have considered it. Under ordinary conditions I can see no possibility of that taking place.

16,952. No lead fumes?—No, not at the temperature which is ordinarily used for the burning off of paint.

16,953. What is the ordinary temperature of a blow-lamp?—The temperature of the flame is very high, but it is not in contact with the paint long enough to produce the same temperature in the paint. All you require to do is to melt the oil, and a painter will not hold it too long against the paint, because he will burn the door.

16,954. It cracks the paint?—It shrivels it and he takes it off with a tool.

16,955. One witness told us that before he got any fumes from lead he had to get to a degree of 760 Centigrade?—Yes.

16,956. Would the blow-lamp approach that?—Not on a door. You would have the door charred a very, very long time before that.

16,957. So you think that that disposes of the question of the fumes of burning off?—I do think so.

16,958. (Mr. Parsonage.) You speak of a paint not drying in the dark. Do you say that it will not dry in the dark?—No, but I say that the rate of drying is very much slower.

16,959. You said that in a house in Park Lane it took some weeks for the paint to dry?—Yes, that is the case. I can refer you to the whole of the scientific literature on it if you like; but it is an experiment you can very easily try.

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16,960. (Mr. Sutherland.) Was the drying of that paint accelerated by a drier?—No, it had no drier.

16,961. (Mr. Parsonage.) It was simply an experiment, not the ordinary house paint?—No; it was an experiment.

16,962. That is a different matter altogether. You say you have questioned painters with regard to what they thought caused lead poisoning?—Yes.

16,963. What reasons have they given to you?—The reason in 90 per cent. of the cases, when I have asked a painter, is that when he washes his hands with turpentine the lead goes into his hands.

16,964. Are painters in the habit of washing their hands with turpentine?—Yes; to get the paint off.

16,965. Several painters have been called before this Committee, and there have been employers, and medical witnesses, and I think I can safely say that their evidence has assigned dry rubbing down as the principal cause of lead poisoning. That has been put forward by every operative painter who has given evidence before this Committee?—I will try to describe to you my last interview with a painter. It took place a week ago. It was a painter in my own district. I said to him: "Look here, have you ever had lead poisoning?" "No." I said, "Well, how do you chaps get lead poisoning?" "Oh," he said, "I do not know; it is the stuff we get on our hands." I said, "What about dry rubbing down?" and he said, "A lot of dry rubbing down there is in this district. I do not think I have rubbed down more than three jobs this last year." And that it a typical district. It is just outside London. The cottage property in the district will not stand rubbing down. They have to hold the house up with the paint.

16,966. (Lord Henry Bentinck.) I understood you to say that if dry rubbing down were forbidden it would be a very good thing?—I think so. I submit that where there is no dry rubbing down you can hardly prohibit it.

16,967. (Mr. Parsonage.) How would you account for the fact that the largest number of lead poisoning cases are in London and Lancashire, as Mr. Sutherland says. I will take Lancashire. That is a district where the apprenticeship system is more strictly enforced than in any other part of the country, and where there are technical schools, where the painter is taught the danger of the trade when he is an apprentice, and educated to the dangers?—As a Lancashire man myself, although I bear a foreign name, I could not answer that question unless you would be at the same time prepared to give me the ratio of apprentices to students.

16,968. The arrangement with regard to all apprentices is fixed by rules, and I can give you the rules of a score of towns in Lancashire where the apprenticeship rules are fixed between the employer and the workman?—Could you give the percentage of actual students at the technical schools and those that are under indenture, or are ordinary apprentices?

16,969. On an average the percentage would be one apprentice to five men?—But what is the percentage of apprentices to students.

16,970. I could not give you the percentage of apprentices to students at the technical classes?—But that is rather the key to the situation.

16,971. But it is not necessary for an apprentice to go to a technical school to learn the danger of the material he is using every day of his life, and that he intends to use for the rest of his life, to earn his living. It is more important to him to know the danger he is working in, than to anyone else. He knows that he has to look after his own health and that his health stands before anything else. Now you decline to express an opinion on the question whether bad housing conditions have anything to do with the health of the painter?—Yes.

16,972. But I suppose you have made a special study of lead poisoning, and you are quite ready to put down the drinking habits of the painter as a cause. Have you studied one more than the other?—I have not frequented the houses of painters and I know nothing about the houses of painters, therefore I cannot express an opinion; but with regard to the other question,

that is a matter of my own observation combined with observation in lead works, where it is quite obvious that men who take alcohol to excess are easily attacked. The housing condition has not come within my own purview, but the other condition has.

16,973. You will agree that a very abstemious man is liable to lead poisoning, but you implied that the majority take alcohol to excess, which is a very different thing?—No I did not.

16,974. That is how I understood it?—I do not think in the transcript of my evidence you will find that I have used the expression "majority," or have even indicated that, because the majority of painters are not poisoned, and it would be necessary for such a condition to obtain before you could impute to me that I had used an expression that would imply what you suggest.

16,975. You would agree that a painter who is a total abstainer or very abstemious is quite liable to take lead poisoning?—I quite agree.

16,976. You agree that the man who takes alcohol to excess is more liable?—Exactly, and I think that I have fairly clearly indicated that I am neither the excess man nor the other.

16,977. Now with regard to enforcing regulations, you seemed rather to take the view that the workman would be the man who would be inclined to evade the regulations rather than the employer?—I am afraid that you have misunderstood my evidence. I hope I never said such a thing.

16,978. You did not say so, but I gathered that you suggested it?—No, I did not suggest that. I have suggested regulations, and I would not suggest them if I thought they were useless.

16,979. You would force the employer to see them carried out?—Yes.

16,980. And provide proper washing accommodation?—Yes. I think you will find that I have mentioned washing accommodation particularly.

16,981. (Mr. Rice.) With regard to washing apparatus, do you think that it would be necessary to use hot water for washing purposes?—If he could get hot water all the better, but if not, it does not matter if he will use pumice soap.

16,982. The point is, is hot water necessary?—No, it is not necessary if pumice soap is used. I have used it and I have tried a great many of such soaps.

16,983. (Mr. Sutherland.) Soap mixed with pumice?—Yes. You can buy it. It gets a grip on the hand. I have had a number of samples sent to me and I have tried them on my own hands.

16,984. (Mr. Gardner.) In answering Mr. Sutherland you said that outside conditions tended to lead poisoning, but you did not say what these outside conditions were?—Did I use the expression "outside conditions"?

16,985. Yes?—If I did use the expression "outside conditions," by outside conditions I mean the home conditions.

16,986. In what respect would the home conditions tend to lead poisoning?—Because it has been generally observed that bad home conditions mean a badly nourished condition of the body.

16,987. (Sir Godfrey Baring.) Decreased vitality?—Decreased vitality, and, therefore, decreased resistance.

16,988. (Mr. Gardner.) Bad conditions such as overcrowding and insufficient food?—Any single factor that will have the effect of reducing a man's resistance is dangerous.

16,989. Then in that case you could not have good home conditions without having good wages?—I quite agree. Lead painters should be paid good wages. People who are in the habit of handling dangerous materials should have good wages.

16,990. We are told that in Scotland the rate of lead poisoning is less than it is in England. Would the fact that wages, generally speaking, are higher in Scotland, and that no red lead is employed, not have an effect on the statistics?—I put it down to porridge.

16,991. Do you think that what I put to you has that effect?—It would assist, and I should also put it down to porridge. It may seem rather a blunt statement, but a stomach full of food is an excellent antidote

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to lead poisoning. The giving of milk in white lead factories has been an incalculable help.

16,992. May I point out that not 75 per cent. of the painters in Scotland get porridge for breakfast. Are you aware that a man who is carrying his food to his work, as at least 75 to 80 per cent. of painters do in the summer time, has no facilities for getting porridge. The men take a can of tea and carry food with them?—The expression "porridge" is rather intended to indicate to you the type of food.

16,993. But it cannot be had?—"The type of food" I said.

16,994. (Mr. Mason.) Is there anything in the course of your experience which would suggest a reason for a case of lead poisoning in a man employed solely in varnishing, and that in a room apart from where lead is used?—No. I am afraid the description is far too general. I should have to see the room and know something about his materials.

The witness withdrew.

Professor E. C. C. BALY, F.R.S., recalled and examined.

16,998. (Lord Henry Bentinck.) In your previous evidence to the Committee you gave an account of your observations regarding the absorption of light by emanations from paste paints made up of white lead and zinc white?—That is so.

16,999. Will you please re-state shortly the result which you found in the previous experiments?—Putting it very briefly, the stiff pastes, such as one obtains from the dealers, were put into a tube, which was closed at each end with a transparent window, and then a beam of light was passed through and examined spectroscopically afterwards to determine whether any absorption of the light took place. Then these tubes were gently heated to various known temperatures, and a record was obtained in that way of the amount of absorption which is exerted by any possible emanation at the various temperatures. It was found at that time that white lead, a basic carbonate material, gave emanations (using the word without specifying anything whatsoever at the moment) which absorb light very strongly at temperatures considerably below those at which the zinc white and the basic sulphates of lead did. These did not give any emanations until one reached a sufficiently high temperature for the linseed oil itself to volatilise off and come to a state of vapour.

17,000. What was the broad conclusion you deduced from this?—The conclusion I arrived at was that there was some volatile produce or material given off by the white-lead paint not given off by the other two substances.

17,001. You stated that the emanations from white lead were poisonous?—Yes, I did, because I suffered several times somewhat severely myself from what is known as painter's colic.

17,002. And that definite evidence had been obtained that these emanations contain volatile compounds of lead?—I cannot go so far as to say that. That is why I confess I was wrong. I was rather misled by the doctors telling me that I had had lead poisoning.

17,003. Have you pursued that investigation further?—Yes, I have taken it very much further in two stages.

17,004. What results did you obtain?—In the first place, as I think I told the Committee at the time, it was necessary to prove whether that volatile and poisonous material really did contain lead or not. Although when I appeared before the Committee I was strongly under the impression that it contained lead, yet by steadily improving the technique of the method, I found that the amount of lead obtained was less and less, until finally I did not get any evidence of lead at all. But at the same time the substance remained just as poisonous.

17,005. Did you condense the emanations?—Yes, with liquid air.

17,006. You found that they were poisonous?—Yes.

16,995. Would you consider that varnish was a dangerous thing?—It depends so largely on the varnish. There are so many varnishes that I could not answer.

16,996. Would you indicate the type of varnish which you consider dangerous?—I should say generally that they are all much about the same, and that there ought to be little or no danger in the application; but I am a chemist and I have not had much practical experience of varnish, so I do not presume to be able to discuss it.

16,997. (Mr. Sutherland.) In Scotland the workmen have an hour for their breakfasts; in England they have half an hour, and I, personally, attach a very great deal of importance to that. When they are working in towns, near their homes, they can go home in that hour and get breakfast. When they are working at a job not near their homes they have the hour for food and Mr. Parsonage agrees with me that it is a very important point?—Yes.

17,007. Did you find any definite evidence that the condensed emanations contained lead?—No.

17,008. Did you make comparative experiments with lead sulphate and zinc white?—Yes.

17,009. What results did you obtain in these cases?—I got no emanations condensed in the case of the two latter, or practically none. Perhaps I should say that.

17,010. Did you then think it possible that the poisonous element in the emanations of white lead might be due to an oxidised product of linseed oil?—That is my present opinion.

17,011. Did you make an experiment to test this?—Yes, quite recently, in the last three weeks, I have made a series of experiments, and I have not the slightest doubt in my own mind that there is a definite poisonous compound given off, not only as given off from the original stiff material, but which is somewhat increased, in fact very considerably increased, by the addition of linseed oil, so as to bring the paint nearer to the ordinary conditions of use.

17,012. Do you also think emanations might be due to the fact that white lead is a hydrated carbonate?—I should like to explain to the Committee that my original idea was that the hydrated condition that ordinary white lead exists in, was really the origin of the trouble, and in order to test that point I investigated what you might describe as a paint made up with pure hydrated lead oxide, and then I found that the amount of this emanation was very considerably increased. I think that my conclusion is a fair one. The basic sulphate of lead, which is not a hydrated compound, gives exceedingly little, if any, emanation, while the hydrated carbonate gives a very considerable amount, and the hydrated oxide gives a very large amount indeed of the emanation.

17,013. Do these experiments lead inevitably to the conclusion that there is no lead in the emanations?—Yes, I think I can say that, certainly.

17,014. To what then do these emanations owe their poisonous character?—If I may speak in chemical language for a moment, it is due to the presence of what we call unsaturated aldehydes.

17,015. Will you please explain that to the Committee?—I will endeavour to do so. When a compound of linseed oil and various compounds of that type are oxidised, one of the first products one can get is what we call aldehydes. These aldehydes are undoubtedly poisonous substances, and I think there is no doubt that any scientific person would agree with me that if they are what we call "unsaturated" they are still more poisonous. Linseed oil is what we technically call an unsaturated compound. It would make the matter clearer to the Committee if I took another example perhaps. It is well known, I think, that raw whisky when first distilled has poisonous compounds in it, and it has been proved pretty conclusively that the poisonous action is not due to what

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is known as fusel oil, but to the presence of the aldehydes, which come from the original grain.

17,016. Have you made comparative experiments with other compound substances?—Yes, I have, with practically only one other substance, namely, manganese dioxide, which I took because it is a recognised oxidising material, and exactly the same thing happened there. These aldehydic compounds were given off, and they were equally poisonous.

17,017. Have you made any tests with turpentine?—Yes. Do you mean turpentine alone or paint mixed with turpentine?

17,018. Mixed?—Yes, I have. I found that if anything it was a little more increased.

17,019. Do I understand that your present conclusion is that the poisonous emanations are due to oxidation in the presence of water?—Yes.

17,020. Can you tell us whether the emanations would be increased by the presence of turpentine?—I have practically answered that. You will understand what I mean, Dr. Collis?

17,021-2. (Dr. Collis.) Yes?—I would like to say that since I sent in the précis of my evidence I carried out one or two experiments yesterday under ordinary proper conditions, that is to say, I made paints of these various materials, and mixed them with linseed oil and turpentine, exactly as an ordinary painter would use them. I put each one inside a tube, and passed a slow current of air over. I examined the air which came off by the test I was using, and I found perfectly clear and undoubted evidence that poisonous emanations were given off, that is to say, the aldehydes, and as regards the relative amounts, by far the greatest amount was given off by hydrated oxide of lead, and the least amount by the basic sulphate of lead and by zinc white, and any other material we liked to use, such as sand, or anything of the sort, to make a surface. From white lead there was a very decided amount of aldehyde given off. In fact I have got now so that I can always smell it perfectly easily, and detect it in that way.

17,023. (Mr. Sutherland.) Is not manganese dioxide what they use as drier?—No, they do not really use that substance, but they use a compound of manganese for the driers.

17,024. Do you think that a humid climate is more hurtful than a dry one in the use of paint?—I should say that would be a natural conclusion, but I could not answer definitely. I am certainly of the opinion that any water present in the paint is bad.

17,025. Are we to take it that whisky contains unsaturated aldehyde?—Freshly prepared whisky contains aldehyde.

17,026. That accounts for much?—It accounts for very much of the headache experienced, and the workmen themselves who are dealing with the stills suffer.

17,027. Your further experiment really disposes of your first evidence?—Yes, as regards volatile lead, but nothing more than that. I was wrong, I confess, but I was misled somewhat by the doctors, and somewhat by my own tests.

17,028. (Mr. Mason.) Am I to understand now that the aldehyde is what gives the painter lead poisoning?—Oh, no. I have consulted doctors on the matter, and they divide what used to be known as lead poisoning into two classes. There is the real lead poisoning which you get by handling lead pipes and lead paint, when you actually absorb compounds of lead and that, I imagine results in the blue line on the gums, and that sort of thing. But painter's colic, which I have suffered from now half a dozen times, is not due, I think, to lead poisoning. I do not know whether Dr. Collis agrees.

17,029. (Dr. Collis.) No?—Then how is it that one gets it?

17,030. A painter who is never exposed to any aldehyde at all in other lead trades gets colic all right?—I got what the doctor said was a pure and specific case of painter's colic. There is no volatile lead in the aldehydes at all.

17,031. Aldehyde may produce similar symptoms, and that is the interesting point?—That is what I

feel. Of course, you have to go very carefully when you are up against doctors, but there are certain symptoms which one can get which somewhat resemble painter's colic.

17,032. (Mr. Mason.) If you got rid of the aldehydes, what proportion of lead poisoning would disappear?—I could not answer that; I do not know.

17,033. Do I understand that the aldehydes were only obtained from carbonate of lead?—I thought that I had made it fairly clear that you get very very small amounts from any material whatsoever, but the white lead gives a very distinct amount—very much larger!

17,034. And this is due to the presence of linseed oil?—Yes.

17,035. If we used some other kind of oil should we get rid of the aldehydes?—That is a difficult question to answer straight off, because I do not know. If you were to use a fatty oil, what we really call a fat, as linseed oil is, you would probably always get it, but if you started using mineral oil I do not suppose you would. But could you use mineral oil in practice?

17,036. Take tung oil and Chinese wood oil?—That is fat.

17,037. You do not consider, then, that there is any drying oil which would not produce these aldehydes?—I am not an oil expert, but I think that it would be exceedingly difficult to get rid of these compounds. I think the simplest answer is that the painter should be advised not to use driers, and to use as little white lead as possible in painting.

17,038. (Mr. Sutherland.) Under what circumstances?—What was the question? The question suggested to me how we could get rid of the difficulty of these aldehydes coming off?

17,039. (Mr. Mason.) Still using white lead?—I think that you would decrease the amount very considerably by using no driers. There is not the slightest doubt that you would get less without the driers, but you would still have it there.

17,040. Is it possible to use white lead and still get rid of this danger?—I should say no, but to properly answer the question is really rather difficult, because it is a question of relative amount. All I am prepared to say to the Committee is that white lead when mixed with linseed oil gives a distinct, and one might say a large amount, of these aldehydes, even without the presence of driers, but when you say, could you get rid of the danger altogether, still using white lead, I would say in the first place, no, you could not, because even when you use a substance, such as very finely divided sand or anything of the sort, you still get it in very small amounts.

17,041. Could you ever get it down to the same proportion as with zinc?—No.

17,042. (Mr. Sutherland.) Mr. Parsonage has raised the question whether that emanation of aldehyde would give the nausea and sickness that ensues very often when people are working in a room or using a room that is newly painted?—I think so. I think that those are the very symptoms that you would expect. I have had a sample of one of these very high aldehydes (when I say "high" I mean complicated) given to me by one of the professors in order to see whether it resembled in its character these emanations which I have been dealing with. In the first place its smell is singularly like that which you get with white lead, and, secondly, it makes one feel uncommonly bad after smelling it.

17,043. Should we have to revise our vocabulary as to poisoning from paint?—I think so. I think that there is a certain amount of poisoning which arises from these aldehydes without any connection with lead as lead.

(Mr. Sutherland.) That is my point.

17,044. (Mr. Parsonage.) Sir Thomas Oliver, in a lecture which I have read, spoke of a person being put in a newly-painted room and getting lead poisoning. Now the suggestion is that that should not be termed white-lead poisoning at all, but some other name?—I have heard of that lecture by Dr. Oliver before. Do you know what the symptoms were in the case that he was dealing with?

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17,045. I do not know the symptoms, but he described it as lead poisoning?—Perhaps Dr. Collis will help me. It has been quoted to me over and over again.

17,046. (Dr. Collis.) He does not describe the case. He does not give us the symptomology of the case.

(Mr. Parsonage.) I know that painters when they are not doing rubbing down, but painting, are ill, and go to the doctor, and the doctor says they are suffering from lead poisoning, and they get compensation for it, too. The doctors on both sides accept it. This is a new theory altogether. I have one particular case in my mind at the present time, of a man who was a very abstemious man, indeed; in fact he was practically a teetotaler. He was foreman in charge, and he simply walked about the works. He was a particularly clean man, but he died from lead poisoning. He never did any work himself for years.

17,047. (Dr. Collis.) The suggestion is clearly that these aldehydes have a similar effect to what alcohol has?—I would like to say that the ordinary person, not a painter, in freshly painted rooms may get another symptom of poisoning arising, which has been mixed up with lead poisoning.

17,048. That in fact you can get poisoned by aldehyde in the same way as you can with alcohol?—Yes.

17,049. (Mr. Parsonage.) Take a room which has been freshly painted with ordinary white-lead paint mixed with oil and turpentine and driers. Suppose you took zinc white, oil, and turpentine, mixed in the same way. A person would not get ill from that in the same way as from ordinary lead paint, even if he was in the room for some hours?—That I am not so sure about. Some people would be more susceptible than others. A very susceptible person put into a freshly painted zinc white room would get affected. I have heard of cases.

17,050. But not in the same way as in the other case?—Yes. It is a very very small amount that comes off zinc white paint; I would not say none, because there is evidence of a very very small amount.

17,051. But the lead is a danger?—I think that the lead is a very considerable danger. White lead and driers themselves are inadvisable, because they both of them bring the question of poisoning really into practical politics. When a chemist is studying these things his tests are exceedingly delicate. I am able to say that you get a vanishingly small quantity, but I cannot say that there is none in the case of zinc white.

17,052. The base of the evil action is the white lead?—I think it is.

17,053. (Mr. Sutherland.) I think that your evidence very seriously modifies the position which we have had put before us up to now, because it introduces a further element that we have never before regarded as a danger, except when Dr. Goadby was before us. You have the

danger from white lead. You have the danger from white lead plus aldehydes?—Yes.

17,054. And the danger from ordinary zinc paints? I think that it is infinitesimal, but I cannot say that there is none.

17,055. But your evidence is very definite that a large amount of nausea and cases of sickness that arise and have been ascribed to lead poisoning would not come under that description except in an indirect way. The effect is due to aldehydes given off by the paint, you think?—I am rather of that opinion certainly.

17,056. (Mr. Mason.) How much aldehyde is given off in the case of zinc white?—I have no quantitative evidence at all.

17,057. Where does it come in the scale? You put white lead at the top and the sand at the bottom?—You have at the bottom sand and linseed oil only. Up at the top you have white lead.

17,058. Call that 100?—I would say 10 for zinc white—something of that sort. I hesitate to pin myself down. My impression is 10 for zinc white and basic sulphate of lead and other materials of that type, without any water in the compound at all. Then white lead about 100, and a very hydrated compound like oxide of lead somewhere about 250.

17,059. (Mr. Fell.) Do you get aldehydes given off with turps and oil?—Linseed oil alone with turps in the experiment I have described gives an exceedingly small amount; a slightly larger amount with zinc white, and the hydrated sulphate a very much larger amount indeed with the basic carbonate.

17,060. (Mr. Sutherland.) Would the litharge that is used in the boiling of varnishes be a contributory cause to the giving off of aldehyde?—I think so, certainly. I think that boiled oil will be a still further danger, because there is unmistakably a very large chemical change in the oil when it is being boiled, and you are aware that a very unpleasant material is given off, and the workmen suffer very considerably.

17,061. An unpleasant smell?—I had a large quantity of the material sent to me—the condensed fumes, and those fumes contained no lead whatsoever, but they were most unpleasant. Those fumes convinced me that there was nothing in my idea of lead. What I say is, that boiling oil with lead oxide, litharge, is a bad thing, because if you use that oil in practice you have half the process done already, namely, the hydrolysis of the oil.

17,062. (Mr. Mason.) A witness, Professor Armstrong, gave us experiments conducted with aucuba leaves exposed to the fumes of various compounds. These aucuba leaves were turned black by certain compounds and not by others. Would the aldehydes be the agent that turned them black?—I could not say; I do not know what the aucuba leaf contains or gives off.

17,063. (Dr. Collis.) It is the Japanese aucuba, the variegated laurel?—I could not answer that question.

The witness withdrew.

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Evidence to 17,084 handed in and taken as read; witness then called and examined.

17,064. I am an official of the London Chamber of Commerce, which has been specially requested to collect certain statistics and to present them on behalf of the members of the chamber directly or indirectly interested in the various industries affected by the inquiry.

17,065. The manufacture of white lead is a British industry, and has been carried on for centuries. 58,000 tons were manufactured in this country in 1910, as against 14,500 tons imported from abroad. About 15,000 tons of white lead are exported, of which I estimate that 7,500 tons are of British manufacture. Over 85 per cent. of the white lead manufactured in this country is therefore consumed in the United Kingdom.

17,066. The British white lead manufacturers employed, in 1910, 2,489 men (having some 8,100 persons dependent upon them), and paid 158,300*l.* in

wages; they have expended more than 80,000*l.* on structural and other alterations required by the factory inspectors during the last twelve or fifteen years, in pursuance of the special regulations for white lead corroding works and other factory regulations (which regulations have much reduced lead poisoning in white-lead works). A capital of at least 23,000*l.* (taking lead at 15*l.* the ton, the average of the last five years) is required for an annual output of 1,000 tons of white lead. The total capital which is employed at the present time may therefore be put at 1,334,000*l.* as a minimum figure.

17,067. The closing down of the British white-lead works would leave other industries entirely dependent upon the foreigner for one of their raw materials. Potters, colour and wallpaper manufacturers may be mentioned in this connection.

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17,068. The white-lead manufacturers annually expend—

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| 8,980 <i>l.</i>  | - | - | - | - | On pots,        |
| 9,850 <i>l.</i>  | - | - | - | - | On timber,      |
| 13,680 <i>l.</i> | - | - | - | - | On tin,         |
| 15,890 <i>l.</i> | - | - | - | - | On acetic acid, |

the producers of which, if the demand ceased, would be affected.

17,069. In addition, the white-lead manufacturers expended 864,660*l.* in 1910 on pig-lead. The total annual consumption of pig-lead in this country amounts to 200,000 tons. If the demand for white lead ceased, that consumption would be reduced by 25 per cent. This would be proportionately increased by any restriction in the use of red lead and lead colours also. Such a reduction could not fail to have a disastrous effect on the lead market, upon smelters and refiners, and upon lead mining, not only in the United Kingdom, but also in other parts of the British Empire and in foreign countries.

17,070. I have communicated with the leading representatives of lead mining in every district in the United Kingdom where that industry is carried on, and all express the gravest fears as to the effect upon British lead mining of the very large reduction in the demand for pig-lead which would be caused by wholesale restriction of the use of lead in pigments. It is not too much to say that probably only the largest mines could remain open. Returns have been obtained from mines producing (in 1909) 24,547 tons of lead ore out of the total production for that year of 29,744 tons. On the basis of those returns it is seen that, for the total 1910 production (25,534) the number of workmen employed was 2,687 having 6,945 dependents upon them, and earning 151,308*l.* annually in wages.

17,071. I have collected the following figures (for 1910) from the British smelting and refining firms:—

|  |                  |
|--|------------------|
| Total output from native ores              | 16,444 tons,     |
| Total output from imported and silver ores | 87,480 "         |
| Total workmen employed                     | 780              |
| Total dependents                           | 2,439            |
| Total wages                                | 72,970 <i>l.</i> |

17,072. I estimate that the capital required to smelt 1,000 tons per annum would be 6,600*l.*

17,073. Five firms treat native ores alone, and these would be affected to the same extent as the English mines, *i.e.*, would shut down if the mines were closed. Four out of the five are directly connected with the mines. The remaining works, those, namely, which handle imported silver lead, would presumably be affected to the extent of 25 per cent. of their output. Any prohibition of the use of lead in paints would consequently disastrously affect smelting and refining in the United Kingdom; would mean, at best, a 25 per cent. reduction in the output, number of workers employed, total wages paid, &c.

17,074. There is no substance in any way comparable with pure red lead for the special purposes for which it is used. The manufacture of red lead and litharge in this country is by no means unimportant. In 1910 the output amounted to 11,800 tons. I estimate that the capital required to produce 1,000 tons annually is 12,000*l.* and the total capital involved in the industry is not less, therefore, than 150,000*l.* Any interference with this industry would, as in the case of white lead, proportionately affect the lead trade and lead mining.

17,075. The possibility of eradicating lead poisoning from the occupation of the house-painter by abolishing, or very largely restricting, the use of white lead depends first and foremost upon the existence of a substitute comparable with it as a paint base. Alternative lead compounds, being open to the same objection as white lead, cannot be considered. It is suggested that the substitute is to be found in zinc oxide. It is abundantly clear that no other pigment can be seriously considered in this connection; it is common ground that lithopone is very far from the required standard. Patents for the manufacture of white-lead substitutes to the number of over 200 have

been taken out during the last 60 or 70 years, covering a wide range (barium, zinc, lead, strontium, manganese, calcium, antimony, magnesium, sodium, sand, china-clay, limestone, stearite, alumina, potassium, gypsum, &c.). Apart from lead compounds and one or two zinc compounds none of these appear to have any real commercial value at the present day.

17,076. Zinc oxide is by no means a new or unknown pigment. It has been commercially known under the name of zinc white for over 50 years in this country. An English firm has used it for the last 50 years. Patents on the subject of "zinc white" as a pigment have been numerous in England, and date back from the year 1786, the term "zinc white" being employed in patent specifications in the '50's. The words "the undercoats may be zinc white or white lead" occur in a specification dated 1862. In France, a powerful commercial organisation has been pushing the sale of zinc white since 1850, and it has been used on a considerable scale in that country for certain purposes since that epoch. In Holland, it has been experimented with for perhaps a longer period.

17,077. These particulars are of importance in view of the suggestion that the continued allegiance of the painting trade to white lead is due principally to prejudice, which prejudice has hampered the diffusion of knowledge in so far as zinc white, for instance, is concerned. This is incorrect. *First*, of master painters, especially those doing what may be termed the higher-class work, a large number have tried zinc white for exterior work, and nearly all use it to-day for interior finishes (more often as enamel), having discarded it for other purposes; it is indeed rare, in this part of the country at any rate, to find a master painter who has not used or does not use zinc white for some purpose. Over 15,000 tons of zinc oxide, valued at some 324,000*l.*, were imported into this country in 1910, of which I estimate that only 10 per cent. was used for enamels. The export of British-ground zinc oxide in 1910 was 1,911 tons, value 44,595*l.* The re-exports of foreign zinc oxide was 70 tons, value 1,556*l.* Zinc oxide imports have been given separately since 1905, and even in that year the quantity totalled 144,192 tons, value 282,358*l.* *Secondly*, an example can be given of a pigment produced and placed upon the market thirty years after zinc white, which, at the present day, is widely used and well known to all—it is lithopone (patented in 1874, and brought into general use from about 1880); it is an admittedly inferior pigment, and yet prejudice, in this instance, has been conspicuous by its absence. Numerous other cheap and inferior pigments have been brought out and promptly rejected by the trade. It cannot be seriously contended that 99 per cent. of the master painters in the Kingdom find zinc white of considerable use in interior work, whilst obstinately refusing to test it for other purposes. As already stated it is demonstrable that a large percentage of the better class of painters and decorators have tried zinc white for exterior work and discarded it. If this were due to a lack of knowledge in the workman applying the paint, the same result would have to be recorded in interior work. The painting trade necessarily understand their business better than others, as its members alone can thoroughly appreciate the requirements. That white lead has remained supreme for centuries would be admitted in commercial circles everywhere to be the best possible proof of its superior all-round qualities.

17,078. The chamber of commerce caused a set of questions upon the subject to be addressed to the leading painting and decorating firms in the largest cities in the United Kingdom outside London; the names being supplied by the local chambers of commerce. One hundred and twenty-three replies were received from the following 29 cities:—Aberdeen, Belfast, Birmingham, Blackburn, Bradford, Bristol, Burnley, Cardiff, Coventry, Derby, Devonport, Dublin, Dundee, Edinburgh, Glasgow, Halifax, Huddersfield, Leicester, Liverpool, Manchester, Middlesbrough, Norwich, Nottingham, Oldham, Plymouth, Portsmouth, Sheffield, Swansea, Wolverhampton.



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17,079. The replies may be summarised as follows:—

111 said that there was no substitute for white lead for outside painting equally effective for body, covering power, and durability.

78 said that they had had experience of zinc white for exterior work; of whom 52 said that it was unsatisfactory and not equal to white lead. A few said that zinc white is unsatisfactory except when used with enamel or varnish.

110 said that they have had experience of the use of zinc white for inside work.

93 recommend the use of under-coats of white lead for inside work.

91 have no objection to simple regulations, such as quarterly medical inspection; the use of overalls; provision of soap and water, &c., and the use of them before meals.

17,080. As one of the results of these questions, the following facts came to light unsought:—

One firm, established 20 years; never had a case of lead poisoning.

|           |   |     |   |                                 |   |
|-----------|---|-----|---|---------------------------------|---|
| Two firms | " | 28  | " | "                               | " |
| "         | " | 30  | " | "                               | " |
| "         | " | 50  | " | "                               | " |
| One firm  | " | 40  | " | only two or three slight cases. |   |
| "         | " | 20  | " | no serious case.                |   |
| "         | " | 34  | " | only one case.                  |   |
| "         | " | 100 | " | no record of any case.          |   |

17,081. Several other firms, on the same occasion, wrote that they had never had any case of lead poisoning in their business.

17,082. In this connection the report of M. Stas, "rapporteur" of the jury (Class 10) of the Paris Exhibition of 1855, is of great interest in view of the contention that zinc white is a more or less new pigment, for 56 years ago M. Stas, who was intimately acquainted with the two pigments, and was a chemist of high reputation, wrote (translation): "To-day zinc white disputes with white lead for pride of place." The qualities of zinc white, he states, were first recognised in 1779. It failed because of its high price and lack of drying properties. Before the year 1800 a French Minister of Marine attempted its adoption for the interior of vessels, but without success. In 1805 the French Academy of Science presented a report which states that the inferior covering power can be got over by an extra coat, which M. Stas confirmed as his own opinion. In 1844, M. Leclair discovered a process of manufacture which brought zinc white to a reasonable price, and, further, discovered a more or less inadequate drier. He sold his rights to the Vieille Montagne company, which, even at that date, says M. Stas, "owned most of the zinc mines of Europe." In 1855 the jury were informed by a manufacturer of zinc white that during the preceding year some 6,000 tons were consumed in France alone, but he added that "already the consumption showed a notable diminution." The jury concluded that whilst, apart from the question of cost, zinc oxide could replace white lead in interiors, having indeed the advantage of conservation of colour, for the outside this was impossible. "White lead," they said, "forms a combination with oil; zinc white is almost entirely inert." But M. Stas's most interesting observations are the following:—"Zinc white cannot replace white lead for all purposes; it is not prejudice or custom, that enemy of progress, and less still, ill-will, that is responsible, but the very nature of zinc white itself, which it is not in the power of man to change." M. Stas had no prediction for white lead, for he concludes his report by saying that the adoption of the use of zinc white for certain purposes constituted one of the glorious conquests of the century.

17,083. Finally, the report of the Departmental Committee of 1893, on the various lead industries stated that:—

"In the past a large amount of thought, labour, time, and money have been expended by many experts in the search for a substitute for carbonate of lead. Several compounds have been mentioned

to the committee as being equal to white lead and capable of taking its place, if only the prejudice of middle-men and dealers could be removed so as to secure for them a fair field in the paint market. One of these compounds, and the one on which most stress has been laid, is oxide of zinc. This has been used with success for internal decoration, but for rough surfaces and for exposure to heat, cold, and rain it does not possess the qualities for which white lead is conspicuous, namely, covering power and durability. Moreover, the price of oxide of zinc is greater than that of carbonate of lead. With regard to all these so-called substitutes the committee have invariably found that on closer inquiry of persons competent to judge, and unprejudiced on either side, the substance in question was in some particulars inferior; and they have come to the conclusion that there is at present no substitute that can take the place of carbonate of lead."

17,084. No new pigment has been discovered since that year.

17,085. (Chairman.) In paragraph 17,064 you state that the London Chamber of Commerce has been specially requested to collect certain statistics. Will you please tell us by whom the request was made?—By the white lead corroders' section of the chamber.

17,086. In paragraph 17,065 you state that about 15,000 tons of white lead are exported from Great Britain, and that you estimate that 7,500 tons of this are of British manufacture. How did you arrive at that estimate?—By taking the opinion of various people in the trade in London with whom I come in contact.

17,087. The official figures are: Exports 1910, 20,220 tons. Of this, re-exported foreign imports, 1910, 2 tons?—But the official figures, the Board of Trade figures, include as British manufacture foreign white lead, which is simply ground in this country and exported. That I think accounts for the difference.

17,088. In paragraph 17,067 you state some of the results of closing down the British white-lead works. Why should they be closed down?—Prohibition of the use in painting, or any limitation or restriction of the use of white lead, to a small percentage would clearly have the effect of closing white-lead works, because a very large proportion of their output is used in painting.

17,089. Would they not retain their foreign markets as well as their trade in white lead for potteries and other manufactures?—I think I have shown that the proportion of their foreign trade is so small that they would not be able to keep going on it.

17,090. You have no statistics of how much white lead is ground and how much is re-exported?—No. I do not think that there is any method of ascertaining that, beyond what I have stated above.

17,091. Therefore the official figures really stand?—They do not stand to this extent—that they are not British manufacture.

17,092. How do you estimate to get those figures. You make a very vague statement?—It can only be an estimate because there is no possibility of getting the precise figures. There are 7,500 tons of British manufacture it is estimated, exported. There is in addition to that a large quantity of foreign dry white lead merely ground in oil in this country which is exported.

17,093. But there are no figures?—There are no figures.

17,093a. Would not also the loss of subsidiary trade, dependent on the manufacture of white lead, be counterbalanced by subsidiary employments arising in connection with the increased use of leadless paints?—That is a hypothetical question which I should prefer not to answer.

17,094. In paragraph 17,069 you state that the total annual consumption of pig lead in this country amounts to 200,000 tons. I note that the actual figure for 1910 is 187,000 tons. Can you give the figures for previous years?—No, not the exact figures. It varies from about 200,000 tons.

17,095. The average is 194,000?—I do not give the figure as being correct to a ton.

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17,096. You state that, if the demand for white lead ceased altogether, consumption would be reduced by 25 per cent. Taking your own figure of 200,000 tons, and accepting for the moment your assumption that the demand for white lead ceased altogether, there would still be an annual consumption of 150,000 tons of pig-lead in this country?—Yes.

17,097. You are aware that the total production of pig lead in Great Britain in 1910 was 21,000 tons and the rest was imported. Can you tell us why the production of pig-lead in this country should be affected at all?—The production of pig-lead in this country is, as I have shown, over 100,000 tons, and this is what is known in the market as "English" lead, which commands a superior price. The figure mentioned, viz., 21,000 tons, is the product of English mines and depends entirely on the price, and a reduction in the consumption of some 25 per cent. would presumably have the effect of bringing down prices very considerably, adversely affecting both the "English" production of pig-lead and the mines in Great Britain.

17,098. Why should not the reduced consumption of some 50,000 tons bring about a reduction of the importations by 50,000 tons?—The British lead-mining industry is in a very poor way, and has been for some years, and I believe that the cost of bringing up the ore and so on is very much more than in other countries where lead principally comes from, such as Spain. The almost complete absence of silver from English ore would make the mines in this country the first victims of a fall in the price of lead.

17,099. In any case there seems no reason why the proportion of English pig-lead to foreign pig-lead should be reduced. At the present time English pig-lead represents almost exactly one-ninth of the total used. A reduction of 50,000 tons in the demand would therefore cause at the most a reduction of one-ninth of 50,000, that is about 5,500 tons, in the demand for English pig-lead?—For the time being there would be a very large over-production temporarily, at any rate. I am pre-supposing, as you are, I take it, that white lead is no longer manufactured here, and that the consumption is reduced by 25 per cent. It would result in a fall of prices which would get below the figure at which the mines could be kept open.

17,100. All your figures then regarding British mining, smelting, and refining must at any rate be divided by nine?—I do not quite follow that.

17,101. One-ninth is home production?—Certainly, but it is not so much a question of the actual amount which is produced in this country as a question of price. It is the price which keeps the English lead-mine open or not. It is not a question of the possibility of selling it. It is well known that "English" lead is worth a little more than foreign lead. It has a separate quotation of its own—a few shillings more per ton. But "English" lead, as I have explained, is five times as much as the product of mines in Great Britain.

17,101a. Surely it would hold the market then?—It might; that cannot be said for certain.

17,102. In paragraph 17,071 you refer to imported and silver ores. Will you please explain this? Is the silver ore English or foreign?—It is Colonial and foreign, principally the former.

17,103. In paragraph 17,073 you state that five firms treat native ores alone. How many people are employed by those five firms?—252 workmen is the figure I think; no, that needs modification.

17,104. The Home Office figures show that one of those firms employs about 5 people, another under 20, the other three about 25 each; that is a total of about a hundred?—The figure should be 128.

17,105. At the beginning of paragraph 17,074 you state that there is no substance in any way comparable with pure red lead for the special purposes for which it is used. Would you tell us your experiences and qualifications as an expert authority on the relative values of red lead as compared with iron oxide, bituminous paints, carbonising paints, graphite paints, and others, which are to-day very largely used in place of red lead for the painting of engineering structures and the like?—I am not an expert authority on the subject. I am simply giving the result of my

experience. Naturally I am thrown up against the trade and have been for years, because of the position that I hold, but I do not speak as an expert.

17,106. You tell us in paragraph 17,074 that 11,800 tons was the out-put in 1910 of red lead and litharge. What do you understand by "litharge"? Do you mean Massicot or flaked litharge?—I should include all. That includes Massicot and flaked.

17,107. Massicot is entirely used up in the manufacture of red lead, is it not?—I should not care to answer; I could not say for certain that I understand this last question correctly. There is no litharge or Massicot included here which is afterwards used for the manufacture of red lead which is also included in the figure. Have I made myself clear?

17,108. Do you include the litharge which is the product?—I have not included the Massicot and then again included the red lead.

17,109. In paragraph 17,077 you give an interesting estimate that only 10 per cent. of the zinc oxide used in this country is used for enamels. What is the other 90 per cent. used for; is it for ordinary paints?—Stiff paint mostly.

17,110. At the end of paragraph 17,077 you say that the continued use of white lead proves "its superior all-round qualities." Do you use the word "superior" deliberately?—Yes, I mean by that as a general utility paint. I do not mean to say that it is superior from every point of view, but as an all-round general utility paint.

17,111. If substitutes of equal value are on the market, surely they would not necessarily displace the substance which has been used for a considerable length of time?—I think that if they were non-poisonous they would.

17,112. In paragraph 17,080 you give replies to questions issued to leading master house-painters. Among the many witnesses that we have examined we have doubtless heard a number of those you quote?—That may be so.

17,113. Your figures are also of doubtful value as they do not state the average number of painters employed by each of those firms?—No; I simply give those returns for what they may be worth.

17,114. As an illustration of the fact that statements collected in that manner are not very reliable, may I inform you that the Institute of British Carriage Manufacturers collected similar replies, and it was found that a number of recorded lead cases were overlooked in the replies?—We did not ask for any returns of lead poisoning. One would necessarily imagine that the employers would not be able to give them completely at all. These questions were on the subject of the comparative use of zinc oxide and white lead for interior and external painting. The excerpts which I give there as to the number of cases of lead poisoning were given voluntarily as notes, but were not asked for in any way.

17,115. In paragraph 17,082 you refer to M. Leclair, who introduced zinc white at a reasonable price in 1844. You are doubtless aware that for the last 50 years all the painting by the Maison Leclair has been and is to-day done with zinc white only?—Not all. They admitted using lead where their customers required it up to the time that the argument was used against them in the French controversy. Since that time, I believe somewhere about 1905, they have, I believe, used only zinc oxide.

17,116. In your final quotation in paragraph 17,083 you refer to a statement that in 1893 the price of oxide of zinc was greater than that of carbonate of lead. White lead has increased considerably in price since then. Can you give us the prices of ready-mixed lead and zinc paints of the same quality at the market prices of to-day, gallon for gallon, ready for use?—That is a somewhat difficult question to answer, because zinc oxide is sold in a number of different qualities, whereas white lead, although it is sold pure and reduced by various percentages, is not sold in different qualities.

17,117. (Dr. Collins.) What is the highest price per gallon?—I could not give that.

17,118. (Mr. Sutherland.) There is no standard of price for paints. Between pure zinc oxide and genuine

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lead you can get a standard, but not for paint. Every proprietor has his own price?—Yes.

Mr. E. L. COLLIS, M.B., in the Chair.

17,119. (*Dr. Collis.*) You state in paragraph 17,067 that "the closing down of British white-lead works would leave other industries entirely dependent upon the foreigner for one of their raw materials. The potters, colour, and wallpaper manufacturers may be mentioned in this connection." Do you mean that these manufacturers use white lead?—Yes.

17,120. Do you think that the call that they make for white lead would not be sufficient to keep any individual white-lead factory in existence?—I do not think it would. I think that the percentages are too small.

17,121. The percentages that they use?—Yes.

17,122. What percentage would you consider that they do use?—It is a very difficult matter to say, but I think that 95 per cent. of the white lead is used for painting. That is what is thought in the trade.

17,123. So that these manufacturers you mentioned do not consume as much white lead as to-day comes in from the Continent?—No, certainly not.

17,124. So that they are therefore to-day, partially, at any rate, dependent upon the foreigner for one of their raw materials?—They are not dependent, but they can and do purchase from the foreigner occasionally.

17,125. There is more white lead used in English trades to-day than is made at home?—Yes, possibly.

17,126. So that in that sense England is to-day dependent on the foreigner?—Yes, possibly, in that sense.

17,127. In paragraph 17,071 you give the total output from native ores, and then the total output from imported and silver ores. Are silver ores imported or native?—Imported.

17,128. But surely some of the native ores contain silver?—Only to a very small extent, I believe. The percentage of silver is very much more in the Spanish ore for instance, than it is in the English. It is quite inconsiderable in this country. It is the trade term that I am using.

17,129. "Silver ore is practically what is known in the trade as bullion ore, containing precious metals "over a certain amount"; that is what you are referring to?—Yes.

17,130. I have not quite followed you on the number of workpeople employed. You state in paragraph 17,071, 780, and in paragraph 17,070, 2,687?—Paragraph 17,070 refers to mining, and paragraph 17,071 to smelting and refining.

17,131. So that 780 are those who are employed in the smelting and refining, and the others in mining?—Yes.

17,132. So that if the same amount of British ore was raised, it would only leave the question of the 780 in the smelting furnaces?—Yes.

17,133. You give a list in paragraph 17,080 of seven firms who reported that they had had no case of lead poisoning. You had answers from a great many more firms than that, I believe?—We had answers from something over 100. I believe that I give the exact number in my evidence.

17,134. You do not wish us to conclude that all the rest had had cases?—No; I have already explained that these were simply added as notes. We did not ask them any questions on lead poisoning at all. We simply asked their opinion with regard to the use of zinc and lead for exterior and interior work.

17,135. Some of them volunteered the information that they had not had a case of lead poisoning?—One of our questions was whether they would have any objection to certain regulations, and a certain number of them did object, adding that they did not see the use of them, because they had been established for so many years without any case of poisoning.

17,136. So that those firms would object to regulations?—I could not say that offhand.

17,137. That is the impression that they left on your mind?—That was one of the reasons for which the information was given; but it was not only that. It was entirely voluntary.

17,138. You give us some information as regards the amount of zinc oxide imported. Have you any information as to whether this amount has been rising or falling in recent years?—It has been rising considerably.

17,139. Could you give us the figures?—No, I am afraid I cannot.

17,140. Or to what extent it has been rising?—No, I am afraid I cannot. I could obtain them for the Committee. I believe that zinc oxide was put in a special category in the official returns about the year 1905. Since then it has been rising regularly.

17,141. That would be six years. Has there been any alteration in the price of zinc oxide during that period of six years?—I should hardly like to say off-hand. The quality question comes so much into it.

17,142. Yes, but still, the price must bear a relation. It varies a little?—Obviously it varies, also with the price of spelter, which varies, as you know, very largely, just the same as lead.

17,143. The point is, then, that it has varied more with the price of spelter than with the call for this material for painting purposes?—Yes, I should think the price of spelter would be the principal factor.

17,144. My point is, that up to the present the increased demand for zinc oxide for painting purposes has had no effect upon the price of zinc oxide for painting purposes?—It probably has to a small extent. With the increased consumption the price has probably come down to a certain extent.

17,145. We always have to look upon that question—does increased demand increase price or does increased demand give the opportunity to the manufacturer to manufacture on a larger scale and absolutely lower the price. That is a point I thought you might have considered?—I do not think that the price of zinc oxide has varied very much in the last few years.

17,146. So that we have no reason, as far as we can go on the figures that we have before us, to think that an increased demand for zinc oxide would advance the price of the material, as far as we know?—Probably not.

17,147. In paragraph 17,077 you instance the fact that there is no lack of knowledge on the part of the workpeople in applying the zinc oxide paint. You think that that is so because it is being used for internal work?—They have had practice in applying it. Special workmen are always employed.

17,148. But there is a body of men at present painting in England who have knowledge of applying zinc paint?—Yes, but I should not like to say that that body of men was sufficient for the demand.

17,149. No, but you think there is at any rate a certain number?—Certainly.

17,150. If your argument is sound, that follows, does it not?—Yes, certainly.

17,151. I ask you the question in connection with the suggestion that has been made, that a long time ought to elapse, if the Committee thought it was necessary by restricting the amount of lead used, to force the trade to use zinc, to allow the workpeople to obtain knowledge of how to apply it?—At the present time the number of men whom one might call fully qualified men, who are used to the better class of work, zinc-white enamelling, and so on, is only a small proportion relatively of the whole body of painters, and if zinc oxide only were used, necessarily a certain amount of time would be required in order that everybody might get used to it.

17,152. Have you any knowledge as regards the respective amounts of zinc ore and lead ore which exist in the British Isles?—Do you mean the unmined?

17,153. No, the ore used year by year?—Do you mean the stock on hand, or simply the quantity raised?

17,154. Raised from English mines?—It varies from year to year. Sometimes there is more lead ore raised, sometimes more zinc.

17,155. Possibly the amount raised is not so very different?—I think it more or less approximates.

17,156. A little perhaps in favour of lead?—Do you mean to say more lead than zinc?

17,157. Yes?—I think that if you go back twenty years, year by year, you will find that it is the other

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way round, but really I have no knowledge on that subject; I think it goes in cycles, if I remember correctly.

17,158. The amount of lead raised has been falling, and the amount of zinc raised as ore has been almost stationary; and the two now bear rather close relation one to the other?—Yes, they do now.

17,159. So that an increased use of zinc may call for more zinc mining in England than in the past, while it does not appear that at present, from the amount of lead raised, that lead mining is to-day a flourishing industry?—No. Of course the total amount of lead mined in this country is very small compared with the total consumption.

17,160. Yes; so that we are dependent on the foreigner to a great extent for our ore, are we not?—Yes, and the Colonies.

17,161. And we shall be very little differently placed as regards the paint industry from that point of view if zinc is used instead of lead?—Are you presuming that zinc oxide would be manufactured here?

17,162. I am speaking from the ore point of view only at the moment, leaving the manufacture on one side. As regards the amount of lead ore raised and zinc ore raised, zinc appears, except for the last two years, to be about holding its own as a mining industry, while lead has gone back from 73,000 tons in 1873 to 28,000 tons in 1910?—Yes. Of course, it must be remembered that the principal zinc mines in England belong to the foreign manufacturers of zinc oxide.

17,163. Yes, but the labour of raising the ore is carried out here as far as that goes. Do the Vieille Montagne manufacture under patent?—It is a secret process. No one is ever allowed to go into that part of their works in which the zinc oxide is manufactured. I have known of parties being conducted over other parts of their works. Their works are very large.

17,164. Have they no protected patent in England?—They do not manufacture in England.

17,165. Have they a patent?—I do not think so. It is a secret process.

17,166. The Patent Act does not cover it?—No, not so far as the Vieille Montagne secret is concerned. It has never, I believe, been divulged since Leclaire originally discovered the process.

17,167. A certain amount of foreign zinc is to-day ground at home, is it not?—Yes, quite a considerable amount.

17,168. And re-exported. You mention that in paragraph 17,077. "The export of British ground zinc oxide in 1910 was 1,911 tons; valued at 44,595*l.*"—It is nearly all consumed in this country.

17,169. That is about one-seventh of the total amount of zinc oxide which is imported, which is an appreciable amount?—Yes.

17,170. So that if there is an increased call for zinc oxide, and that material is probably used in the country, British labour is used in the grinding, if not in the manufacture?—But the grinding is a very simple process, and gives employment to very few people.

17,171. There are a good many people employed in colour works?—Zinc oxide is received dry in the barrels, and simply put into the machine. It gives rise to very little labour indeed.

17,172. My point is that there is a certain amount of zinc ore raised at home, though it goes to France and the Vieille Montagne Company, and is there turned out as zinc oxide, a certain amount appears to come back to be ground here, and from the point of view of British labour we only lose the moment while it is being converted from the ore to the oxide?—But that is the principal item.

17,173. You do not know the number of people employed in that process?—No, I could not say. May I come back to one question you asked me? I think we rather misunderstood each other. It was as to the price of zinc oxide, and the question of increased demand. Obviously, at the present time, if the use of white lead was prohibited, and nothing but zinc oxide could be used, the supply would be very much below the demand for the whole of Europe, and consequently the price might go up to anything; because it is not possible under existing circumstances for the white-

zinc factories to supply anything like the quantity of zinc white that would be required.

17,174. Do you not think that that would equalise itself very rapidly if a certain time was given for them to have an opportunity. If there was a sudden greatly increased demand, I quite agree with you, but I was asking whether the demand has not been increasing in recent years steadily without an increase of price. I think it is correct to state that the price of zinc oxide is this year *l.* a ton less than it was two years ago?—Yes, that may be.

17,175. While lead carbonate has risen at least this amount, I think in that period?—Yes.

17,176. Possibly more?—Possibly more. I take it what I meant to say is clearly down on the note. When you were speaking about the price of zinc oxide, I was imagining the present condition of open competition between the two, and not a prohibition of white lead, which, as I say, even if it ran over a number of years, say ten, would clearly send up the price of zinc oxide. Have I made myself clear?

17,177. The price of zinc oxide must depend a good deal on the price of zinc, must it not?—Yes, but it would depend very much more on the supply and demand, if white lead were used no longer.

17,178. But the amount of zinc used in other commercial processes is very much greater than will ever be used in regard to zinc oxide for paint?—Yes, possibly. I do not think that the supply of zinc would be the principal factor in the case.

17,179. A great deal of zinc oxide is made by the indirect method from spelter?—It is made from strippings from houses when they are pulled down. It is made from the refuse from galvanising works, and so on—zinc in many forms.

17,180. Yes, but it must depend on the price of spelter practically?—Certainly, to some extent.

17,181. And the price of spelter is almost ruled to-day by the demand for it in the galvanising trade?—Yes. But with any such thing as prohibition, the supply would be so very much below the demand that the price would for some time, at any rate, be quite artificial.

17,182. It would very much depend upon the rapidity with which the demand came, would it not?—It would very much depend upon the rapidity with which white lead was done away with.

17,183. That is the same thing. I say it would depend upon the rapidity with which the demand came?—Yes.

17,184. You have no knowledge of the length of time that it takes to construct a works where zinc white can be made?—No, but I know that in one particular works in France they have been experimenting with it for a matter of five or six years, and they have not yet reached the point where they can produce an article sufficiently good to be put on the market.

17,185. (*Mr. Sutherland.*) What do wallpaper manufacturers use white lead for?—As a base for the colours. White lead is stained, so to speak, with the colouring agent, and then printed on the paper.

17,186. Purely in the printing?—Yes.

17,187. Zinc oxide has an open market in England, and has always had, and if its merits had been what are claimed for it, would it not have made a larger impression on the paint trade than it has?—You say if its merits were what is claimed for it.

17,188. Yes, by the manufacturers, and by its advocates?—By its special advocates? Presumably it would have taken its place. I see no reason why it should not have done.

17,189. Is not the strong preference in the painting trade for white lead a very strong presumption that it has merits which justify its popularity?—Most undoubtedly.

17,190. Would you be surprised to hear that of the large number of master painters who have given evidence before this Committee, many have no actual experimental knowledge of zinc oxide, and the bulk of those who have tried it have abandoned it as inadequate, except for finishing purposes?—I should be very surprised to hear that many master painters have no

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knowledge of zinc oxide. Speaking for London, it is a difficult matter to find a master painter who has no knowledge of zinc oxide for one purpose or another.

17,191. The question goes on, "and the bulk of those who have tried it have abandoned it as inadequate except for a finishing coat."—That is so as far as my knowledge of the trade goes.

17,192. These gentlemen came from Scotland and from various parts of England. They tried it some time back, and they all say it is inadequate. This Committee cannot regard enamels as affecting the question of zinc oxide at all?—I think not at all.

17,193. Enamels stand in a category of their own?—They stand in a category of their own, and it is not a question of the treatment of the pigment so much as of the vehicles, the oils and varnish, and so on, which are used with it. It is an entirely different question.

17,194. Though zinc oxide and lead are both largely imported into this country, zinc oxide manufacture is largely a monopoly of foreign firms, is it not?—Entirely, one might say.

17,195. Are there any manufacturers in England producing zinc oxide?—There is one small manufacturer.

17,196. There is obviously a large market for it already, so why are there not more?—Because the production of zinc oxide has been for 50 years in the hands of the foreign manufacturers.

17,197. I wanted to get that answer. If the prohibition of lead is enforced in France, which all the French witnesses have expressed grave doubts about, would not that make the question still more difficult for this country, assuming that they prohibited lead?—Most certainly it would. It would very largely affect the price and the supply of zinc oxide.

17,198. In view of the answer you gave to a question by the Chairman, that one firm, experimenting for five years, had not produced a satisfactory product, would not a very considerable interval have to elapse to enable zinc manufacturers to establish works and perfect processes in this country?—In my opinion it would take many years. Indeed, it is difficult to put a limit to it under existing circumstances.

17,199. Is not that a very strong argument in favour of the Committee recommending a good trial of regulations to see how they would affect the incidence of lead poisoning rather than prohibiting?—Most undoubtedly it is, because it would be a generation before, under the most favourable conditions, you could produce sufficient zinc oxide in this country to meet the demand. It is very doubtful if the right kind of spelter would be obtainable at all.

17,200. It is your opinion that zinc oxide could not replace white lead for all external uses?—Certainly not.

17,201. (Mr. Parsonage.) In paragraph 17,079 you have a summary of four different questions. One reads that 110 said they had had experience of the use of zinc white for inside work. There is no mention of any of them saying that they found it suitable, or that they were favourable to the use of zinc white?—Six of the replies gave zinc white as being equally effective.

17,202. You speak about special men for painting with zinc. Have you any practical knowledge?—No.

17,203. None whatever?—No; but I am constantly thrown amongst the trade—the manufacturers.

17,204. And workmen?—Not workmen.

17,205. You have no knowledge that a man who could paint that door with white lead could not paint it equally well with zinc white?—I have no direct knowledge.

17,206. That evidence may only be taken as an opinion?—It is not my opinion. I personally have no opinion upon it; but it is the result of what I hear in the trade.

17,207. The use of zinc oxide is increasing in the country?—You are including enamels.

17,208. Including everything?—Yes, certainly.

17,209. You say that nearly all the master painters in London use zinc white, or are acquainted with the use of it?—Certainly.

17,210. Can you explain how, if once they tried it and abandoned it, the use of it can continue to be increasing? Do you mean that someone else is fool enough to take it up?—Have I said that after one trial it is abandoned?

17,211. The question was put to you, "Is it not the fact that after trying it the majority of those who have tried it have abandoned it?"—That was for external painting.

17,212. (Mr. Sutherland.) I was responsible for the question, and I based it on the testimony of witnesses before this Committee?—I think the question was, "except for internal finishing."

17,213. (Mr. Parsonage.) Not at that time. If you intended to say so, very well?—I feel sure that the question was, "except for internal finishing."

(Mr. Sutherland.) I will read the question, "except for a finishing coat."

17,214. (Mr. Parsonage.) They have abandoned it but for that, and yet the use of it is continuing to increase?—Yes. It is being continually used for finishing coats internally.

17,215. Do you term the finishing coat the last coat of all?—It depends on the quality of the work being done. In the very best work you would put more than one coat.

17,216. (Mr. Gardner.) The question was put about the supply of zinc oxide being controlled by practically a syndicate, I think, of manufacturers. Is it not the case that white lead in Great Britain is controlled by a combine?—I believe so.

17,217. In view of the fact that the use of zinc has been increasing so rapidly of late years, does it not betray a want of business capacity on the part of the colour manufacturers and grinders here in not catering for the public supply?—Do you mean in not opening factories in this country?

17,218. Yes?—I think I have already explained that it is almost an impossibility under present circumstances to successfully establish zinc oxide works.

17,219. Why, if there is a demand for the article?—Of course it is a question of competition with existing concerns.

17,220. I should have thought that you could manufacture and supply just as readily as the foreigner?—Theoretically, perhaps, there is no reason why we should not do so; but when we come to practice it is quite another problem.

17,221. In paragraph 17,074 you say: "There is no substance in any way comparable with pure red lead for special purposes." What are these special purposes?—In view of the fact that I have already answered a question on that, and said that I have no personal knowledge, I would prefer not to answer that question.

17,222. But you put this in your evidence; you make a definite statement?—I have practically withdrawn it by means of my other answer.

17,223. (Mr. Sutherland.) Is not zinc oxide and lithopone largely used by linoleum and oil-cloth manufacturers?—Lithopone is very largely used, but I could not say whether zinc oxide is largely used. It is used.

17,224. Do you know whether the zinc oxide that comes into the country is all consumed in the painting trade, or are there any other markets for it?—All of it most certainly is not.

17,225. You do not know what other markets there are for it besides that?—No, I am afraid I could not say.

17,226. I thought that it might throw light on the increased consumption?—It is used, I should imagine, wherever colouring is done.

17,227. Is not there a difficulty in getting zinc oxide paint to cover on mouldings and sharp arras and surfaces of that kind?—That is the principal difficulty, but I have no practical knowledge of painters' work.

17,228. (Mr. Kinggate.) How do you arrive at the fact that 95 per cent. of the white lead is used for painting only?—That is the opinion in the trade.

17,229. In what trade?—Amongst the manufacturers of white lead, colour manufacturers, and so on.

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Mr. HEDLEY MILLER.

[Continued.]

17,230. How do they know? They cannot know for certain, but they have a guide to it in their own sales.

17,231. That does not at all follow?—It certainly does.

17,232. It does not in the slightest degree, as far as I am concerned?—Most certainly it does. They know what goes to the Potteries.

17,233. May I point out to the Committee that 50 per cent. of the white lead sent to the coachmakers' shops is not used for painting. I know what I am talking about. It is used for jointing, and that kind

of thing, and is not used for painting at all. There is a tremendous amount of lead used in coach-building?—Do you say 50 per cent.

17,234. Yes. Such a broad statement as this, that 95 per cent. is used for painting, without statistics to prove it, is entirely valueless?—It is impossible to get statistics on this.

17,235. (Mr. Parsonage.) The manufacturer does not know what use it is applied to. He only knows what he sells?—But he knows where it goes. He knows that it goes to the Potteries, for instance.

The witness withdrew.

## TWENTY-NINTH DAY.

Thursday, 21st March 1912.

### PRESENT:

SIR ERNEST HATCH, F.G., BART. (Chairman).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARDNER.

Mr. J. PARSONAGE.  
Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (Acting Secretary).

Captain MATTHEW FRANCIS.

Evidence to 17,244 handed in and taken as read; witness then called and examined.

17,236. I am senior partner in the firm of Matthew Francis and Son, Halkyn, near Holywell, Wales, and have practised as a mining engineer for 50 years in the Flintshire district.

17,237. I manage the following mines:—

- (1) The Halkyn Mines.
- (2) The Mount Halkyn Mine.
- (3) The South Halkyn and Rhydymwyn Mines.
- (4) The Bryngwog Mines.

17,238. And I am consulting engineer of the Holywell-Halkyn Mines and of the Pantymwyn Mine in the same county of Flint, and of Bog Mines, Limited, in Shropshire. The productive capacity of the foregoing mines in Flintshire is upwards of 3,000 tons per annum.

17,239. Being intimately acquainted with all the conditions of lead mining in Wales, I am able to say of my personal knowledge that the industry would be most prejudicially affected by any prohibition of the use of white lead by house-painters and coach-builders. Welsh lead is peculiarly free from silver, and suitable for the production of white lead, and I learn that from 25 to 30 per cent. of the output is used by the white lead corrodors. Even a 5 per cent. difference in the demand would most seriously affect the lead-mining industry, and a very slight excess of supply over demand always creates a most disproportionately great difference in the price realised for the whole output.

17,240. Even with the demand for lead for corrosion into white lead the average price of the metal for many years has been so small as to allow a bare margin of profit on the whole to the Welsh mine owners, who have a very large capital sunk in the industry, and, with a demand for lead paint destroyed or seriously diminished, it is not unreasonable to infer that British lead mining would very shortly be numbered among the ruined industries of the country. Not only the lead mine-owner and miner and their respective families would be involved in the misfortune, but other lead industries, such as lead smelting and spelter manufacturing, would be adversely affected.

17,241. Great Britain is now the dumping ground for foreign supplies of lead, and the British producer

of that metal is greatly prejudiced thereby. Not many years ago Great Britain was the greatest contributor to the world's production of that metal, but she now occupies only a very subordinate position. The first place is at present held by the United States of America, whose production for 1910 was estimated at 382,408 tons, whereas the British was only 29,300 tons. The disparity would be less marked were it not for the protective policy that the United States have adopted whereby a price is secured there several pounds a ton in excess of the British price; more especially would this be so if the whole of the American production was retained for home consumption, or no part of it was put in competition with British lead except at the American price, which, unfortunately, is not the case, for it is the rule and not the exception for American or Mexican lead to be sold in London at many pounds per ton below the New York price.

17,242. Having to compete with foreign lead under such conditions, the British producer is already seriously handicapped, and he is in no position to withstand the inevitable decline in price that would result if the consumption of lead were diminished to the extent which would be involved by a prohibition of the use of white lead for painting purposes.

17,243. I am accustomed to deal with substances even more dangerous than white lead. In every instance the methods of user are carefully defined by regulations which are strictly enforced, and the men who use the substances are carefully trained and fully cognisant of the dangers to be avoided.

17,244. The prohibition of the use of white lead, if classed as a dangerous article, whilst an attractively simple method of obviating its dangers is available, would, if the principle were applied in other industries, upset the whole industrial arrangements of the country. An element of danger even greater than that to which the painter is exposed is an incident of many industrial occupations, and in my opinion, whilst the dangerous processes should be reduced to as few in number as possible, the true remedy to be applied is the regulation of the conditions under which the dangerous article is used, and the training and education of the men who use it to the nature of the risks which they are running.

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Captain MATTHEW FRANCIS.

[Continued.]

and the best methods of securing immunity from that danger.

17,244a. (*Chairman*.) You are the manager of several very important lead mines in North Wales, are you not?—Yes.

17,245. To whom do you supply the ore which is raised from those mines?—To English smelters. A good deal of it is used for pottery purposes.

17,246. Do you smelt any portion on your own premises?—No, we do not.

17,247. In paragraph 17,239 of your evidence you state that you learn that from 25 to 30 per cent. of the output is used by the white lead corrodors. From whom have you ascertained that?—There is one mine that used to produce between 2,000 and 3,000 tons a year, and they say that the whole of it is used for white-lead making. I hear from the smelters themselves that the larger proportion, if not nearly all, is used for making white lead.

17,248. But have you any authentic information, or is it merely hearsay?—I hear it from the smelters.

17,249. But have they given you any figures?—They have not given me any figures.

17,250. Simply the firms have told you that fact, but you do not know from your own knowledge?—I do not know from my own knowledge. Smelters have told me. The late Mr. Quirk used to tell me that nearly the whole of the lead that he bought from us was sold to the Warrington White Lead Company for white-lead making exclusively.

17,251. But you make a very definite statement here. You say that you learn that from 25 to 30 per cent. of the output is used by white lead corrodors. Where did you get that information?—I have had an opportunity of reading evidence that has already been given, and there that statement is made.

17,252. It is a statement that you have got from other people, and you do not know it yourself?—No, I have no personal knowledge, but I speak from what I read and hear from the smelters who buy our ore.

17,253. Are you aware that practically eight-ninths of the pig-lead used in this country is imported from abroad?—I know that we import over 200,000 tons a year.

17,254. But are you aware that eight-ninths of what is used in this country is imported from abroad?—Yes, that is true.

17,255. A previous witness, sent by the white lead corrodors, estimated that a quarter of the pig-lead was used for making white lead?—That is in accordance with the information I received. That is the English production. I cannot say as to the whole production.

17,256. This refers to the whole consumption of pig-lead in Great Britain?—Yes; that would correspond with what I have heard from other quarters.

17,257. That leaves three-fourths of the demand for pig-lead unaffected by any restriction in the use of white lead for house or coach painting?—Yes, that would be the case.

17,258. Then what grounds have you for suggesting that the one-ninth which is supplied by British firms, would be disastrously affected when as much as three-fourths of the present amount will still be required for purposes other than the manufacture of white lead?—We know that when the Broken Hill lead came into the English market the price of lead declined from about 20*l.* to 9*l.* a ton. That is solely owing to the excessive supply. A very slight difference, even 5 per cent. excess in the production over consumption, will account for an enormous difference in the price. I feel assured that if the consumption of lead was reduced, as it would be by restricting the use of lead for paint, the price that we should get would be a wreck price, which would extinguish lead mining in this country. You see it is in a very precarious condition as it is. Nearly the whole of our lead is used for making paint and for pottery purposes. It is in demand for those purposes. We should be very disastrously affected if you restricted the use of lead in the way that it is proposed to do.

17,259. In paragraph 17,240 of your evidence you state that the average price of the metal has been very low for many years?—Yes.

17,260. Have not the prices risen considerably of late?—Recently; the last few months.

17,261. But have not they risen in the last year or two?—Yes, it has been a little better.

17,262. There has been a gradual rise in the last three years?—It may be so. I cannot speak positively. There has been a little increase, but the price has been very moderate.

17,263. What is the price to-day?—It is about 16*l.* a ton—foreign lead.

17,264. What was it three years ago?—To the best of my recollection about 12*l.* a ton. The price of English lead is governed by the price of foreign lead.

17,265. What was it before the Broken Hill lead came into the market?—18*l.* to 20*l.* a ton, and over. The average price of our lead ore used to be 12*l.* to 15*l.* a ton. I have worked a large mine at Halkyn. The average has been under 8*l.* 10*s.* a ton.

17,266. You will agree that the price has risen very considerably during the last three years?—Yes, it has.

17,267. Can you tell us the reason of this rise?—It has fluctuated, and there is very little stability in the price when it gets high. There is no security at all.

17,268. But can you tell us the reason for this very considerable rise in the last three years?—The importation has been a little less. I attribute it entirely to that.

17,269. But do I understand that the consumption of lead has increased?—The consumption may have increased, but we know that the importation is a little less. The Spanish importation has fallen off a little.

17,270. Now, at the end of paragraph 17,240 of your evidence you state that spelter manufacturing would be adversely affected by the restriction in the demand for lead. Why do you say that?—Because the zinc ore from which spelter is made is associated with the lead in every case, and if we do not get a remunerative price for lead there will be no inducement to mine for zinc. Zinc ore alone will not pay for working, but associated with lead, if we get a fair price for it, it is worth working.

17,271. Would not the increased demand for zinc paints lead to a great increase in the demand for spelter?—Spelter would be of no value in our district. Even if the price of spelter appreciated 50 per cent. it would not be worth working. The bulk of the ore is lead. If the lead has no value, or lead has depreciated in price to a very small extent even, it would not be worth working.

17,272. But you do not tell us seriously that if lead is prohibited in house-painting and coach-painting the price of lead is going to depreciate to a comparatively low figure?—I know that if the price of lead depreciated to a very small extent, the little zinc ore that is associated with lead would not be worth mining.

17,273. But you have told us that the price of lead has increased very considerably in the last three years, from 12*l.* to 16*l.*?—We have had an increase before, but in every case it is only temporary. We have never had a spurt for more than 12 months, and there is no security that the spurt will last longer.

17,274. When you take into consideration the small amount of lead out of the total consumption that is used for house-painting and coach-painting, you do not mean to tell us seriously that the abolition of lead in these industries is going so seriously to depreciate the price of lead that it is going to ruin the industry?—Yes, I am fully conscious of what I am saying. I am sure that if you restrict the consumption of lead it will extinguish lead-mining in our district. It is in a very precarious condition. That will be the last straw that will break the camel's back, I feel sure of it. The price depends entirely on the consumption, and when the consumption is restricted so seriously as you propose to restrict it, it would mean the ruin of our industry.

17,275. But we have heard these pessimistic opinions before when legislation has been suggested for the amelioration of the condition of the working classes?—Yes, and in many cases I should think they have been verified up to the hilt.

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[Continued.]

17,276. You can recall the introduction of the Factory Acts and similar Acts for the amelioration of the condition of the working classes? I sympathise up to the hilt.

17,277. Do not you remember that all these pessimistic predictions were put forward by manufacturers in the case of those measures?—It may be so.

17,278. They would you go so far as to repeat what you said just now—that all these pessimistic suggestions have been verified up to the hilt?—I should say a great many.

17,279. Do you remember the Workmen's Compensation Bill? That was introduced into the House of Commons in my time, and the employers said that it would ruin them if it was passed?—Some of the predictions have been verified, and a good many men have been scrapped in consequence of it.

17,280. You might possibly be on the side of those pessimistic gentlemen who were mistaken?—Unfortunately, there is an excuse for my pessimism. I have been associated with an industry all my life the price of the produce of which used to be 12*l.* to 15*l.* a ton; for many years the average has not been more than 8*l.* a ton, and we have not been getting more than under 6*l.* a ton sometimes. One place alone used to yield 24,000 tons of pig-lead a year. Now the production is 8,000 or 9,000 tons, or less than that. The industry is in such a precarious condition that I feel assured that you would menace it with extinction if you persist in carrying out the restriction which is suggested.

17,281. In paragraph 17,243 of your evidence you state that you are accustomed to deal with substances even more dangerous than white lead. Please tell us what they are?—Explosives.

17,282. Do you suggest that the workpeople are generally in the habit of handling such explosives?—Yes, all our miners are in the habit of using them daily in their work.

17,283. But only occasionally?—Every day, every miner.

17,284. But they are not using these explosives from morning till night, whereas those who come into contact with the dangerous elements of lead are in contact with them all day?—You see the miners go down in shifts. They work eight hours. They bore two holes and blast them between six and nine, say, then they bore two holes and charge them and blast them between one and two o'clock.

17,285. How long are they engaged in each operation?—The explosives are in proximity to them all the while, and they handle them twice during each shift, and in many cases more frequently.

17,286. But they are not continuously exposed to danger in handling explosives, as those people are continuously exposed to danger who come into contact with lead dust?—Not continuously, but intermittently.

17,287. In paragraph 17,244 you state that there is an "attractively simple" alternative to the prohibition of the use of white lead. Will you please describe what you mean?—I just jotted down roughly what I thought the precautions should be.

17,288. I understood that we had had them all before. Have you something quite new?—No, nothing, unfortunately. I cannot suggest anything new, but I would say that no lead paint should be sold and distributed unless labelled as containing lead, and no such paint should be sold unless mixed with oil so as to form a paste. All paint made with white lead should be sold wet, mixed with oil.

17,289. (Mr. Sutherland.) Would you apply that to the white-lead compounds like chrome and that sort of thing?—Yes; I should think it could be applied to those.

17,290. Chrome is required for tinting in distemper and a number of colours? Then none of those paints should be rubbed down unless precautions are taken against dust. I do not know whether any respirator could be used by the painter.

17,291. (Chairman.) Would you like to wear a respirator all day?—I do not think I should be very comfortable. Then, with regard to personal contact with the lead, neither the hands nor any part of the body to be brought into contact with the paint;

washing accommodation should be provided, hands should be washed and overalls should be worn when painting. Those, roughly, are what you had before. I cannot suggest anything else.

17,292. I quite understand now why you call them "attractively simple"?—If I take a pessimistic view, I am justified. If there were any substitute for lead, it would be a different case, but I am told that no paint is so efficient as lead paint, and for many purposes it cannot be done without.

17,293. Now I will put this question to you, and I want your answer as a sympathetic gentleman. Supposing we found that no regulations could be properly enforced, and that the evils arising from coming in contact with lead dust are very serious, would not you then consider that this Committee should, notwithstanding that it might be slightly injurious to the lead industry, prohibit the use of lead?—Are you prepared to apply the same restriction in other cases? There are many industries that are dangerous.

17,294. We must deal with one industry at a time. I quite agree that we must look after the health of all the workpeople of the country, but will you answer the question with regard to the lead industry?—You place me in a very awkward position. I am afraid I should have to say in that case you would be justified, but first you must prove that no precautions against the danger can be taken. I maintain that they can.

17,295. Then I will ask you this: How can you provide for washing accommodation, mess-rooms, and dust removal at every painting job throughout the country?—I should think there would be no difficulty.

17,296. I know; because you call the precautions "attractively simple," and I want you to tell us how you would go to work to introduce those precautions. You must remember that these jobs are spread all over the country. How could you be quite sure that the washing accommodation is provided?—But is the use of lead paint associated with such danger; that is the point. I am not aware that the danger from the use of this paint is so great as you lead me to understand.

17,297. There is no question about the injury that ensues from it; everybody admits that. The Home Office figures are incontrovertible in that respect?—I should think that in every house where painters are engaged provision could be made to enable them to carry out the regulations.

17,298. But you do not know of your own knowledge, do you, how you could protect the workman from the dust?—If painters were engaged in my house, I think it would be very easy.

17,299. Because you might look after them yourself?—I think it would be very easy to carry out the regulations.

17,300. Do you know all the operations in painting? Do you know that there is a lot of dust generated?—Yes, but that can be avoided by rubbing down wet-saturating before scrubbing.

17,301. But, even if you rub down wet, there is a great deal dropping on the floor, and on their clothes and hands. You state in one of your suggestions that their hands should not come into contact with lead. That is one of your "attractively simple" suggestions?—They might wear a cap.

17,302. What would they wear on their hands?—In the first place, I would obviate dust by rubbing down wet.

17,303. But there are droppings on their heads and hands and their clothes. You have no practical suggestions for getting rid of that danger?—No.

17,304. Now you state that greater dangers are incidents of many industrial occupations. Will you please say what do you mean by this?—The coal-mining industry is very dangerous; the use of, and handling of, explosives is very dangerous, and those who use them have to work under certain regulations to obviate these dangers. The brakeman, engaged on railways coupling trucks and so on, is engaged in a dangerous occupation, but it is necessary avocation, and the risks are reduced to as low as they possibly can be by compelling the men to observe certain rules and regulations.



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[Continued.]

17,305. You mean to say that, if the danger of lead poisoning were removed, the painter's work might become more healthy than some other occupations. Is that what you mean?—No.

17,306. But is it not that the sum and substance of what you tell us?—No, it is not what I intended you to understand.

17,307. But is it not the fact that, if the dangers of lead poisoning were removed from house painters, their position would be more healthy and more comfortable and safer than that of men engaged in some other occupations?—Yes.

17,308. (*Dr. Collis.*) Could you give me the proportion of ore which came in from Broken Hill which lowered the price from 18*l.* and 20*l.* to 9*l.*?—Twenty-five years ago the production from Australia (New South Wales) was nil. Now it is fully 100,000 tons. One mine alone used to produce about 60,000 tons a year. That excessive production and the excessive production of America, owing to the bounty of 6*l.* a ton that is given to the producer, accounts for the low price and the depreciation in price from the standard that I mentioned.

17,309. One hundred thousand tons came in from Broken Hill while we were raising, taking the figure for 1896, about 41,000 tons?—I do not think the production of 1896 was 41,000 tons.

17,310. Yes; I have the figure from the Blue-book. So that it took 100,000 tons to drop the price from 18*l.* to 20*l.* to 9*l.*, and notwithstanding that the Welsh mines just live?—They have had a very precarious existence for many years, unfortunately.

17,311. Yes; but to follow your argument, with this Broken Hill ore still coming the price has now risen to 16*l.*?—That is the present price. That is exceptional. We have only had it for the last few days. It has gradually got up. It was as low as 9*l.*, and it has gradually got up with many fluctuations to 16*l.* Three months ago it was only about 13*l.* a ton, or something like that.

17,312. But your own estimate of the effect of any restriction of the use is that about 25 per cent. of the output would not be required for making white-lead paint. Surely the effect of the Broken Hill ore coming in was far more than 25 per cent. alteration in your output. Your outputs vary from 41,000 tons in 1896 to 28,500 in 1900. I am talking entirely of the United Kingdom?—Is that pig-lead or lead ore?

17,313. Lead ore?—The pig-lead would only be about three-fourths of that.

17,314. I have given the figures for lead ore each time. Twenty-five per cent. is all the reduction that the importation of 100,000 tons from Broken Hill made, which would hardly seem to justify your inference. Would 25 per cent. reduction have a more serious effect on the lead mines of Wales than the importation of that large amount from Broken Hill. At any time there may be a discovery of lead ore somewhere in the world?—But the importation into this country would not be more than 65,000 tons. 100,000 is the production.

17,315. I asked for your figure. I thought you gave rather a high figure, but I had not looked it up. The pig-lead is given here separately from the lead ore, so we have to make a calculation. Would you say about a quarter more for the ore?—It would be a third more.

17,316. Your figures are not so far wrong. There were about 75,000 tons raised in New South Wales and imported into this kingdom last year?—It is a little higher than I thought. I thought it was about 60,000 imported.

17,317. Still the lead mines live, and the proposed alteration is not going to be anything like as severe a test to the lead-mining industry of North Wales even if it produces the result which you yourself estimate?—I know how the importation of this extra quantity from Australia has affected the price, and if the consumption is reduced in the way that is suggested, I think I can maintain, with justice, that the presumption is that it will affect the mines of our district very seriously.

17,318. I am not putting before you any suggestion that it will do good to the industry for a moment, but I am only looking at the blow that the industry received when the Broken Hill importation came about, and suggesting to you that even on your own estimate nothing like a similar blow will be dealt to the industry if the use of lead in the production of paint is entirely abolished. And it is also possible, of course, to find lead elsewhere in the world which might deal an equal blow to you. You might ask us to hold our hands to-day and to-morrow, but they might find lead elsewhere and ruin your industry. It may be found in the Argentine or Brazil, and all the good we shall do will be to increase the product from the Argentine or Brazil and do you no good, and not protect our workpeople. You would not ask us to take up that position, would you?—We employ a great number of men who have been brought up in mining, who cannot turn their attention to any other industry, and they claim some consideration. You propose practically to extinguish us. We have been so handicapped in the past that we are on the verge of extinction now, and what you propose to do would, in my opinion, deal us the final blow.

17,319. But I point out that the blow, even if as heavy as you suggest, would not be as heavy a blow as you have received in the past, and although your industry is going down, you are still existing. You were raising 80,000 tons in 1877. That was the top figure you reached. This year you have only raised 28,500 tons. What is the cause?—It is not because the deposits are exhausted. We have proved in our district that we have as good a deposit as ever, but there is no encouragement to go after it because the price has been so low.

17,320. It is not the price I am dealing with. Your industry has come from 81,000 tons in 1877 to 28,500 tons in the present year, without any restriction in the use of lead for lead paint, and you are being hit elsewhere in the world. The finding of other mineral deposits seems to have a far greater influence on your trade than any question of the use or non-use of lead in paint?—That is your argument, but because we are handicapped in other ways, is that a justification for handicapping us further?

17,321. No, it is not, but I point out to you that had we in 1877 restricted the use of lead in paint, and the reduction of output which then followed had taken place, you would probably have put it on our shoulders, but I suggest that as a matter of fact the figures show that there would be no justification for it whatever. Your industry is one which has not been flourishing because of the extra mineral deposits that have been found in the world and have come into competition with you. This question of the use of lead in paint is quite a minor point?—I daresay it occurs to you why there has been such an excessive production. It is owing to the duty. The Americans impose a duty of 7*l.* per ton. When the price is 16*l.* in London it is 23*l.* in New York. The Australians impose a duty and ship the excess to this country at any price they can get for it. We have been terribly handicapped. I am not a Tariff Reformer, and I do not advocate duty.

17,322. Has Mexico a tariff?—I do not know.

17,323. Before going further into this question of the importation of American lead, let me tell you that information will be given to us later on that American lead does not come into England because of the high wages, but that Mexican lead does. The bulk of the American lead does not affect the market. The person who has apparently looked up the question does not agree with you, so I suggest you should not be so emphatic on the point?—The American lead is quoted in the statistics. I always thought that it was the excess of production in the United States.

17,324. Now you made a statement which astonished me. You said that the bulk of zinc ore contains lead, and that it was by obtaining lead from this ore that the industry exists. May I read to you from a White Paper on Dangerous or Injurious Processes [Cd. 5152]. With regard to zinc ores, "Lead occurs in zinc ores as an impurity. Its presence is undesirable. It is present in amounts varying between 1 per cent. and 10 per cent. About 3 per cent. is the average"?—In some

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[Continued.]

cases the zinc ore preponderates, but it is nearly always associated with lead.

17,325. I am speaking of the zinc ore dealt with by the spelter manufacturer. The only ore which contains any thing like 10 per cent. is the Broken Hill ore, which is used in one smelting factory only and they have to get rid of it?—I know mines in Wales where there is scarcely any lead associated with it; it is pure. At Halkyn lead would form about 30 per cent.

17,326. I suggest that the English smelter never uses ores which contain an appreciably high percentage of lead. He will not use them?—We separate the zinc ore from the lead ore.

17,327. You separate it out first?—We separate it out first.

17,328. You could not afford to separate the two out unless you could get value for your lead?—No.

17,329. You consider that it would be fairly simple to follow out the precautions that you suggest? At present at your mines do you supply washing accommodation for the men?—No.

17,330. It is suggested in the Coal Mines Bill?—We supply places for them to change, but not washing accommodation. There is no necessity in our case.

17,331. I only wondered whether you did?—It is a comparatively clean occupation—lead mining.

17,332. So that you have no experience with regard to the supplying of washing accommodation?—No.

17,333. (Mr. Gardner.) You speak at the end of paragraph 17,244 of the training and education of the men who use white lead. What do you mean by that? Do you mean that no one should be allowed to use

white-lead paints unless he had been previously trained in the use of them?—I do not think I have made any observation to the effect that you have mentioned. It is not in my evidence, I think.

17,334. You say just at the very end of your evidence: "The true remedy to be applied is the regulation of the conditions under which the dangerous article is used, and the training and education of the men who use it to the nature of the risks which they are running." Do you mean that no men should be allowed to use white-lead paint unless they have had a previous education and training?—I think it desirable that the men who use it should be apprenticed and should be habituated to the regulations.

17,335. And to the use of paint?—Yes.

17,336. That is to prevent adult workers from going into a trade and using an article of which they know nothing?—Yes.

17,337. You speak about washing accommodation being provided as one of the regulations?—I think it is desirable.

17,338. I suppose you do not know that there are great difficulties in the way of providing washing accommodation; do you know, for instance, that washing accommodation should be provided in workshops coming under the Factories Act for men who are using paint? We are continually receiving complaints about the lack of washing accommodation in factories?—I am not associated with factories.

17,339. That is a difficulty even where you have men massed together in great numbers, whereas in the house-painting trade you have men working in twos, threes, and dozens?—Yes.

The witness withdrew.

Mr. EDWARD NOEL HUMPHREYS.

Evidence to 17,350 handed in and taken as read; witness then called and examined.

17,340. I am a Fellow of the Institute of Chartered Accountants, having my office at Old Bank Buildings, Chester. I have been personally acquainted with the lead mines of the Flintshire district for the past twenty-five years.

17,341-3. I am now, and have been for some years, a director of the East Halkyn Mining Co., Ltd., and joint managing director of the New North Halkyn Mines, Ltd. The registered office of each of these companies is at my office, and all their business passes through my hands.

The capital expenditure of the above two companies has been:—

|                              |            |
|------------------------------|------------|
| East Halkyn Mining Co., Ltd. | - 50,916l. |
| New North Halkyn Mines, Ltd. | - 20,215l. |

The average number of men employed by these companies is about 200, and the average amount of wages paid, 11,000l. to 12,000l. per annum. The average price of lead ore over a number of years has been small, and only a bare margin of profit is made by the successful mines, while others make nothing. For example, the average dividend paid by the East Halkyn Co. (which is considered a very successful mine) during the last four years has only been 15 per cent. per annum, out of which shareholders have to make their own sinking fund to replace capital; while the New North Halkyn Mines, Ltd., has been working since its commencement, upwards of seven years ago, without earning any profits at all, though it has spent already 20,215l. I am informed by the South Halkyn and Rhydymwyn Co. (whose invested capital is 50,000l., and who pay an average of 4,200l. in wages per annum) that their dividend for the past ten years has averaged only 6 per cent. per annum. I am informed by the Pantymwyn Mining Co., whose invested capital is 33,500l., and who pay an average of 3,800l. wages per annum, that they have paid only one dividend during the past 10 years, or an average of 1 per cent. per annum.

17,344. I have the negotiation for sale of the output from both the above mines, and am able to say that any reduction in the demand for Welsh lead ore would at once prejudice the price, and this would most seriously affect the lead-mining industry.

17,345. I am acquainted with seven other lead-mining companies now in operation in the county of Flint, whose invested capital, added to that of the East Halkyn Co. and New North Halkyn Co., exceeds a quarter of a million pounds, and the total number of men employed will exceed 500. There is also a sum of 75,570l. invested in the Halkyn District Mines Drainage Co. in the construction of a drainage tunnel in the district, which depends entirely on lead-mining industry for a return by way of royalty, as the mines are only able to work by reason of the gravitation drainage this tunnel affords.

17,346. The lead-mining industry is, therefore, a most important one of the county of Flint, giving employment, directly and indirectly, to a large number of men, who, being brought up in this industry, would not be able readily to turn to other employment.

17,347. I am informed that about 25 per cent. of the output of Welsh lead is used by white-lead corrodors, and if the use of white lead is prohibited, it would so reduce the demand as to cause a serious reaction upon the price of lead ore. This would in its turn extinguish the present small margin of profit to those venturing capital, and must result in diverting capital from the lead-mining industry, thus causing the closing of mines and throwing out of employment the men now engaged therein.

17,348. I am able to say of my own knowledge that the industry of lead mining involves no special danger to health to those engaged in it by reason of the lead produced. Those engaged in this industry are accustomed to deal with substances even more dangerous than white lead, but there is not found any practical difficulty in defining by regulation the methods of their use, and the men who use the substances are well aware of the dangers to be avoided, and are carefully trained to follow the regulations laid down.

17,349. It is submitted that there is an element of danger inseparable from the pursuit of certain trades, and that the danger to which the painter is or may be exposed by the use of white lead is less than the risk of many industrial occupations.

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[Continued.]

17,350. It is further submitted that, having regard to the importance of the industry, the true principle to apply is suitably to regulate the conditions under which the dangerous use does or may take place, and, by the education and training of the men using it, to reduce the risk to its lowest point, if not to eliminate it altogether.

17,351. (Chairman.) I understand that you are a director of two lead-mining companies in North Wales?—Yes.

17,352. You say that you are informed that about 25 per cent. of the output of Welsh lead is used by white-lead corrodors. Would you tell us who your informant was?—My last informant was a smelter.

17,353. But do you make a statement of that importance on the information of one smelter?—No. The previous information we got from the London Chamber of Commerce.

17,354. Shall I ask you again; who informed you that 25 per cent. of the output of Welsh lead is used by white-lead corrodors?—The London Chamber of Commerce.

17,355. Can you tell us whether it was published in any document?—That I do not know.

17,356. Who told you at the London Chamber of Commerce?—That came to us in a circular letter last June.

17,357. Was it from the Corrodors' Section of the London Chamber of Commerce?—This is a circular signed by Charles E. Musgrave, the secretary.

17,358. You have taken the information, that you have given us in your proof of evidence, from this circular?—I thought I would verify that by making an independent inquiry from smelters.

17,359. Have you inquired of more than one smelter?—No; from one firm of smelters only.

17,360. And did that firm verify it?—They put it at 20 to 25.

17,361. Even if we accept the estimate that you have given us on the strength of that information, there remains three-fourths of the demand for pig-lead unaffected?—Yes, that would be so.

17,362. You are no doubt aware that only about one-ninth of the pig-lead used in this country is the product of British mines?—Yes, that would be so. There is this to be said, that the lead ore produced in this country is low in its percentage of silver, and high in lead, which makes it more suitable than other ores for certain purposes.

17,363. What reason have you for believing that the producers of white lead in this country will be disastrously affected by the reduction in the demand for pig-lead by 25 per cent.?—We have to sell our lead upon the basis of the pig-lead prices, and we have always found (it is a matter of common knowledge to anyone engaged in the industry) that the actual price depends not upon the total, so to speak, as upon the margin of overlapping between the supply and the demand.

17,364. The total consumption of pig-lead in this country is about 180,000 tons per annum. A reduction of one-fourth would leave the demand at about 135,000 tons per annum, would it not?—Yes.

17,365. The total home production of pig-lead is about 20,000 tons. Why should this home production of 20,000 tons be affected at all if the demand in this country remained as high as 135,000 tons?—But if you withdraw 25 per cent. of the demand, you are withdrawing a serious percentage of the demand, and particularly at certain times and conditions of trade. You are coming to just that point of overlapping or the narrow approach of the supply and demand which affects prices out of all proportion to its own figures.

17,366. I do not understand that; but I will put it in this way; why should not the importer of foreign pig-lead suffer at any rate eight-ninths of the loss, if not the whole, seeing that the demand for pig-lead in this country would still be nearly seven times what the native mines can produce?—Well, I am unable to say.

17,367. Then your suggestion of the disastrous effect is purely hypothetical?—No.

17,368. Then I must put my question again to you if you do not admit that. It is either one or the other.

This is the question which you say you cannot answer. Why should not the importer of foreign pig lead suffer at any rate eight-ninths of the loss, if not the whole, seeing that the demand for pig-lead in this country would still be nearly seven times what the home mines could supply?—Well, that is not how it appears to us to go. If you have even 1 per cent. excess supply, you will affect the price out of all proportion to even the 1 per cent., and if you withdraw your demand so that your demand is 1 per cent. below you will affect the price.

17,369. But you have not answered the question: I want to know why the foreign importers should not suffer proportionately? I cannot say why they should not, but I do not admit that they would.

17,370. You cannot answer the question at all, so that the corollary of that is that your suggestion, that it would have a disastrous effect is hypothetical?—I do not agree that it is purely hypothetical. I say that it is a matter of common knowledge that if you withdraw any serious percentage of the demand for an article, you affect the price; and you affect the price out of proportion to the percentage you withdraw from demand if you bring it to the point when the demand falls below your supply.

17,371. Then why should not the foreign importers suffer proportionately to the English supplies of pig-lead?—I cannot say why they should not. I do not quite know that we, producing ore of the class that I mentioned, with a high percentage of lead, should not possibly suffer even out of proportion to the others.

17,372. But that is hypothetical?—I grant that it is hypothetical.

17,373. Then I think that I will leave it where it is. Now, in the paragraph 17,348 of your evidence you state that workers engaged in lead mining are accustomed to dealing with substances even more dangerous than white lead. Will you kindly tell us what substances you are referring to?—Blasting gelatine (high explosive).

17,374. You state that the danger of handling those substances is removed by regulations?—Yes.

17,375. Those substances, however, are entirely handled on your own premises, and under close inspection by your own officials as well as by inspectors of mines. Is that not so?—Yes.

17,376. How would it be possible, then, to apply any such inspection to painting operations which are scattered throughout the country and are carried on for a few days, or at most a few weeks, at a time in the private dwellings of the house decorator's customers? Do you know anything about the intricacies of house-painting operations?—Well, I know what a business man, a man who is accustomed to employ painters and so on, knows and sees. I am not in the trade or interested in the trade.

17,377. But do you know the various operations that a painter would have to be engaged in ordinary house-painting operations?—Do you mean in the preparation of the colour or the preparation of the substance for the colour and putting it on?

17,378. I mean the actual work—the painting, the rubbing, the messing of his hands, the stippling and all the rest of it. Do you know anything about those operations?—Yes; I know what a man sees.

17,379. Do you know that these operations are likely to engender, in the course of a day's work, a considerable amount of dust?—I know you cannot work on dry surfaces without engendering dust. That is true.

17,380. Do you know of your own knowledge any regulations that could be introduced to remove those dangers?—To minimise the danger of dust, not to remove it altogether. You cannot work on a dry surface without some dust.

17,381. So that your illustration in regard to these workmen in your industry, who handle dangerous substances and who are protected by regulations, would not apply to house-painting operatives in the same way?—For instance, as to the handling of explosives in frosty weather, it is necessary for them to heat the gelatine. They might very easily get into trouble if they did not do it carefully.

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17,382. I am not questioning the danger of the operations which may obtain in your industry, but I am asking you whether you can suggest from your own knowledge any regulations which would remove the dangers that I have depicted which occur in house-painting?—You cannot remove dust from a dry operation.

17,383. (Mr. Fell.) Can you say at all what percentage of the lead that is produced is used for white lead manufacture?—Are you speaking of our particular lead?

17,384. Yes?—No; I am not able to say that; we cannot follow it.

17,385. (Mr. Parsonage.) You say in your proof that the average number of men employed by these companies is about 200 (East Halkyn Mining Co., Ltd.; New North Halkyn Mines, Ltd.)?—Yes.

17,386. The average amount of wages paid is 11,000*l.* to 12,000*l.* per annum?—Yes.

17,387. Is a large proportion of boys employed?—Not a large proportion; but there is a proportion of boys.

17,388. About what would be the number?—I would not like to say offhand, but it is not a large proportion.

17,389. 12,000*l.* per annum would include the wages of the managers, and the higher-paid officials too?—I think not.

17,390. Only the workmen?—Only the workmen.

17,391. One mine has paid an average dividend of 1 per cent. per annum. Do you think it is worth while trying to save an industry which cannot pay a living wage to its workmen and can only pay 1 per cent. interest on its capital?—The average rate of wages works out at 2*s.* per week. We do not admit that it is not a living wage.

17,392. Well, calculations of the cost of living at the present day show that 2*s.* per week for an adult workman, having perhaps, a family to keep on it, is not a living wage; and if on those wages you can only pay 1 per cent. I should say that the sooner the mine was closed the better and the men given a chance to earn a

higher rate of wages at some other industry?—Any material fall in the price of this lead ore will have that effect, undoubtedly. Their hour shifts are not long, and they live up there, and a good many of them have their cottage and pigs and garden.

17,393. (Lord Henry Bentinck.) It depends on the rent that they pay. What is it?—Perhaps a couple of shillings a week.

17,394. Then they are not getting a bad wage?—No.

17,395. (Mr. Robins.) You lay special stress on educating men to the dangers of these dangerous products. Do you make provision in your mine for educating your men to the danger?—In what way do you mean?

17,396. Do you make provision for educating your men to the danger of their occupation?—It is explained to them. They learn it as they come on. The danger of the substance is explained to them and they are acquainted with it.

17,397. Are there courses of classes for youths and boys?—Do you mean particularly in regard to the employment of these substances?

17,398. Yes?—No.

17,399. You point out that they should be educated to recognise the danger of their occupation and you lay stress on that, and I say do you educate your men in a manner like that which you have recommended here?—We make sufficiently clear to them the danger of the substance they are using, and they are able to follow and observe the regulations which are laid down. We do not put them to school for it.

17,400. But, at the same time, there is no special effort made in that direction?—I did not think I was suggesting that they should be put to school. In this case it is a matter of hygiene and cleanliness, and so on, in the use of this substance.

17,401. You carry out that in your mine?—Yes, there is a change house. Our miners change their clothes when they go down and when they come up, and so on. Their things are dried and various things are done.

The witness withdrew.

Mr. HENRY GARDNER.

Evidence to 17,407 handed in and taken as read; witness then called and examined.

17,402. I am a director of the firm of Henry R. Merton & Co., Limited, and the Merton Metallurgical Co., Limited, who carry on business both in London and in Frankfort as metal merchants. I have had 35 years' experience of the metal trade in general, and am well acquainted with the circumstances of the lead trade in particular. My firm are responsible for the production of the annual volume of "Comparative Statistics of Lead and other Metals," which is the standard statistical record for the metal market.

17,403. For some considerable time the prices of lead have been very unremunerative, owing principally to the increased production in Germany, America, Spain, and Australia, which has also caused Great Britain, once the first producer of lead, now to be subordinate.

17,404. It has been estimated that the consumption of lead in Great Britain for corrosion into white lead is about 45,000 tons, and that of red lead and litharge about 12,000 tons. The whole world production has been calculated at about 1,100,000 tons, or if the 370,000 tons produced in America be taken out of the calculation, as owing to the American tariff the bulk of this does not affect the market, the whole world production may be taken at 730,000 tons. I do not include Mexican lead in deducting American lead, as Mexican lead comes on to the English market at cheap prices.

17,405. If the use of lead compounds were to be prohibited for house-painting and coach-painting, this would decrease the demand by a very large percentage of the 57,000 tons used for white lead and red lead and litharge, and would have the effect of decreasing the world prices. There is no probability of

the development of any new channels of consumption which would carry off the excess supply.

17,406. British lead is of very good quality and peculiarly adapted for the manufacture of white lead. British mines, however, are specially expensive to work; and whereas in other parts of the world lead is produced in conjunction with silver and gold, and the prices of lead are therefore not of primary importance to the working of such mines, this is not the case in Great Britain. The reduction of prices would, therefore, practically result in the closing down of British mines which have already been worked for some time at a very slender margin of profit.

17,407. There is also no doubt that such a prohibition would most seriously affect, and probably destroy, the special industry which deals with the production of double refined lead and production of selected raw material free from small impurities which are specially required by white-lead corrodors. Desilverisers use raw materials from various sources, and the apparatus of selection is by way of an analysis of the impurities, and a special price is always to be obtained for such selection.

17,408. (Chairman.) You are a director of two firms who carry on business in London and Frankfort as metal merchants?—Yes.

17,409. You state that for some considerable time the prices of lead have been unprofitable?—That refers to the English makers.

17,410. Is there not a likelihood that this state of affairs may tend to increase?—At the present moment the price of lead is better than it has been for some considerable time. Since last October there has been quite a good market, and the price paid is about 3*l.* per

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ton over the average price of last year; but these things are apt to alter, and we do not know what the future may bring.

17,411. Accepting for a moment the standpoint of your own evidence, if the price dropped the manufacture of lead and lead compounds in this country would altogether cease to be profitable?—Yes.

17,412. On the other hand, you admit that there has been a considerable increase in the price of lead quite lately?—Yes.

17,413. Has not there been a rise in the price of lead for the last three years?—No, I do not think there has. I think that I can give you the average figures. The price has remained at about 13*l.* for some time past. The average price for 1910 was 13*l.* 1*s.* over the whole year; for 1909, 13*l.* 1*s.* 8*d.*; for 1908, 13*l.* 10*s.* 5*d.* In 1907 there was a high price—19*l.*

17,414. What was the 1911 price?—About 13*l.* It is not worked out here.

17,415. You have had rather a large increase these last few months?—Yes.

17,416. (Mr. Sutherland.) Are you speaking of blue lead?—Yes.

17,417. What is the price to-day?—16*l.* 5*s.*

17,418. (Chairman.) Has this increase that has recently occurred in the price of pig-lead been owing to the combination of the employers?—It has partly been that. There is a selling agency. We are the selling agency, and we have regulated sales in such a way as not to press upon the market; that, in conjunction with an improvement in trade, has enabled us to put the price up.

17,419. I notice, in the table published by the Board of Trade in the Mines Report, Part III., for 1910, that the prices of foreign lead were lower than those for English. Can you tell us why?—The reason is that the English lead is of rather better value for some purposes than the foreign lead. It can be used for more purposes.

17,420. For what purposes?—People like it very much for white lead. It is a purer lead.

17,421. Are there any other reasons?—It is a great favourite for chemical lead, as it is called; that is, for making tanks containing acid. English lead goes up and down with foreign lead. There is a certain amount of preference given to English lead, but it does not stand by itself. "English lead" is not merely the product of British mines—but is a product of English smelting and desilverising work; but we are talking here of the effect upon the English lead mines.

17,422. (Dr. Collins.) English lead keeps its price above foreign lead?—The margin varies from perhaps 2*s.* 6*d.* per ton to 7*s.* 6*d.* per ton.

17,423. (Chairman.) You state that the consumption of lead in Great Britain for corrosion into white lead is about 45,000 tons?—Yes.

17,424. And the total consumption of pig-lead in this country is 180,000 tons?—Yes.

17,425. Therefore, if the manufacture of white lead ceased, there would still be a demand for about 135,000 tons of pig-lead in this country?—Yes.

17,426. The output of the British lead mines is about 20,000 tons, is it not?—I think it is more than that. I think it is nearer 30,000 tons.

17,427. Other witnesses have told us 20,000; will you take that figure?—I have no figures to controvert that.

17,428. You state that British lead is of very good quality?—Yes.

17,429. Can you give any sufficient reasons for believing that there would not still be a market for the 20,000 tons of home lead of good quality; seeing that the total demand for pig-lead in this country would still be almost seven times the amount that was supplied from the home mines?—I do not think that anyone would say for a moment that you could not sell all the lead manufactured in Great Britain very easily for other purposes, but that is not the point.

17,430. Would you kindly tell us what the point is?—The point is that if the use of white lead ceased or partially ceased there would be less lead required all over the world, and that small amount might have the effect of putting prices down. If prices were put

down, English lead miners and smelters would get such a bad price for their lead that they could not go on.

17,431. What you fear is not that there would be such a diminution in the use of lead as to make it difficult to sell the English lead?—Not at all.

17,432. But that it might affect the price here and in foreign countries?—It would affect the general price of lead all over the world. If you have a scale which exactly balances, and you put the smallest weight on one side or the other, the scale goes down.

17,433. What are your reasons for the opinion you hold?—The lead market, like all the other markets in the world, is in a state of equilibrium more or less. A little more consumption will make the price go up; a little less will make the price go down.

17,434. When did the Broken Hill mines begin to compete with the lead industries of the world and send their lead into this country?—About 1890.

17,435. What is the output of the Broken Hill mines?—The ordinary lead that comes over here is something like 80,000 tons, and silver lead comes over for desilverising purposes.

17,436. That is very considerably more than the total output of the English mines?—Yes.

17,437. Did the advent of lead from Broken Hill seriously interfere with English prices?—Yes; it put the price down in 1894 to 9*l.* 11*s.* 6*d.* average for the year. It had been, in 1890, 13*l.* 7*s.* I have no previous figures with me.

17,438. It has recovered itself to such an extent that it is now 16*l.* 5*s.*?—Yes; things do adjust themselves in this world, fortunately.

17,439. And do not you think that things will adjust themselves equally if lead were prohibited in house-painting?—I think from a broad point of view things would adjust themselves, but in the meantime a difficult situation is created.

17,440. You are bound as a lead manufacturer to be pessimistic?—I am not a lead manufacturer; I am a lead merchant, and it does not matter very much to me whether the price of lead is 16*l.* or 10*l.*

17,441. But your suggestion that these dire conditions are going to be brought about is purely hypothetical?—You can argue from experience.

17,442. I do. I take the advent of the lead found in the Broken Hill mine, and I say that it probably had the effect of lowering the price, but that has been re-adjusted in the course of time?—The chief reasons of the re-adjustment has been the very large increase in the use of lead for covering electric cables. No doubt that will go on increasing to a certain extent. And there may be other things. You see, you are knocking out one source of demand entirely.

17,443. But that does not amount in the aggregate to anything like the effect of the importation of lead from the Broken Hill mines?—That is quite true, but I do not think your argument is very good. If you look back at the whole history of the lead market, you will find that in the last 20 years it has increased nearly 50 per cent.

17,444. (Mr. Sutherland.) The price?—I refer to the production and the consumption. If you wipe out one part of the trade entirely, you have nothing to replace that.

17,445. (Chairman.) You are extremely pessimistic in regard to the lowering of the price of lead, because you say there will be a certain decreased quantity used if we prohibit lead in the house-painting industry?—Yes.

17,446. I point out to you that when the Broken Hill began to send lead to this country it was very much larger in quantity than the amount by which the demand would be depleted by the prohibition of lead in the house-painting industry?—That is quite right. The point I want to make is that the way in which that was adjusted was by a new industry springing up.

17,447. Then you must remember that a new industry may spring up?—That is what we have to pray for. If we pray hard enough, no doubt we shall get it.

17,448. In paragraph 17,407 of your evidence you refer to desilverisers?—Yes.

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17,449 Do you mean that desilverisers endeavour to obtain specially pure lead for their work?—Yes, they try to get it as pure as possible, but that is not an absolute necessity. What is wanted is a pure lead for white-lead making.

17,450. I want to ask you in what way can this possibly bear on the lead question which is before us?—The argument there is that people like to have English lead and object very much if they cannot get it, which they are afraid they will not do if the price goes down too much.

17,451. I should think they would get more of it if the price goes down?—No, they will not, not English lead.

17,452. Why?—Very few of the English mines are making any money at all.

17,453. You have said that they will sell their lead if they make it?—But if the price was to remain at the level of 13*l.*, in a few years you would find none was made.

17,454. When it went to 9*l.* a ton they did not cease to make it?—People do not all die all at once.

17,455. They have been a long time dying?—At that time the production of English lead was between 60,000 and 70,000 tons a year.

17,456. You have recently made an employers' combination?—Yes.

17,457. Will not that assist you in keeping up prices?—We are doing our best for all our friends to keep prices up.

17,458. And I suppose that that will continue?—I hope so.

17,459. (*Lord Henry Bontinck.*) If the market was very adverse to you, you could not keep up your combination?—We should have to adapt ourselves to circumstances.

17,460. You are in a strong position now?—Yes.

17,461. There is no reason to think that the abolition of white-lead paint would deal such a blow to your industry. You are strong enough to form a combination?—At the present time the lead market is in an exceedingly favourable position, and 30,000 or 40,000 tons dropping out might not affect it, but then you have the other side of the picture; you do not have always one side.

17,462. "Sufficient for the day"?—But are you looking sufficiently ahead?

17,463. The price of raw material inclines to go up, if anything, all over the world?—Yes.

17,464. There is no tendency to a fall anyhow?—Not at present.

17,465. (*Dr. Collis.*) You stated that when lead was 9*l.* a ton about 60,000 or 70,000 tons of ore were being raised?—No, previously to that period 60,000 or 70,000 tons of lead were being produced in the United Kingdom.

17,466. How long before that?—I cannot give you the exact date, but I should think within the last thirty years.

17,467. You have to go back some years to get 60,000?—What was it in 1894?

17,468. 40,500. It would appear that there had been a great fall in the amount of lead ore raised in England even before the Broken Hill lead came in to interfere with the situation?—There was, undoubtedly.

17,469. It had fallen from 80,000 in 1877 to 40,000 in 1893?—In 1877 the price of English lead was 20*l.* 1*l.* 3*d.*; in 1894 it had fallen to 9*l.* 1*l.* 6*d.* Taking the figures for 1878 and the next year, that rather supports the argument.

17,470. But, quite apart from the Broken Hill production interfering with the situation, the amount of ore got had halved itself between 1877 and 1892?—Yes; but I did not state that the Broken Hill production was the only factor that had caused the fall in the price of lead.

17,471. Nor did I. From when we had the Broken Hill importation, about 1892 or 1893, the price of lead has steadily risen; but notwithstanding the rise in the price of lead, the quantity of ore raised has fallen from 40,500 to 28,500?—Yes.

17,472. So that is against you?—I do not agree with that. It simply proves that the price of lead is not sufficient to encourage the British people to produce it.

17,473. Take 1910, when it was 13*l.* 9*s.* 2*d.* In 1899 it was 15*l.* You have to go back to 1899, when the price was below the price of to-day. In 1889, 48,000 tons were got, 20,000 tons more than now, at the same price?—But you must not forget that the last two or three years the average price has been only 13*l.*

17,474. But the average prices just before the year I quoted were very close—13*l.*, 12*l.*, 13*l.*, 11*l.*?—You mean prior to 1899?

17,475. Yes?—Yes.

17,476. The price of ore got was far in excess of what is got now. My point is that the amount of ore got does not seem to bear any relation whatever to the price per ton of lead?—These British producers have been fighting a losing battle all along.

17,477. I grant that they are fighting a losing battle. Notwithstanding the fluctuations that the table shows in price, there is a steady fall in the quantity of ore got?—There is no doubt at all about that.

17,478. There has been a greater reduction of output than 25 per cent., notwithstanding that the price rules where the price was before, and there is nothing to show that the matter of 25 per cent. reduction of output is ruled by the price of lead?—I think that if you were to go into the balance-sheets and profit and loss accounts of some of these English lead people you would find that, as I say, they have been fighting a losing battle all along. They have made very little money, and a series of low-price years is not by any means compensated by one or two years of better prices.

17,479. The amount of ore they raise in better-price years would certainly seem to show that your contention is not substantiated by the figures. Take the year 1883, 56,000; it has fallen in 1910 to 28,000 without any marked alteration whatever in the price of lead. So that it does not seem that a slightly decreased production will have much influence on the price. The relation does not hold. The two curves do not run together. If they ran together I should agree with your argument, but they do not?—Take the curve from 1877, the 20*l.* price, to the price of last year; you get the two things running absolutely together.

17,480. No, they do not. You fall in 1884 to 11*l.*, and you have a rise again. The fall of production is even, but the fall of price varies with constant ups and downs?—You cannot make money out of a lead mine if you only have one or two good years and all the rest of the years are bad. You have to take the average of the whole period. You may make a loss one year, and get it back in the next year, but you have to take the average.

17,481. The ten-year average of 1900 to 1910 for the price of ore is considerably higher than the average price of ore from 1890 to 1900. At the same time it is quite the reverse with regard to the amount of ore got?—That does not get rid of my argument that the price from 1900 to 1910 was not high enough to be remunerative.

17,482. The production still goes on falling the whole time. The obvious arguments from these figures is that if you are dealing with an industry in such a position as this, the influence of anything that may be done in the way of limiting the amount of lead required in the production of white lead is infinitesimal, or rather not so great as the influence brought on the lead-mining industry from other sources?—I put it in this way: that now you have arrived at the survival of the fittest, and if you reduce the price of lead you will extinguish the industry.

17,483. Your point is that the mines which are now raising ore are the fittest of the mines in England?—Yes.

(*Dr. Collis.*) That is a new light.

17,484. (*Mr. Sutherland.*) Is the English ore purer than the foreign for the manufacture of white lead?—It is of a purer character. It does not contain so much silver, and does not require to be refined to the same extent, and does not as a rule contain bismuth or arsenic or any deleterious matter.

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Mr. HENRY GARDNER.

[Continued.]

17,485. When they get to the point at which the corrodors get them, they all have to go through a preparatory process?—Most of the foreign lead which comes in for white lead purposes is what we call "double refined." It goes through the ordinary refining process to make it soft lead, and it is refined again to make it into corrodors lead. The English lead is only once refined.

17,486. And yet foreign lead can compete with English lead, notwithstanding the double process?—

Yes, because nearly all the foreign lead contains precious metals to some extent.

17,487. Why has not the production of British lead responded to the increased outlets for lead which you have referred to?—Because they can only produce it at a very small profit.

17,488. (Mr. Mason.) Has the cost of producing the ore increased in England?—It has increased to some moderate extent, owing to natural causes.

The witness withdrew.

Mr. JULIUS MATTON.

Evidence to 17,495 handed in and taken as read; witness then called and examined.

17,489. I am a member of the Metal Exchange, and have carried on business in London for 35 years in the lead trade, after having been employed for nine years in the same branch. It has been part of my business to devote special attention to the statistics of lead production and consumption, and my statistics are still subscribed to all over the world. I estimate that the total consumption of lead in England is about 200,000 tons, of which approximately 45,000 tons are used for corrosion into white lead and 12,000 for red lead and litharge.

17,490. My estimate of the figures is as follows:—

Estimate of Consumption in Great Britain.

|  | Tons.     | Tons.          |
|--|-----------|----------------|
| Pig lead, pipe, and sheet                        | - 117,000 |                |
| Less—Old lead                                    | - 8,000   |                |
|  |           | 109,000        |
| White lead                                       | - - - -   | 45,000         |
| Red lead and litharge                            | - - - -   | 12,000         |
| Other uses, particularly electrical accumulators | - - - -   | 42,000         |
|  |           | <u>208,000</u> |

17,491. A very large percentage of the white lead and red lead is for use in house-painting and coach-painting.

17,492. I estimate the whole world production of lead to be approximately 1,100,000 tons. For the purpose of calculating the effect of the decreased demand which would be caused by the prohibition of the use of lead compounds for house-painting and coach-painting I would err on the side of caution and deduct 370,000 tons of the United States of America, because at any rate the greater part of this does not come into competition owing to the United States protective policy; this would leave a total world production of 730,000 tons. The sudden diminution of demand by the greater part of 57,000 tons which are at present required in Great Britain for white lead and red lead and litharge could not fail to have a very serious effect on prices, which have already been depressed for a long period.

17,493. Such a decrease in price would have a very serious consequence for Great Britain and for British industries, and in particular for the lead-mining industry, which has already been working for many years at barely remunerative profits; indeed, some mines have already been given up in consequence of low prices. The product of British mines is good and peculiarly adapted for the manufacture of white lead, for which reason it has had a preference over the product of foreign mines.

17,494. The cost of production for British mines is very much greater than for others, such as the Australian and the Spanish, and they would be even more directly affected than foreign mines by a decrease of price, because in most other mines the lead is produced with gold or silver, and is therefore in a sense a bye-product, so that the price of lead is for such mines only of secondary importance.

17,495. There can be no doubt that the result of prohibition of the use of lead compounds for house-painting, &c., would be the practical destruction of the British lead-mining industry.

17,496. (Chairman.) You have been a lead merchant for a great number of years, have you not?—Yes, I have been in the trade for 44 years.

17,497. You estimate the consumption of pig-lead in this country at about 200,000 tons?—Yes; a little bit more now.

17,498. Do you know that the Board of Trade returns give an average for the last few years of, roughly, 180,000 tons. That is very near your own estimate?—I am very close to those figures.

17,499. Of this you estimate that 45,000 tons is used for corrosion into white lead, and a further 12,000 tons for red lead and litharge?—Yes.

17,500. In paragraph 17,492 of your evidence you lay stress on the effect which would be produced by the sudden diminution of demand by the greater part of 57,000 tons?—Yes.

17,501. Why should the diminution of demand be sudden?—If white lead was prohibited, there would be so much less used in this country.

17,502. Is it your opinion that market conditions would adjust themselves if the element of suddenness were obviated?—I do not think that such a large quantity taken from what is sold on the market would be easily adjusted.

17,503. If, for instance, two years were allowed before any measure of prohibition came into force?—It is my opinion that the production of lead at present is already more than the consumption.

17,504. One witness who has recently been before us told us that, even if white lead were prohibited, there would be no difficulty whatever in selling the lead in other quarters?—Of course, I do not know what another witness has told you.

17,505. Your opinion is that that is not the case?—I do not think that it is. At present the lead is in the hands of a very strong syndicate, of which the witness before me is one of the heads. At present they have got the price up by taking care of the stocks of lead.

17,506. The total consumption of pig-lead in this country is, as I say, about 180,000 tons per annum, according to the Board of Trade returns. A reduction of one quarter would leave the demand at about 135,000 tons, would it not?—Yes.

17,507. The total home production of pig-lead is about 20,000 tons?—Yes, apart from that produced in the United Kingdom from colonial and foreign ores and bullion.

17,508. Why should this home production of 20,000 tons be affected at all if the demand in this country remains as high as 135,000 tons?—As soon as you threw 30,000 tons on the market, or even more, the price would naturally go down, and the mining industry in this country already gives a very poor profit. I will tell you how the price acts on the production. I have here the figures for 1877, when the average price was 20l. 3s. and the production was 61,403 tons. Three years after we have the average price at 16l., and the production goes down to 56,949. In 1886 the price is down to 12l. 16s. and the production to 39,482 tons. Then, again, six years afterwards, in 1892, the price is 10l. 9s. 6d. and the production goes down to 29,654 tons. In 1896 it is 11l. 3s. 3d. The production goes a little bit higher again—to 30,316. In 1902 the price is 11l. 2s. 7d.

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Mr. JULIUS MATTON.

[Continued.]

17,509. Now let us take 1900?—In 1900 the price is 17l. and the production 24,964 tons. Then it must be remembered that two years before the price was much lower. The production had gone down.

17,510. The two years before had been a little lower, but very much higher than 1896?—In 1899 the price was only 14l. 18s. 7d.

17,511. Yes. What was it in 1898?—12l. 19s. 9d.

17,512. So there was a general increase in the price between 1896 and 1900?—Yes.

17,513. Do you wish to state that when the price is low the production falls too?—Yes. Then you must remember that the production cannot be increased at once. The two previous years had been very low in price, and so the production had gradually fallen off. So that even at the high price of 17l., we cannot get the production up so quickly. And that was a phenomenal year. The next year was 12l. 10s. 9d. again.

17,514. Give me the 1901 figures?—12l. 10s. 9d. and the production 20,034 tons.

17,515. 1902?—11l. 2s. 7d. and the production 17,704 tons.

17,516. 1903?—11l. 11s. 8d. and the production 19,958.

17,517. It goes up again there, you see, does it not? Now take 1904?—I am afraid that I have not the figures here for 1904. I have them for 1903 and 1910. The fact is that if the price goes down so the production must. Those mines which cannot produce at that price must shut up.

17,518. Why should not the importer of foreign pig-lead suffer at any rate eight-ninths of the loss, if not the whole, seeing that the demand for pig-lead in this country would still be nearly seven times what the home mines can supply?—Lead is produced now, for instance, in Australia, at a much cheaper rate than here. The mines are more productive there. They make a very good profit out of it at 13l. or 12l. They want to sell the lead, and they beat the mines here. As long as they can get a profit they sell their lead.

17,519. Yes, but there is a syndicate existing now to keep the prices up, you told us?—Yes, by taking care of the stocks, but they would not be able to carry the 45,000 tons for any length of time. They carry now 10,000 to 20,000 tons, perhaps in the hope that trade will mend.

17,520. Do you mean to tell us seriously that, if there is a diminution in the use of lead in England, the whole of the loss will fall on the English mines?—No.

17,521. Is it not much fairer to say that it would proportionately fall on the foreign importers?—No.

17,522. Tell me why not, because it is rather an interesting point. Why would it not fall proportionately on the foreign importers?—The London market is the market for Europe. The London market gives the price. The lead market of London is really the market which gives the price, for Europe at all events. Foreign lead is brought into this market. If the price goes down here it goes down in the whole of Europe.

17,523. That does not answer the question. I asked you whether you assumed that if there is a diminution in the use of lead in England the whole of the loss would fall on the English mines. You said "No." I then asked, "Is it not much fairer to assume that it would fall proportionately on the foreign importers?" Why should not it fall proportionately on the foreign importers?—Because the foreign mines are worked cheaper than the English.

17,524. But then the price of English lead is a little higher than that of foreign lead?—There is another thing that is against you.

17,525. It is not against me, because I have no interest, save to get at the real facts?—I mean it is an argument against abolishing white lead. English lead is very good lead, and therefore it is mostly used for white-lead purposes.

17,526. But is it not a fact that the price is regulated by the quality in a sense—that the English lead is a little higher in price because it is of better quality?—It is because it can be used for white lead, but if you throw it out and it cannot be used for white lead, then the price is no better for other purposes.

17,527. Would you suggest that foreign lead cannot be used for making white lead?—Some of it—not so much. If it is used for white lead it commands a higher price.

17,528. Can you tell us what lead produced in foreign countries could not be used for making white lead?—In Germany, for instance, they use a good deal. They mine it there and they refine it.\*

17,529. The quantity of lead from Germany is comparatively small?—From Germany we do not get so much now. We get very little.

17,530. What countries send lead over here in large quantities which could not be used for white-lead purposes?—There is very little sent over for white lead purposes. The desilverisers here refine the foreign lead. It does not go into consumption for white lead direct as it arrives here, but it is refined again.\*

17,531. I am afraid that you have not given me a very clear answer to the question why the foreign importers should not bear their proportion of the loss caused by diminution of the quantity of lead used if lead is prohibited for painting. You mentioned Germany just now. I see that the importation of lead from Germany is comparatively infinitesimal?—I admitted that.

17,532. But you used Germany as an illustration. What is the use of giving an illustration if you take it away again immediately afterwards? Can you tell me definitely why the loss caused by a diminution of the use of lead should not fall proportionately on the foreign importers?—I say that there would be so much less used in England, and there would be so much more lead in the market. London, being the principal market for lead in Europe, takes generally the surplus of lead.

17,533. (Dr. Collis.) You suggested that English lead is the best for making white lead?—Well, yes, it is the best.

17,534. It has a special market for that purpose?—It has a special market for that purpose.

17,535. We understand, from evidence which has been given, that 25 per cent. of it is used for that purpose?—Yes, quite that.

17,536. That will give us an absolute figure. Our home production of lead is 20,000 tons per year?—Yes.

17,537. Twenty-five per cent. of that is 5,000 tons?—Yes.

17,538. The total amount of lead converted into white lead is 45,000 tons, and 5,000 off that gives 40,000?—Yes.

17,539. So that 40,000 tons of what is converted into white lead must be foreign lead?—Foreign and colonial lead refined in England.

17,540. The total consumption of lead in Great Britain is 180,000 tons, of which 20,000 is home production, which leaves 160,000?—Yes, except that foreign and colonial ore and bullion refined in the United Kingdom is known as "English lead."

17,541. The proportion of 40,000 to 160,000 is 25 per cent?—Yes.

17,542. Then what is the superiority of English lead over foreign lead for making white lead?—As long as the lead is not used for white lead it must be used for some other purpose.

17,543. Quite so, but the statement that the English lead is used specially for making white lead absolutely falls, because 25 per cent. of the lead coming from abroad is used for exactly the same purpose?—Yes, after it has been refined. I said at least 25 per cent.

17,544. You gave us that figure?—The English lead is used for other purposes because the manufacturers are nearer the mines.

17,545. But we want to stick to the point that English lead is specially suitable for making white lead?—It is specially suitable.

\* The witness stated subsequently that he understood both these questions to refer to foreign lead which could be used for white lead, and answered accordingly.



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Mr. JULIUS MATTÓN.

[Continued.]

17,546. And yet the proportion of foreign lead used for that purpose is precisely the same—25 per cent. P—Yes.

17,547. How can you say, then, that there is any special market for English lead when the same proportion of foreign lead is used?—I will not say any special market.

17,548. But that point has been specially made to-day—that there is a special market, and that by interfering with the manufacture of white lead, by restricting the use of white lead in paint, English lead is being specially hit?—Yes: English lead is specially hit in the respect that the price goes down, and it cannot be raised at the price.

17,549. The point is that precisely the same proportion of English lead and foreign lead is used in making white lead, so that there is no special advantage in the use of English lead in the manufacture of white lead. The statement does not hold?—They can refine the foreign and colonial lead to such an extent that they can use it, and about 100,000 tons so refined are sold as English lead annually.

17,550. So that we are doing no more damage to the English industry by restricting the use of white lead in paint than we are to the foreign industry?—Yes.

17,551. Why?—Because if you throw so much lead on the market you will bring the price down, and English lead cannot be mined at the same rate as lead in other countries can be mined: They can raise the lead much cheaper in foreign countries than here.

17,552. But we are not specially hitting the English lead. It has been represented to us that by restricting the manufacture of white lead or the use of it we are hitting the English lead out of proportion to foreign lead. We have been told that the proportion of English

lead used in the manufacture of white lead is greater. I have shown that the proportions used are precisely the same for this purpose; and that if restriction was made it would hit the home and the foreign industries alike. The fact that our mines may not be able to stand it is another point?—That is not my argument. My argument is that if you throw so much lead on the market you will bring the price down, and foreign and colonial lead will be just as much hit as English, but the English cannot stand it. The foreign can stand it.

17,553. (Chairman.) If the use of lead for paints was prohibited; the foreigners would bear more than their proportion?—They would bear their share, but you would ruin the industry here. Everyone would lose by it, but in other countries the industry would go on. They would not make so much profit.

17,554. You say that the industry would be ruined here because you take an infinitesimal amount less of white lead for a particular industry?—Yes, and I say that other countries can stand it, but the English cannot. Other countries would lose by it, but the industry here would be ruined altogether.

17,555. (Mr. Sutherland.) I take it you mean that the other lead-producing countries do not mine lead primarily for lead as lead so much as for what it contains?—They may mine it for lead, but at the same time, having so much silver in it, they make so much profit and can mine it cheaper.

17,556. And they can import cheaper?—Yes.

17,557. English lead is not so rich in silver?—It is very poor in silver.

17,558. Your contention is that the reduction of price would make it unprofitable to mine, and therefore throw the mines out of work?—Yes.

The witness withdrew.

Mr. HARRY O. LANCASTER.

Evidence to 17,568 handed in and taken as read; witness then called and examined.

17,559. I am technical director of Messrs. Locke, Lancaster, and W. W. and R. Johnson and Sons, Limited, desilverisers and manufacturers of lead in all its branches, and grinders of zinc oxide. I am a member of the Institute of Metals, having studied physics, chemistry and metallurgy at the Royal School of Mines, South Kensington.

17,560. One of the most important facts to be considered in this inquiry is the difficulty, or practical impossibility, of preparing zinc oxide of good commercial quality from any available British ores. The type of lead ore available from Great Britain or British possessions is a complex ore of zinc and lead sulphides.

17,561. My company, in conjunction with two other firms, for many years had the whole of the output of silver-lead from the Broken Hill mines of Australia. The existing ore, for the most part, is a complex one consisting of zinc and lead sulphides, with varying quantities of silver, which the ordinary jigs in use for the recovery of lead ores fail to separate.

17,562. There were at one time enormous quantities of this ore available, and my company has given much consideration to the question of the treatment of this ore for the purpose of the preparation of commercial zinc oxide. Numerous experiments were carried out in our works under the direction of Professor Thorpe, and with my personal supervision, but with a negative result.

17,563. Since 1903 there have been various processes tried to recover the different values in these concentrates, notably the "Potter," "Delprat," "De Bavay" mineral separation companies and other processes, and in the year 1910 no less than 470,000 tons were produced, averaging 47 per cent. zinc.

17,564. This concentrate is unfortunately quite unsuitable for the direct production of good quality zinc oxide, and although there have been many attempts to overcome the difficulties, up to the present they have all resulted in more or less failure, essentially owing to the high lead contents, together with the loss

of silver value which affected both the colour and texture very seriously.

17,565. In 1899 the Smelting Corporation, Limited, erected large and costly works at Ellesmere Port, on the Manchester Ship Canal, for the treatment of these complex zinc and lead sulphides, based upon experiments carried out at Llansamlet, Swansea. These works treated several thousand tons, and after fifteen months closed down. The zinc oxide produced proved useless as a pigment, and had to be disposed of to zinc smelters for producing spelter. The company proved a colossal failure, and only lost a part of the whole of the works and plant were disposed of.

17,566. When the processes afore-mentioned developed, they not unnaturally attacked all the dumps which contained the most value in zinc, lead and silver, and consequently the remaining dumps are, as a whole, much poorer in value, and only produce a concentrate containing 20 per cent. zinc, 6·5 per cent. lead, and 10 ozs. silver per ton.

17,567. Speaking generally, the only known way of producing a marketable zinc oxide from these products is by first recovering the zinc in the form of metal, and then converting the same into zinc oxide. This is a costly method, and can never compete with the direct method as employed at the works of the New Jersey Zinc Company, of the United States, which I have visited, and where I have investigated the process. This company has the advantage of obtaining a certain class of ore, known as franklinites, on the spot, free from lead and other deleterious impurities, which is converted direct without any expensive retort work, and with a minimum consumption of fuel, into zinc oxide of high quality as regards purity, with physical properties eminently suited for a pigment.

17,568. From the foregoing, it will be seen that it has so far been found impracticable to prepare zinc oxide from any available British ores; and the effect of prohibition of white lead would be to make the British paint quite dependent for its supply of raw material upon a foreign corporation.

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Mr. HARRY C. LANCASTER.

[Continued.]

17,569. (*Chairman.*) You are a director of two very important lead firms, are you not?—A combination of Locke, Lancaster, and W. W. and R. Johnson and Sons, Ltd. It is all one firm.

17,570. You have also had experience of zinc oxide?—Yes.

17,571. You state that the type of lead ore available from Great Britain or British possessions is the complex ore of zinc and lead sulphides?—Yes.

17,572. These are similar ores to those in which zinc predominates, are they not?—No, not necessarily.

17,573. Can you tell us anything regarding the zinc ores which contain less than one part of lead to 20 of zinc?—In this country.

17,574. Yes, in Great Britain and British possessions?—The zinc ores in this country vary enormously. You may get certain portions of them containing a very small quantity of lead; taking the bulk of them, I suppose they will certainly contain an average of 5 to 10 per cent. of lead.

17,575. You have laid stress in your evidence on the difficulties of separating lead from zinc in such ores?—Yes.

17,576. You realise, do you not, that if not more than 5 per cent. of lead is to be allowed in a paint, ores containing not more than 1 part of lead to 20 of zinc can be used direct, without any separation, to make zinc oxide by the direct method?—Well, I do not know. I am afraid that I could not give a negative or positive answer to that. I think that there would be the greatest difficulty in producing a zinc oxide that was of any use commercially.

17,577. You say in paragraph 17,567 of your evidence that the only known way of producing a marketable zinc oxide from these products is by first recovering the zinc in the form of metal, and then converting the same into zinc oxide?—Yes.

17,578. This is what is known as the indirect process, is it not?—Yes.

17,579. You say this is costly and can never compete with zinc made by the direct process?—That is so.

17,580. Are you aware that the Vieille Montagne Company manufacture their zinc oxide by the indirect process?—Yes; they make all their zinc by the indirect process.

17,581. How is it, then, that they have such a very large business in zinc oxide in the open market?—I cannot answer that question, but I can tell you this: you must not imagine that all the zinc oxide that comes into this country is used as pigment. Very large quantities are used in the rubber trade, and for enamelling and many other purposes. I know that the zinc oxide produced by the direct process makes an infinitely better pigment than one made by the indirect process. It takes less oil, and it has other decided qualities, which always, I consider, make it a better pigment.

17,582. You warn us of the risk of making the British paint trade dependent for its supply of raw material upon a foreign corporation?—Yes.

17,583. Suppose for a moment we accept your view that zinc oxide cannot be manufactured commercially in this country. Why do you say that the paint trade would be dependent upon a foreign corporation?—Because we have not facilities for making zinc oxide in this country. We have not the material for making it in this country, nor have we the knowledge of making it even by what you might call the indirect process.

17,584. You are aware, of course, that there are many competing firms and syndicates making zinc oxide abroad?—Yes, of all kinds.

17,585. To what extent is there free competition in the white-lead industry?—Do you mean in this country?

17,586. Yes?—I am afraid that that is rather more a commercial question than I could answer. I do not profess to be a commercial man. I am a technical man.

17,587. Do you know that there is a combination for maintaining prices of white lead?—Yes.

17,588. How is it that the prices of all brands of white lead have risen so materially of late?—I think because of the combination partly, but also owing to rise in the price of pig lead, labour, fuel, and oil.

17,589. (*Mr. Sutherland.*) Is not the process by which the Vieille Montagne Company make the zinc oxide a secret process?—No, I should not say that it was a secret process, but there is no doubt that, to produce the article they do, they depend upon certain technique and certain knowledge and practice which other competing firms do not possess. I do not think that it is a secret process. It is known generally.

17,590. There is no serious competitor with that company on the Continent or in this country?—No.

17,591. And French witnesses who have attempted to make zinc oxide have told us that it is a secret process?—Every process depends for commercial success on certain little things, a combination of little things for making a good product. To that extent you might call it, perhaps, a secret process, but it is common knowledge to technical men.

17,592. Quite so; but they stand out from all other makers of zinc oxide, do they not, as eminently successful?—Yes, because they have a very large control.

17,593. But they have no monopoly. The Vieille Montagne will take precedence of any. It is the first brand in the market?—If I were offered by the New Jersey Zinc Company and by the Vieille Montagne two samples of zinc at the same price, and they were submitted to me, and I put them down in my laboratory and had certain tests made, I have not the slightest doubt in my own mind that I should advise my buying director to purchase the American zinc.

17,594. Why?—Because it will take less oil, and therefore it is cheaper to produce, and because it has certain qualities in it. It is not in quite such a fine state of division, and in our opinion it will make a better paint.

17,595. (*Chairman.*) But I did not quite gather that that was your answer to the question I put just now. It will make a better paint because of the amount of lead in it, do you mean?—No; on the contrary, very frequently the New Jersey contains under 0.1 per cent. of lead. They have a class of ore which is remarkably free from lead.

17,596. Is it not possible to make zinc oxide in England?—Well, you can make anything. You can recover gold from sea water, but it is a question of cost.

17,597. But I am speaking of a commercial product?—Do you mean to say if we had the men with the knowledge?

17,598. No, I do not mean anything beyond this: if it is possible to make it commercially, why has it not been made, because there is a big demand for zinc oxide?—Because it does not pay to do so. Look, for example, at the Vieille Montagne. They have taken over mines in Cumberland; they have spent many thousands of pounds in developing that property; they spent 40,000*l.* on the dressing floor alone for dressing the ores. They are recovering now a little over 3,000 tons of ore a year, containing approximately 40 per cent. of zinc. What do they do with it? They send it over to their own works to recover the zinc from it. If it could be produced in this country, why does not the company, who is sending into this country nearly 6,000 tons of zinc oxide a year, produce it here? Why do they not convert it into zinc oxide in this country? It is for the simple reason that they have not a suitable clay. Clay enters very largely into the cost of the production of metallic zinc, and fuel is a very big element too.

17,599. Are you quite sure that that is the reason?—That is one of the reasons. Very probably there are other reasons.

17,600. Would not the main reason be the question of the magnitude of the business which is done in zinc oxide to-day in England?—I do not say necessarily that the ore is used for conversion into zinc oxide. They convert it into metal.

17,601. If the demand for zinc paint in England was very much larger, would it not follow that they would make proper arrangements for making zinc oxide in England?—Possibly. The question is what would the tonnage amount to. The 3,000 tons they are producing now will give about 1,000 tons of zinc, and if you convert that into zinc oxide it will give probably

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[Continued.]

another 20 per cent. It would be about that figure. It is in the same way with the zinc recovered in Wales. There the tonnage is very small.

17,602. Do I understand you to mean that the production of zinc in England is so small that it would not pay to establish works to turn it into zinc oxide?—I doubt very much if it would. The total tonnage of zinc ores raised in this country was about 11,000 tons last year; the year before it was about 9,000, and you may take that at about 40 per cent. of zinc. Zinc oxide contains 80 per cent. of zinc.

17,603. (Mr. Sutherland.) There was a big attempt to treat it in England, I see by your proof?—It has been going on for 26 years.

17,604. The Smelting Corporation at Ellesmere Port made a big attempt to make zinc oxide?—Yes.

17,605. Did that prove a failure?—A dreadful failure.

17,606. Can you tell me why?—Because they did not get the class of oxide that they hoped to get. It was absolutely useless as a pigment. It had to be all sold to the zinc smelter; and I daresay, apart from that, there was a want of technical knowledge about the whole thing. But there it was; it was a dreadful failure. It happened that the head chemist who was conducting those works, and had charge of them, is manager of one of our works, and I got to know a good deal about it in that way, in addition to going over the works myself and seeing them.

17,607. There is no other firm in the country that produces zinc oxide, is there?—It is a little difficult to say no to that.

17,608. There is nominally one?—I would put it in this way: we have tried to get a quotation and we have not been able to get it.

17,609. Do you think that if lead were abolished in paint we should be able to command sufficient zinc oxide or other substance to meet the call for paint—especially in view of the abolition in 1914 of lead in France?—Honestly I do not quite see where you would get it from.

17,610. (Chairman.) Are you aware that the production of lead in Great Britain is about 22,000 tons a year?—Yes.

17,611. In Greater Britain it is 204,000 tons?—Yes.

17,612. Of zinc the production in Great Britain is 4,000 tons, in Greater Britain 150,000, and in the rest of the world, 700,000?—I have to accept those figures.

17,613. So that comparatively there are about the same proportions of lead and zinc produced throughout Great Britain, Greater Britain, and the rest of the world?—Yes, I accept that.

17,614. (Mr. Sutherland.) In view of what I have put to you, would there be sufficient zinc to meet the requirements of the painting trade in this country if paint were made from zinc oxide, seeing that we have failed hitherto to make zinc oxide in this country?—I fail to see where it would come from. The quantity the Chairman spoke of is already being used. Look at the enormous quantities being used in France, for instance; it is not as if the stuff were lying idle and you could take it.

17,615. Assuming that the use of lead were prohibited and assuming that paint is made from zinc, and that there is capacity on the part of our English manufacturers and others to make zinc oxide, would not the price of paint be put up enormously?—I think that that is the natural sequence.

17,616. (Chairman.) I see, in the Home Office Report on Mines, Part III., 1910, that the importation of zinc ore was 92,000 tons; of roughly smelted zinc, 121,117 tons, and of manufactured zinc, 18,168. What becomes of all the other zinc if it is not manufactured in this country?—An enormous quantity is used in the brass trade.

17,617. (Dr. Collis.) And in galvanising?—Yes, and in galvanising. Enormous quantities are used for boiler purposes—for zinc plates. We ourselves supply very large quantities of zinc to the Admiralty.

17,618. (Chairman.) Would you go so far as to say that none of this large quantity is made into zinc oxide?—None whatever.

17,619. It is all used for some other purpose?—Yes.

17,620. (Dr. Collis.) Would a ton of zinc when made into zinc oxide give you as much material, or less, as a pigment for making paint (that is to say, for making so many gallons of paint), as a ton of lead when made into lead carbonate?—Do you mean when mixed up in oil? May I answer the question in this way; if you had a gallon of ready-mixed white-lead paint as against a gallon of ready-mixed zinc paint, you would have probably in that gallon (these are test figures) about 22 lbs. of lead, and you would probably have about 12 lbs. of zinc. I will put it in another way. A gallon of white-lead paint might weigh about 28 lbs., and a gallon of zinc paint about 18 lbs., but you have, roughly speaking, about 6 lbs. of oil in the case of the white-lead paint and 6½ lbs. in the case of the zinc paint. Those are rough figures. But what I would like to point out is that that is by measure; by the gallon. If you are going to coat, say, for the sake of argument, that wall, and put a gallon of white-lead paint on one part of it and a gallon of zinc paint on the other part of it, you would probably find that you would have to put two gallons of zinc on to meet the requirements. But, mind you, I am only giving that roughly. You must not pin me down to a concrete case.

17,621. No. If we used 2 gallons of zinc, at any rate we should get 24 lbs. of zinc to 22 lbs. of lead. It would be almost fair to say on that computation that equal amounts of zinc and lead are to be used?—If you are on the weight question, yes.

17,622. There are 45,000 tons of lead at present used in the kingdom converted into white lead?—Yes, 45,000 tons of pig-lead.

17,623. So that we should want, if we were replacing that with zinc, 45,000 tons of zinc to do it?—If you accept the fact that one coat of zinc oxide is equivalent.

17,624. I am taking your own estimate of two. The world's total production of zinc is 856,000 tons, and an increase of 45,000 tons is not a very large increase on that total amount?—I should call it a very big one, Dr. Collis.

17,625. You would?—Yes, enormous.

17,626. We have not the figures to show how the total world's output has increased in recent years?—But you have to put that against the increase of other metals too. It is no argument because it is so with regard to every other metal, and coal.

17,627. But my point is that, if there is an increased demand, there is the possibility of meeting it? I do not know how many years it would take to produce it; that is all I say.

17,628. We have 856,000; add 45,000 tons; that gives 900,000. 856,000 tons has to become 900,000 tons. It is not a very large increase?—I call it an enormous increase.

17,629. I do not know how fast the increase has gone on. I am sorry that I have not the figures ready, but it is not improbable that the increase has taken place in a few years. The difference between 1910 and 1909 was 19,000 tons of crude zinc, and zinc ore, imported, in one year without any special demand for a new purpose?—The increase was for other purposes—not zinc oxide.

17,630. Certainly. We do not use by any means all the zinc in the world. The 45,000 tons increase I do not suggest will be made in a month or several months?—It is a difficult question to answer. Where are you going to get the material from—this country?

17,631. I am talking of the whole world's output?—But are you going to get the Germans to put it here? The zinc in our dependencies is controlled by the German Syndicate—

17,632. Wherever the total amount comes from, we ourselves and our dependencies are producing the proportion of the total production of the world that I have already put?—There are enormous quantities of these complex ores in South Australia. Twenty-six years ago, when we started taking sulphide of lead from the Australian mines, they were only treating the sulphide and the carbonate. They were accumulating enormous dump heaps of zinc. Only last year they treated 470,000 tons. In another three or four years it will be wiped out; and where are they going to get more from?

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If you rush the price of zinc oxide up to 40l. or 50l. or 60l. a ton, it is quite possible that huge syndicates would develop to find out other properties, but whether they would find them or not is another question.

17,633. (Mr. Sutherland.) That would kill the painting trade?—Yes.

17,634. (Dr. Collis.) Taking your own estimate of two coats of zinc to one of lead, if we are dealing with a matter of 856,000 tons (it has increased in our own country in twelve months by 19,000 tons), the 45,000 does not bear such a large proportion to the total amount?—I look at it purely from a metallurgical point of view, and from that point of view it is an enormous increase, and would be absolutely impossible to find. It must be borne in mind that this 45,000 tons has to be converted into zinc oxide.

17,635. (Mr. Sutherland.) What is the total production of zinc oxide?—About 15,000 to 16,000 tons.\*

17,636. That would require to be doubled, would it not?—Trebled, if France is going in for abolition, too.

17,637. (Dr. Collis.) Is that the production in the world?—No. I cannot give you the figures.

17,638. (Mr. Sutherland.) We should have to treble it if white lead were abolished?—The Vieille Montagne last year made about 10,000 tons, I understand. What the New Jersey Company made I do not quite know. When I was over there about six or seven years ago they turned out about 80 tons a week, but I know that they have increased their output since then.

17,639. Are those the two big sources of supply?—Undoubtedly—the New Jersey and the Vieille Montagne.

17,640. The others are all small, are they not? Is there not a German syndicate?—The Vieille Montagne and the German syndicate are in the same combine.

17,641. Your opinion is that as we have not been successful in making zinc oxide in this country hitherto, although many attempts have been made, and unless the price were put up enormously, we should not be successful in the future?—I do not see how you could. You are dependent on the right kind of clay in the right place, and even right freights. Take, for example, Swansea; the output there is not a very big one, but they are able, and they are doing it now, to take a freight of coal to Spain, and bring back a freight of zinc ore.

17,642. The New Jersey Company are specially favoured with a particular ore, are they not?—Yes.

17,643. Assuming that the Committee recommend prohibition, have you formed an idea of the length of time that should be given before it came operative?—No.

17,644. Would you say five years, like the French?—You might do that. I am quite convinced in my own mind that you would not get the zinc oxide. Undoubtedly zinc oxide is the next best pigment to white lead, and if it means that you must have that, it is impossible to say how many years it would take.

17,645. It is not as good as white lead for outside work, is it?—No; I do not think that the most biased man would say that it was.

17,646. (Chairman.) The Office of Works say it is. In some of the departments they have tried it, and they found it just as good. What do you think of that?—I do not know whether the evidence of that has

\* The witness subsequently corrected this to "53,000 tons about (1910)."

depended on a certain chemist, or what it is. No doubt it is a very vexed question. One man will get up and swear on zinc oxide, and another man will swear on lead; and there you are.

17,647. And they both might be right?—I would not go so far as to say that, but both lead and zinc oxide are useful for pigments, and they have their specific uses.

17,648. (Mr. Mason.) Given a zinc ore containing less than 5 per cent. of lead, would you say that there would be difficulty in converting that into zinc oxide by the direct process?—I think that it would be practically an impossibility. Zinc ore of that class first of all would have to be roasted, and after roasting put on a special grate with about half its weight of coal. It has a blast underneath it, and the zinc together with the lead is volatilised. The whole of the oxides are drawn off by enormous fans, and practically blown into bags. The New Jersey Zinc Company, that I was with some years ago, had about 26 miles of bags. The bag room covered two or three acres. Not only would it be almost impossible to produce zinc oxide containing less than that percentage of lead, but there are other points. With regard to those that we have had submitted to us containing anything like 5 per cent. of lead the colour goes off at once. Then there are other points. Very often zinc oxide with lead in it will have zinc sulphate in it (I do not know why), and a very small percentage of zinc sulphate affects the zinc oxide pigment tremendously. It has a tendency of making it chalk and wash off. I do not say for a moment that it is absolutely impossible to produce a pigment from such an ore, but it is not being done commercially at the present time. There are hundreds of people working at this, and there have been for the last twenty years, trying to produce a good pigment, but such a pigment has not come on to the market.

17,649. Do I understand that your answer is that the resulting pigment is not fit for use as a paint?—No.

17,650. There is no difficulty in volatilisation?—No.

17,651. The resulting pigment is not good paint?—We are in this position as manufacturers: I may say "That is all right" or "That is no good," but we have to convince another man. What does he do? He takes it to his laboratory first of all and then puts it to a practical test. He says, "It is no good to me."

17,652. (Mr. Sutherland.) Does it discolour in the atmosphere?—I do not think that there is very much in that.

17,653. It is not as pure a white?—No; and that has an enormous effect on painters. They will not look at anything that is not pure white. It is astounding. They look on zinc oxide as being very much whiter than ordinary white lead. It is used largely for decorating interiors. They ask for white, and they expect to get it.

17,654. What is the effect of zinc on colours as compared with white lead?—Taken generally, zinc has not the same body.

17,655. But I mean as to enriching, or intensifying, or dulling colours for decorative purposes. Does zinc dull the colour as compared with white lead, or does white lead make a softer colour?—White lead makes a softer colour.

17,656. Zinc would make the harder colour?—Generally.

The witness withdrew.

**THIRTIETH DAY.**

Friday, 22nd March 1912.

## PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Mr. E. L. COLLIS, M.B.  
 Mr. W. G. SUTHERLAND.  
 Mr. A. GARDNER.  
 Mr. J. PARSONAGE.  
 Mr. A. L. C. FELL.

Mr. C. L. MASON.  
 Mr. C. KINGGATE.  
 Mr. W. ROBINS.  
 E. A. R. WERNER (*Acting Secretary*).

Mr. JOHN SIBTHORPE.

Evidence to 17,692 handed in and taken as read; witness then called and examined.

17,657. I am a master painter of 45 years' experience from the days of my apprenticeship, and have carried on business for many years in Dublin, where my Company has been established since 1747. I am a past Master of the Dublin Guild, past President of the Irish Association of Master Painters, and Vice-President of the Incorporated Institute of British Decorators. I am also a member of the Urban District Council of Rathmines, on the outskirts of Dublin.

17,658. I have given considerable attention to the question of lead poisoning among painters. It is desirable to take some legislative or administrative steps to abate lead poisoning, but I am strongly of opinion that this should be by way of regulation of the use of white lead and other compounds as paint and not by way of prohibition, which would be both costly and difficult to enforce, as well as being unnecessary and ineffective.

17,659. To make regulations effective it is necessary that they should have the adherence of masters and men.

## GENERAL REGULATIONS.

17,660. Regulation 1.—I would make compulsory the labelling of all receptacles in which lead colours are kept, sold, or sent to the job, with a clear statement that they contain lead. This would meet such a danger as is frequently caused by the use of chrome without any knowledge of its poisonous nature.

17,661. Regulation 2.—(a) I attach great importance to the licensing or certifying of each master painter; the licence should be one for the use of lead as a paint, and it should affect all users, including the private individual temporarily employing painters, who should take out an occasional licence. The licence should in terms bind all who took it out to observe all regulations in force or to come into force for the use of lead as paint.

(b) I would license or certify each operative painter and oblige him to keep a card upon which should be noted places and times of employment for at least twelve months, and any attacks of lead sickness. This card should be produced for inspection when applying for work, and whenever else desired by the inspector or examining doctor. There might well be used in this connection an extended form of the declaration already in use in regard to section 8 (1) (b) of the Workmen's Compensation Act, 1906, of which declaration I produce a copy.

The decay of the old apprenticeship system has caused the ranks of the painters to be swelled by a number of undesirables, careless of their own health and unskilful in the use of the brush, whose presence among us must have added to the ill repute of our trade from a health point of view.

17,662. Regulation 3.—I would prohibit the use of white lead otherwise than in the form of paste.

## PREPARATION.

17,663. Regulation 4.—I would prohibit dry pumice-stoning and glass-papering of old paint or surface that has been burned off, as on this the oil is absent and much dust results.

I would restrict dry scraping of painted woodwork to the very few cases (not 5 per cent.) where it is absolutely necessary, and permit it then only after notice to the inspector, so that safeguards should be used.

There is no danger from the dry scraping of iron, because, rust being underneath, the paint comes off in flakes, not dust.

I do not consider dangerous the glass-papering between the coats, as the oil is still present. The object is to remove the nibs; fine paper is used and almost all that is taken off adheres to it. But, if desired, I would insist on the use of waterproof glass-paper or ground pumice being used with water for the purpose.

If the use of lead were prohibited the prohibition of dry pumice-stoning, &c., would need to be enforced for at least 20 years afterwards.

17,664. Regulation 5.—Burning off I do not consider to be dangerous.

## PERSONAL CARE OF HEALTH.

17,665. Regulation 6.—I would make it compulsory upon the workman to provide overalls (not merely aprons). This is the present practice of painters in good employment.

It would be unfair to put this burden on the employers, because (a) they provide all the brushes; (b) owing to the difficulties and delay arising from fitting; and (c) the liability to loss which the men can much more easily prevent.

The foreman should see to the carrying out of this regulation, and make sure each Monday that these overalls are properly washed.

17,666. Regulation 7.—(a) Facilities should be provided for washing:—i.e., nail brushes, soap, and towels, also hot water. The employer should be absolutely responsible for the first three, and primarily responsible for the last, but in an occupied home he should have the right to receive it from the occupier.

(b) A separate place should also be provided for eating, and also for storing out-of-doors clothes, apart from the place where the paint is stored and mixed; and the incidence of responsibility for this should be the same as in the case of hot water.

(c) It is most necessary that w.c. accommodation should be provided. The responsibility for this in occupied houses should rest on the occupier; the employer being liable to make good any damage.

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## INSPECTION.

17,667. Regulation 8.—It should be obligatory for all the licensed employers to permit their paint shops to be inspected whenever called on.

17,668. Regulation 9.—It should be obligatory for all the licensed workmen to be medically inspected at least three times in the calendar year.

The individual employer or the local Master Painters' Society should keep a register in which the doctor should make notes of his inspection, and the dates of each inspection should be entered on the workman's card by the inspecting doctor.

17,669. Regulation 10.—I would cause all those whom the recurrence of lead poisoning has shown to be specially susceptible to be deprived of their licence to use lead. Men thus deprived should thenceforth be restricted to some other employment, as paperhangers, distemperers, or users of non-lead paints. Or if they were obliged to give up the painting trade they might receive reasonable compensation, to be paid *pro rata* by those who employed them during the previous 12 months. I am sure that most employers would prefer to save three lives at a cost of 50*l.* a-piece than pay 150*l.* for one death.

17,670. I believe that a set of regulations as indicated above would be most effective in the prevention of lead poisoning, and that they would not impose an unreasonable burden upon the employer.

17,671. I am convinced that such regulations could be efficiently enforced without any great cost to the community, certainly at a cost to the community far less than would be involved by prohibition. The operation of inspection would be very simple and such as could be performed by one of the better type of painters; it might indeed be possible to provide in this way for some of those disqualified by special susceptibility to lead poisoning; such a man would, in my opinion, be better able to discover whether the regulations were being observed than would a factory inspector. He would be able to visit a large number of places in the course of a week. I have made a rough calculation for the city of Dublin, which has a population of 402,000, with townships out to Kingstown, and I reckon that four inspectors at a salary of 2*l.*, rising to 3*l.*, a week, could easily perform the work of inspection. It is true that the inspection would be relatively more costly in the country, but prohibition would be even more difficult to enforce.

17,672. The most important thing is to bring home to the workmen the fact that they are working with a dangerous substance, and the necessity of observing the rules of personal cleanliness.

17,673. In my opinion one of the promoting causes of ill-health is the fact that in most districts house painting is a seasonal occupation; the men eke out a somewhat precarious existence during the winter and come on to the rush of work in the spring ill-fed and with lowered vitality. They are at first largely engaged on outside work, and the tendency is for them to ignore the first symptoms of trouble. It is important that men should commence work decently fed, and that their midday meal should not take place too long after their first meal. I would also lay great stress upon the avoidance of smoking during work and the avoidance of over-drinking. I have noticed that the men who suffer are either those who are under-fed, who drink too much, or are personally dirty.

17,674. The alternative to regulation is prohibition, which, to my mind, is quite impracticable; it would, in the first place, greatly increase the cost of painting, as the average life of paint would be at least a quarter less.

17,675. The only substitute for white lead is zinc white, which lasts a very much shorter time on the outside. For the inside, it is occasionally desirable where pure white is required, but it involves an extra cost, and has disadvantages.

17,676. The cost of prohibition would fall on the community. It is true that the substitution of zinc white for white lead might well be financially advantageous to the master painters, but they are practically unanimous in condemning it.

17,677. In many branches of work, such as painting on ironwork, on ships, and wherever there is much exposure to moisture, there is really no practical substitute for red lead.

17,678. I would point out that prohibition would involve inspection equally with regulation, and, in my view, it would be a more difficult kind of inspection, and would be more unpopular both with employers and men.

## ADDENDUM.

17,679. I beg to submit the following supplementary notes:—

17,680. I am acquainted with the methods adopted by the Commissioners of Irish Lights who are responsible for the maintenance of all the lighthouse and fog-signal stations, &c., round the Irish coast. Their engineer issues instructions for painting, based on long practical experience, from which I have extracted the following:—

*Four-coat Work.*

17,681. If the finishing colour is to be red, apply the first two coats in red lead and the third and fourth coats in equal parts of red lead and venetian red. If the finishing colour is to be white, black, brown, cream, or green, the first two coats are to be white lead, and the third and fourth of the finishing colour.

*Three-coat Work.*

17,682. Omit the second coat. All ironwork which is scraped clean down to the base and repainted is to be three-coat work.

*Instructions for Work.*

17,683. All internal doors and frames and the inside of external doors, windows, casings, presses, architraves, cupboards, and skirtings are to be primed, and second coated with white lead and painted with the service standard dark brown, the panels being of a lighter shade of brown.

17,684. These I consider most important, as being the result of constant inspection by a man quite unprejudiced in favour of one paint more than another, as the following extract shows:—

"Oxysulphide of zinc may be used for special purposes in place of white lead where extra pure white is required."

17,685. One purpose for which zinc is used with good effect is on corrugated iron. This is first treated with mordant, and then receives two coats of zinc white, which stands well. I would not have expected this, but suppose it results in some way from an affinity between the paint and the zinc which forms the galvanizing.

17,686. The conditions under which paint is used in these buildings is very trying, because of the salt spray which takes the oil out of the paint leaving it chalky.

17,687. The spray is carried many miles inland. The greater part of Ireland and Scotland, Wales and the North and West of England are therefore subject to the same sort of test in a greater or less degree. This country should, therefore, be slow to give up the use of its best protective paint.

17,688. I submit also the following extract from the contract form for painting work required by the Commissioners of Public Works, Ireland:—

"Oil painting with paint as specified No. 121. 121 paint strained, composed of some or all of the following ingredients, viz., white lead or zinc any colour-ground in oil, oils, turpentine and driers. 129 white lead, —'s genuine."

17,689. My firm were for many years the sole contractors for the Dublin district, and I can state that white lead practically was used alone, and I am able to form an estimate of the extra cost which the substitution of zinc for lead would entail on the taxpayers in connection with that section of the Board's operations. I am sure that to keep the buildings in an

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equally good condition to the present would mean an increase in the vote of at least 1,500*l.* per annum.

17,690. I am constantly engaged on work for Messrs. Guinness. The conditions of a brewery are specially trying on account of the steam and the glucose which it deposits on iron. This firm is at all times willing to give any new invention a full and impartial trial, and I have used, under their directions, some of the patent paints, and other contractors have done likewise. The question of cost does not weigh with them. They want the best and are prepared to pay for it. But they have come back to the old method of using red lead on the parts of ironwork which are scraped and polished bright, followed by succeeding coats of white lead stained to certain standard tints.

17,691. From my experience I am convinced that if lead is prohibited, all the scraping and painting of our mercantile marine will be done in foreign ports, both outside and between the skins, as red lead is absolutely without an alternative for this purpose.

17,692. I also submit:—1st. A panel showing the relative covering properties of lead and zinc. 2nd. Two pieces of ornamental moulding showing the relative sharpness of ornament when painted with lead in the ordinary way, and with zinc sufficiently stiff to cover. 3rd. A series of tints in which lead and zinc are used as bases respectively.

17,693. (*Chair*.) You are a master painter of Dublin?—Yes.

17,694. How many painters do you employ on the average?—I did not make a calculation of that, but I should say off-hand that my summer average would be considerably over 50.

17,695. How many cases of lead poisoning have you had in the last ten years?—One.

17,696. You have, of course, studied the statistics of lead poisoning among house painters?—Not very carefully, but I have seen a good deal of the literature on the subject.

17,697. And I notice you agree that some action should be taken to remove this evil?—It should.

17,698. So you admit that the evil is sufficiently great to justify some action being taken?—I think that goes without saying.

17,699. You state that you would prefer regulations and you suggest a code?—I do.

17,700. The regulations which you suggest are very interesting. I suppose you agree that such a code would be considered troublesome and vexatious and would meet with opposition from employers and probably from workmen?—I do not think so.

17,701. We have had evidence from a large number of employers, and I think I can say confidently that a considerable proportion have told us that they prefer prohibition to regulations of any kind?—Well, I can only say that I differ from them.

17,702. I should like to take a few points in your suggested code of regulations in detail. In paragraph 17,661 of your proof, you state that the ranks of the painters have been swelled by a number of undesirables. Have you any statistics on this point?—No, I have not. It is merely my own experience, and it is of comparatively recent date.

17,703. What do you mean by "undesirables"?—Men who have never properly learnt the trade and who come amongst us purporting to be painters but have not learnt either how to mix paint, how to prepare the brushes for use, or how to prepare work. In point of fact there is a name in the trade that describes the man I mean by an "undesirable." He is spoken of as a "paint spreader." If everything is put into his hands he may go the length of spreading paint, but of the technique of painting he is lamentably ignorant.

17,704. Do you wish us to draw the conclusion that there is more lead poisoning amongst those whom you call undesirables than amongst the regularly trained painters?—Well, now, let me say that I have very little experience of the undesirable, because as soon as he is discovered we get rid of him.

17,705. But is it not rather a dangerous thing for you to come and speak of such a set of men unless you have some specific knowledge of their disabilities?—

I have knowledge of the disabilities. They must get employment somewhere, and if they practised, in the employment which they get, the tricks that I have stopped them at, then undoubtedly they would lie open to lead poisoning far more than the trained painter. I may be allowed to give an instance, if I am not too long. Last summer was a busy season, and we would occasionally get a number of men from the labour bureau. One of these came to our place. He had not a set of overalls, but simply an apron, and he was given the usual kit of tools. The last thing which the colour man handed him was a large lump of pumice-stone and two small lumps of pumice-stone. He asked in the most innocent manner possible, "What are these for?" He was promptly deprived of his set of tools and told he had better look for employment somewhere else.

17,706. You are aware, no doubt, that the House Painters' Trade Unions accept only genuine operative painters as members?—I cannot endorse that.

17,707. Is not that the fact?—I would like to explain what I mean. In stress of circumstances I know of cases where the Unions who have branches in Dublin accept men whom they would not accept if it were not for the stress. They take in the sort of man I have described sooner than have him going as a free lance.

17,708. Can you speak of that from your own knowledge?—Yes. I can speak of men who have had no regular training being accepted as members.

17,709. How many men do you think you could suggest come under that category?—Suppose you take our number in Dublin (I cannot speak with absolute certainty about this), it is somewhere about 800. I should not say that it would be more than one-twelfth or one-sixteenth of the whole number, but that is the merest guess judged by my own experience.

17,710. What is your own experience?—My own experience is that it is one-sixteenth of the total.

17,711. Does that mean that one-sixteenth of the men you employ are what you call undesirables?—No. It means one-sixteenth of those in the trade societies. That was the question I was asked.

17,712. I was trying to ascertain how you arrived at that conclusion?—By the number of men who present themselves to us for employment, and who, on proof, show that they are not skilled painters.

17,713. Do I understand that you discourage the employment of undesirables?—As much as we possibly can, and in the only way that we are recommended by the societies to do it, and that is by getting rid of them directly we find them out.

17,714. Have you formed your conclusions, that the trade unions accept these undesirables as members, from the questions you have put to these men who have applied to you for employment?—As a rule not from questions but from their work.

17,715. But you said just now that you do not employ them?—If I did, I did not state exactly the thing as it occurs. When we discover, as we did in that particular case, that a man knows nothing about the use of pumice-stone—

17,716. You told us very definitely that one-twelfth or one-sixteenth of the members of the trade unions of Dublin are undesirables. I want to know how you arrive at that conclusion?—By the number of men that I have to dispense with year by year.

17,717. But you said just now that you did not form your conclusions from the number of people that you employed?—If I did, I did not mean to say that. I will amplify my answer. What I meant to convey was this: We as a rule only employ men that we know. In the busy season we are glad to get men who offer themselves, and I am judging by the number who offer themselves and get employment, and who subsequently prove to be undesirables.

17,718. But how do you know that they subsequently prove to be undesirables, unless you employ them?—By the character of their work.

17,719. Then you employ them?—We have employed them. We, like the trade unions, have taken them on through stress. They do not do it willingly. They would much rather keep up the

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standard of their men. I want to be clear about that, because my relations with the trade unions are friendly. In that we are entirely at one.

17,720. But I am still in doubt as to how you arrive at the conclusion that one-twelfth to one-sixteenth of these men who belong to the trade unions are undesirable?—When you get a man to work for you, you can tell.

17,721. But it is no use telling me about one or two men. What I want to know is how you arrive at such a large figure?—Suppose for a moment our number to be 50. We will at least discharge, as incapable, four during a season.

17,722. Then do you ask, when you employ these men, specifically whether they belong to a trade union or not?—We do not.

17,723. Then how do you know that they belong to the trade union?—I will tell you how we know. We do not know as a matter of legal judicial knowledge, but we have always been recognised as a union shop and, although we profess to have the right to employ non-union men, paying them union wages, as a matter of fact I believe we very seldom ever get a non-union man.

17,724. Do you consider that that is sufficient justification for your stating to the Committee that one-twelfth or one-sixteenth of the men who belong to the trade unions are undesirable?—I think it goes a good deal further than that. Our shop has the reputation of doing good work, and they would not come to us if there were other places where a more sloppy kind of work would be allowed.

17,725. You think, from the simple fact that the men know that you are a trade union shop, that these men who apply to you are trade unionists?—I think that in most cases they are. I never ask them the question, but I believe as a matter of fact they are.

17,726. As you say, that would not be admitted as legal proof?—No, by no means; neither would my guess of 8 per cent. That is only a surmise.

17,727. Do you know that the statistics of these Trade Union Societies show a most distressing amount of illness and death from lead poisoning?—I do not of my own knowledge know that, but I suppose it is a matter of common knowledge. My own experience and knowledge are rather the other way.

17,728. From what you have told us, we must conclude that amongst the unskilled and untrained painters the state of things is still worse?—That is my opinion, but it is only opinion.

17,729. So that necessity for precautionary measures is more vital than ever?—For untrained and unskilled men.

17,730. As you suggest, you cannot keep the unskilled men from employment, sometimes, when you are rushed?—We do not, as a matter of fact. Whether we could or not is another thing. We do as much as we can.

17,731. In the middle of paragraph 17,663 you state that there is no danger from the dry scraping of iron?—Yes.

17,732. Now, other witnesses have told us that there is very great danger from this process?—Well, again I do not agree with them, and if you like I will give you my reasons.

17,733. I should like to have the reasons, please?—We do a very considerable amount of work for Messrs. Guinness, and they insist, as indeed all good engineers do, that where ironwork is being repainted, the scaly paint shall be removed, the iron laid bare, and the iron itself polished, either with emery paper or steel brushes. Now that is done, in Dublin, not by the painters but by a class of men called painters' labourers, and I have never known a case of lead poisoning amongst these painters' labourers who are engaged on that work. I think the reason that I have given in my proof is the reason why that is so, namely, that where the paint is scaly it gets a sharp blow from a hammer or some sharp-edged tool and the scale comes off as a scale, and what is underneath is not lead at all but iron rust. So that the dust that is made there is the dust of oxide of iron, and ought to be a tonic if anything.

17,734. Would you go so far as to say that the scraping down of iron is beneficial to the men?—Well, I will not go that far. I do not mind saying that I do not think that it does them the least harm. The evidence that I am prepared to give from my own knowledge points to that.

17,735. But the conclusion at which you have arrived that there is no harm in the scraping down of iron painted with lead paint, because there have been no cases of lead poisoning within your knowledge, applies equally to your statement that you have only had one case of lead poisoning in your industry in the last ten years, and yet you admit that the prevalence of lead poisoning is very serious in the whole trade?—Quite so, but may I qualify that in this way: You ask if I have had any experience of lead poisoning within my own knowledge, and I mention one case. I know that there have been a great many more than one case in Dublin. It is also right to say that there are four or five contractors who, with us, work for Messrs. Guinness, and they have exactly the same experience. They have had no cases of lead poisoning. And, as far as I know, there has not been a case of lead poisoning among the employees of the railway companies who do this work for themselves on their bridges. So that, not my direct knowledge but my indirect knowledge goes a good deal further.

17,736. I should like to draw your attention to the examples from three different branches of the industry—first, where an iron bridge has been painted with lead, repeated cases of lead poisoning have been reported, and the majority of these are ascribed to the dust from scraping off?—I can only answer that that is not my experience.

17,737. But if that is the experience of other eminent gentlemen in the business, you will probably feel inclined to reconsider your emphatic decision?—Well, I would like to sift their evidence. When I have a solid fact of my own, I am very slow to give it up.

17,738. But your solid fact equally applies to the fact that you have had no case of lead poisoning in your own works?—Except one.

17,739. You might on the same hypothesis make a similar deduction and say that there is no lead poisoning in the country at all?—I would not say that at all.

17,740. But why not?—I think that probably lead poisoning occurs more among the unskilled, the dirty and the careless painters, whom, as a rule, we do not tolerate.

17,741. You assert that there is no lead poisoning from scraping lead paint from iron, because there have been no cases to your knowledge. Would it not be an equally fair deduction to say that, as you have had only one case in ten years, there is no lead poisoning in house painting generally?—I will put my answer to the question in this way: I have no evidence that the scraping of bridges among the people to whom you refer, has been done by a different class of workman from the man who subsequently lays on the paint.

17,742. But you do not know?—No; but I do know that in my own case it is done by a different class of man.

17,743. But you could not say, because you have had no case of lead poisoning in your own experience from the scraping of iron painted with lead paint, that the people who do that work are immune from lead poisoning?—Of course I could not say that.

17,744. The second point to which I wish to draw your attention is that the Admiralty have been taking steps to reduce the dangers of lead poisoning. One of the first directions in which they took action was to substitute red oxide of iron for red lead in the painting of confined spaces in ships, because of the great danger of lead poisoning which has been found to arise when old paint was scraped off the iron surfaces in holds, and the like?—I do not think that they could do that.

17,745. Do what?—Substitute red oxide of iron for red lead.

17,746. They have done it. They have been here and given evidence to us that for many years they



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have done it?—Well, then, the spaces between the skins of their ships must be a great deal stauncher and a great deal freer from damp than is the case in the commercial navy.

17,747. You do not put that forward seriously, do you?—I put this forward: that red lead is the only thing I know that will dry under water.

17,748. But I have told you exactly what the Admiralty are doing. May I suggest that you in Dublin are not quite up-to-date?—I regret to say that we have very little shipwork to do in Dublin at all of the kind you speak of; that is to say, the painting of these spaces; but I know something about it where it is done elsewhere.

17,749. The third point I want to present to you is in regard to locomotive engine repairing shops. Several cases of lead poisoning have arisen from the chipping off of old paintwork. Does that fact surprise you?—It does, as there is very little white lead used in the painting of an engine.

17,750. But you see the inference from this information we have already received, as compared with your own rather striking statement?—I do, but I would like to have the evidence before me and to know what part of the engine the white lead is put on.

17,751. It does not matter what part, does it?—I do not think any is put on.

17,752. (*Mr. Kinggate.*) Do you mean the locomotive engines?—Yes.

(*Mr. Kinggate.*) There is any amount used.

17,753. (*Chairman.*) The big surfaces of the tender tanks, for instance?—In the tanks themselves?

17,754. On the outside of the tenders?—They are generally painted with one or other of the standard paints of the various companies.

17,755. But I am giving an illustration of where they are painted with lead paints?—It is very curious. That is all I can say. The greens may have any amount of chromes, for instance. It reminds me of a specification given out by our Corporation in Dublin for the painting of certain work, which was to be painted olive green, and nothing but white lead was to be used.

17,756. (*Mr. Gardner.*) Could not you get an olive green with white lead in it?—Of course you could, but this was to be nothing but white lead.

17,757. (*Chairman.*) What do you suggest is the principal substance or base of coloured paints?—I have no knowledge whatever. I have never had an analysis made.

17,758. Would you be surprised to hear that the basis must generally be either lead or zinc?—I should not be at all surprised with regard to the white or light coloured paints, but for dark paints there is no necessity. There are paints commonly known as Torbay paints.

17,759. If that is the case with regard to this particular class of work, we can prohibit the use of lead without any danger to the particular work that is being done. I am referring to what I understand is the case—that in some instances no lead is used in paints for this kind of ironwork?—I do not agree to that, because my experience points to nothing being equal to red lead for the first coat of ironwork.

17,760. You cannot have it both ways. Either there is lead in it or there is not. If there is no lead then there is no danger. If there is lead in it then the evidence we have received shows that the scraping off of lead is highly dangerous to the worker. You have made the statement that there is no danger in scraping lead off iron work. I have given several illustrations where danger has arisen and I want to know what you say about that?—I am only speaking of cases where lead is put on, not where it is not. Coming back to my own experience with Guinness's work, I dare say that some of you gentlemen know the circumstances of breweries. It is about as trying a position for paint as you can have, on account of the vast amount of moisture that is always present and constantly being deposited and constantly drying off. Their practice there is invariably to touch up all the bare places—all places which have been treated as I have described—with red lead, and then give two

coats, of which the basis is undoubtedly white lead, only the smallest amount of colouring matter being used of certain standard colours. They give us the colour and we have to make it up, guaranteeing that the lead shall be genuine. In that case we are dealing with lead in its worst form, I suppose, and it is on that that I base my statement or my opinion that the danger, if it exists at all, is of a very remote character. What I want to point out is this: that you will not get rid of the danger, supposing that there is danger, from hammering and scraping ironwork for the next twenty years by merely prohibiting the use of lead now, because you have to get rid of all the lead which has been put on, which has to come off sooner or later.

17,761. That is obvious. In paragraph 17,664 you state that you do not consider burning off to be dangerous?—That is so.

17,762. What experience have you had of that, because that is a remarkable contrast to the evidence we have already received. I do not think that a single witness has told us that it is not dangerous?—I do not know whether you have ever seen the thing in process.

17,763. Yes, I have?—There you do not get any dust.

17,764. No, but you get the fumes of lead?—Of the oil. You will not volatilise lead in the process of burning off. You cannot do it.

17,765. Your opinion is that, in the actual burning off, no lead could be volatilised?—I do not think that it could, but I am very strongly of opinion that after the burning off has taken place very very frequently danger arises from glass-papering the surface. I think that that should be prohibited, because there you deprive the lead of its oil, and it is just in the very state in which dust is easily blown about.

17,766. Would it be possible to prohibit the sand-papering?—Surely. My practice is to pumice down either with water or with spirit—which I prefer.

17,767. Would not that be rather an expensive operation?—No. As a matter of fact, it is the cheapest thing to do, but the other has been the old custom. If it is properly done and laid off with a broad filling knife, it is almost as good as a coat of priming paint.

17,768. In paragraph 17,665 of your evidence you suggest that it would be unfair to ask the employer to provide overalls?—I think it would.

17,769. Why?—Well, there are a variety of reasons. In the first place you can hardly supply overalls quite as carelessly of the stature of the men as is the case with some of the territorial uniforms.

17,770. Do you want that put on the notes?—I do not mind a bit. I am not at all ashamed of it. My experience is that the painter is rather a natty man, especially a good painter, and he likes to be tidy, and he likes his suit of overalls made for him with some regard to what sort of man he is. He does not want to have them hanging in loose folds about him. Under those circumstances an employer would be obliged to keep a small tailor's shop of overalls to fit the men out, and there would be the trouble of fitting them on. And there is another thing too. I do not say it at all in an invidious sense, but I should take more care of my own clothes than I would of the clothes of any gentleman round the table here, supposing that I were allowed to wear them.

17,771. Are you aware that in every other industry for which regulations have been made for the prevention of lead poisoning, the employers have accepted the principle that they should provide and maintain the necessary means of precaution, including overalls?—I do not think it is on all fours, because painters constantly come and go. At all events, with us it is in one way a great hardship to the men and a great pity, and nobody is sorrier for it than the employer—that a great number of men have to be dispensed with and that the men in a particular shop are constantly changing. It is not so, as far as I know, with manufacturers.

17,772. If the Committee felt it imperative, as one of the essential rules to be introduced, to recommend

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that overalls should be provided for the workpeople, would you agree to that?—I would.

17,773. Now we come to the question of the question of the enforcement of regulations. In paragraph 17,667, you say it should be obligatory for all licensed employers to permit their paint-shops to be inspected. In the term "paint-shops," do you include every place where painting operations are being carried on?—No. Technically, in the trade, the "paint-shop" is a dépôt from which the various jobs are supplied.

17,774. Are you aware that those places are already subject to inspection under the Factory Act?—Well, I am very glad to hear it, but I have never seen an inspector in my shop.

17,775. Would it, in your opinion, be possible to maintain efficient inspection in regard to all the private dwelling-houses where painters may be employed from time to time?—I think so; I have no reason to doubt it at all.

17,776. Now, will you tell us how many inspectors you think would be required in Ireland?—I have not made any calculation for Ireland.

17,777. But you have made a very positive statement that you agree to it?—Yes.

17,778. Without thinking it out?—No. I have made a calculation for Dublin.

17,779. How many inspectors do you think would be sufficient to cover Dublin?—I think that three would do for Dublin very fairly well.

17,780. (Mr. Sutherland.) You say four in your proof?—I put down four, but my opinion is that three would be enough. Four would be ample.

17,781. (Chairman.) How many private dwelling-houses would they have to inspect?—I will tell you my calculation; or the basis of it. We have, as I say, roughly about 800 painters. When they are in full work, it is a fair supposition that there would be about four painters to each job. That will give 200 jobs. I reckon that once a week would be quite enough to visit the places. It is a mere matter of arithmetic. It would be 12 visits a day.

17,782. (Mr. Sutherland.) For each of the four men?—For each of the four men.

17,783. (Chairman.) I have made a rough computation of what that would mean if it was applied to the whole country. You think that four would be sufficient for the town, but in country districts you would want a somewhat larger proportion of inspectors?—You must either have a larger proportion or less frequent visits.

17,784. I find that it would require 450 more inspectors to do this particular work in Great Britain and Ireland?—I daresay. I can only speak of Ireland, judging from my knowledge of Ireland and the amount of painting. There we are an agricultural country, and the farmer does not get a painter to paint his house very frequently. The figures might be applicable to the whole country. Very likely they would, but they certainly would not be applicable to some parts.

17,785. Do you think that the master house painter should pay the cost of the inspection?—My idea is that the registration fees would go a very long way towards doing it.

17,786. What registration fees?—You would naturally charge some fee in connection with the licensing.

17,787. At the present moment the number of Factory Inspectors existing under the Factory Act is 200 for the whole country?—Yes.

17,788. Taking it at 300*l.* per year, per Inspector, without adding to that the cost of travelling, office expenditure, stationery, &c., it would reach the huge sum of 135,000*l.* a year. Do you seriously suggest that the Government should be asked to provide that sum for the protection of the house-painter?—It is perfectly immaterial to me whether the Government pay it or whether the customers pay it. Either the one or the other will have to pay it.

17,789. Of course, if this scheme of inspection were adopted by the Government, it would be an incentive for other dangerous trades to insist on similarly frequent inspection, and so the amount of the Home Office Vote would go up by leaps and bounds?—Well you cannot have omelettes without breaking eggs.

17,790. I do not think that the Treasury would accept your simile as a suitable one. Now you suggest the prohibition of dry pumice-stoning and glass-papery. Do you think that the inspection of these jobs once a week would be sufficient to prevent the infringement of that rule?—Well, if the man knew his work it would.

17,791. If he did not?—If he did not, it would not. If he was a painter, it would do quite well. The condition of the pumice-stone would tell the tale.

17,792. But there would be difficulty even with this frequent inspection?—With regard to the men who were not very fully qualified workmen.

17,793. Are you speaking about inspection?—Yes, I am talking of the inspection. My theory is that an Inspector who knew his business would jolly soon get information from either of two sources that would put him on the track of infringement in this respect—either the clogged condition of the pumice-stone or the condition of the work which had been rubbed with the pumice-stone,—the scratched and torn appearance that the dry pumice-stone had given to the work.

17,794. Do you advocate medical inspection of the workers?—Yes.

17,795. Of course, you agree that this should be paid for by the employer?—I have no objection. I see that the employers have long been contemplating doing this on their own account.

17,796. You state that you believe that such regulations would be most effective in the prevention of lead poisoning?—I believe that they would. I believe that the regulations I have sketched there are of a sort that would commend themselves to the thinking workman and the humane employer.

17,797. But do you not think that in a great many cases they would result in the disease of lead paints?—Well, if they do, they will have attained the object that some people want, without the necessity for prohibition.

17,798. Yes, but they would attain the result of prohibition coupled with a very enormous expenditure?—I do not think so. You must have the inspection in any case. If you prohibit, you must inspect equally.

17,799. That is a question for us to consider, but supposing we come to the conclusion that prohibition does not necessitate any inspection, then my suggestion holds good?—If you do not have inspection, I do not care how soon you prohibit, because we will put on the lead without asking any questions.

17,800. But is there not such a thing as regulating the distribution of lead?—No; I do not know how you will do it without an elaborate scheme.

17,801. You think that if we prohibited lead, some of the employers in Dublin, for instance, would evade the law and use it?—We would love to do it. You could not offer us a greater inducement to use lead than to say, "You must not."

17,802. Now, if a considerable number of employers of painters state that they would prefer restriction of the use of lead to the burden of such regulations, would that not weigh with you?—Restriction I do not understand. You mean prohibition.

17,803. I use the word "restriction" because it is suggested that, if they were allowed to use 5 per cent. of lead, that would be sufficient?—Personally, to commence with, I do not see the great advantage of 5 per cent. I think that possibly if you gave the painters the idea, by allowing this restricted amount of lead, that they were handling an entirely innocuous article you might do more harm than good. What I should prefer would be to impress upon them the danger of the article they were using by every means I could very well adopt.

17,804. You state towards the end of your evidence that zinc white lasts a much shorter time on the outside than white lead, and also that on the inside it has disadvantages?—Yes, that is my experience.

17,805. Now, several witnesses who have been before us have given an opposite opinion. For example, the Savings Bank Buildings in London were painted in 1906 inside and outside with zinc paints, and reported in excellent condition in 1910 when they became due for re-painting. A large number of post

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offices and sorting offices in the London district have been similarly painted with zinc paints. The top structures of the Orient Steamship Company's liners, and of the Royal Yacht "Victoria and Albert" have been painted with zinc white?—How much zinc paint? Where did it come in? I ask that because I happen to know a good deal about yacht painting: I do not know much about ship-painting. Kingstown is a fairly good yachting centre.

17,806. In regard to the public offices, I can tell you details?—I do not know anything about those.

17,807. The evidence we have received is that the cost of zinc paints is no more than that of lead paints?—I would suggest that probably the zinc paint used on those public buildings (I have no knowledge of it) is used in some form of enamel.

17,808. But your suggestion is not correct in this case with regard to these standard paints applied by firms?—I have used some of them, and as far as I could judge they have depended for their life on the vehicle that has been used—the higher or lower class of varnish in which the zinc is mixed.

17,809. I understand that the paints in question contain from 5 to 17 per cent. of varnish, but I do not think it is right to say that they are enamels. And moreover we have had evidence that various gasometers and other ironwork painted with zinc and iron oxide paints have been reported as very satisfactory. The exterior of the Stock Exchange is painted with leadless paints, which have been reported by the Official Architect as very satisfactory. We have this evidence before us, and that controverts what you stated as your opinion?—Well, my experience of zinc put on in similar conditions to that of ordinary lead is that zinc parts with the oil much sooner than the lead does, and the paint becomes chalky.

17,810. With regard to the painting of ironwork on ships and wherever there is much exposure to moisture, you say that there is really no practical substitute for red lead?—That is my opinion, for the reason that I gave.

17,811. What experience have you had of good red oxide of iron paints, graphite paints, and bituminous paints?—That none of them will dry on a wet surface or a surface that is wet during the process of drying.

17,812. Will you admit this—that for ironwork that is not moist, you could use graphite paints?—Certainly. We frequently use so-called Torbay paints.

17,813. Your suggestion, with regard to the painting of ironwork on ships and wherever there is much moisture, is that in that case lead is essential?—That is my opinion.

17,814. I understand that you wish to put in an addendum to your proof of evidence?—Yes.

17,815. What do you wish to say about the Commissioners of Irish Lights?—What I wish to say about them is this: that their experience is one that gives us in Ireland what the Americans call a pointer for a large part of the Kingdom; that is to say, that the salt which they have in a large measure distributed over their buildings is in a lesser measure distributed over a very large area in Ireland, on account of the way in which the western seaboard is indented with bays, and the prevalence of westerly winds. What their experience has taught them is the best and the only thing that will stand is, to a certain extent, applicable to all outside painting on the western and southern coasts of Ireland, and for a considerable distance inland.

17,816. Is any provision made for the use of zinc paints in the place of lead?—Yes. Their specification provides for zinc paint under certain circumstances. It is principally used where it is desirable to have a very white surface, altogether apart from the question of standing, as, for instance, on railings which a man wants to see at night, so as not to fall over a cliff. They also find, which I must say was a surprise to me, that, on corrugated iron treated with mordant, zinc paint as a base stands very well. But, as far as I know, they only use it for finishing where a white surface is an object, and on corrugated iron, and nowhere else.

17,817. Has zinc paint on corrugated iron ever been exposed under trying circumstances?—Yes, they have it there in the shape of fences round yards, and sometimes it is used on roofs.

17,818. You have ascertained that it stands very well?—That is what their engineer told me.

17,819. Do you wish to put in a contract form of the Commissioners of Public Works, Ireland?—Yes, an extract. The original can be easily got in detail, but it is a thing of many articles.

17,820. Have you had experience as a contractor for public works?—Yes, ranging over a quarter of a century, or more.

17,821. Do you wish to state the effect on your contract price that the demand for the substitution of zinc for lead would entail?—It would certainly add to our price per coat. Each coat is priced separately according to a schedule. If zinc were used, a higher price would be put on each coat, and in my opinion an extra coat would be necessary in most of the work. The specification is to coat with two oils plain, commonly abbreviated to "2 O.P."

17,822. On what practical experience do you base that estimate?—For many years, when I was a junior member of our firm, I superintended all the Board of Works contracts myself.

17,823. But I want some more recent information than that. What recent information have you acquired to justify your statement?—How do you mean "recent"?

17,824. I do not want to know anything about what happened 25 years ago?—It did not happen 25 years ago. I said that I have had 25 years' experience of it. I have carried out work for them within the last two or three years.

17,825. Is your statement based on your experience of two or three years ago?—Yes.

17,826. Can you tell us what that experience actually was?—The last job of any magnitude that I did for them was to paint the whole of the outside of Dublin Castle. That would, I should think, have required an extra coat of paint if it had been done with zinc.

17,827. Would that have cost considerably more?—Yes, it would have cost considerably more.

17,828. (Mr. Sutherland.) You mean the cost of the additional coat plus the extra cost of material?—Yes.

17,829. (Chairman.) Witnesses who have been before this Committee have given quite a different view of the relative cost of lead and zinc. For instance, in the painting of the Post Office Savings Bank, the Office of Works have told us that the cost has not been more than it would have been if they had painted with lead. How do you account for that?—Because of the extra cost of material, and the need for a third coat over and above.

17,830. Why should you need an extra coat of paint for Dublin Castle, when it was not necessary for the Post Office Savings Bank in London?—I cannot answer that, but I know that you cannot get the same effect with two coats of zinc that you can with two coats of lead. You cannot get it to cover to the same extent. This question has been discussed among the Dublin painters, and some of them have said that it would be a very good thing for us if you do prohibit lead, because it will run up our accounts by 50 per cent.

17,831. But that is a very extravagant statement, is it not?—I do not think that it is an extravagant statement.

17,832. You do not say seriously that the substitution of zinc for lead paints will increase the cost of painting 50 per cent.?—I think it is nearly as plain as that two and one make three, or very nearly so.

17,833. You are quite right in stating your opinion, but that does not agree with the majority of the witnesses?—I have no prejudice one way or the other.

17,834. What do you mean by "no prejudice one way or the other"?—I should be perfectly happy to use zinc if I thought that it was nearly as good as lead.

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17,835. What do you wish to say with regard to Messrs. Guinness?—I have practically said all I have to say with regard to them.

17,836. Will you tell us about the leadless paints that you tried in connection with the work at their brewery?—I cannot say whether they were leadless or not. They were mixed paints.

17,837. (Mr. Sutherland.) Patent paints?—Patent paints. I will give you one instance—a large storehouse. We commenced at the top and finished at the bottom, and by the time we got to the bottom the rust was out through the paint at the top.

17,838. Through the new paint?—Through the new paint.

17,839. (Mr. Kinggate.) The rust had not been got off then?—Certainly it was. You do not get soft jobs like that from Guinness. The engineer was round with a little hammer of his own.

17,840. (Chairman.) What do you suggest was the reason?—Simply that the patent paint did not resist the rust in the same way that red lead would have done.

17,841. We do not know the ingredients of the paint. You do not ask us to say that all zinc paints are equally bad, because one has failed?—No, I do not. That was a concrete case, and the firm I am speaking about are absolutely open-minded in their trial of any new thing that can be brought to them. They are absolutely determined to have the best they can get, and if you come to them with any new thing you like to suggest (I did not suggest this paint but someone did) it will get a fair trial.

17,842. It was simply a very unfortunate selection. That is all you can say?—I believe that they have made other selections.

17,843. They have made several unfortunate selections of paints?—I can go no further.

17,844. (Mr. Sutherland.) Would not that be exactly the problem that the painting trade would be up against if red lead were prohibited?—They would have to make a series of experiments at the public expense.

17,845. And their own discredit?—Yes. It would have to be said, "This is recommended to me. You will have to take it and be a purchaser with notice."

17,846. (Mr. Gardner.) With regard to the extreme case which you have just mentioned with regard to rust, do you believe that any other paint would have kept the rust from coming through?—It has been since painted red lead in the way I have described, and the rust has not come through.

17,847. Under exactly the same circumstances?—Under exactly the same circumstances.

17,848. (Chairman.) You refer also to ships of the mercantile marine which you suggest would be repainted at foreign ports if the use of lead were restricted?—I believe that that is what would happen.

17,849. Some time ago I mentioned that the Orient Steamship Company use no lead in the painting of their ships. The answer to my question which their witness gave was as follows: "We use no lead paint at all, with the exception of the funnels and the ventilators." I might mention that I then went through almost every part of the ship to ascertain precisely from the witness whether zinc was used exclusively except for the funnels and the ventilators. He stated in reply to Mr. Sutherland that he bought the zinc in paste form, and mixed it himself with linseed oil and driers, but no varnish. I put this last question to him, which is important: "It is very interesting to hear that on your Line of steamers you never use lead," and he said: "To my recollection lead is hardly ever used. I remember hearing about white lead when I first went to sea, and I know the trouble they used to have in keeping the paint white?"—What colour is the top sides of the Orient boats painted? If they are black, then you do not want zinc white for that. It is quite right that white lead will discolour.

17,850. They do not use it for any part of the ship. That is the point. You are probably not aware that lead has been abandoned voluntarily by many important shipowners in addition to the Orient Steamship Company, whom I have just spoken about. The

Great Eastern Railway Company have decided to abandon the use of lead in painting their ships. I understand that you wish to submit comparative tests?—Yes.

17,851. Now what are those comparative tests? When were they made?—Within the last ten days.

17,852. They are of no use to us in regard to durability?—The tests are simply as to the relative covering powers of lead and zinc under similar circumstances, and under circumstances which were made particularly favourable to zinc, with a view to seeing if it was possible to get it to cover. A set of tests was made with regard to the effect of lead and zinc as a basis for various tints, and the decorative value of paints composed of lead and pigment as compared with zinc. The paints were both brought to exactly the same consistency (*the witness produced some specimens of painting*). The upper one is lead, the lower zinc. They are all painted on the same black surface; painted black all over to begin with. In another test, the zinc was made much thicker than the lead, and in point of fact much thicker than I should ever like to put on paint. Calling the three test surfaces A, B and C, A is three coats of white lead, with the usual proportions of oil and turpentine over black; B is three coats of zinc of much stouter consistency over black; C is a fourth coat of the same. B and C are both zinc.

17,853. What is the deduction?—The difficulty you see there is this: that the low portions of the zinc-painted moulding, the portions down on the surface, catch the colour and are nearly filled up, and the prominences are stripped. Zinc has not the toughness of lead and the brush draws it away off the prominences.

17,854. (Mr. Parsonaga.) It would be better to use the same kind of moulding for both zinc and lead?—Yes, but I have given the zinc the better chance, because I have given it the pattern with the least sharp arrises.

17,855. (Mr. Sutherland.) The most open pattern?—The most open pattern. The next two, I will call these L and Z.

17,856. (Chairman.) What are your deductions from those?—They are pretty much the same. In one place the brush has removed the zinc.

17,857. (Mr. Parsonaga.) How many coats each?—Three—one, two, three. The effect is visible right through. On that there is no difference. As a painter would expect, the finishing coat is about relatively as dense as the first coat in each.

17,858. (Mr. Gardner.) The first coat was not dry when the second coat was put on?—Yes.

17,859. (Mr. Fell.) How long a time elapsed between the coats?—A couple of days.

17,860. (Mr. Parsonaga.) They would both be dry?—They were both dry.

17,861. (Mr. Sutherland.) It is zinc oxide, not lithopone?—I do not know what lithopone is. It is the zinc of commerce, and, if you want to know, it is zinc supplied in a ground paste from Messrs. ———.

(*The witness produced a card of coloured paints.*)

17,862. (Mr. Kinggate.) There is not much in this?—I believe that some of the witnesses have made a point about the relative effect of lead and zinc as a base for tints, and I made these from practically the rainbow tints lightened down with eight parts by weight of lead to each one of the others. *These* are lead, and *these* zinc. In my opinion the lead gives a softer colour. There you get the true value of the colours with a neutral. The black takes from the value and the white adds to it.

17,863. (Mr. Sutherland.) The zinc is more brilliant?—Yes, but not soft. The lead requires more staining.

17,864. For decorative purposes you want a soft colour?—Yes. *This* is a better green than *that* in my humble judgment.

17,865. (Dr. Collis.) Could you give any estimate of the amount of extra labour which, in your opinion, is entailed by painting with zinc paints rather than with lead paints?—In the actual work of painting do you mean, or in the preparation?

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17,866. I mean in painter's work, taking that of a painter only?—It is merely the labour.

17,867. It is merely the labour?—Except that another coat is necessary.

17,868. One coat extra in three—four instead of three?—Yes, four instead of three, or three coats instead of two. I think myself, as a painter, there may be more care needed in painting mouldings, but in broad surfaces I think that probably the zinc will be slightly easier to spread than lead. It will not have what a painter knows as the same "drag."

17,869. Would you consider that if zinc paints were used instead of lead paints, roughly speaking, there would be a quarter more labour to be expended in painting than there is in the use of lead paints?—Quite.

17,870. When that has been done, do you think that the surfaces will want repainting more often than they do if lead paint is used?—I believe that they would.

17,871. How much more often?—For outside work I should say at least a fourth more often.

17,872. And inside?—Well, I will give you my own experience. I think that people do not paint inside if they can help it, and probably the zinc will keep clean quite as long as the other. In the ordinary decorative work I fancy that the length of life will be very little less.

17,873. With regard to the number of times painting has to be done, we have really only the outside to consider?—Yes.

17,874. In your opinion, comparing lead paints with zinc paints, there will be a quarter as much more labour required in putting zinc paints on?—Yes.

17,875. That will call for an extra number of people, I suppose, to do it?—I expect so; that is to say, if the same amount of painting is done.

17,876. If there were 100 people employed painting with lead paint, you would require 125 to put on zinc?—Yes; if there was the same amount done, as I said before.

17,877. I am assuming the same amount?—Quite so. If you prohibit lead the chances are that zinc will not be used, but some cheaper substitute in the lower class of work. Zinc is a pure paint that we get some guarantee with. Lead is so, also. Once we get into patent paints, we do not know what we are getting, because we have not a laboratory on our premises.

17,878. We have been asking about zinc up to the present. Could you give me any information about these substitutes of which you are speaking. Will they require more labour to apply?—No; I think I could make up a paint out of barytes or out of common whiting that would spread and cover probably better than zinc.

17,879. To apply that, you think, would require no more labour, and would only require the same coats as lead?—Probably less labour than zinc.

17,880. But with regard to lead?—About the same as lead.

17,881. Would it require repainting more often?—Surely.

17,882. How much sooner would it require repainting?—Quite as soon as zinc, probably a little sooner.

17,883. You said that inside zinc will not need repainting any quicker than lead, did you not?—This stuff would certainly require repainting more frequently.

17,884. But how much more frequently?—Probably a third more, or a quarter.

17,885. The increased amount of labour would be not far off that which we put for zinc against lead?—The cheaper substitute would not have the ultimate advantage to the customer.

17,886. Because it ought to be painted more often?—Yes; because it ought to be painted more often, and the inside painting is vastly larger in amount than the outside.

17,887. With regard to substitutes, probably a quarter more labour would be right again?—Yes.

17,888. So we come to the same point—100 painters to-day and 125 in the future?—Yes.

17,889. (Mr. Sutherland.) Along with other master painters who have been before the Committee, you

have no interest in contending for the continued use of white lead, except that from your experience you know it to be the best of all basic white pigments?—I do not own a share in any white lead manufacturing company, nor have I any other interest.

17,890. Except for its toxic defects, could there in your opinion, be any possible competitor from other white pigments?—I have never seen such.

17,891. Is it your opinion that zinc paints could replace white lead for interior work without any serious inconvenience or loss, speaking broadly?—I do not understand.

17,892. More frequent painting would be a loss to the customer?—And the extra cost of using zinc would be a loss to the customer.

17,893. There are a lot of zinc paints which are not zinc oxide, and zinc paint will much more readily work than zinc oxide?—Yes.

17,894. You are quite convinced that for outside work there is no efficient substitute for white lead?—I have never seen any.

17,895. You are familiar with the trade in this country and in Scotland?—I have never worked in Scotland.

17,896. You know many Scottish employers?—I am very intimate with a large number of Scottish employers, and we have talked over this business with the absolute freedom that exists amongst painters, as you know.

17,897. Do you know that in Scotland lead poisoning is very slight, and that if you omit the Glasgow area it is almost negligible?—I am very glad to hear it.

17,898. (Chairman.) You do not know that of your own knowledge?—No, not of my own knowledge.

17,899. (Mr. Sutherland.) You know many of the leading Scottish decorators, and are familiar with the class of work they do. Many of them have appeared before this Committee, and have told us that they use nothing but white lead for their painted work, except for occasional finishing, and that they have no experience of lead poisoning. From your knowledge of the thorough way in which they conduct their business and the large nature of their transactions, can you account for this remarkable fact—that what is poisonous in England is comparatively innocuous across the border?—Well, I do know this, and I want to say it with all honesty—that the Scottish journeyman painter is a very fine type of man, and he probably knows the business as thoroughly as, or more thoroughly than, any other painter that I have come in touch with, and I think that probably this may account for it, because he is more careful. This is harking back to where I was originally. He will be more careful than the less instructed painter. Speaking generally of Scotland, that is my impression. It is only a kind of impression.

17,900. Do you think that any serious harm would be inflicted on the trade, or that the work would suffer by the prohibition of dry rubbing down?—I do not think so. I have thought this matter out, and I see nothing that we could not overcome.

17,901. If the process of dry rubbing down were prohibited, do you not think that the trade would loyally accept it, and devise some method to meet the position?—I do. So soon as you got the men convinced that a certain thing is harmful to them, I am perfectly certain that nineteen-twentieths of them would loyally carry out the regulations for their own health.

17,902. (Chairman.) Have you discussed it with them?—I have known them to do it in other matters.

17,903. But have you discussed this particular suggestion with them?—No, I have not. The twentieth man would be a crank, who would take some looking after.

17,904. (Mr. Parsonage.) It would be an employed man who would be the lunatic, not the master, surely?—A much larger proportion of the masters would be cranks.

17,905. (Chairman.) You said that if we made this illegal, the Irish, at any rate, would love to break the regulation?—That is concerning the use of lead.

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17,906. (*Dr. Collis.*) You said that if we make anything illegal, you would love to break it?—Quite right. You have me on the horns of a dilemma there. My point is this: you would have this among a number of other arrangements, all of which would commend themselves to the judgment of the men. A painter who drinks beer tells you that he believes it is for his health, and he honestly does believe it is for his health, and he thinks he is keeping lead poisoning at a distance by doing it. If you were to convince him that he was doing wrong, I do not say that he would give up the beer.

17,907. (*Mr. Sutherland.*) Dr. Legge of the Home Office, who is an authority on the subject, lays down five sources of danger. He places them in this way: (1) inhalation of dust from dry rubbing down; (2) inhalation of dust arising from mixing dry white lead; (3) inhalation of dust arising from paint drying on the clothes; (4) contamination of food; the pipe, or cigarettes—from dirty hands; (5) possibly the fumes arising from burning off paint. Of these, No. 2, that is inhalation of dust arising from the mixing of dry white lead, does not arise in our practice?—No.

17,908. No. 5 has been abandoned as a source of lead poisoning, that is, the fumes from burning off paint. No. 4—contamination of food—would be met by cleanly habits. There remain No. 3 and No. 1. If dry rubbing down is prohibited, the danger from dust is confined to No. 3—the lead dust accruing on the overalls. Under normal conditions does much paint get on the overalls?—No.

17,909. Is not the dust which gets on the overalls the dust arising from stripping, distempering, the handling of scaffolding, and the numerous other processes in a painter's daily work, and not painting?—I think I would undertake to eat all the dust that came off a man's overalls. If we have no green distemper, or an old flock paper in which the flock has been dyed with an arsenical pigment, the danger would be less. I look to that as the greatest danger.

17,910. Have you ever tried to get a spot of paint off the floor of a room when once it has dried? Is it easy to do?—You would take away the surface of the wood underneath in many cases before you got the spot out.

17,911. If paint spots dry on the overalls, would they, in your opinion, come off in the shape of dust?—Do you mean, supposing a man starts with clean overalls on Monday, and that he gets those overalls spotted with paint, would it come off in the shape of dust during that week?

17,912. Yes?—I hardly think it possible. The spot will be a very small one.

17,913. (*Mr. Parsonage.*) It would crack when the overall was folded?—You could not fold the spot.

17,914. (*Mr. Sutherland.*) Therefore, bearing in mind Dr. Legge's statement that lead poisoning cannot come through the skin, can you tell the Committee how the washing of these overalls can be a source of danger to those who wash them, or to the home where they are washed?—What exactly is the process of washing? Does not the wife put the thing down on Saturday night to boil with soda, and get rid of it all in that way in a liquid form? I do not think that it could come off as dust.

17,915. Dr. Legge says that lead poisoning cannot come from absorption through the skin?—I am very glad to hear that.

17,916. You attach great importance to the educational value accruing to the trade (to both employers and employed), from the promulgation of regulations, the insistence on their observance, and the labelling of all lead compounds as dangerous?—I do. I am very keen upon the labelling, because we have been going on in gross ignorance with regard to chromes, for instance.

17,917. And greens?—And greens. I have taken up a lump of chrome myself, and carefully shredded it off with a palette knife before putting the turpentine to it.

17,918. But in drafting regulations—if regulations be adopted—they should, so far as is compatible with their avowed purpose, conform to the established

usages of the trade?—As far as possible. My experience of painters is, that they are the most conservative animals on the face of the earth. They hate changes, and consequently you must make the changes as little different as possible from their general practice.

17,919. So far as is compatible?—Yes.

17,920. Do you not think that the providing of overalls by the employers is an unnecessary departure from the established practice of the trade, and an unworkable one?—I think I have said to the chairman all I want to say on that. The difficulties are great, and I do not know that such a regulation would be taken very kindly to.

17,921. I was going to ask that. Do you not think that the great bulk of the men would resent having to wear overalls which were common property to all and sundry?—I do.

17,922. (*Chairman.*) Why do you say that?—I would not like to put on another man's clothes.

17,923. But have you consulted the men at all?—Mr. Sutherland asked my opinion, and that is it.

17,924. (*Mr. Sutherland.*) Would not all sorts of inconvenience arise from the employer having to provide overalls, and does their provision by the workman impose any hardship upon him financially or otherwise?—Well, it must impose a financial charge upon him.

17,925. I said a hardship?—I do not think it is a hardship, and I will tell you my reason for saying that. The painting trade, as far as I know it, differs from almost all other trades in that the employer supplies all the tools which the man uses, and they only ask him to supply his own overalls—his own personal wear.

17,926. In any regulations which may be framed you would put compulsion on the householder (the customer), as well as on the employer of the workman, to give him conveniences?—Indeed I would. It would strengthen our hands immensely.

17,927. This would contribute to simplifying the provision of hot water?—Yes.

17,928. And separate rooms for meals, would it not?—Yes.

17,929. The other provision of nail brushes and soap and towels would readily be complied with by the employers?—It would.

17,930. Do you see any difficulty in a medical examination at stated intervals, quarterly or bi-monthly?—No difficulty from the employer's point of view. Whether the men would consider that at all as an interference I do not know. I have not consulted them, and therefore, having regard to what the chairman said, I would be sorry to give an opinion. I think that they would probably soon overcome the difficulty and get used to it.

17,931. Arising from that, would there be any practical difficulty in putting a man, certified to be showing symptoms of lead poisoning, to other work such as washing off, stripping, distempering, rubbing down with pumice-stone and water, &c., until he was certified clean?—There would be difficulty, but not difficulty that could not be overcome if the master set himself to do it. It would need a little arrangement.

17,932. (*Mr. Parsonage.*) Might I interpolate one question here? There would be special difficulties in Dublin with regard to that?—Why?

17,933. It may not apply to your shop, but there is a society of labourers called the Whiteners' Society, who advertise to do this kind of work at the rate of 5*d.* per hour in Dublin. It would mean placing these men out of the ranks of the painters into the ranks of the Whiteners. You know we have continual trouble with them, but not with you?—May I take the opportunity of, to a certain extent, correcting you with regard to that, because the history of this Whiteners' Society in Dublin, is an extremely interesting one. These men were not labourers, they were the old paper-stainers, and with the advent of machine-made papers, the paper-staining business has practically gone from Dublin; from their experience as paper-stainers they were expert colourers, and expert in the use of whitening with a size medium. It is the remains of these men who have come down to us from the last 30 years or so that are the whiteners of to-day. What I have to

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say with regard to them is, that they are a vanishing body, and I am sorry to say it, because they were exceedingly useful in their own way, but they never did to any large extent the preparation which Mr. Sutherland speaks of now, as far as I know. I never allowed them to do any punicing. Sometimes they stripped walls; they sometimes washed off ceilings, but when I tell you that I have 2 whiteners to 50 painters, you will see that they do not interfere much with the painters' work. But the effect of this would be the other way up. It would kill the Whiteners' Society rather than drive the painter downwards, because he still would be receiving his full wages.

17,934. (Mr. Sutherland.) This suggestion would be a valuable check on the development of the symptoms of lead poisoning, would it not?—Yes, invaluable.

17,935. The compensation you mentioned in your proof to be given to a man who is compelled to give up his work from lead poisoning, exists now under the Compensation Act, does it not? Or is your suggestion to compensate him before he is liable under the existing Act? If so, would not that open the door to malingering?—What I suggest is, that when a doctor certifies a man to have been repeatedly, so to speak, on the verge of being incapacitated through lead poisoning—

17,936. (Chairman.) I do not quite understand what you mean by "repeatedly on the verge"?—There are some men, and not only men but families, who ought never to have been painters, because they seem to have a marvellous facility for lead poisoning.

17,937. Because they are more susceptible than others?—Because they are more susceptible than others. If we have a man of that type, the circumstances may be such that he ceases to be useful as a painter. What I hold is this—that it is not enough to give that man his half wages for a certain number of weeks, five or six weeks or whatever it may be, when he is actually suffering from lead poisoning. It is much better to deal with him in a fair and reasonable way, and give him a lump sum down to start him in some other business. That is the idea that I had at the back of my mind.

17,938. (Mr. Sutherland.) Does that assume total incapacity, because in that case he is covered under the Compensation Act?—No; he does not get the compensation. While he is incapacitated he gets it. After he is certified sound, you send him out to get incapacitated again and again. Looking at it from a merely mercenary point of view, it is much cheaper as well as being more humanitarian, to give him another chance of something else, rather than have him tied to this thing, which means tying him to sickness.

17,939. Are you familiar with the Scotch system of dividing the day into three periods of 3 hours each with a break of an hour between each for breakfast and dinner?—I know that is so.

17,940. Do you think that this may explain or contribute to their comparative immunity from the evil of lead poisoning?—I think that on the whole the well nourished man is much less likely to contract lead poisoning.

17,941. You think that the additional time of rest between is very valuable?—Very valuable.

17,942. (Mr. Parsonage.) If he puts it to the best use?—Yes; I cannot go further than that.

17,943. (Mr. Sutherland.) Do you know that the great storm centres in this country are London and Lancashire, and that outside these areas (excepting Birmingham) the cases do not present any grave problem?—I have heard that.

17,944. Does not this postulate a combination of conditions in these areas which is provocative of the evil?—I am afraid there is something in that; there must be. There is no reason why Birmingham, for instance, should be comparatively immune if Manchester is not.

17,945. But Birmingham and Manchester are both bad. Is it not a baffling question to determine that, whilst in Edinburgh, where the amount of lead used per painter is quite the equal of Glasgow, there is, according to Dr. Legge, practically no lead poisoning. In five years, in Glasgow, there are 12 reported cases?—I cannot account for it.

17,946. Then you agree that it is a baffling question to determine?—Yes.

17,947. Knowing both cities and the firms there, you would not say that they do less sand-papery in Edinburgh than they do in Glasgow?—No, I do not think they do.

17,948. (Chairman.) Do you know yourself?—I do not know myself; I have never asked.

17,949. Have you come to speak with very intimate knowledge of Scotch painting?—I have never worked in Glasgow and I mentioned that my intimate knowledge was simply due to my acquaintance with men in the trade, and I do not know of any serious differences in the practice.

17,950. (Mr. Sutherland.) Why should dry rubbing down be so innocent in Edinburgh and generally in Scotland and so hurtful in London and Lancashire? Can you form an opinion on that?—I cannot.

17,951. Have you had any experience of painting with zinc white outside?—Yes.

17,952. Do you know how it compares in cost with paint made on a white-lead base—I mean with regard to the cost of the paint as well as the cost of painting?—I cannot give figures.

17,953. A witness from Vienna, who claims to be the largest contractor for bridges and outside iron structures on the Continent, told the Committee that it is his practice to give a six years' guarantee to his lead-painted work, but that he makes it a practice to decline all guarantees for painting done with zinc oxide when he has to do it. Is not that a tremendous tribute to the value of white lead over zinc oxide?—I think he is a wise man.

17,954. Do you know anything of the report of the Commission appointed by the Dutch Government, whose investigations and experiments extended over seven years?—I have not looked carefully through it. I have glanced at it.

17,955. Taken altogether, this is the most complete and exhaustive experiment of the comparative values of lead and zinc paints of which we have records. Let me read you their final conclusions premising two things: first, that they state that for interior work zinc oxide and zinc white paints (lithopone) can be used equally well; second, that the Dutch painter is familiar with the use of zinc paints, and uses them daily. I have conceded the point as to interior work. As to outside painting, the Dutch Commission say, "zinc white paints applied on wood, if not exposed much to the action of vapours containing sulphurous acid, will in many cases during five years remain in an equally good condition in the open air as white lead paints, and can replace the latter with good results." Now you see there are important qualifications. "But in all places where accumulations of water remain during a long time, such as on window sills, the lower side of cornice work, &c." (and this, I submit bears out your experiment) "they will even after three or four years deteriorate in the course of a short period to such a degree that repainting will become necessary for the preservation of the wood. In this respect, therefore, they are inferior to white lead paints." That bears out your experiment that, on arries and the edges of wood frames and sills, zinc white does not cover as well as white lead. Now, viewing this report from an impartial standpoint, is it not a justification for white lead for outside work and a weak defence for zinc oxide for the same purpose?—From your reading of it, the only thing that I would take exception to in the report is the life that they give to zinc. I do not think it is five years, so that it is probably quite as strong a defence for zinc as they could make.

17,956. The report clearly indicates greater expense in that, according to the Commission, zinc oxide paint costs more to prepare for repainting, and it may have to be repainted more frequently. Are not these important facts, and should they not have weight with this Committee in determining its action?—That is a very important point about the preparation of work which has been treated with zinc for subsequent painting.

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[Continued.]

17,957. (*Chairman.*) Have you studied very carefully this Duteli report?—No.

17,958. Then are you qualified to speak upon the various conclusions of it?—Taking the portions read to me, standing by themselves, undoubtedly they are important facts.

17,959. (*Mr. Sutherland.*) You are qualified to form an opinion, as a master painter of long experience, on what I have put before you. If the facts are, as expressed in the report, do you agree?—Well, if they are facts, I have got to agree with them.

17,960. Have you ever thought of the difficulty which the abolition of white lead will create in standardising white paint?—This is not a fanciful objection, is it?—I have thought of that, and thought very seriously of it. You are aware that the Institute strove to standardise paints other than white lead some few years ago, but their effort was quite a failure.

17,961. An architect to-day can and does specify, and it is the formula of the R.I.B.A.; "genuine white lead," "best Baltic linseed oil," and "pure American turpentine," as the basis of the paint to be used, and he knows that if the specification is followed he gets the best possible white or light paint for general use. He can check it too. Abolish white lead, what can he specify as a standard paint to take its place?—I do not know.

17,962. It would leave the door open for a great deal of trouble?—Immense.

17,963. (*Chairman.*) But, supposing that the master painters had two years' interval before lead was prohibited, they would begin to arrange their formula?—It is possible, but judging by some eight or ten years that we have been anxiously seeking for standardisation, I doubt if the results would be very good.

17,964. (*Mr. Sutherland.*) White lead, though a small item in the volume of our national trade, has a preservative office to property and structures of all kinds out of all proportion to its monetary value. Is it a thing to be lightly set aside without first finding a satisfactory substitute?—I think that one, probably the greatest advantage in what the Chairman pointed out as likely to result from regulations, is the trying of these other paints. That would be absolutely necessary before you could prohibit white lead.

17,965. But what do you say to two years' test? You could not go on for two years?—It would be absolutely useless.

(*Chairman.*) It might go on *ad infinitum*. Supposing the Committee resolved to give trials (some of the witnesses have said 10 years) and if they did not succeed, then you might have another 10 years' trial, and so on.

17,966. (*Mr. Sutherland.*) You do not know, of your knowledge, any satisfactory substitute for white lead for outside purposes?—No, I do not think there is any, as a basis for white paint.

17,967. You, therefore, are of opinion that, before proceedings of so drastic a nature as prohibiting white lead are adopted, a trial should be given to regulations?—I think, from the reasons I have mentioned, on account of our insular position and on account of the quantity of salt there is round our coast, we ought to be the last and not the first to prohibit white lead.

17,968. You know that this is the opinion of the National Association of Master Painters, passed at the Derby Convention?—I was not at the meeting, but I was at the meeting succeeding, where the minutes of that session were read.

17,969. Now, as to cost. Whether regulations or prohibition be adopted, it means an inspectorate, does it not?—Certainly, I believe so. I think I told the Chairman that I do not know of any other way if you have prohibition.

17,970. Therefore, the cost would be the same in either case; whether you have regulations or abolition of lead. I will put it that a large cost would be involved in either case?—I think you must have regulations in any case, because you must do something. If you are fighting the dust question you must have regulations to deal with it. It would be much more

difficult for an inspector to satisfy himself that there is no white lead being used than it will to satisfy himself that regulations with regard to the use of white lead are being enforced.

17,971. Do you know that medical and scientific witnesses have demonstrated to this Committee that all paints give off a substance which they term aldehyde?—No, I cannot say that I know that of my own knowledge.

17,972. Which may account for some of the effects hitherto attributed to lead?—I know this of my own knowledge—I do not know whether it all bears on it, but if the Committee like I will tell them—that 30 years ago we had the idea that painters' colic was the result of flating largely; that is to say, putting on the final coat which is composed mainly of turpentine, but we found that a turpentine varnish was almost as potent, if it was put on in large quantities, in producing painter's colic.

17,973. Spirit varnish?—Yes. Then we were told by the doctors at the time that, what really took place, was that the turpentine irritated the mucous membrane and produced colic.

17,974. Do you know that the War Office and the Admiralty are the largest consumers of white and red lead in this country?—I should think it is very likely; I do not know of my own knowledge.

17,975. (*Mr. Fell.*) Have you had anything to do with carriage or coach painting?—No.

17,976. In your opinion, is there any difficulty in using zinc white where the paint is varnished?—Let me see if I understand.

17,977. Take, for instance, a tramcar which is frequently varnished; do you see any difficulty in using non-poisonous paint such as zinc white?—You see, my difficulty is that I have no practical experience of that, and I do not want to say anything more than I really know.

17,978. (*Mr. Parsonage.*) The painters in Dublin take their breakfast before they start work in the morning?—Yes.

17,979. And yet you agree with Mr. Sutherland that it is better to have the Scotch system where they work three hours before breakfast, as he stated?—I do not say so. He asked me that, and the answer I gave him was that a well-nourished painter was less susceptible to lead poisoning than one who was not so well-nourished; and my great reason for advocating, as I did 11 years ago, breakfast the first thing, was that it gave the man an opportunity of getting a comfortable meal at home altogether free from the possibilities of lead, and one of the danger points would be removed.

17,980. There is far less lead poisoning in Edinburgh than there is in Dublin. The painter in Edinburgh works for three hours before breakfast, but the painter in Dublin starts after he has had a meal. Doctors recommend now that a painter should not work on an empty stomach?—Then I am very glad that I am on the side of the angels.

17,981. You were speaking about the number of incapable men. You put it at 8 per cent.?—8 per cent. is the highest I would put it at.

17,982. You estimate the number of painters in Dublin at about 800?—Yes.

17,983. You know that there are two societies in Dublin?—I know there are two societies, and two branches of one society.

17,984. Two branches of the National Society, and there is the local society?—Yes.

17,985. You could not form any idea as to what society these incapable men belong to?—No.

17,986. Your work generally is above the average of the ordinary work in Dublin?—I think I can honestly say it is.

17,987. I should say it is?—But though an Irishman, I do not want to blow my own trumpet.

17,988. You have not very much knowledge of lead poisoning?—The only case within the last 10 years was that of a member of your Society, I think.

17,989. Yes?—That is an exceedingly curious case. If the Committee would like I will tell them about it.



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[Continued.]

17,990. I could give some very curious ones at the same time. We have had six deaths in Dublin from lead poisoning since 1907. I will not be positive as to the date 1907. We have paid out in six cases of total disablement and blindness from lead poisoning?—Yes; I know that.

17,991. I daresay you know some of the men?—I daresay I know most of the cases. One man has been totally disabled. He is only 80 years of age. He said it was lead poisoning. Most people said it was senile decay. He was a full grown man when I was a boy.

17,992. In Dublin?—Yes.

17,993. At the present time there is a man lying totally paralysed at the hospital in Dublin from lead poisoning. He has been examined by three of the best doctors in Dublin. They have all certified him as suffering from lead poisoning. He is totally paralysed. I have a case now in my annual report of a man 40 years of age certified as dying from lead poisoning. The cases of death vary from 23 years of age up to 46. We have some totally blind from lead poisoning?—In the totally blind cases that you speak of, unfortunately they allowed the time to pass; several doctors are prepared to certify that it has no more to do with lead poisoning than with the colour of the carpet, and it is a case of the act of God.

17,994. We do not pay our money away unless we get the best medical evidence?—I am merely telling you that of my own knowledge.

17,995. I should not take your shop, as a fair criterion of the ordinary risks of a painter?—Possibly not.

17,996. I should not. I should have preferred to have seen two others who I know have cases, at the present time, of lead poisoning, and frequent cases. Dublin is rather a bad place for lead poisoning. I will leave that. Now with regard to the use of zinc and lead, if lead was prohibited, the painter could use zinc paint just as easily as he could lead?—No doubt.

17,997. You agree with that?—Certainly.

17,998. He would not require any special training?—Oh, dear no.

17,999. I entirely agree with you, but a good many witnesses have stated the reverse?—Well, I am very much surprised if they say that a good painter could not use zinc.

18,000. Now with regard to the question of dry rubbing down, you say in your statement that it can be dispensed with?—I believe it can.

18,001. Dry rubbing down between coats?—Certainly.

18,002. Then you would not rub down at all?—I would.

18,003. Would you rub down wet?—There is nothing in the world to hinder them from sponging the surface and then rubbing down with waterproof sand-paper.

18,004. Is there a waterproof sand-paper on the market?—It can easily be made.

18,005. Just as easily as a substitute for lead?—By no means.

18,006. They have been 30 years trying and have never produced a waterproof sand-paper yet?—They should try.

(Mr. Parsonage.) They have tried and they say that they cannot produce it.

18,007. (Chairman.) Then your acquiescence in the abolition of dry rubbing down depends on finding a waterproof sand-paper?—No, because there are many other ways of doing it. It does not depend on that. I think that the danger of dry rubbing down between the coats has been enormously exaggerated. My experience is that dry rubbing down between the coats is only resorted to to take off the sort of nib that is left on by the brush mark. It is done when the paint has a considerable amount of oil in it, and most of the stuff that comes off comes off on the face of the sand-paper itself. That is my experience, but I am not going to the stake for it.

18,008. (Mr. Parsonage.) With regard to inspectors, how would you go on with a job that only lasted a day? A man might be at half-a-dozen jobs in a week?—A

painter will not do very much dry rubbing down, pouncing, and three-coat work in a day.

18,009. I am not speaking of dry rubbing down. What sort of a job would it be that would only last a day?—I want to understand the question.

18,010. They may have a shop to do in a day and night?—Then it would all be distempored and no lead would be used at all.

18,011. Yes. Hundreds of jobs are done between Good Friday and Easter Tuesday, flattening ceilings and painting and all that?—If you have a hurried job of that kind, you will do precious little preparation.

18,012. (Mr. Sutherland.) Very little rubbing off?—Very little rubbing off.

18,013. (Mr. Parsonage.) I am referring to the notification of the jobs?—My theory is that all you would need to do in a case of that kind would be to give the notification that the job commences at such and such time and will probably end at such and such a time. You or I would know when the danger was likely to come of infringement, and we would make it our business to drop in without advertising when we were coming.

18,014. (Mr. Gardner.) The only thing that the inspector would do would be to see that there was no dry rubbing down done. It would be hardly worth while providing a staff of inspectors just for that?—He would have a good deal more than that to do. He would have to see about the provision of a separate place for paint to be stored and mixed and a separate place for the meals to be eaten in. He would have to see that there was provision made of water for washing. He would have to see that there was (a thing which I know is a very great difficulty with painters) proper lavatory accommodation. One customer of mine (only one) will not allow our painters to use the servants' closet, and the men have to go a quarter of a mile to the public-house for the call of nature. I consider that cruel. One of the dangers that we suffer from, which you know as well as I do, is the danger of constipation.

18,015. If you are of opinion that lavatory accommodation should be provided, soap and hot water, towels, and so on, and are also alive to the dangers of lead poisoning, can you tell us why the master painters have never made any effort to get these things put into force?—There is no difficulty about soap or towels in my shop.

18,016. (Chairman.) For instance, how do you know whether your men get hot water?—I have frequently dropped in on them at lunch time, and I have always seen them washing their hands with hot water. I cannot go further than that.

18,017. (Chairman.) Do you think that that is regularly supplied to them?—I think they take care of that themselves.

18,018. You think; you do not know?—I am judging by the experience I have had. I want to make it clear that our effort with regard to lead poisoning, it would seem now, has been altogether directed to a wrong point, but although it has been directed to the wrong thing it probably has attained some at least of the objects. We were altogether proceeding on the assumption that the danger arose from absorption, and that consequently specially clean hands were the things to be aimed at. Of course, the clean hands were a good thing anyhow. Whereas when I was serving my time we had two bad cases of dropped wrist in our shop, I have not seen a case since.

18,019. (Mr. Gardner.) You are speaking only of your own shop; but speaking of the trade in Dublin, and Ireland generally, the employers have made no provision whatever in the past for facilities for hot water, for instance?—They have not boiled the kettle, but they knew that the kettle was boiled.

18,020. But they have made no provision?—No.

18,021. Now, where do all the unskilled, careless and dirty painters you spoke of come from. Do you consider that these are all men who have served their time?—No. I know that a great majority of them have not served their time.

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[Continued.]

18,022. Then who is responsible for the introduction of these men into the trade?—Not the masters.

18,023. Is it the men? The men do not bring these men into the trade?—Yes, they do.

18,024. How do the men bring these unskilled men into the trade?—Simply in this way: when there is any chance of labour trouble affecting a particular branch, there is an effort made to get all and sundry into the society, so that the society may speak with a stronger voice.

18,025. Yes, but in that case your answer admits that these men are already working at the trade?—Certainly, but every man who handles a brush is not a painter. The first brush that some of them handle is a broom as a scavenger.

18,026. I take it from your evidence that you would be inclined to prohibit adults entering the trade who had not served a previous apprenticeship?—Yes.

18,027. You told us that a painter is a very conservative animal. Does that not tend towards his present adhesion to the use of red lead and white lead in many cases? Does he not make it a sort of fetish and think that he cannot do away with lead without trying to find anything else in its place?—It is up against the master to find a substitute, and not the painter, who uses what he is given.

18,028. I take it that the master is just as conservative as the man, and possibly more so?—I agree.

18,029. You spoke about red lead drying under water, what do you mean by drying under water?—You are a practical painter, and you have often had the gutters round a house to paint?

18,030. Yes?—You just simply stop the water out of it. You put on your red lead; the water comes back. You come back the next day and the red lead is hard.

18,031. Does not that apply to other materials?—No. Your white lead will float off, or most of it.

18,032. It all depends on the medium which it is mixed with?—I only know of one medium.

18,033. You have tried zinc on outside work. Was it a failure?—Comparatively.

18,034. What did you make it up with?—With raw and boiled oil.

18,035. Ordinary boiled oil?—Yes.

18,036. Have you ever tried pale boiled oil?—Yes.

18,037. How did it work?—I have not used it with zinc outside, but I have inside.

18,038. You used zinc as you would use lead?—Precisely.

18,039. Would it not have been better to have given it particular treatment?—I do not know what you mean by particular treatment exactly.

18,040. What suits one material will not suit another material. Did it never strike you that you might try to do the work by using the material in another form from that in which you would use it with white lead in order to do justice to the material?—No, because from the fault the material had, it did not promise any better result with a change of vehicle.

18,041. But you have not tried it?—No, but a painter would naturally see. For instance, how, except by the introduction of the gum, that is to say, the making of a varnish, can you get rid of the chalk which I complain of in zinc?

18,042. White lead chalks too?—Yes, but in a much longer period.

18,043. Under certain circumstances?—Under all circumstances.

18,044. With regard to red lead, do you think it is the only protection for ironwork?—I think it is the best protection for ironwork.

18,045. The engineer of the Commissioners of Irish Lights thinks that white lead is quite as good a protection?—He does, apparently.

18,046. Why is red lead such an efficient protection of ironwork?—I cannot tell you that.

18,047. You can tell us why white lead is an efficient protection for woodwork or work exposed to outside influences?—Can I tell you?

18,048. You know the generally accepted statement that white lead and oil saponify?—Precisely.

18,049. But red lead and oil do not saponify?—No. I do not use it as a finish in any case.

18,050. You use it as a protection?—Yes, for the rust underneath.

18,051. If the red lead is an effective protection against rust, where does the rust come from?—You might as well ask me why we die when we come to 80 years of age. The life of the thing is gone.

18,052. But one substance would do as well as another?—No. You may shorten your life.

18,053. You spoke about work rubbed down with pumice-stone being scratched and torn?—Yes.

18,054. Is that your experience?—Yes. You will not get the same smooth surface. You and I would detect the difference.

18,055. But it will not be much scratched or torn?—I do not say that the man in the street would tell the difference, but you or I would tell the difference.

18,056. You have to recollect that other people are going to read your evidence?—I am very much obliged to you for helping me to make it clear.

18,057. Now, outside work is not all painted with white lead or a white lead base. How is it that projections on outside work painted with other colours stand so well against the weather if zinc will not?—I can only speak of my own knowledge. I know of exceedingly little outside painting that is not on a white lead base.

18,058. Dark paint?—If painting with dark paint, it is my practice to give a coat of lead colour first.

18,059. But take a one-coat job?—I do not take one-coat jobs.

18,060. I wish that all painters were in the happy position that they could refuse to take one-coat jobs, but unfortunately they cannot. They have to take them too often?—It would be to the advantage of the customer if they did not.

18,061. Why do you think that it is more costly to prepare a zinc painted surface for repainting than a white lead painted surface?—Did I say that?

(Mr. Sutherland.) That was a question I put to you on the evidence of Mr. Nooijen.

18,062. (Mr. Gardner.) You admitted that it was so, and I want to know why?—I did not intend to make my evidence amount to that. It would be the merest guesswork.

18,063. (Mr. Sutherland.) I do not think you did give a reason?—I can well imagine a reason for it, but I do not know one.

18,064. (Mr. Gardner.) I should not have put the question unless something had been said to make me ask the question. It was simply guesswork to say that it would be more costly?—Mr. Sutherland stated what the Dutch people said, but I neither assented nor dissented from it. If you ask my opinion, I think it is exceedingly likely, but I have no knowledge.

18,065. (Mr. Sutherland.) I read from the Dutch report, and you assented to the question which I put?—If it is in the form of enamel, you can easily understand how you will have considerably more trouble.

18,066. (Mr. Gardner.) I am not speaking of enamel paints. We all know that a varnish paint is much harder to grind down?—Yes.

18,067. (Chairman.) You have stated that in your view regulations would be preferable to prohibition of lead?—Yes, I think it would be the wiser.

18,068. But I take it you mean by that that the regulations should be thoroughly and continuously enforced?—And on all users of paint. I want to make that very clear—and I mean the man who paints a house for himself as well.

18,069. You have told us that there should be at least four inspectors for the population of Dublin, and anything less than that you would not think sufficient?—My evidence was that four would be enough.

18,070. You would not think that half would be sufficient?—I think that that number would do it in a very perfunctory way. When the thing is fresh and new, until you have educated the men, I think you want to follow them fairly closely.

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[Continued.]

18,071. You still maintain that to follow them fairly closely, and to have very efficient inspection, you would require four inspectors in Dublin?—Yes.

18,072. You made an observation in connection with susceptible cases. Do you mean that, if a man has had lead poisoning, he should not be allowed to again be employed in the work. You said after one case, did you not?—No, I mean after repeated cases.

18,073. What do you mean by that?—Some men get it time after time. Other men get it only once, and then are more likely to be careful.

18,074. They say that some workmen are more susceptible?—Yes.

18,075. It is not a case of how often, but of susceptibility?—Yes.

18,076. You made what I thought a very good suggestion—that in the case of these susceptible people, they should receive a lump sum sufficient to enable them to start in some other business?—Yes.

18,077. How many times should they be afflicted with the disease before they became qualified?—I would say anything over three times.

18,078. For how long do you think they should have suffered before they became entitled?—I cannot go into the duration. I would say a well-marked case.

18,079. However slight?—Yes.

18,080. (Mr. Sutherland.) However slight! Do you mean that?—A case that would involve compensation, if it was repeated, would point to the man being susceptible.

18,081. (Chairman.) Would you go so far as to say that any man who was not actually suffering from lead poisoning, but who the certifying surgeon thought was on the verge of it, should be taken away from the employment before the actual poisoning took place, and under those circumstances should receive compensation from the employer?—No. I think that his case would be met by giving him the other employments that were suggested till the certifying surgeon could be satisfied that he was clear.

18,082. Would you, as a large employer, make that a *sine qua non*? Would you make it a condition of being allowed to use lead?—Yes.

18,083. If a man was on the verge of becoming poisoned, he should be taken from that work and given work in surroundings that were not dangerous?—Yes.

18,084. At equal wages?—Yes; you cannot do otherwise. He is still a member of the society, and the society will take care that you do not cut him down, or if they do not they are of very little use, and not what I think they are.

18,085. You would agree that that should be one of the new rules?—Yes.

18,086. You spoke of the insular position of England?—I was speaking more of my own island, but it applies to Scotland even more.

18,087. You said that owing to our insular position you think that we should be the last country in the world to prohibit lead, and not the first?—Yes.

18,088. Do not you know that we have always led the van in regard to the social amelioration of our own

workpeople?—I do not think so. I think we have only taken up the Insurance Act after Germany.

18,089. That is the case, but in other instances we have always been proud of being the first in the field, not the last?—Yes, but if we are the people to take it up last we should be satisfied of its efficacy elsewhere. If we are the people to whom it would be the most ruinous to adopt, I think we ought to have the evidence of other countries that the adoption of it is a success.

18,090. If I may say so, you have given very humane and kindly consideration to this question before us. Would you go so far as to say that if we cannot get the other employers to agree to a rule such as you have suggested, including this very efficient inspection, or supposing that that very efficient inspection was impracticable from a financial point of view, you would then think that this Committee should, from the humane side of the question, decide to prohibit the use of lead in the industry?—I cannot see how you are going to prohibit any cheaper than you are going to regulate. You mention the "financial point of view." If you dispose of the financial question, I do not think that there is any point in it.

18,091. If any of your suggestions prove to be impracticable, would you suggest that we should recommend prohibition of lead, or that the men should go on suffering as they do to-day?—I would put it in this way: that the regulations should be given a fair trial.

18,092. I am supposing that the regulations and the very efficient inspection which you have foreshadowed are not workable?—But from what point of view, except that of cost?

18,093. I am assuming that it is not practicable?—If regulation is not practicable, then prohibition is not practicable.

18,094. But you are assuming that you want regulation even with prohibition?—You do.

18,095. Supposing that we thought that we could have prohibition with every safety to the worker without regulations, but that regulations for the protection of the workers in the ordinary working of the trade were impracticable, then would you agree to prohibition, rather than that men should go on suffering?—I am afraid it is too hypothetical a question. I cannot conceive how it can be carried out, but supposing we had the millennium, then we might prohibit lead.

18,096. What do you mean by millennium?—When everybody will do what he ought to do.

18,097. That does not answer the question?—I cannot; I should be very glad if I could.

18,098. It comes to this, if we cannot frame a set of rules on the basis of your suggestion this morning —?—Or some others.

18,099. Yes, or others—and if we cannot concurrently feel quite confident that they can be enforced by very efficient inspection, then I ask you whether you would agree to prohibition, or would you say that the thing must drift on as it is now?—I am a great deal more interested in the painter than I am in the public, and I would say, do anything you can that will safeguard the painter and let the public go. That is what it comes to.

The witness withdrew.

Mr. GEORGE PLUMB.

Evidence to 18,112 handed in and taken as read; witness then called and examined.

18,100. I am foreman of the painting and decorative department of Messrs. George Trollope, of Belgrave Works, 77, Grosvenor Road, Pimlico, S.W. I have had 44 years' experience as a house painter, and have been nine years in my present position, where I control a large number of men, varying seasonally from 150 to 350. I can claim to have had the widest possible practical experience in all kinds of paint and all kinds of painting.

18,101. I have no doubt as to the all-round superiority of white lead to any other kind of pigment for house-painting purposes, for use both for the outside and for the inside. Where a very superfine

finish and delicacy is required, and money is no object, zinc white may be used in place of white lead, at any rate, in the interior, but even then it is my practice to mix a considerable proportion of white lead with the zinc white. For similar reasons, and under similar circumstances, zinc white with an enamel finish may also be used. Apart from such considerations, no practical man can doubt the superiority of white lead over zinc white in point of (1) efficiency and (2) durability.

18,102. As to efficiency, it is well known that, although by reason of its greater volume zinc white has a greater "spreading" power, yet, because it has

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[Continued.]

to be mixed with larger quantities of linseed oil, its true "covering" power, *i.e.*, power to render opaque, is notably less. As to durability, zinc white does not "petrify" as it dries as does white lead; that is to say, zinc white continues to oxidise or burn, and speedily scales and is worn away. White lead as it dries forms a hard sort of glaze and resists rain and weather. I estimate that zinc white will at the outside last some two years, while white lead will be good for eight. These two factors of greater durability and efficiency, of course, mean that, even apart from the greater cost of zinc white paint, white lead is the more economical pigment, especially by reason of the greater amount of labour required for zinc white, labour being by far the greatest factor in the cost of painting. The element of cost becomes, of course, the greatest factor in the maintenance and redecoration of property.

18,103. I have had to do with the painting of iron, for which purpose there is really nothing, which can generally supersede red lead. To some extent the coal tar bituminous paints can take the place of red lead, but never where other than black paint is required.

18,104. I am accustomed to the painting of ships, such as the "Lusitania," and materials for ships, and here, also, am convinced of the superiority of white lead. I am accustomed to use zinc white paint for special decorative finish in special parts of ships, when I use either a top coat of zinc white mixed with white lead, or an enamel with zinc white.

18,105. I see no sense in the suggested use of zinc white with a five or six per cent. mixture of white lead; this would add nothing to the good qualities of white lead to so large a proportion of zinc white, and it would increase the painter's danger because he would think that he was working with zinc white only, which has for many the reputation of being harmless. I do not myself agree as to the harmlessness of zinc white, as I think just as much dust is caused with it as with white lead, and breathing of metal dust of any kind must be harmful.

18,106. I do not think that the dangers of dry rubbing down or burning off are so great as supposed. It is only on the highest class work that there is any quantity of lead dust. Nevertheless, I see no strong objection to the prohibition of dry rubbing down. In certain classes of work, however, rubbing down with water is not always practicable to the extent required, as it would cause the work to swell and push off the new paint in drying out. Whether done with water or oil, it has, in my opinion, the tendency to soften the painter's skin and promote absorption of lead. The amount of burning off done is also much exaggerated; it is an advantage in most cases to retain the old painted surfaces, except where they are cracked, blistered, or perished, or the mouldings and enrichments have been choked up. In any case, I consider that the dangers of burning off are slight, as it is mostly done out of doors. The stripping of old paint by a spirit solvent is dirty and unpleasant, and there is much evaporation. An alkali stripper is also dirty and creates a danger of absorption by the hands.

18,107. I have no doubt of the real gravity of lead poisoning, or of the considerable number of cases of lead poisoning, but I am convinced that they have come into greater prominence of late on account of the Workmen's Compensation Act, as before that Act there were a great number of cases of colic and indigestion of which no notice was taken; there is now an obvious incentive to get these grouped with other more serious cases of lead poisoning. In my opinion, the great necessity is the greater personal cleanliness of the painter. This has improved to my knowledge in late years, and will increase as education increases. The great thing is that the painter should really be aware of the danger of white lead.

18,108. I should approve of medical inspection, and of some machinery by which those who have a special tendency to lead poisoning might be excluded from the occupation, and I should, therefore, approve of some system of registration.

18,109. So long as all were equally obliged, I should approve of masters being compelled to supply washing

materials, as is already done by all large firms, although it would add somewhat to the cost. In regard to the provision of blouses and overalls, I would point out that even at the present time it is only the inferior class of workman that does not wear blouses and aprons or overalls of their own will and at their own cost.

18,110. Whatever regulations are suggested, they should be such as would have the support of the painters themselves, and should be compulsory upon masters and workmen alike. They should also, so far as necessary, be compulsory on the occupier of the house painted, &c., so as to remove the difficulty of obtaining separate rooms for meals, &c.

18,111. I see no grave difficulty in instituting a system of inspection for the purpose of supervising the observance of the regulations. Whether there be prohibition of white lead or regulations, there will have to be inspection. The inspectors should have a thorough knowledge of the trade, practical and otherwise, and, if they had experience similar to myself, I see no reason why there need be a very large number of them. It would not be necessary to visit every job daily, and therefore there is no reason why an inspector should not cover quite a large area in the course of a day.

18,112. In conclusion, I would like to repeat that the most important thing is to bring the danger of lead poisoning to the knowledge of painters, as there are a large number of men working in the trade who are very careless about cleanliness. Further, I cannot help thinking that a very large proportion of the serious cases are among those who have come into the trade comparatively late in life and without the advantage of a training under an experienced master such as was obtained under the old apprenticeship system.

18,113. (Chairman.) Are you the foreman painter or Messrs. Trollope, of Pimlico?—Yes.

18,114. How many painters are employed, on the average, by that firm?—An average of about 230. They fluctuate from about 120 to over 300. At the present time the number is considerably over 200.

18,115. How many cases of lead poisoning have here been during the nine years that you have been foreman of this firm?—Only three cases of compensation.

18,116. Are there any without compensation?—Yes; at the present moment there is one man away for a day or two with colic, but they are not serious cases; they go away for a day or two and come back to work.

18,117. Do you have a good many cases of slight attacks?—Not a large number considering the number of men.

18,118. What proportion do you think it would be?—Certainly not 5 per cent.

18,119. About 5 per cent, we may take as the average?—That is a very full average, and those mostly happen in the country on what we call country work.

18,120. I suppose that means that there they have not the same opportunity of getting washing accommodation and so on?—They have not the convenience of their home, and are perhaps a little bit neglectful of themselves.

18,121. Would they have the same opportunities of getting washing appliances, &c. in the country districts as they would in London?—No. The lodgings which they have are not equal to what they have in their own houses.

18,122. You state in your evidence that white lead paints have great advantages over zinc white in point of efficiency and durability?—Yes.

18,123. Now we have had several witnesses before this Committee who have given us an opposite opinion?—That is my opinion.

18,124. For instance, the Savings Bank buildings in London, under the direction of the Office of Works, were painted in 1906 inside and outside with zinc paints, and reported in excellent condition in 1910, when they became due for re-painting?—Was the paint that was used analysed?

18,125. It was a formula which the Office of Works assures us is free from lead?—There is a paint now

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being used (I must not say by whom it is made) as a zinc paint, but I know that it is largely adulterated with white lead.

18,126. I may tell you that the paints which the Office of Works used were analysed by the Government laboratory?—The samples were.

18,127. You do not suggest that they would send in samples of non-lead paints; and then add a little lead?—I suggest nothing.

18,128. No, but you rather demurred, I thought?—A traveller brings me along an article, and says, "This is so-and-so." I take it and, to the best of my ability, I test it. I buy, and buy, and buy, and find, in the course of buying, that the goods actually delivered are not up to sample.

18,129. (Mr. Sutherland.) Is the zinc paint you refer to as being adulterated with lead used by the Office of Works?—I cannot say.

18,130. (Chairman.) Then there have been a large number of post offices and sorting offices in the London district similarly painted with zinc paint, and it has proved to be efficient?—I can only say that every paint used is not analysed. The samples are all right.

18,131. Do you cast a doubt on the propriety of the Office of Works in this respect?—I am not casting any doubt at all.

18,132. But you are?—I am simply saying that I have found paint, which I have bought as zinc paint, adulterated with white lead.

18,133. But the Office of Works, as I am trying to put to you, have painted the insides and outsides of some of their buildings with zinc paints, which they assure us they have had analysed by the Government laboratory?—All I can say is that wherever I have used zinc paint alone it has not given me satisfaction.

18,134. Then the Orient Steamship Company for their liners have used almost exclusively non-lead paints for some years, and various gasometers and other ironwork have been painted with zinc and iron oxide paints. The exterior of the Stock Exchange was painted with leadless paints, which were reported by the official architect as very satisfactory. Are you surprised to hear that?—Very.

18,135. Then, with regard to the painting of ironwork on ships and wherever there is much exposure to moisture, you say there is really no practical substitute for red lead?—I think not. It is used in all the dockyards.

18,136. What experience have you had of good red oxide of iron paints, of graphite paints, of bituminous paints, and so on?—I have used them. They are very good, but are not equal to red lead. Red lead would be used, in a sense, as an under-coating, not as a finish coating.

18,137. You think that the red oxide of iron paints or graphite paints are very good?—Yes.

18,138. We have been told that there are a great many paints, besides zinc paints which have been successfully used for iron structures?—My work has been mostly among the high-class decorating domestic work, ecclesiastical and theatrical.

18,139. Have you had any experience at all of the painting of ships?—I have done the decorative portions of about five or six ships for the Royal Mail Steam Packet Company, and one for the Orient Line. I had something to do with the "Mauretania," and the "Tasmania." Our work is principally among the cabins de luxe, reading rooms, library and so on.

18,140. In the case of the Orient Line, did you use lead?—I had an under coat of lead, and to get extreme whiteness, mixed zinc and white lead together.

18,141. In every case?—Yes.

18,142. Was that stipulated for in the specifications?—It was to be painted so many times, and a certain finish given.

18,143. Did the Orient Company ask you to use leadless paints?—No.

18,144. Did you tell them that you used lead in your paints?—No.

18,145. So they probably were not aware of what you did?—I should say that they were. There was nothing to say to the contrary.

18,146. What I put to you is that they might have allowed you to use lead without their being cognisant of it?—They might have done. If it was in our specification that we should not, we should observe it.

18,147. When did you do this decorative work in the cabins of one of the Orient liners?—It is only on the new boats that we do it. We are now doing about four boats for a different line. We contract with such people as Harland and Wolff or others.

18,148. But I am particularly interested in what you have said about the Orient liner. Do I understand you that you do the painting for the contractors?—Yes.

18,149. Not for the Orient Line itself?—They have the supervision of it. We have to please them.

18,150. But have they any cognisance of the kind of work that is done?—Of the material that is used, do you mean?

18,151. Yes?—I could not say that they have, but I could not say that they have not.

18,152. You say that you do the painting for the contractors?—Yes.

18,153. Who hand the ships over to the Orient Line?—Yes.

18,154. Would the Orient Line be likely to dictate to the contractors what kind of paint was to be used?—They might.

18,155. You do not know that?—No.

18,156. Then you tell us that you do not agree as to the harmlessness of zinc white?—Not altogether.

18,157. Are you aware that the Home Office officials have had opportunities of observing for many years the health of zinc workers, who would certainly have shown signs of poisoning; had your view been correct?—No, I am not aware of it.

18,158. Can you tell us in what way you think that zinc paints are harmful?—In rubbing down to get a highly finished surface you get a lot of dust, and I take it that to inhale dust of any kind is harmful.

18,159. Then your criticism is only in regard to the dust that is generated?—Yes.

18,160. Not in regard to its poisonous nature?—No; I cannot say that I know about that.

18,161. When you say that zinc white paints are harmful you mean with regard to the dust that is created?—Yes.

18,162. Nothing else?—Nothing else.

18,163. In paragraph 18,106 you state that the dangers of dry rubbing down and burning off are not so great as supposed. How then do you account for the lead poisoning from which painters suffer?—I think that they get lead poisoning equally as much by inhalation.

18,164. Through the mouth?—Or nose.

18,165. Yes, through the mouth or nose. That is, I suppose, in the shape of dust?—No, not necessarily. I think that with any paint that is largely oil, or mostly composed of turpentine and lead there is great evaporation and evaporation I fancy carries a certain amount of deposit. In a good many cases men do not do very much rubbing down.

18,166. Have you any specific knowledge as to the truth of that statement?—I have seen the effect of inhalation on the men. If you have a vessel of water in a room where painting is going on, although no dry rubbing down takes place, you can skim off the top of the deposit in the water, and if you analyse it I believe you can get a certain amount of lead from it—from the evaporation.

18,167. Have you ever had it analysed?—I have in my own simple way.

18,168. It is a very interesting point. In what way have you analysed it?—I had a friend, a chemist, and I took it along to him and asked him what he thought of it, and he told me that it showed signs of lead in it.

18,169. Just simply signs?—He found lead in it.

18,170. He could not tell you what quantity?—No, he could not tell me the quantity, but he could tell me what it was.

18,171. Your suggestion is that the fumes which arise in this way are more harmful than the dust which is generated?—No. In whatever way lead gets into the system I think it is equally dangerous, but there

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are a great many painters who never do any dry rubbing down, or very, very little, and they get lead poisoning. It is only on the best class work that dry rubbing down takes place.

18,172. Would not that be accounted for by the greater susceptibility of the worker?—Not necessarily.

18,173. How then would you account for small quantities of lead being so dangerous?—I see what you mean. There are some more susceptible than others, and generally it shows early.

18,174. I suppose you would agree that the inhalation of lead dust is dangerous to the workpeople?—Very. In some cases where we have a very heavy job, I have known my men put muslin over the nose and mouth to prevent it. But you do not get rid of it in that way. It is floating about in such minute particles that you cannot see it.

18,175. That is the difficulty, I take it, that it floats about in the air, and the men must more or less breathe it?—Yes, but that only happens on not more than 10 per cent. of the jobs.

18,176. That probably is the cause of a good deal of the lead poisoning?—That is one cause, but there are many men who do not do dry rubbing down—painting outside.

18,177. I am speaking of the people on heavy jobs where dust is generated and floats about in the air. If they breathe that dust I suppose that is a cause of a great many cases of lead poisoning?—Yes, that is a cause.

18,178. You say that in certain classes of work, rubbing down with water—I take it you mean water and pumice-stone—is not always practicable?—It is not.

18,179. Can you tell us what is the percentage of work where it would be impracticable?—I could not say what the percentage is. It would depend on the class of work which the shop or the firm did.

18,180. But in what class of work would it be impracticable to introduce wet rubbing down?—If you go into a very old house where the surface is loaded up with paint, you could rub down sufficiently to get a surface, but in a house very poor with paint you could not possibly rub it down as much as you ought to rub it down, because you would rub through the coats of paint, and water would get into the woodwork. If you cut the joints or shoulders down, they would swell, and you would be creating trouble for yourself.

18,181. I notice that you object to rubbing down with water or oil, because it has a tendency to soften the painter's skin and so promote absorption of lead through the skin?—I think he gets it through his finger nails and absorbs it through his skin.

18,182. Are you aware that medical opinion is entirely against you as to the possibility of absorption of lead through the skin?—Yes, quite so; and against that I would ask them how, years ago, men who stirred up paint with the hand got dropped hands. You do not see one case in a hundred now compared with what you did when I was a boy.

18,183. The French do not agree with the English in that respect, because they have enacted in their rules that dippers in potteries, for instance, should wear gloves, or should have pincers to catch hold of the work?—If it cannot be absorbed through the skin, why is that necessary?

18,184. In England it has been demonstrated beyond question that there can be no absorption through the skin?—I must be obstinate on that, I am afraid.

18,185. I notice in your remarks to the Committee that you agree as to the real gravity of lead poisoning?—Undoubtedly.

18,186. And you admit that before the Workmen's Compensation Act came into force there must have been a great number of cases of colic and the like of which no notice was taken?—Yes.

18,187. What is your suggestion as to a solution of this very grave state of affairs?—I do not know of any solution at all. I am afraid that if you introduce a commodity which is dearer than white lead you will reduce employment.

18,188. Do you think that regulations would completely stamp out or practically stamp out lead poisoning?—I think they would improve the conditions; the better the conditions are, the better it will be for the men, surely.

18,189. But the difficulty that the Committee see is that if you had the very best regulations that can be suggested, there would be very great difficulty in carrying them out, or in seeing that they were carried out?—No doubt there will, and there always is with regard to everything you want to regulate. The regulations will be a nuisance to people who will be made answerable for obeying them.

18,190. For instance, how will it be possible if you have regulations introduced, to ensure that painters working in country districts would carry them out? How could you be quite sure that they were enforced?—It would be necessary to let them understand that someone was coming along to supervise them.

18,191. Do you mean that you would instil into the men's minds the fact that factory inspectors would be in and out?—I do not think it would be the men that would require so much supervision as the employers. And another thing, if the men knew there were inspectors appointed, and there was any abuse of the regulations taking place at a place, I feel pretty sure that they would find some means to make it known.

18,192. Do not you think that the men should equally be forced to observe any regulations that are introduced for their good?—I do. I think that the men are largely to blame for a good deal of what takes place.

18,193. Unless the precautionary measures were pretty handy, the men would not take the trouble to adopt them?—You cannot make a dirty man clean. You may have twenty at work on a job; fifteen out of the twenty will use the facilities given to them—a pail of water, and a nail-brush, and canvas to wipe the hands—but five will not.

18,194. I went with Mr. Sutherland and paid a surprise visit. There were six men engaged by a most excellent employer. When we went into the yard where the men were washing their hands, we found them wiping their hands on their handkerchiefs, although there was a towel not very far off. So that you see the difficulty, even if you have rules, of getting the men to abide by them?—Yes. I have seen men come to work in the morning early with hands so dirty that I have felt pretty sure that they had not washed them at all before coming—not what you would call washing.

18,195. You think that, even if rules were introduced, there would be a good deal of difficulty in enforcing them, both with regard to masters and men?—Yes, I do.

18,196. So that if we wished to get rid of this admitted evil, the only possible means would be to prohibit the use of lead?—But if you prohibit lead, what steps can you take to ensure that lead will not be used?

18,197. We should have to be careful about that too. I mean to say, provided that the distribution of white lead was properly regulated by the Home Office, the prohibition of the use of lead in house painting would be the only means of preventing this admitted evil, would it not?—In my opinion you will have to analyse every tin.

18,198. I am taking it for granted that the Home Office would introduce specific safeguards against the improper use of lead. That is a very important point which will have to be very carefully considered?—I think it will be more difficult than supervision.

18,199. That is not the point. In view of the great difficulty which you have admitted of introducing rules and being quite sure that they will be carried out, both by masters and men, do not you think that the prohibition of lead is the only means by which we can reduce or get rid of this evil?—If you prohibit a dangerous article you are bound to do away with risk, and if that is your only point, I say, yes; but do not think for a moment that I think that zinc will supersede lead.

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18,200. You have told us about that?—I wanted to make my meaning plain.

18,201. I wanted an answer to the question, as you have admitted that the rules cannot be efficiently carried out?—I do not say they cannot be. I say that it will be a great difficulty.

18,202. Then I must ask you in what way you think they could be efficiently carried out?—You have inspectors under the Factory Act to supervise other dangerous trades, and they are pretty efficient.

18,203. Workpeople who are working in factories can be inspected fairly easily, but if you had a vast number of men scattered all over the country at odd jobs in private houses and so on, you would have very great difficulty in inspecting them?—In London I should think certainly four or five practical men who are known in the trade could pretty easily supervise the work as inspectors.

18,204. But have you thought out how it could be done?—They would have to be continually making calls, and no doubt if they were good and honest men, and had the interest of the trade at heart, they could do it.

18,205. That is very excellent sentiment, but we have to be practical on this Committee. Have you any idea how many places they would have to call at?—Some thousands.

18,206. Some thousands a day?—No, they would not need to call on some thousands a day.

18,207. You may not be able to answer this question; in fact, I feel sure that you will not; taking the population of London as being six millions, how many houses do you think there would be painting operations going on in, in one year?—I could not answer that question; I could only make a guess, and it would not be fair.

18,208. There would be thousands and thousands?—Not shops.

18,209. No; thousands and thousands of jobs, and that is what we are speaking about. Now, how could four men properly inspect the thousands and thousands of jobs?—They could not do it weekly or monthly; but the fear of the inspector calling would keep a lot of people honest.

18,210. There are people who have no fear, and who are not honest. Do you know that there are over a quarter of a million of factories and workshops in England that have to be inspected to-day?—I should not be surprised.

18,211. Besides that, there are many other places not in the category of factories and workshops that have to be inspected, and there are only two hundred inspectors to do it?—I should not be surprised.

18,212. With thousands and thousands of jobs in London alone, you would want double that number of inspectors to make the inspection efficient?—I think not. When you say thousands and thousands of jobs in London, I do not think there would be thousands and thousands of jobs at once.

18,213. I thought you admitted that?—No; during the year there may be, but not going on at once.

18,214. A witness who preceded you told us that he considered that in Dublin, where there are only 400,000 people, they would require four inspectors to supervise properly all the painting that is done in the Dublin area?—That is his opinion, but I think myself that there could be some regulation.

18,215. But you have not thought it out?—Not beyond that it is possible to do it.

18,216. Supposing you had the power to put inspection into operation to-day, how would you begin? How many jobs would an inspector be able to visit in a day?—I myself visit 20 jobs a day.

18,217. Four inspectors—80 jobs a day?—It would not be necessary for them to go every day or every week. Some of them are small jobs that will not last a week.

18,218. You have not any idea how many visits an inspector would require to make, have you?—Some firms the inspector would need to continually visit, and others he would not need to visit so often. And on a good many of the jobs there would be no lead paint used at all.

18,219. (*Dr. Collis.*) How would the inspector have information about what places to visit? It is not like a factory that is always there?—He could go to the shop and ask what jobs they had; and it could be made a rule for every employer to return weekly the work he had in hand.

18,220. Return weekly the work he was to do in the following week?—Yes.

18,221. Do you think that the employer would be likely to do that?—If he was made to do it, he would have to. If it was made compulsory by Act of Parliament, he would have to do it or be liable to some penalty.

18,222. Do not you think that each piece of work would want inspecting?—Oh, no. If the employer were to send in a report weekly of the jobs he had in hand, or would have in hand next week, and the class of work he was doing, the inspector, if he was a practical man, would see whether there was any necessity for him to call.

18,223. It is taken as a general axiom that every factory requires visiting once a year at least to keep it up to the mark, and dangerous trades four times a year. Each of these pieces of work would be a factory; so that if you are going to take the same basis each individual piece of work must be visited once while it is being carried on?—Yes.

18,224. So that it means visiting almost once a week?—Not necessarily. In some work there would be no lead paint used. That would not require visiting.

18,225. We are taking work where lead paints are used, so that it would lead to a very large number of visits by the inspectors?—They would have plenty of work to do, but I think it is possible that they could keep it in order.

18,226. How many visits do you think it reasonable to expect a man to do every day?—That would depend on circumstances. If I was visiting (as I do), and I thought there was anything going wrong, I would pay three visits instead of one. It would just depend on what I found. If, as an inspector, I went along and found something suspicious that caused me to think that the employer or the men were shirking the regulations, then instead of calling there once a week, I should call three times.

18,227. But that is not quite the point. I said: "How many visits do you think it would be reasonable to expect a man to make in a day"?—It depends on whether the jobs are grouped together or not. If they were spread over a large area he could not do so many, but if they were somewhere in the same neighbourhood no doubt he could do 30 quite easily.

18,228. Take an ordinary small country town, and the outlying districts, a place like Margate and the outskirts of Margate?—There should be men appointed for different districts, some for London and some for the provinces.

18,229. Quite so; but how many visits would you expect him to make in a day?—It would depend on the distance he had to travel.

18,230. I put to you a place like Margate and the outskirts?—If the work was in the town he could do a good many, but if it was 12 miles from Margate on one side, and 12 miles away on the other side, he could not do so many, unless he had a conveyance and direct trains.

18,231. He might not be able to do more than three or four a day in some cases, so an average of about 12 a day might be about right, taking everything into consideration?—I have not gone into the figures, but I would say, yes.

18,232. We have to think of these figures?—I was thinking more of the part of London that I am associated with, and not of the country. I go to the country to spend a day or two—not to go here, there, and everywhere.

18,233. Any form of inspection has to include the whole of the British Isles—outlying places like Ireland, Cornwall and Wales, for instance, and it comes to a big lot of work to get through. A man can only inspect about 12 places per day on an average. Each separate piece of work has to be considered as a factory

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and on the basis of one visit per year and four in dangerous trades, you could not ask for less than one visit per piece of work?—If the men only get lead poisoning by inhalation of lead dust, I am surprised to know that any lead poisoning takes place in country places.

18,234. You consider that the scum taken off the water which showed there was lead present, is some indication that there is something besides dust which affects the men?—Lead particles.

18,235. What was the water contained in which you exposed?—A pail.

18,236. What had it been used for?—All kinds of things.

18,237. Probably it had contained lead?—I do not think so. We do not put lead in pails: It is in casks.

18,238. The men might have washed their hands in it when they had paint on them?—No.

18,239. What was it there for?—It was simply deposited there with hay to carry off the smell. Some people are faddy, and adopt that method.

18,240. I have heard of that idea; the men might have washed their hands at some previous time in the pail: I do not say that they had done so?—If you draw a glass of clean cold drinking water, and put it on the mantelpiece in a room where there is new paint, and drink some of it, or tea which has stood in such an atmosphere, you will taste something.

18,241. You had a definite specific test carried out, and it is of some importance. Now what was the vessel which contained that water made of?—A wooden pail.

18,242. Did you make certain that it was a perfectly clean one which had just come from the maker?—No. It was an old pail painted inside, and the water was perfectly fresh.

18,243. You did not have it stood outside in the open, and then have some of the scum, if any had gathered, tested as a comparative test?—No. After heating what I had heard on the subject, I thought I would do what I did.

18,244. It is very interesting, but a test of that kind has to be made with great care?—I did not do it for the sake of giving evidence about it.

18,245. I quite understand that?—The same scum can be got off a glass of water or a clean earthenware vessel. There are painters on the Committee, and they will know that men have felt that they could taste paint after they have been working with it.

18,246. You mentioned a time years ago when men stirred up paint with their hands?—Yes.

18,247. Did they stir the dry white lead into the paint then with their hands?—We always get our white lead ready ground. Years ago they would break it up, as they break up distemper. All the colours that we get ground now by machinery were ground on a stone.

18,248. By the men?—Yes, and boys. I have done it myself when trade has been slack in the winter months.

18,249. Is there not the possibility of danger from dust in dry grinding?—Not so much danger from dust as from getting it down your finger nails, and through the pores of your hands.

18,250. We have rather said good-bye to that antediluvian idea?—We used to grind with oil. We stood them in oil or turpentine as we wanted them, and soaked them: It made it easier. Nowadays, all white lead for painting is delivered in bulk, ground in oil or turps, and is broken down to a thinner paste with oil or turps, and a thick stick is used for that purpose, but I have seen a man do it with his hands.

18,251. Did you mix dry white lead, in those days, for any purpose?—It was not in use so much when I was a boy, as filler. We mostly filled up with distemper.

18,252. We have been told that there is less dry white lead used now than there used to be. Your evidence is to the contrary?—I am speaking of 35 or 36 years ago; 25 years ago it was largely used, and is now, I think.

18,253. Do you think it is more so now than it used to be?—No. In some cases there is not enough old paint on the surfaces to cut down and give you the surface you require. Consequently you plaster it over

with lead mixed with some liquid, and when it is dry and hard you cut it down to a smooth surface. If you will allow me, I will show you a board which I have.

18,254. For that purpose do you use dry white lead?—Yes, in a powder mixed with a gum or varnish thinners.

18,255. It comes to you as powder?—Yes.

18,256. Do you get more of it in powder now than you used to 25 years ago?—I do not think so. On some jobs I might not use a pound; on other jobs I would use 100 pounds. It depends on the class of job, and the state of what I have to work on.

18,257. Could you do it without having dry white lead?—You could use distemper filling, but it is considered not so quick for one thing, and otherwise it is not considered so satisfactory. It takes a better tradesman to make a lasting job with distemper filling than it does with white lead, and, unless the surface, after it was cut down, was charged with oil, rendering it waterproof, there would be a risk of bringing it right away from the woodwork. With dry white lead you do not run that risk.

18,258. You are suggesting that there is really a far greater use of dry white lead in the painting trade than we have heard of before?—Since I received my first appointment, and during the time I was a journeyman, I have always seen as much dry white lead used as I see now; but, as I say, it entirely depends on the class of job.

18,259. In the earlier years of your knowledge of the trade was there no greater tendency to mix by the hand than there is to-day?—I never saw dry white lead for filling purposes treated in that way.

18,260. Or for any purpose at all?—I knew one man in particular who did it. I told him about it, but I never knew him to be ill with lead poisoning. He did not hesitate to put his hand into the pail of white lead and oil to break it up to the consistency of paint. He would not hesitate any more than I should hesitate to put a stick into the pail.

18,261. Do you say that there was no more dry white lead mixed up by hand, if ever such a thing was done 25 years ago, than there is to-day?—I never saw dry white lead mixed by hand. You do not as a rule require it in such bulk. You generally mix it with a knife on a board, and do not use your hands at all. You make it into a paste with a broad knife, and you put it on the surface. When it is hard you rub it down to a very smooth surface.

18,262. What do you rub it down with?—Glass paper.

18,263. You rub it down dry?—Yes.

18,264. That applies to filling and stopping?—Yes, filling.

18,265. Are fillings always done like that?—Yes.

18,266. Could you treat it in any other way?—If you rubbed it with water, I do not think it would stand it. The water would soak through it and bring it away.

18,267. So that that process cannot be got rid of?—I do not see that it can.

18,268. You were speaking of the use of a zinc paint. Do you think that a similar dust would come off from the paint process if zinc was used?—Not zinc paint—zinc filler.

18,269. But if zinc were to take the place of lead, and was used in the same way, do you think that the dust might be harmful?—Yes.

18,270. Why?—It would clog the lungs.

18,271. But what evidence have you that all dust is harmful, because I am prepared to make a statement to meet that?—A sweep is harmed by soot, and a coal miner is harmed by coal dust.

18,272. But is he?—So I have read in books.

18,273. But the coal miner has less chest trouble than any of the people among whom he lives, and a remarkably low mortality?—Soot or coal dust do not lacerate their lungs like the lungs of the grinders in Sheffield are lacerated.

18,274. All inquiry into dusts seems to show that they vary very considerably in their capacity to do harm, and some do no harm whatever?—I am not a medical man, but my idea is that anything that clogs



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the breathing-organs cannot be anything other than detrimental. That is only my own opinion.

18,275. It is an important question that you raise with regard to damage caused by dust from zinc paint?—Would not zinc dust be an irritant?

18,276. We have no evidence of it whatever?—You might say that a noose would not hang a man until you put it round his neck and tried it. Until we have tried it we do not know whether it will do it or not.

18,277. But we have tried lead, and we know it does harm?—Perhaps when you use zinc you will find it out too.

18,278. But we have used zinc, and it does not do harm?—It has not been tried to the same extent to which it will be used if lead is abolished.

18,279. But there are thousands of tons of zinc paint used to-day in England, and we must have heard of it if it had done harm?—You cannot use prepared paints in an ordinary decorative job. You have to make it up yourself. I use about 1½ tons of crude zinc white myself yearly to about 45 to 50 tons of lead. I only buy zinc paints in the form of enamels, and some of these have white lead in them. They are not wholly composed of zinc, although they are sold as zinc enamels.

18,280. Zinc is used, and dust of zinc is given off in the rubbing down?—Zinc white is a crude white by itself, and, whilst it improves the whiteness of the lead, the lead also improves the tone of the zinc.

18,281. Have you ever in the course of your experience heard of a person having any illness different from lead poisoning which could be called zinc poisoning?—No, I have not. If a man went away bad, they would at once attribute it to lead colic.

18,282. (Mr. Sutherland.) You have had a large experience of the house-painting trade, and of the operative painter?—Yes.

18,283. The large nature of the operations carried on by your firm enables you to make a comparison between the different branches of workmen and working conditions in the building trade?—Yes.

18,284. Have you found painters as a class a very respectable, healthy, contented body of men?—About the same as men in other trades.

18,285. How does the painting trade compare with the other branches of the building trade for pleasant, wholesome conditions?—The conditions are not pleasant. The bricklayer very often is working out in the open air. It is the same with carpenters. The joiner is working in a shop among shavings and sawdust, but a painter is often shut up in a room. I have two jobs going on; for instance, one is a suite of rooms. The men have to get into the house and leave it by a ladder, and they are not allowed access to any other part of the house. In another place I have an outside to do. They are pushed into the coal cellar, and the w.c. is locked up against them.

18,286. Those are extreme examples?—I am afraid they occur in a good many cases.

18,287. In London?—Yes.

18,288. In the country you might have better conditions?—There is more open air, but in country places they have to work longer hours, and live in places which are not so good as their own homes. They have to have their food on the job. It is not always convenient to set aside a place for meals. If you are doing up a mansion, and have a portion given to you to take your food in, whatever it is like you have to be content with it. You could not call that pleasant?

18,289. I have been through it, and I found it pleasant. Do you know that medical and scientific witnesses of eminence have established before this Committee that lead poisoning cannot arise from the fumes of burning off paint, nor from emanations given off by paint in the process of drying. That traverses your statement?—I do not believe it, because I have heard that people in houses where we have been working have been taken ill; a physician has been called in, and he has certified it as painter's colic.

18,290. Dr. Legge of the Home Office has told this Committee that lead absorption cannot arise through the skin, and he doubted whether it would arise even

through a cut?—I would not mind putting a piece of white lead on to a cut on my hand, or on a sore.

18,291. The same authority has laid it down that so far as the painting trade is concerned, the great danger arises from and centres round the lead dust created by the rubbing down?—Next to no dust would be created.

18,292. Have you ever formed an estimate of the number of hours spent per week by painters in dry rubbing down, taken over a period of, say, three months?—A man rubbing a room down would create next to no dust.

18,293. I am not referring to filling. Have you formed an estimate of the number of hours?—I should not think that the time taken in dry rubbing down is more than 7 per cent.

18,294. Would not many men go through a job and hardly touch the sand-papery down?—Yes.

18,295. Do you consider dry rubbing down a necessity of the trade, or should it be dispensed with, and its place taken by the wet process?—In some cases, yes, and in some cases, no. With very rich relief work, mouldings and so on, you could not possibly give satisfactory rubbing down with pumice-stone and water.

18,296. Mouldings on doors?—Yes.

18,297. You could do that with pumice and felt?—How could you do that without cutting the paint off the arrises?

18,298. I want your opinion. Is there not an enormous amount of painting work done which is quite innocent of all rubbing down?—Yes.

18,299. And even with smooth painted surfaces in good class work, it is only a small proportion of the surface that has much time spent on it?—It depends on the condition you find the work in, and so on. If you go to a place which has been badly painted previously and have to make a high class job of it, you have more preparation to do than in the ordinary way.

18,300. Could it not be done with pumice-stone and water?—In some cases, yes, and some not. You as a practical painter know that in some cases the water would swell the wood. If it was a jerry-built house, you would have to be careful.

18,301. When you say that the dangers of dry rubbing down are not so great as supposed, you probably mean that the amount of dry rubbing down is not so great as it is thought to be?—I do mean that.

18,302. Would you consider it a hardship to have dry rubbing down prohibited?—No.

18,303. If it was abolished, it would avoid the danger?—Yes, but I would like to know what you would do.

18,304. Do you think that it would be worth while to abolish it for the sake of retaining white lead?—Yes.

18,305. You think that there is no other basic white pigment which gives such durable and efficient results as white lead?—Yes.

18,306. Have your men experienced much difficulty in getting facilities for hot water and separate places for their meals and so on?—Yes.

18,307. Would not this difficulty disappear if, in any regulations passed, it was made compulsory on the part of the householder to give these facilities when workmen were in the house?—Yes, but how would you get on when every room in the house was being painted?

18,308. But you do not paint every room at once?—Yes.

18,309. You leave some rooms to the last when you have possession of the whole house. You have a paint shop and a meal room which you leave to the last?—Sometimes circumstances do not admit of that.

18,310. But speaking generally?—Generally we have them all being done at once.

18,311. Your experience differs from mine?—Possibly. If we have a paint shop or a meal room, that is charged with fumes and the evaporation of paint.

18,312. You have had a larger experience than I have?—It seems like boasting, but I suppose that no one has had greater experience in London.

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18,313. You do not object to providing towels, soap, and nail brushes, and facilities for washing?—No. I do it.

18,314. You do not think it necessary to depart from the existing custom in relation to the provision of overalls and their being kept clean?—No. I cannot quite understand where the danger is with regard to overalls. A man works in his shirt all day long, and sleeps in it at night. He keeps his trousers and waistcoat and so on tidy if he wears overalls. If there is no deposit, I do not see that it will make any difference to his health.

18,315. Have you ever heard of the men complaining at having to provide overalls and keep them clean?—No. They look upon them as part of their kit. It has been the custom always.

18,316. Do you think there is any serious danger arising from the painter having his overalls washed at home?—No. I have never heard of the wife or children having lead poisoning.

18,317. The idea that the painter's overalls are loaded up with lead dust is not quite in accordance with fact, is it?—No.

18,318. Would you agree that the dust that gets on his clothes is the dust coming from dusting down, washing off, stripping walls, distemping, rubbing down the walls for papering, handling the steps and planks, and that anything of the nature of paint on his clothes is dry and does not constitute a danger?—I quite agree.

18,319. If there is any interference with the existing custom, either by way of prohibition of white lead or regulation of its use, it means inspection?—Yes.

18,320. Unless the manufacture and sale of white lead were prohibited, the inspection would need to be equally searching in the one case as in the other, would it not?—Yes.

18,321. So that the Government, whatever course they take, will have to face the cost of an inspectorate?—Yes, either one way or the other.

18,322. You yourself are quite agreeable to regulations and would enforce them under your own jurisdiction?—Yes, but I cannot make dirty men clean.

18,323. Do you not think that this would be the attitude of all reputable master painters?—Yes, and of the better class of men. If they knew that an inspector was appointed, I think in their own way they would help him.

18,324. You are of opinion that regulation by compelling the labelling of all materials containing lead, and by enforcement of the observance of certain conditions, such as prohibiting dry rubbing down, providing towels, nail brushes and soap, and a separate place for meals, would educate both masters and men to the necessity of carefulness and cleanliness?—In a way it would educate the men, but not the masters. Very few master painters in London are practical painters, and in some cases they hardly go on a job.

18,325. They would have to take the responsibility?—Taking nearly all the large firms in London, I do not suppose there is a practical painter in the firm, as a master or director or on the board.

18,326. You would not apply that to a large number of the smaller men?—Yes, in London.

18,327. You are speaking of companies?—Yes, I am taking cases I know specially.

18,328. Now you painted an Orient Company's ship?—Yes, one ship.

18,329. They did not debar you from using lead?—No. They handed over the cabins, saloon, and library for us to make the joinery, do the cabinet work, and decoration.

18,330. Do you know what Harland and Wolff use for the preparatory painting of ships?—White lead, I believe.

18,331. The undercoatings right through would be white lead, whatever the subsequent coats were?—Yes. We are led to suppose that the finishing coat of enamel is zinc.

18,332. (Mr. Parsonage.) Do you say that Harland and Wolff use all lead?—No.

18,333. (Mr. Sutherland.) I asked if you knew what Harland and Wolff used for the preparatory painting of the ship?—My opinion is lead.

18,334. (Chairman.) But do you know?—Yes.

18,335. How?—By what my men who have worked in their yard have told me.

18,336. We cannot use that as evidence?—I am not giving it as evidence, but only as my opinion.

18,337. (Mr. Parsonage.) I was taken through their works and workshops a few weeks ago, by the foreman, and I know there is a great deal of zinc white used. I saw the preparation of the paint. They use red lead and white lead and zinc white?—Yes.

18,338. (Mr. Sutherland.) Do you know that an eminent doctor and scientist demonstrated to this Committee that all paints give off a substance called aldehyde, which is a very noxious product and which produces disturbance of the system and inconvenience which is not lead poisoning?—I can quite believe it.

18,339. Perhaps these effects have in the past been attributed to lead poisoning?—I know from personal experience that there are times when I have felt bad after I have inhaled it. I have never been much troubled with colic. I went to work for my father just after I was 10 years of age. From that day to the present I have worked in the trade and never been troubled with lead, although I dare say I have it in my system.

18,340. Though there would be difficulty in enforcing rules, this is no reason why they should not be put in force?—No.

18,341. Do not the French finish the filling with knives and never rub down after finishing with the knife?—They do rub down, but not to the extent that we do. They have a different kind of method. They do not create the dust that we do, but they do create dust. I have worked in France.

18,342. They finish with the knife mostly?—The dust they make is next to nothing.

18,343. I gather that you are of opinion that regulations should be given a trial before resorting to so drastic a course as prohibiting the use of white lead?—Yes.

18,344. (Chairman.) You told us that in a considerable number of cases in London there are no facilities for the men to have separate rooms, separate rooms in which to keep their clothing or proper accommodation in other ways?—Yes.

18,345. How would you get over that difficulty if a rule was made that those facilities were to be granted?—We should have to have a longer time for the work and say, "we cannot do this room" or "that room until we have finished every other part of the house." That would be the only way. I have a job which I have to clear out of in time for the people to go in by the 25th. It must be done. I am working late to do it, and every room in the whole house is under way at the same time.

18,346. How would you get over the difficulty in such a case as that?—We would have to say, "you must leave us this room and that room; we want them for ourselves, and we will paint them after you have come in."

18,347. Would that be practicable?—If it was the law it would have to be obeyed.

18,348. There would be no law that the owners of houses should make such a provision. It would be a law applying to employers?—Inasmuch as every contractor would be under the same obligation he could embody that in his contract. It would be one of the conditions under which he would take the work. The contractor would say, "you must provide a place for the men to have their food and to put their clothes."

18,349. Do I understand that when you suggest rules for meeting the evil of lead poisoning, you mean that you would make it obligatory by statute that the owners of houses should do that?—Yes.

18,350. (Mr. Mason.) If you are going to do away with white lead for painting, and you have other people in the house using white lead, the inspector must have the right to go into the house?—Yes. The inspector should have as much right to walk on to the

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job and take a sample here and a sample there, like the man who goes into the butter shop and gets a sample of margarine and so on. If all contractors were compelled to observe that condition they would all be on the same footing, and they would put it into their contracts.

18,351. (*Chairman.*) Do not you think that there might be contractors who might leave that clause out when the competition was very keen?—The contractor would put the clause in, but he would not observe it; he would not inconvenience his client.

18,352. What would become of the men under the circumstances?—The men would convey to the inspector that that condition was not being observed on such and such a job. That would make his labours a little lighter.

18,353. In any case, even if you did not put part of the obligation on the householder, it would mean that the inspector would have the right to visit any house where a painting job was going on?—Yes.

18,354. (*Mr. Fell.*) Have you ever felt unwell after using zinc paint?—I have never used zinc paint alone, so I could not tell whether I felt unwell from that or not.

18,355. Do you know of any men who have ever had so-called colic after using zinc paint?—No. I never knew of a job begun and finished entirely with zinc. They might be taken ill, and it might be through the zinc or lead.

18,356. Have you ever had anything to do with the painting of coaches or carriages?—No.

18,357. You do not know the conditions?—I know people in the trade, and I know that the conditions are different from those of house painting. Their shops are very much more confined. They have to exclude a great deal of air on account of the dust.

18,358. Do you see any difficulty in using substitutes for lead paint on vehicles where the surfaces are afterwards varnished?—I should say that you could use zinc as far as I know. I am not a coach painter. I would not put my opinion against that of a coach painter, but I should think that you might use it on vehicles, especially if you preserved it with a coat of varnish. Zinc is so porous and of such a drying nature that it is not so lasting as lead; but supposing that you seal the pores with a coat or two of varnish, it may be all right.

18,359. Do you think that it would cost as much for inspectors to see whether the prohibition was carried out, as for inspectors to see whether regulations were carried out?—I do not think that it would make a great deal of difference.

18,360. On what ground do you base that statement?—It is only an opinion. I do not believe that there is any compound adulterated so much as paint. Prepared paints sold in the market, both the fluid and the paste, are made of things which could not be sold by themselves. They are made up into a compound and called paint. It begins with that and ends with that. A lot of the zinc white would be adulterated largely, and it would be necessary for an inspector to take samples frequently to see that the men were not using white lead. The ordinary painter could not possibly tell whether he was using a compound other than zinc white.

18,361. (*Chairman.*) Could not the inspectors take the samples from the workshops?—You might have 50 casks of lead in; you might take samples from 40 and you might find them all perfect, but the other 10 might be adulterated.

18,362. (*Dr. Collis.*) You have to run that risk in all cases?—You might have 20 cans of turpentine; you might take samples from half of them and find every one of those adulterated to a certain degree, and the others might be perfectly pure. If there was no supervision it would give the dishonest merchant a big chance of selling adulterated stuff.

18,363. (*Mr. Mason.*) Is there any insuperable difficulty in using a patent filling on house work such as is used for coaches?—No, but where you would use a few pounds on a coach, in a house you would use 100.

It is in a very very much worse condition than a coach. Generally a coach body is finished in the highest possible way by the body maker, and the wood work that he has to paint is very very much superior to that which the house painter paints.

18,364. What about the metal body, that is all painted over?—That is different from a piece of wood which has been badly painted. The coach body is very very different from a wall which has been plastered by a very inferior plasterer.

18,365. I do not gather yet why putting on sufficient filling, even if it was not lead, would not fill up the holes?—You could fill up with anything, but what do you rub down with—water?

18,366. We use water?—If the filling became so hard that you could not cut it with sand-paper, but could only polish it, that would add to the expense considerably.

18,367. Do you know of no filling other than a lead-filling which would do the work?—My experience is that fillings are largely composed of lead. They may not be called lead-fillings, but they are largely composed of lead whether they are patent fillers or not; the French filling is. If you tell me yours is not a lead filler that is another matter.

18,368. There is very little lead?—If it is the same material you get the same results. It does not matter whether you use it here or use it there.

18,369. (*Mr. Parsonage.*) You do not take apprentices at your place?—No, and I do not know any place in London where they do.

18,370. Do you think that if a painter had to be registered, as a plumber has to be, and only such men were allowed to work at the trade, that would tend to reduce lead poisoning by keeping out the unqualified men?—I do.

18,371. There are a large number of men introduced into the trade in London, particularly in the spring, who have no knowledge of the danger?—Yes; they are generally broken down men who have worked at some indoor sedentary kind of business and been thrown out of it, or they are men who have served their time in the Army and Navy. They are perhaps good climbers, rough-and-ready fellows, and they get work outside for a few seasons. Then somebody takes a fancy to them, takes them by the hand, gives them a few wrinkles, and they are painters.

18,372. They are more liable to lead poisoning than men who have been properly trained?—Yes. A doctor told me, and this gentleman here will confirm it, that when a man has been out in the tropics and his kidneys have become rather affected, he does not get rid of lead poisoning so readily as another man would. I have noticed that these men, what I called substitutes for painters, are more often taken ill than the ordinary mechanic who serves his apprenticeship and goes on right through to the end of his life as a painter. I have the balance-sheet of the Painters' Society. There are some painters 87 years of age and 91 years of age. These men have all served an apprenticeship or the equivalent of an apprenticeship, and have been in the trade from boyhood up. They have never had any other trade but painting. A lot of the men such as you refer to who are taken ill are walking about the streets the greater part of the year and in the spring or autumn they get a few weeks' work.

18,373. (*Mr. Parsonage.*) If one of the regulations made was that every man in the trade had to be registered, as plumbers are, it would be a very good thing?—It would be better for the men and better for the customer. There would be a better class of work, and it would probably be cheaper in the end.

18,374. Have you known men of extremely cleanly habits who have suffered from lead poisoning?—Yes.

18,375. Some men are more susceptible than others?—Yes. I would make it compulsory for any young man who went into the painting trade who showed himself susceptible to lead poisoning to clear out of it. In one case the doctor to the Housepainters' Society said to a youngster who was susceptible: "You had better clear out." His father thought he was doing a

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good thing in bringing his boy into the business, but he went out of it. He is a compositor now.

18,376. If you were going to use pumice-stone and water for rubbing down between coats, you would have to let the paint stand longer between each coat?—Yes.

18,377. That would add considerably to the cost of the job?—Yes, and if I was obliged to use pumice-stone and water I could not afford to put so much oil in it. It would not cut down; it would simply clean.

18,378. Have you ever known smoothing done with glass-paper, moistened with turpentine?—No.

18,379. A witness said that that was done?—I should laugh at a witness who stated that because it is the first thing one uses to remove paint, and to use it in the way described would work up the surface and roughen it or remove the paint.

18,380. A large employer in the West-End of London said it?—Perhaps he is one of the gentlemen whom I class as non-practical men. The turpentine on the paper would soften the surface of the work, and instead of smoothing it it would rub it up.

(Mr. Parsonage.) Your experience is the same as mine with regard to that.

18,381. (Mr. Sutherland.) It was a question of lightly rubbing down the top surface?—Some think that you rub a lot of paint off, but you do not. You only smooth the surface. We do not cut down the surface of the work. We do not cut through the face of the work. We simply cut off the ribs to smooth it. Often-times those are not lead ribs; they are deposited by draught carrying the dust on.

18,382. Do you think that no lead dust gets into the air?—Not in my opinion. I cannot see how it is possible in cases of this kind.

18,383. (Mr. Parsonage.) You consider that it would not make the conditions any better to moisten the glass-paper with turpentine?—I have never known it done, and I have never heard of it; and if a man suggested it to me I should think he was pulling my leg. He would work up the surface into a lead soap.

18,384. (Mr. Gardner.) If dry rubbing down is the great cause of the evil of lead poisoning, and there is so little of it in the trade, how is that we have the evil of lead poisoning?—That only strengthens my opinion that inhalation, breathing paint fumes, is the cause of it.

18,385. And absorption through the skin?—Yes, and absorption through the skin.

18,386. Painters all hold that opinion. You have not had a great deal of experience with zinc?—I use about a ton to one and a half tons a year. I think that is a good deal.

18,387. I understood you to say to Mr. Fell that you had not had a great deal of experience with zinc paint?—Not by itself. I have painted houses throughout or parts of houses by special request with zinc, and I have experimented with zinc. I have painted parts of my own house where I live with zinc, both inside and outside, and also parts with lead. I have also used prepared zinc paint. I maintain as a painter that you cannot get the same class of job with prepared paint sent to you by the manufacturer as you can with paint you make yourself.

18,388. All we practical painters agree?—I consider that prepared paint affords great facilities for adulteration.

18,389. How did you find the zinc stand outside?—In about 18 months it shelled off like distemper.

18,390. It stripped?—Yes.

18,391. Did you give it any special treatment as zinc or did you use it as ordinary white paint?—I used it as ordinary white paint. One was an enamel paint, and one was a zinc ground in oil. I used the one ground in turpentine thinned with oil and the enamel paint on top.

18,392. Ordinary linseed oil?—Ordinary linseed oil.

18,393. You have never tried any special treatment of zinc paint?—No. I tried it by the ordinary treatment to satisfy myself and get at the truth.

18,394. Just from trying it at home you think that two years is the life of zinc paint?—In exposed parts I do not think it would last that time, where it gets sun and rain.

18,395. You have not had much experience in the painting of iron-work?—No, not a great deal.

18,396. Where did you get your opinion about red lead?—Wherever I have had anything in the way of iron and I have treated it that way, I have found, when I have gone back two or three years afterwards, it is in a good state of preservation. I have been round dockyards and seen the Government ships painted with red lead, and I take it that they would not use it unless they had satisfied themselves about the efficacy of it.

18,397. The painter is very conservative?—I have been told that by many and many a traveller.

18,398. Have you ever tried white lead instead of red lead?—Yes.

18,399. Have you ever made a comparison?—No, I have not made a comparison, but I do not think that white lead will dry as hard and be as efficacious as red lead.

18,400. You have had no experience of ship work in that respect?—No.

18,401. On the question of inspection, do you know anything about tenement work?—Yes.

18,402. Because all work is not done in large houses?—I have done all buildings from the cottage to the palace.

18,403. I am not speaking about cottages in England, but about tenements in Scotland. If the regulations provided for a separate meal room and everything to be done away from the room where work was going on, in a one or two-roomed house the people would have to clear out?—Yes. In the tenement house that you speak of, there would be next to no danger, and in fact I think it would be a good thing in some of the tenements. It would be a disinfectant.

18,404. Suppose it was a six-roomed tenement and there was dry rubbing down?—I should think you would not have much dry rubbing down in a six-roomed tenement.

18,405. Your opinion is that there is danger from inhalation and absorption?—The little dry rubbing down that would take place in a small house would not have any effect unless the people were very susceptible to lead.

18,406. Would not the painters suffer just as much whether there are one or two apartments or more?—If lead is going to kill him, it will kill him. We all have to die when we are about 60 or 70, and if one thing does not kill us another will.

18,407. (Chairman.) As I understand it, it is a question first whether there is the same danger to a painter if it is a small house as if it is a large one?—In the class of property spoken of, the jobs are so short and such a little paint is used that there is not the same danger.

18,408. (Mr. Gardner.) You could not carry out regulations on that class of property at all unless you turned the people out of the house?—You could put up a shed in the back yard or something of the kind.

18,409. Supposing you had to do a tenement with a few rooms, you could not put up a temporary shed?—How many men would you have?

18,410. You might have two. What would you do in that case?—I would have one man and not let him stop there all day.

18,411. (Chairman.) Would not there be the same danger in the aggregate to the painter working day after day, week after week, in small houses, as there is if working in big houses?—Well, anyone susceptible to lead would probably get colic. Would you care to see the boards which I have brought?

18,412. (Chairman.) Yes. (The witness produced some boards. There were two boards, one filled up with a lead filler and one old painted board. The lead filler was cut down with sand paper and the other with pumice stone and water.)

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Mr. GEORGE PLUMB.

[Continued.]

(Witness.) We plastered *this* over with a compound of dry white lead and medium, and cut it down with sand-paper. It is only in extreme cases that we have to use a lead filler. People think that we have to take off every particle of old paint before we can paint

inside a house, but it is not always necessary. It depends on the state of the old paint. We cut down with pumice-stone and water.

18,413 (Mr. Sutherland.) There is no dry rubbing down in this case?—None whatever.

The witness withdrew

## THIRTY-FIRST DAY.

Thursday, 9th May 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (Chairman).

Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.

Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WERNER (Acting Secretary).

Professor WEFERS BETTINK.

Evidence to 18,416 handed in and taken as read; witness then called and examined (through an interpreter).

18,414. I am a doctor of chemistry and a pharmaceutical chemist, and was for upwards of 30 years Professor of Pharmaceutical Chemistry and Toxicology at the University of Utrecht. I have acted for the Government for many years in the investigation of cases of poisoning, industrial and otherwise.

18,415. A White Lead Commission was appointed by the Government of our country on the 13th of September 1903, and was charged to investigate "to what extent white-lead paint could be replaced by zinc-white paint or in other manner in Holland, and what objections of a technical as well as of a financial nature would eventually be connected therewith." It was composed of 15 members, comprising Government officials, chemists, technical persons, architects, and three master painters. In 1907 it issued a Provisional Report, which I produce, dated October 1906. This report was criticised extensively by Mr. O. P. van Hoek, of Gorinchem, who remarked that there were no exact data given for the comparative trials made as to the covering power of white lead and zinc oxide, upon which the Commission based its opinion:—"Zinc-white paint is in no respect inferior to white-lead paint as regards covering power, and may be said to cover even slightly better." Van Hoek proves that the coat of zinc oxide which was applied was much thicker than that of white lead, and also that the prepared paint of zinc oxide used was much thicker than the paint of white lead. All this is explained by him in his brochure, which I now produce.

18,416. The Netherlands Master Painters' Association issued a pamphlet No. 1 (which I now produce), dated October 1907, addressed to the Minister of Agriculture, Industry, and Commerce, criticising the conclusions of this Provisional Report, and pointing out that the zinc-oxide paint used by the Commission was much too thick and that it is quite impossible to work with such a paint. Following this opinion, without any doubt the test of spreading power results in favour of white lead; 106.6 grams of zinc oxide are wanted against 83.2 grams of white lead to obtain, spreading these quantities on the same surface, an equal coat (page 6). The Master Painters' Association did not confirm the advantages of grinding the paint of zinc oxide three times in a roller-mill, as was recommended by the Commission.

18,417. The Commission issued a Second Provisional Report, dated February 1908, which was again criticised by the Master Painters' Association in their pamphlet (No. 2), which I now produce, date

August 1908, addressed to the Minister as before. The Commission stated on page 8 of such Second Provisional Report:—

"There exists a difference between the various sorts of linseed oil and also between the quantities of paint they absorb."

and, dealing with the master painters' first pamphlet, go on to say:—

"If they (the master painters) had taken into consideration this circumstance instead of following to the letter the recipes given in the report, they would have obtained the same results as the Commission."

To this, however, the reply of the master painters in their No. 2 pamphlet is:—

"Zinc-white paint prepared in accordance with the recipes given by the Commission cannot be worked with."

18,418. Upon this point I may state that the criticisms offered by the master painters in their first (No. 1) pamphlet are not adequately answered by the Commission in their Second Provisional Report, as when a recipe or prescription is given in which specified quantities of materials are indicated, upon which conclusions about covering capacity and cost are founded, the recipes ought to be strictly followed and no arbitrary deviations permitted, otherwise there can be no standard of comparison between two sets of experiments.

18,419. In 1909 the definite Report was issued by the Commission, the principal conclusions of which are to be found on pages 26-28, and are as follows:—

### FINAL CONCLUSIONS.

18,420. "Taking everything together, the Commission are of opinion that their labours lead to the following conclusions:—

18,421. "1. Zinc-white paints are much better able to withstand the action of sulphuretted hydrogen gas than white-lead paints, which soon become motley and black. Where such gas occurs much—e.g., near stinking canals in our cities—zinc-white paints can be substituted for white-lead paints with good results."

18,422. "2. Zinc-white paints are not so well able to withstand frequent recurrent action of vapours containing sulphurous acid as white-lead paints are."

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Professor WEFERS BETTINK.

[Continued.]

"As the vapours occur in coal-smoke of locomotives, steamers, tall chimneys, &c., zinc-white paint which is much exposed to such-smoke, for instance, in railway stations, &c., will soon become corroded, and is certainly not able to replace white lead there."

18,423. "3. Zinc-white paints applied on zinc, Portland cement, or iron (the latter having previously been provided with first coats of red oxide of lead or iron) are able to withstand the action of the open air during five years quite as well as white-lead paints, and can entirely replace the latter, provided they are not exposed to the action of vapours containing sulphurous acid."

18,424. "4. Zinc-white paints applied on wood, iron, zinc, Portland cement, and plaster remain in an equally good condition in the interior of buildings as white-lead paints, and can entirely replace the latter there, provided they are not exposed much to vapours containing sulphurous acid or to great dampness."

18,425. "5. Zinc-white paints applied on wood, if not exposed much to the action of vapours containing sulphurous acid, will in many cases remain, during five years, in an equally good condition in the open air as white-lead paints, and can replace the latter with good results. But in all cases where accumulations of water remain during a long time, such as on window-sills, the lower side of cornice-work, &c., they will, even after three or four years, deteriorate in the course of a short period to such a degree that re-painting will become necessary for the preservation of the wood; in this respect, therefore, they are inferior to white-lead paints."

18,426. "6. Zinc-white paints, such as the White Lead Commission have used successfully, cover at least equally well as the white-lead paints customary in this country."

"The zinc-white putty used by the White Lead Commission is quite as serviceable as ordinary white lead putty."

18,427. "7. Painting with zinc-white paint, such as the Commission used on new woodwork in the open air is not dearer than painting with the white-lead paints customary for that purpose."

18,428. "8. Painting on existing paint-work, so-called re-painting, in the open air with zinc-white paints, such as the White Lead Commission used, is dearer than with the white-lead paints hitherto in use, inasmuch as the wood painted with zinc-white paints involves a greater expense in rendering it fit for re-painting than does wood painted with white lead in rendering it fit for further painting with white lead."

"In the case of painted wood which is exposed to the open air the possibility is not excluded that where such wood is in an unfavourable condition of humidity it may have to be re-painted sooner than if it had been painted with white-lead paints."

"In these circumstances the cost of maintenance of wood painted with zinc-white paint, and exposed to the open air, is further increased in connection with this shorter duration as compared with wood painted with white-lead paint."

18,429. "9. Lithopone paints cannot replace white-lead paints in the open air, because they have proved to be altogether unfit in this respect."

18,430. "10. For paint-work above water, first coats of oxide of iron have, during five years, proved to be quite as good and serviceable as first coats of red oxide of lead."

"For coats of paint under water, oxide of iron cannot be used."

"Coats of oxide of iron paint are cheaper than coats of red oxide of lead paint."

"When oxide of iron is used for the first coat much more technical ability is required for the painting of the covering coats than is the case when red oxide of lead is used for the first coat."

18,431. As to the advantage of zinc oxide, which is there stated, *i.e.*, that the zinc-oxide paint resists the influences of hydrogen sulphide ( $H_2S$ ) better than white lead, this is a fact which every painter will admit readily, knowing that white lead gets a darker tint after having been exposed to hydrogen sulphide. However, this circumstance has little or nothing to do with the durability of the paint, as the white-lead paint remains, although the colour changes. On the other hand, zinc oxide does not possess the same resistance as white lead against the influence of vapours containing sulphurous acid.

18,432. In the following conclusions (2-5) the equivalence of zinc oxide is stated, but every time the reservation has to be made: "Provided that the paint of zinc oxide is not exposed to the frequent influence of vapours containing sulphurous acids or to great moisture." But who can warrant this? In cities, in the neighbourhood of manufactories, in places where the atmosphere is defiled by the smoke of carbon, in rooms where gas of carbon is burnt, sulphurous acids always are present; nobody has it in his power to regulate the quantity of it, and its influence is of great importance, especially in the Dutch climate. So the equivalence of zinc oxide and white lead stated by the Commission is very conditional.

18,433. As to the conclusion in paragraph 6 that "zinc-white paints cover at least equally well as the white-lead paints," the criticisms pronounced by van Hoek and the Master Painters' Association must not be forgotten. My own observations and experiments have shown me that in fact zinc oxide possesses a less covering power than white lead; that is to say, a less opacity for the same quantity. The smaller density or lower specific weight of zinc oxide makes it possible to cover a greater surface than with the same quantity of white lead, the proportion being 355 to 307. Yet, because of the less opacity of zinc oxide it requires more coats of it to cover the same surface as well as white lead, three coats of zinc oxide being required for two of white lead. The true proportion which represents the comparative covering power of zinc oxide and white lead is therefore  $\frac{355}{3} = 118.3$  for zinc oxide and  $\frac{307}{2} = 153.5$  for white lead.

18,434. As to the conclusion in paragraph 7 that "painting with zinc white on new woodwork in the open air is not dearer than painting with white-lead paints," there must be taken into consideration with this what is said in paragraph 8: "Painting on existing paint-work, so called re-painting, in the open air, with zinc-white paints . . . is dearer than with the white-lead paints."

18,435. On page 16 of the Report the Commission informs us that all materials used have been examined in the chemical laboratory, and states the tests to which they were submitted. However, it does not appear that during the painting samples of the paint were taken and that those have been examined; this would have been desirable, especially in view of the complaint of many practical men that zinc-white paint such as is recommended by the Commission practically cannot be used.

18,436. That superficies of thousands of quadrato metres of Government buildings were painted with it is true; however, it is not correct that this was done with paint prepared as has been prescribed by the Commission. In fact, it was quite impossible to use so thick a pigment; the paint was often diluted with oil; sometimes without asking, sometimes with the consent of the persons who were appointed to control the tests, because these persons were convinced of the impossibility of working with such a paint.

18,437. Of course, the inference from all this is not that zinc oxide is not fit for use, but that the prescription given by the Commission is not fit for practical use. The Commission itself—as was shown in its Second Provisional Report—did not make any difficulty in increasing the quantity of oil, if this was necessary or desirable in the actual execution of the work.

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[Continued.]

18,438. It has been well known, since the researches of Stas in 1855, that white lead forms a certain chemical combination with linseed oil when mixed with it, which has been called a process of saponification. It is in consequence of this that, as it oxidises, white lead forms an elastic varnish, which expands and contracts with changes of temperature. Zinc oxide, on the other hand, does not enter into any combination with the oil, but remains inert, and the zinc oxide and the oil do not form a varnish as white lead does. In consequence of this, zinc oxide forms a hard surface after drying, which cracks and peels off, particularly if applied to materials exposed to water or condensation of water from the atmosphere. Further, I have heard neither from architects, inspectors, building contractors, nor from practical painters that zinc oxide can be esteemed equal to white lead for outside painting. My final opinion, tested by the experience of practical men and my own knowledge of chemistry, can only be that, as yet, white lead cannot be replaced by zinc oxide.

18,439. At present no regulations for the use of white lead in paint are in existence in Holland, but it is understood that some may be issued as a result of the Commissioners' report.

18,440. On the health question, I would call attention to the fact that the Dutch statistics must be read in the light of the fact that the majority of house-painters in Holland are men who were not physically strong enough to follow a more exacting vocation. They are generally recruited from among the weakest of the workboys. Their illness is frequently not so much attributable to white lead, but to their general weakness. It certainly would be desirable to substitute white lead by a less injurious (zinc oxide) or, better still, by a fully harmless pigment; but experience has shown, however, that up to now this is not possible.

18,441. As a chemist I cannot believe that there is any danger from poisonous emanations from surfaces freshly painted with white-lead pigment, as white lead is not volatile at normal temperatures, and it does not form volatile alliances.

18,442. In regard to burning off lead paint there can be no noxious fumes, as the only effect of the blowing lamp is to burn up the oil. The temperature created is not high enough to volatilise the lead from the compounds which would require 1,200°-1,400° Celsius. The resulting dust from rubbing down is, however, dangerous, and regulations should be made that, after burning off, the paint should be rubbed down wet, as is done in Germany and Austria.

18,443. It is also my opinion that the supply of dry white lead to painters should be prohibited, as there is far less danger in the use of white lead ground wet in oil, i.e., in the white lead factories the paste is prepared in a special way by grinding the white lead in oil while still containing 25 per cent. of water, or a sufficient percentage of water to entirely prevent any danger from dust. The painters themselves are more and more convinced that this white lead in paste is much to be preferred above the white lead in powder which was formerly used, principally because now the mixing of dry white lead with oil need not be done any longer in the painter's workshops, and the danger of dust has been so far completely removed. It is regarded as quite probable that if the Government contemplate the establishment of regulations these will include a prohibition of the use of dry white lead for painting, as has been done in Belgium. The increase of the consumption of white lead ground in oil is shown by the quantities which were delivered by G. Greve, white lead makers, of Utrecht, since 1907, in which year the new method of preparation of white lead mixed with oil was adopted by them:—

|      |   |   |   |             |
|------|---|---|---|-------------|
| 1908 | - | - | - | 380,000 kg. |
| 1909 | - | - | - | 547,318 "   |
| 1910 | - | - | - | 800,441 "   |

18,444. I wish to point out, also, that the Marine Department workshops at Amsterdam required, for 1909, 10,000 kilos, of white lead; and in 1910 the three Marine Department workshops together required 19,000 kilos.

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18,445. I have also asked myself, in conclusion how it is possible that after a struggle of more than a century zinc oxide has not yet taken the place of white lead, though from a hygienical point of view the former undoubtedly is to be preferred. Because, according to my opinion, the technical part of the question also weighs heavily, and because the greater majority of practical men, not from a passing opinion or from custom, are convinced that paint of zinc oxide, as to durability, is very inferior to paint of white lead.

18,446. I have purposely left out of consideration two points: First, the cost, as this will be dependent on the quotations of the raw materials, which fluctuate very much and very often; secondly, the political side, which has been connected with the white lead question. I wish to judge the question only from a scientific point of view. I cannot imagine that any Government, judging independently and not wishing to oblige a certain section, will resolve to prohibit the use of white lead, and other paints containing lead, unless they have absolute proof that an efficient substitute is available. Should such a prohibition be made, I would point out that after some years it might be necessary to return to the use of white lead, in consequence of the greater cost which the maintenance of zinc-oxide paint involves, according to the opinion of the greater majority of experts. Especially the cost of the painting-work for Government and municipal buildings would increase in such a manner that it would be very disadvantageous for the public purse.

18,447. (Chairman.) I understand that you have investigated cases of lead poisoning, on behalf of the Dutch Government, for many years?—Yes; not only lead poisoning, but poisoning cases in general.

18,448. Can you tell us how many of these cases occurred among painters?—Yes. In the Wilholmina infirmary or hospital of Amsterdam there has been in ten years only one case of a painter who was taken ill with lead poisoning. In the Binnengasthuis, another infirmary, in six years there has only been one case of a painter who was taken ill by reason of lead poisoning, and in the Roman Catholic Hospital, in ten years, there were two cases. Therefore, in the whole of Amsterdam, with 600,000 inhabitants, we had in six years four cases in hospital. This is taken from an official report of the City Council of the 7th April 1912.

18,449. Are there official statistics kept with regard to lead poisoning in the city of Amsterdam?—No, there are none.

18,450. So that there may be a very much larger number of cases of lead poisoning than is suggested by the four cases in hospitals?—Yes, but the serious cases will go through the hospitals. Occasionally there might be a case of minor interest, but the serious cases all fall back to the hospital.

18,451. Can you tell us why the Dutch people should be so immune from the danger of lead poisoning, when the people of other countries suffer very severely from it?—There is no immunity, but a good many cases of illness are attributed to lead poisoning which are not lead poisoning at all.

18,452. Do you speak now for Holland, or do you speak for the whole world?—I speak only for Holland.

18,453. What deduction are we to draw from what you have stated?—Of course, people are not immune, but it is a difficult thing to compare those statistics of other countries, the correctness of which I am not absolutely convinced of. I have spoken to 20 master painters, and in 40 years only one case of lead poisoning had occurred.

18,454. They admitted only one case?—During 40 years' experience only one case had occurred. Of course, this is only with regard to house-painters, not men engaged in white-lead works.

18,455. But you have told us that there are no official statistics?—No, in Holland there are none.

18,456. You are simply quoting your own opinion as to the immunity of the Dutch house-painters from lead poisoning?—It is not only my opinion, but an opinion based upon the information which I got from house-painters, from foremen, from engineers, and

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[Continued.]

different people who have been in connection with white lead.

18,457. But in what form have you obtained these opinions from these people? What other people have told you in the trade is only hearsay evidence. I want to get facts?—I have here the book of Mr. Van Hoek, master painter, "Waarom Geen Loodwit-Verbod."

18,458. (Mr. Sutherland.) Was he one of the Dutch Commission?—No. He gave evidence. I am no doctor; I am a chemical man, and therefore it is not in my way to keep statistics of lead poisoning. I deal only with the chemical part and not the medical part.

18,459. (Chairman.) If we see you that the statistics compiled for the English Government show that the suffering amongst house-painters who are engaged specifically in painting houses and the like is lamentable, you will probably agree that it must be lamentable where the same conditions prevail in other countries?—The high figures of those statistics are in my opinion to be attributed to the fact that they include all cases taken together not only from the painting trade but from the different works and the factories where they use white lead and lead in other forms.

18,460. I did not ask you to give us a criticism of our official figures. I have asked a simple question, and you must not answer me by giving a hypothetical reply with regard to the inaccuracy of our figures, because you are quite wrong about that?—There are no statistics whatever compiled in Holland, and therefore I do not feel at liberty to attribute any value to other statistics, especially as those statistics are all from the medical side and not the chemical.

18,461. In other words, you know nothing of the incidence of lead poisoning in Holland with regard to house-painters. You do not know whether it is great or small?—After my experience, I say that the amount of lead poisoning is very small; but I would like to say something before you ask another question just to throw a better light on what I am going to say. My personal experience is based on the fact that I personally investigated the matter in regard to twenty master house-painters who employ altogether 300 hands. Amongst those people the uniform idea was that a case of poisoning was very rarely heard of, and was generally attributed to gross carelessness.

18,462. In this investigation did you have the assistance of workmen?—I started by asking the masters, and then afterwards I asked the workers and compared their opinions. The workpeople themselves also were quite convinced of the little danger. Only one case was told me personally by a painter, who, as a young man, was poisoned through mixing the powder into paint.

18,463. When did your inquiry take place?—September and October 1911.

18,464. Last year?—Yes.

18,465. Was this information collected so as to enable you to give evidence here?—It was a thing that I was interested in, because the Dutch Commission Report was wrong. There were several points which were not right. There were several points that I did not agree with. I felt interested, and for that reason I started a personal investigation.

18,466. Do you contend that your opinion is more worthy of the consideration of this Committee than the conclusions of the Dutch Commission?—Whether my opinion is better or not I am not going to judge, but it is a different one.

18,467. You would prefer that this Committee, having heard your views, should weigh the two sets of evidence, your evidence and the evidence produced before the Dutch Commission, and come to their own conclusions?—The conclusion which I have come to is that technically white zinc cannot replace white lead.

18,468. I did not ask you that. That is not an answer to the question. I understand that the Dutch Commission had the assistance of doctors in their inquiry. Did you have the assistance of doctors when you made your inquiry?—No; there were no medical men as far as my knowledge goes on the Dutch Commission.

18,469. Did you have any medical men to assist you when you made your own inquiry?—I did not ask any medical man to assist me, for the reason only that I wanted to go in for the technical and toxicological and political side and not for the medical side.

18,470-2. You deal in paragraphs 18415-18418 of your proof with certain criticisms of the provisional Reports of the Dutch White Lead Commission. These criticisms were earlier in date than the final Report issued by the Commission, I believe?—Yes. Mr. Van Hoek's original criticisms were on the provisional Reports. My criticisms are of the final Report and I could not possibly have made them before having it. The first thing that I wrote about white lead was my pamphlet in July 1910. The Report of the Commission was issued 5th October 1909, and Mr. Van Hoek's criticisms were of the Reports of 1907 and 1908.

18,473. Do you adhere to the evidence given in those paragraphs of your proof? May the Committee take that as being authentic?—Yes, it is.

18,474. The conclusions of the Dutch Commission point to zinc-white paints being unsatisfactory where they are exposed to vapours containing sulphurous acid?—Yes, that is quite true.

18,475. These vapours occur in the coal smoke of locomotives, as, for example, in railway stations?—Everywhere where they burn gas and coal there is sulphurous acid in the atmosphere. They occur in railway stations because the locomotives burn coal.

18,476. Have you had any experience of other leadless paints in such places. For example, bituminous paints, graphite paints, carbonising coating paints, and iron oxide paints?—I have had some experience.

18,477. Will you tell us what your experience is?—My experience is that no zinc paint can replace white lead. It has not been found so up to now. The reason is that only white lead and linseed oil give an elastic coat which expands with the temperature and prevents the paint falling off.

18,478. On what authority do you give such a very emphatic opinion? Have you had any practical experience of painting?—My authority is based upon my knowledge of chemistry, and the fact that for a long time people have tried to find a substitute which up to now cannot be found.

18,479. But have you had any practical experience?—I have had no practical experience, being no painter, and having no chance to investigate the materials. My opinion is based simply on chemical conclusions.

18,480. Have you any experience of bituminous paints or graphite paints, or carbonising coating paints, or iron oxide paints?—I have not; but it is a noted fact that iron-oxide paints are wasted within three or four months, and this is stated by the Marine Authorities. Ships painted with iron oxide lose their coats within three or four months. The Marine people came to ask the reason, and I answered that it was due not to the iron but to the paint. I would like to add that carbon paint (graphite paint) is no paint at all: therefore I would rather disregard that, because it is no paint.

18,481. We have been told here that the paints which I have just enumerated are suitable for iron structures, such as railway stations, roofs, and bridges?—These paints can be used for rough iron-work, but they cannot be substituted for white lead, as they have not a sufficient covering power.

18,482. That statement is based not on any practical experience but on your theoretical knowledge as a chemist?—Yes.

18,483. You stated that sulphurous acid is always present in rooms where coal-gas is burnt. Do you mean us to understand that in your opinion zinc paint is especially unsuitable for such rooms?—My answer is that for inside work zinc paints when properly mixed with oil can be used, but for indoor work only.

18,484. The further reservation you mention is that these paints must not be exposed to great moisture. Does not this refer to such places as greenhouses?—They cannot be used in a wet atmosphere. In damp places they cannot be used, and a greenhouse being a damp place, they cannot be used there.



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[Continued.]

18,485. Evidence which has been given before this Committee shows that both lead and zinc paints are equally unsatisfactory in the presence of excessive humidity?—White lead is to be preferred because it is much better than white zinc. In the case of humidity white lead keeps longer.

18,486. Now, as regards paragraph 6, No. 18,433, you again quote the criticisms pronounced by Mr. Van Hoek and the Master Painters' Association?—Yes.

18,487. These criticisms, I believe, were pronounced before the final Report of 1909 was considered?—Yes, they were.

18,488. The Commission must, therefore, have considered that they had good grounds for brushing aside those criticisms, because, if they had not done so they would have accepted them?—I think it is quite probable that the Commission discarded them. My own opinions were expressed after the date of the final Report.

18,489. There were two master house-painters of great standing on the Dutch White Lead Commission which drew up the Report of 1909, I believe?—Yes.

18,490. You will understand that this Committee cannot attach much weight to the criticism of individual gentlemen, however eminent, when they are opposed to the considered conclusions of White Lead Commission appointed by the Government of their country?—I do not quite catch your meaning—that the Committee cannot attach much weight to the criticisms of individual gentlemen.

18,491. Your evidence, Mr. Van Hoek's evidence, and the evidence of any other gentleman before the Commission as individuals, could not weigh with us as a Committee in comparison with the definite conclusions to which the White Lead Commission of Holland came?—I repeat the answer above that whilst Mr. Van Hoek's opinion was expressed in reference to the interim Report, my own views were only expressed after the final Report was issued. Mr. Van Hoek also wrote further on the subject in 1911.

18,492. Now you agree that there are certain dangers which must be guarded against?—Absolutely.

18,493. For example, in paragraph 18,442, you advocate a regulation that paint-work should be rubbed down wet. Will you tell us how such a regulation could be enforced?—By law. It is done already in Amsterdam.

18,494. How would you suggest, with regard to various houses where painting is carried on, that we should see that the law was carried out?—First of all, we have in Holland special inspectors of labour and inspectors of buildings, and when a house is erected or repaired, they have a right to enter, and the inspector would see very easily if the regulation was not being carried out. They would not dare to do otherwise if it was the law.

18,495. Would the inspector be there all day to see that the law was complied with, or would he go there once a month?—He would go occasionally.

18,496. If this Committee are able to satisfy themselves that it is impossible to enforce such a regulation, would you agree that they must seek some other means of safeguarding the workers' health?—The only way is for the regulations to be enforced by government, as we are trying to do in Holland, and by seeing that sufficient care is taken when the law is carried through that it is obeyed. Of course, if it cannot be done by law, you have to look for something else.

18,497. In paragraph 18,443 you lay stress on the danger of supplying dry white lead to painters. Are you aware that in this country practically all white lead is supplied in paste form?—Yes.

18,498. The prohibition of the supply of dry white lead would therefore not help us to reduce the incidence of lead poisoning amongst painters in this country?—I cannot answer this by a single word, because contained in this question is a prohibition of the use of white lead. I still say that every care has to be taken as to washing of hands, &c. By answering it I am put into a corner. I am afraid that you will give a further meaning to my answer than I want to put into it.

18,499. (Dr. Collis.) How many house-painters are there in Holland?—I do not know exactly, but perhaps in Mr. Van Hoek's evidence you might find it.

18,500. How many house-painters are there in Amsterdam?—I do not know. I have not collected these figures. As I have said before, I do not compile statistics.

18,501. How many inspectors are there in Holland to look after the house-painters?—There are no special inspectors for house-painters. There are general inspectors of labour.

18,502. How many inspectors of labour are there in Holland?—There are, in Holland, 2 Head Inspectors, 7 Inspectors (First Class), 4 Inspectors (Second Class), 4 Lady Inspectors, 80 Assistant Inspectors, and 3 Assistant Lady Inspectors.

18,503. What other duties have these inspectors besides having to look after house-painters?—They have nothing to do with house-painters at present; they look after works to see to all requirements.

18,504. (Mr. Sutherland.) What was the purpose of the Dutch Commission? Why was it appointed?—Because from the Socialistic side there was a request to prohibit white lead, and to investigate the matter the Commission was appointed to make a thorough investigation.

18,505. But they do not seem to have inquired into white-lead paint as a poison. There is no evidence in their report that they considered it from a medical standpoint at all?—The poisonousness is generally known, and it was not necessary to investigate it again. It was a known fact that it was poisonous, and just because it was poisonous the Government thought that it was good to go into the matter.

18,506. But they do not seem to have gone into it at all from that standpoint?—In Holland it was a Socialistic question, because with using white zinc, which does not wear so long, more work would have to be done.

18,507. Then it was an economic question from the Socialist standpoint?—Yes, it was a Socialistic question. They wanted more work. The Government did not make that a political question, but said, "because it is poisonous, we will go into it from the standpoint of public health."

18,508. But there is no evidence of that at all in the Commission's Report?—Of course not; they are not going to mention that. If they said that in the Report, they would make it a political question. They took the technical side.

18,509. They simply inquired into the relative merits of white lead, zinc white, and lithopone?—Yes.

18,510. And they did not regard the question of lead poisoning at all?—The Commission tried to prove that white zinc was just as good as white lead. They could not say straightforwardly, "We prefer white zinc because it will mean more labour," but they said, "We prefer white zinc because it is less poisonous."

18,511. But they do not say anything in the Report about its being less poisonous. The basis of our Inquiry here is the evil effect of lead, and it runs right through the Inquiry, but in the case of the Dutch Commission they absolutely ignored it?—That is quite true.

18,512. May that be because there is very little lead poisoning with you?—I could not say, but on chemical grounds white lead is superior to white zinc.

18,513. To establish that point is really the burden of the Commission's Report?—Yes.

18,514. You will be interested to know that what you have stated about the rarity of lead poisoning is confirmed by the evidence which Mr. Nooijen of the Hague gave to this Committee?—Mr. Nooijen is the secretary of the master painters' association of the Netherlands outside Amsterdam. His association takes in all the master painters in Holland except Amsterdam. In the original White Lead Commission, poisoning was not spoken of at all. It simply is this, if I may read it to you: they had to consider how far in Holland white-lead paint could be replaced by

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[Continued.]

white zinc, and what technical and financial difficulties would be associated with it.

18,515. (*Chairman.*) The inference from that is that they had a reason for it, and the reason was the danger connected with lead?—Yes. The White Lead Commission in Holland was simply appointed because the Government, from the Socialistic side, were requested to investigate the replacement of white lead by white zinc, and the Socialistic party always hammered at the standpoint of poisoning. But it was a question of labour, and not poison. I cannot prove it strictly, but that is the general opinion.

18,516. (*Mr. Sutherland.*) Then you are of opinion that there is very little lead poisoning in Holland?—Very little as far as I know, but I am not a medical man, as I have told you.

18,517. That evidence confirms what we have heard before from Holland. Do you know anything of the effect of oil, turpentine, and driers, and the emanations that are given off?—It is only the turpentine that is given off. The oil by itself is not volatile.

18,518. But I refer to the noxious effects produced when the paint is drying by the vapours of the oil, turpentine and driers mixed with it?—Yes. It is known that the fumes of turpentine are poisonous to a certain extent. Might I refer to a case of a paint called inertol which happened a fortnight ago. They thought that it was lead poisoning, but it was only the turpentine which caused the noxious effects, because inertol does not contain lead at all.

18,519. Do these noxious effects produce the symptoms of nausea, headache and that kind of thing, even when zinc is the paint that is used?—Yes, it is exactly the same.

18,520. So that even if white lead were abolished, we should still have some of these symptoms which have been attributed to lead poisoning, but which really belong to the effect of the oil, turpentine, and driers?—Yes, but it is not lead poisoning.

18,521. No, but still there would be these effects?—Yes.

18,522. In your opinion I understand there is no really satisfactory substitute for white lead for outside places or places where there is damp and moisture?—My answer is that we can use white zinc, but it lasts for a much shorter time. There is no substitute which will last as long as white lead, or which will equal it.

18,523. What alternative are there to white lead for white paint?—Lithopone and white zinc.

18,524. Zinc oxide?—Yes, zinc oxide.

18,525. So that we are really limited to those two things for white paint. There is nothing that we can deal with except these two things and white lead on a large scale?—Up to now nothing else has been found.

18,526. So, that if white lead were abolished, we should be limited to these two alternatives?—Yes. Science is making progress, but up to the present white zinc is the only substitute. Men of science for more than 100 years have been looking for something which can be used as a substitute for white lead, but up to now nothing satisfactory has been found.

18,527. (*Mr. Gardner.*) You say that there is no satisfactory substitute for white lead. Have you yourself made any practical experiments with regard to the durability of different paints?—No, because I am not a technical chemical man, but a toxicological chemical man.

18,528. Then you only give us a personal opinion?—Yes.

18,529. Based on no practical experience?—I am no inventor. I am a man of science, but no inventor.

18,530. Is there a great deal of ill-health among house-painters in Holland?—As far as my knowledge goes, no, but it really is not in my line. I have to mention one important thing, and that is that the house-painters are generally workmen who are not strong enough to perform the duties of another avocation. They are not physically strong enough to be smiths or carpenters, and therefore they become ill because they are not really strong men. It is frequently the case that a man says, "My son is not fit

" for a carpenter, let him be a painter, because it is " easy work."

18,531. If it is the case that all the weaklings go to house painting, would it not follow that there would be a great deal of sickness in that trade?—I have no statistics, so I cannot answer that.

18,532. But you make the assertion that it is all the weaklings in Holland who go to the painting trade. On what ground do you say that? It is rather a strange thing to say that the majority of house-painters in Holland are men who are not physically strong enough to follow a more exacting avocation. Why would that be? Does a house-painter in Holland not get as good a wage, comparatively speaking, as men in other trades?—He is worse paid. It is the worst-paid trade.

18,533. All the men in the trade appear to be Socialists according to your evidence?—I will not go as far as that.

18,534. The deduction to be drawn from your evidence is that the Inquiry of the Commission into the question of white lead in Holland was because it was a political question and the men wanted more work. Their representatives in Parliament would not raise the question unless the men had first put the question forward?—Certainly, the men put the question forward. I told you before that the men put the question forward, the Socialistic men first, and the Government appointed in 1903 the White Lead Commission to investigate it technically and financially (I speak of the technical investigation, and not the statistical) with regard to how far white lead could be replaced by other paint.

18,535. You can give us no definite ground for saying that it is only weaklings who enter the painting trade in Holland? You have no authority for stating that?—What I say is the result of my personal research, but I cannot give any official papers about it or any exact official statement.

18,536. (*Mr. Parsonage.*) Have you made any tests yourself of the vapours arising from white lead and oil and turpentine, and also from zinc white and oil and turpentine?—It does not make any difference. I personally did not carry out any special researches on the question, because it is among chemical men a known fact that neither lead nor white zinc is volatile. It is simply the fumes of the turpentine which cause the sickness.

18,537. You have not made any test yourself to find out whether there is any difference between the emanations from turpentine, oil and zinc white, and the emanations from turpentine, oil and white lead?—No; and as lead only gets volatile at 1,100 degrees Centigrade, and not less, it is quite impossible.

18,538. It is quite impossible to make any test?—I do not want to investigate what I know already. It is no use looking into it, because it is a known fact.

18,539. But I want to get at the difference between the emanations from zinc white and the emanations from white lead?—Zinc gets volatile at 900 degrees. Therefore it is the same as lead. It does not get volatile before that, and it is only the fumes of turpentine.

18,540. Then if the oil and turpentine were mixed with nothing at all, you would still get the fumes from them that would cause illness?—Yes, of course.

18,541. Then we may take it that it is not the pigment at all that causes the poisoning?—It is not in the pigment, it is not in the paint, but it is in the turpentine, and if you were to paint with pure oil and pure turpentine the effect would be just the same. The pigment or colour has nothing to do with fumes.

18,542. (*Mr. Kinggate.*) I understand that you made an investigation on your own account, in which you obtained evidence from the workmen. I would like to know how the workmen from whom the evidence which you have placed before us was obtained were selected, if you say there is no poisoning from the workers' point of view?—I did not have any special system. I asked, for instance, a man who was working with me. I went to different painters who occasionally did jobs in my house, and then I went to Haarlem and asked different people, and I chatted

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[Continued.]

with the men and with the foremen, and that is how I got my information. My son is in the building trade, and he gave addresses of different painters.

18,543. You did not get men selected by the employers?—No, not at all. I had no interest. I did it simply for the sake of science. I asked masters as well as men to compare evidence to be sure it was right.

(Mr. Kinggate.) It appears that you entirely disagree with the decision of the Commission. I wondered whether it was possible that the men were selected by the employers to give evidence to bear out your own views in contradistinction to the decision of the Dutch Commission. I think that the point with regard to Socialism is rather an important one. If the Socialists are strong enough to force the Government to have a Commission to deal with the matter, and it is merely a question of more labour, I should imagine, seeing that this is the worst paid industry in Holland, that the Socialists were strong enough to go for a higher rate of wages. Socialism here would mean more money and less work.

18,544. (Mr. Robins.) On this Dutch Commission there were two master house-painters. Were those master house-painters recommended by the master house-painters of Holland as their representatives?—No. They were appointed by the Government.

18,545. Were they qualified men?—One of them is a decorative painter in Amsterdam of little importance, and the other is Mr. Kippel.

18,546. Seeing that these are qualified painters, how comes it about that great stress is laid on the imperfect manner in which the zinc white was mixed up for their experiments and nothing is said about anything being imperfect with regard to the white lead in their experiments. I recognise myself that the two master house-painters were men who knew their business, or they would not have been there, or ought not to have been there at any rate. It would have been their duty, as members of the Commission, to see that the zinc white was mixed up in a proper manner so that fair tests were made with zinc white the same as with white lead. We find nothing about the imperfect method with regard to white lead, but we find great stress laid on the imperfect method which was employed with regard to zinc white in those experiments. I would like to know the reason. As there are two painters on the Commission, I want to know whether it is a fallacy or not?—I think you have a translation of the book of Mr. Van Hoek. I cannot give exact evidence as I was not on the Commission. I must give an answer as an opinion, and not as a fact.

18,547. And you are not a practical painter?—The proof is in the book of Mr. Van Hoek.

The witness withdrew.

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Evidence to 18,674 handed in and taken as read; witness then called and examined.

18,548. I am a consulting actuary, a Fellow of the Royal Statistical Society, an Associate of the Institute of Actuaries, an actuary authorised by the Treasury to prepare and certify annuity and pensions tables dependent upon death-rates under the Friendly Societies Act, and an actuary authorised by the Board of Trade regulations under the Life Assurance Companies Act, 1909, to value assurance companies; since the year 1880 I have been continually engaged in making many statistical and actuarial investigations relating to the computation of death-rates, sickness rates, &c. I am the author of the "British Trade Book."

*Occupational Mortality.*

18,549. The following portion of my evidence relates to occupational mortality in various occupations in England and Wales. It is based solely upon Blue Book Cd. 2619, a supplement to the 65th Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, Part II., published in 1908.

18,550. The purpose of this investigation is to compare the mortality in occupational group (64) Plumber, Painter, Glazier, with the mortality in other occupations.

18,551. For this purpose I use mainly the facts contained in pages 3 to 159 of Cd. 2619. These pages show the death-rates per 1,000 living in a great number of different occupations, each set of death-rates being shown for seven periods of life from age 15 upwards.

18,552. In many cases these death-rates are shown in Cd. 2619 for "Occupied Males" and for "Occupied and Retired Males." I have used for this inquiry the death-rates of "Occupied Males."

18,553. In parts of Cd. 2619, other than pages 3-159, various "comparative mortality figures" are shown, these figures not being death-rates. In the remarks relating to these comparative mortality re-

sults the need for much caution in the use of them is strongly emphasised in the Blue Book. Some of the tables in Cd. 2619 which contain these comparative mortality figures have a note of warning as to drawing deductions from them, and a statement that these figures do not show the comparative mortality as between one occupation and another. Although, as is stated in the Blue Book, these comparative mortality figures do admit of comparison in each occupation of the death-rates in that occupation during different periods, such as 1880-1882, 1890-1892, 1900-1902. It is desirable to draw attention to the warning contained in Cd. 2619, because the neglect of this warning may lead to the forming of wholly erroneous ideas as to occupational mortality.

18,554. An essential feature of a comparison of occupational mortality is the age distribution of the years of life exposed to risk of death, the age distribution of the deaths that occurred, and the age distribution of the death-rates per 1,000 living, computed upon the two factors—exposures and deaths.

18,555. The objection to this process is, its much greater bulk in the presentation of the results than is necessary when a "comparative mortality figure" is used. The latter does not show age distinctions, while a comparison of death-rates must, to be sound, show the death-rate for each age-group throughout life.

18,556. But this disadvantage of greater bulk that attaches to the showing of occupational death-rates is, in my opinion, outweighed by the advantages of precision and of soundness of results that accompany the showing of death-rates in each age-group. It is my opinion that a comparison of occupational mortality based upon death-rates in each age-group is a superior mode of comparison to that which consists of the showing of a computed "comparative mortality figure" not distinguished as to age.

18,557. Thus, for the reason stated, this report is mainly based upon death-rates per 1,000 living in each age-group.

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TABLE A.—OCCUPIED MALES.

From Cd. 2619, pp. 3-159.

Mean Annual Death-Rates per 1,000 Living, 1900-1902, at Seven Age-Groups from Age 15 until Death.

The death-rates for occupation (64) Plumber, Painter, Glazier, are here compared with the death-rates in each age-group for each of 133 occupations in which the death-rate at any age-group is higher than the death-rate of occupation (64) Plumber, Painter, Glazier. Where the death-rate in any of the 133 occupations is lower than the death-rate in occupation (64) the space in the columns is left blank. Thus all the death-rates here recorded are higher than the death-rates in occupation (64) Plumber, Painter, Glazier.

| Occupied Males in various Occupations.<br>(The number in brackets at the left hand is the reference number of each occupation on pages 3-159 of Blue Book Cd. 2619. The page references are stated at the right hand.) | Mean Annual Death-Rates per 1,000 living. |        |        |        |        |        |               |
|--|---|--------|--------|--------|--------|--------|---------------|
|  | 15-19.                                    | 20-24. | 25-34. | 35-44. | 45-54. | 55-64. | 65 and older. |
| (64) Occupied plumber, painter, glazier, p. 106  | 2·02                                      | 3·77   | 5·59   | 11·56  | 21·34  | 35·73  | 80·75         |
| Occupied males, England and Wales, p. 3  | 2·44                                      | 4·41   | 6·01   | —      | —      | —      | 88·39         |
| Occupied males, London, p. 5   | 2·82                                      | 4·44   | 6·82   | 12·96  | 22·35  | —      | —             |
| Occupied males, industrial districts, p. 6   | 2·65                                      | 4·52   | 6·47   | 12·26  | 22·12  | 39·18  | 98·05         |
| Occupied males, agricultural districts, p. 7   | —   | 4·21   | —      | —      | —      | —      | 85·08         |
| (2) Barrister, solicitor, p. 10  | N.K.                                      | —      | —      | —      | —      | —      | 89·62         |
| (3) Law clerk, p. 11   | —   | 3·87   | —      | —      | —      | —      | —             |
| (4) Physician, surgeon, general practitioner, p. 12  | N.K.                                      | —      | —      | —      | —      | —      | 99·50         |
| (5) Schoolmaster, teacher, p. 13   | 2·11                                      | 4·04   | —      | —      | —      | —      | 90·78         |
| (6) Artist, engraver, sculptor, architect, p. 14   | 2·77                                      | 4·30   | —      | —      | —      | —      | 81·43         |
| (7) Musician, music master, p. 15  | 2·17                                      | 5·35   | 7·71   | 12·61  | 22·24  | 36·81  | —             |
| (8) Domestic indoor servant, p. 16   | —   | —      | 5·88   | —      | —      | —      | —             |
| (9) Commercial traveller, p. 17  | —   | —      | —      | —      | —      | —      | 87·41         |
| (10) Commercial clerk, insurance service, p. 18  | 2·16                                      | 4·69   | 5·78   | —      | —      | —      | —             |
| (11) Railway engine driver, stoker, p. 19  | 3·48                                      | 3·92   | —      | —      | —      | —      | 122·51        |
| (12) Railway guard, porter, pointsman, &c., p. 20  | 4·07                                      | 4·76   | —      | —      | —      | —      | —             |
| (13) Railway official, clerk, p. 22  | 2·54                                      | 5·11   | —      | —      | —      | —      | 91·78         |
| (14) Coach, cab, omnibus service, groom, p. 23   | —   | —      | 6·37   | 12·51  | —      | —      | 96·10         |
| (14a) Domestic coachman, groom, p. 24  | —   | —      | —      | —      | —      | —      | 147·38        |
| (14.) Tramway service, p. 25   | 2·39                                      | 4·76   | 6·69   | —      | —      | —      | —             |
| (15) Carman, carrier, &c., p. 26   | 2·80                                      | 4·29   | 6·71   | 13·09  | —      | 36·46  | 107·84        |
| (16) Bargeman, lighterman, waterman, p. 27   | 7·36                                      | 8·01   | 8·22   | 14·17  | 24·11  | 38·95  | 115·52        |
| (17) Seaman, &c., Merchant Service, p. 28  | 7·13                                      | 10·71  | 13·37  | 18·50  | 28·33  | 41·71  | 135·79        |
| (18) Dock labourer, wharf labourer, p. 29  | 2·05                                      | 5·18   | 9·69   | 17·38  | 26·89  | 38·39  | —             |
| (19) Messenger, porter, &c. (not railway or Government), p. 30   | 2·06                                      | 7·19   | 10·02  | 16·94  | 25·93  | 36·49  | —             |
| (20) Farmer, grazier, farmer's son, &c., p. 32   | 3·28                                      | —      | —      | —      | —      | —      | —             |
| (20a) Farmer, grazier, in agricultural districts, p. 33  | 3·49                                      | —      | —      | —      | —      | —      | —             |
| (21) Farm labourer, farm servant, p. 34  | —   | —      | —      | —      | —      | —      | 84·38         |
| (21a) Labourer, &c., in agricultural districts, p. 35  | —   | —      | —      | —      | —      | —      | 86·75         |
| (23) Fisherman, p. 39  | 3·38                                      | 6·40   | 8·05   | —      | —      | —      | 98·50         |
| (24) Malster, p. 40  | —   | —      | —      | —      | —      | —      | 115·98        |
| (25) Brewer, p. 41   | 2·31                                      | 5·19   | 7·30   | 16·03  | 25·38  | 44·93  | 95·07         |
| (26) Innkeeper, publican, spirit, wine, beer dealer, p. 42   | 2·04                                      | 4·94   | 13·53  | 21·15  | 29·04  | 47·32  | 90·68         |
| (26a) Innkeeper, &c., London, p. 43  | N.K.                                      | 4·09   | 10·85  | 21·83  | 28·84  | 42·48  | 81·67         |
| (26b) Innkeeper, &c., industrial districts, p. 44  | 8·55                                      | 3·84   | 16·51  | 28·13  | 34·19  | 55·82  | 97·35         |
| (26c) Innkeeper, &c., agricultural districts, p. 45  | N.K.                                      | 11·40  | 16·61  | 25·20  | 42·25  | —      | 85·40         |
| (27) Inn, hotel—servant, p. 46   | 3·03                                      | 5·90   | 14·21  | 26·28  | 33·87  | 37·30  | —             |
| (27a) Inn, hotel—servant, London, p. 47  | 3·12                                      | 5·39   | 14·47  | 30·39  | 43·24  | 50·31  | 83·95         |
| (27b) Inn, hotel—servant, industrial districts, p. 48  | 2·48                                      | 5·74   | 13·83  | 22·87  | 33·86  | 37·71  | —             |
| (27c) Inn, hotel—servant agricultural districts, p. 49   | 5·60                                      | 5·28   | 12·75  | 17·20  | —      | —      | —             |
| (28) Stationery manufacture, stationer, publisher, newsagent, p. 54  | 2·71                                      | 5·60   | 6·72   | —      | —      | —      | —             |
| (29) Chemist, druggist, p. 55  | 2·88                                      | 4·85   | 6·58   | —      | —      | —      | 95·40         |
| (30) Tobacconist, p. 56  | 2·76                                      | 5·88   | 6·76   | —      | —      | —      | —             |
| (31) Milk-seller, cheesemonger, &c., p. 57   | —   | —      | —      | —      | —      | —      | 94·10         |
| (33) Fruiterer, greengrocer, p. 59   | 2·51                                      | 5·01   | 6·49   | —      | —      | —      | —             |
| (35) Draper, linen draper, mercer, p. 61   | 2·07                                      | 4·37   | —      | —      | —      | —      | —             |
| (36a) Coal, coke—merchant, dealer, p. 63   | 2·38                                      | —      | —      | —      | —      | —      | —             |
| (37) Ironmonger, p. 64   | 2·05                                      | —      | —      | —      | —      | —      | —             |
| (38) General shopkeeper, p. 65   | 2·56                                      | 5·13   | 10·93  | 19·71  | 28·16  | —      | 82·96         |
| (39) Bookbinder, p. 67   | —   | 6·04   | 5·83   | —      | —      | —      | 82·08         |
| (40) Printer, p. 68  | 3·19                                      | 6·03   | 6·46   | —      | —      | —      | 87·61         |
| (40.) Lithographer; copper and steel plate printer, p. 69  | —   | 5·36   | 5·62   | —      | —      | —      | 82·25         |
| (41) Watch, clock, scientific instrument maker, jeweller, &c., p. 70   | —   | 3·94   | —      | —      | —      | —      | —             |
| (41a) Watch, clock—maker, p. 71  | 2·06                                      | 3·90   | —      | —      | —      | —      | —             |
| (42) Saddler, harness maker, p. 72   | —   | 4·70   | 6·08   | —      | —      | —      | 90·33         |
| (43) Butcher, p. 73  | —   | —      | 5·98   | 11·85  | —      | 37·65  | 99·03         |

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[Continued.]

TABLE A.—OCCUPIED MALES—continued.

| Occupied Males in various Occupations.<br>(The number in brackets at the left hand is the<br>reference number of each occupation on pages 3-<br>159 of Blue Book Cd. 2619. The page references<br>are stated at the right hand.) | Mean Annual Death-Rates per 1,000 living. |        |        |        |        |        |                  |
|--|---|--------|--------|--------|--------|--------|------------------|
|  | 15-19.                                    | 20-24. | 25-34. | 35-44. | 45-54. | 55-64. | 65 and<br>older. |
| (64) Occupied plumber, painter, glazier, p. 106  | 2·02                                      | 3·77   | 5·59   | 11·56  | 21·34  | 35·73  | 80·75            |
| (44) Miller, cereal food manufacturer, p. 74   | —   | —      | —      | —      | —      | —      | 98·23            |
| (45) Baker, confectioner, p. 75  | 2·26                                      | 3·80   | —      | —      | —      | —      | —                |
| (46) Hatter, p. 76   | 2·90                                      | 6·19   | 6·70   | —      | —      | 35·97  | 103·42           |
| (47) Tailor, p. 77   | 2·19                                      | 3·98   | 5·64   | —      | —      | —      | 83·09            |
| (48) Shoemaker, p. 78  | 2·65                                      | 5·14   | 6·33   | —      | —      | —      | 83·13            |
| (49) Hairdresser, p. 79  | 3·14                                      | 5·72   | 6·95   | 11·56* | —      | —      | —                |
| (50) Tallow, soap, glue, manure, &c.—manufacture,<br>p. 80.  | 2·42                                      | 4·13   | —      | —      | —      | —      | 83·33            |
| (50a) Tallow, soap—manufacture, p. 81  | 2·97                                      | 5·81   | —      | —      | —      | —      | 89·89            |
| (51) Tanner, p. 82   | 2·51                                      | —      | —      | —      | —      | —      | 89·45            |
| (51a) Furrier, skinner, p. 83  | 3·72                                      | 4·42   | 8·52   | 12·91  | —      | 51·28  | 107·84           |
| (52) Currier, &c., p. 84   | 2·36                                      | 5·24   | 5·71   | —      | —      | —      | 97·99            |
| (53) Engine, machine, boiler—maker, fitter, mill-<br>wright, p. 85.  | 2·38                                      | 4·30   | —      | —      | —      | —      | 99·73            |
| (53a) Engine, machine—maker, fitter, millwright,<br>p. 86.   | 2·44                                      | 4·36   | —      | —      | —      | —      | 101·46           |
| (53b) Boiler maker, p. 87  | —   | *3·77  | —      | —      | —      | 37·86  | 88·20            |
| (54) Tool, scissors, file, saw, needle—maker, p. 88  | 2·09                                      | —      | 6·32   | 13·65  | 25·97  | 42·05  | 100·65           |
| (54a) Cutler, scissors maker, p. 89  | —   | 3·85   | 7·58   | 16·98  | 31·94  | 46·18  | 112·65           |
| (54b) File maker, p. 90  | 2·62                                      | 4·88   | 9·72   | 17·80  | 34·29  | 49·86  | 99·57            |
| (55) Gunsmith, p. 91   | —   | 5·22   | 7·20   | —      | —      | 43·33  | 86·96            |
| (56) Lock, key, gasfittings—maker, gasfitter, p. 92  | 2·06                                      | —      | —      | —      | —      | —      | 86·08            |
| (57) Blacksmith, striker, p. 93  | —   | —      | —      | —      | —      | —      | 108·07           |
| (58) Nail, anchor, chain, &c., p. 94   | 2·91                                      | 4·67   | 6·80   | 11·88  | 22·43  | 40·15  | 124·70           |
| (59) Copper, tin, zinc, lead, brass, &c.—manu-<br>facturer, worker, p. 95.   | 2·38                                      | 4·82   | 5·95   | —      | —      | —      | 88·41            |
| (59a) Copper manufacturer, worker; coppersmith,<br>p. 96.  | 2·17                                      | 6·23   | 5·83   | —      | 21·97  | 38·28  | 108·36           |
| (59b) Tinplate manufacturer, tinplate goods maker,<br>p. 97.   | 3·02                                      | 5·40   | 6·59   | —      | —      | —      | 91·44            |
| (59c) Zinc manufacturer, worker, p. 98   | 3·72                                      | 5·11   | —      | 13·77  | —      | —      | —                |
| (59d) Lead manufacturer, leaden goods maker, p. 99   | 3·58                                      | 5·54   | 7·48   | 12·89  | 21·39  | 63·70  | 164·18           |
| (59e) Brass, bronze—manufacturer, founder, finisher,<br>&c., p. 100.   | 2·22                                      | 5·13   | 5·86   | 12·79  | —      | 36·60  | 83·78            |
| (60) Bricklayer, mason, builder, p. 102  | —   | —      | —      | —      | —      | —      | 88·12            |
| (61) Carpenter, joiner, p. 103   | —   | —      | —      | —      | —      | —      | 81·03            |
| (62) Slater, tiler, p. 104   | —   | —      | 5·90   | 13·90  | 21·45  | —      | 108·92           |
| (65) Cabinet maker, &c., p. 107  | 2·61                                      | —      | —      | —      | —      | —      | 82·99            |
| (66) Sawyer, p. 108  | 2·53                                      | —      | —      | —      | —      | —      | 103·12           |
| (67) Wood turner, cooper, &c., p. 110  | —   | 4·46   | 6·23   | 11·69  | 24·98  | —      | 92·82            |
| (68) Coach, carriage, railway coach, &c.—maker,<br>p. 111.   | —   | —      | —      | —      | —      | —      | 93·99            |
| (68a) Cycle and motor manufacture, p. 112  | 2·32                                      | 5·44   | 6·21   | —      | —      | —      | —                |
| (69) Wheelwright, p. 113   | —   | —      | —      | —      | —      | —      | 96·51            |
| (70) Shipbuilding, p. 114  | 2·43                                      | —      | —      | —      | —      | —      | —                |
| (71) Chemical manufacture, p. 115  | —   | —      | —      | —      | 21·44  | 41·25  | 98·13            |
| (72) Wool, worsted—manufacture, p. 116   | 2·19                                      | 5·03   | —      | —      | —      | 37·10  | 128·92           |
| (72a) Wool, worsted—manufacture, West Riding,<br>p. 117.   | 2·20                                      | 5·23   | —      | —      | —      | 36·70  | 129·95           |
| (73) Silk, satin, crape, &c.—manufacture, p. 118   | 2·30                                      | —      | —      | —      | —      | 36·01  | 107·55           |
| (74) Cotton manufacture, p. 119  | 2·68                                      | 4·32   | —      | —      | —      | 41·15  | 127·81           |
| (74a) Cotton manufacture, Lancashire, p. 120   | 2·74                                      | 4·36   | —      | —      | —      | 42·13  | 129·29           |
| (75) Lace manufacture, p. 121  | 2·58                                      | —      | 6·71   | —      | —      | —      | 87·56            |
| (76) Rope, twine, cord—maker, p. 122   | 2·20                                      | 5·75   | 6·47   | —      | —      | —      | 105·86           |
| (77) Textile dyer, bleacher, printer, finisher, &c.,<br>p. 123.  | 3·30                                      | 4·58   | 5·83   | —      | —      | 41·36  | 125·16           |
| (78) Carpet, rug, felt—manufacture, p. 124   | 2·89                                      | 5·19   | 5·86   | —      | —      | —      | 116·77           |
| (79) Hosiery manufacture, p. 125   | —   | 5·75   | —      | —      | —      | —      | 192·13           |
| (79a) Hosiery manufacture, Leicestershire and<br>Nottinghamshire, p. 126.  | —   | 5·22   | —      | —      | —      | —      | 131·89           |
| (80) Paper manufacture, p. 128   | 3·46                                      | 4·01   | —      | —      | —      | —      | 94·80            |
| (81) Potter; earthenware, &c., manufacture, p. 129   | 2·62                                      | —      | —      | 14·52  | 31·64  | 54·15  | 118·25           |
| (82) Glass manufacture, p. 130   | 3·22                                      | 5·09   | 6·74   | 13·14  | 24·14  | 41·84  | 119·38           |
| (83) Coal miner, p. 131  | 3·20                                      | 4·47   | —      | —      | —      | 35·98  | 139·82           |
| (83a) Coal miner, Durham and Northumberland,<br>p. 132.  | 3·14                                      | 4·88   | —      | —      | —      | —      | 155·40           |
| (83b) Coal miner, Lancashire, p. 133   | 3·65                                      | 4·86   | 6·01   | —      | —      | 42·41  | 136·61           |
| (83c) Coal miner, West Riding, p. 134  | 2·85                                      | —      | —      | —      | —      | —      | 142·19           |
| (83d) Coal miner, Derbyshire and Nottinghamshire,<br>p. 135.   | 2·56                                      | 3·79   | —      | —      | —      | —      | 149·04           |

\* This death-rate is identical with that of occupation (64).

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TABLE A.—OCCUPIED MALES—continued.

| Occupied Males in various Occupations.<br>(The number in brackets at the left hand is the reference number of each occupation on pages 3-159 of 'Blue Book Cd. 2619. The page references are stated at the right hand.) | Mean Annual Death-Rates per 1,000 living. |        |        |        |        |        |               |
|---|---|--------|--------|--------|--------|--------|---------------|
|   | 15-19.                                    | 20-24. | 25-34. | 35-44. | 45-54. | 55-64. | 65 and older. |
| (64) Occupied plumber, painter, glazier, p. 106   | 2·02                                      | 3·77   | 5·59   | 11·56  | 21·34  | 35·73  | 80·75         |
| (83e) Coal miner, Staffordshire, p. 136   | 2·49                                      | 4·00   | —      | —      | —      | 38·00  | 163·21        |
| (83f) Coal miner, Monmouthshire and South Wales, p. 137.  | 4·03                                      | 5·01   | 5·78   | —      | —      | 39·84  | 105·30        |
| (84) Ironstone miner, p. 138  | 3·08                                      | —      | —      | —      | —      | —      | 98·27         |
| (85) Copper miner, p. 139   | 9·35                                      | N.K.   | 14·57  | 23·08  | —      | 48·78  | 116·40        |
| (86) Tin miner, p. 140  | —   | 5·53   | 13·41  | 27·15  | 38·75  | 72·17  | 222·22        |
| (87) Lead miner, p. 141   | 6·14                                      | 4·81   | 7·40   | 12·91  | —      | 50·61  | 215·78        |
| (89) Stone, slate—quarrier, p. 143  | 2·64                                      | 4·50   | —      | —      | —      | —      | 94·23         |
| (90) Coalheaver, p. 144   | 3·49                                      | 4·55   | 7·91   | 14·75  | 21·54  | —      | —             |
| (91) Gas works service, p. 145  | 2·86                                      | —      | —      | —      | —      | —      | 85·04         |
| (92) Platelayer, railway labourer; navy, &c., p. 146  | 3·07                                      | 3·89   | —      | —      | —      | —      | —             |
| (93) Brick, plain tile, terra cotta—maker, p. 147   | 2·39                                      | 4·01   | —      | —      | —      | —      | 83·94         |
| (94) Costermonger, hawk, &c., p. 148  | 4·39                                      | 6·83   | 13·28  | 24·92  | 35·99  | 41·95  | —             |
| (95) General labourer, p. 149   | 4·42                                      | 9·03   | 14·44  | 24·92  | 38·61  | 55·26  | 155·64        |
| (95a) General labourer, London, p. 150  | 3·81                                      | 7·88   | 13·39  | 24·54  | 36·73  | 43·06  | —             |
| (95b) General labourer, industrial districts, p. 151  | 5·44                                      | 9·98   | 16·00  | 31·86  | 50·16  | 68·89  | 153·53        |
| (96) Engine driver, stoker, &c. (not railway, marine, or agricultural), p. 152.   | 3·21                                      | 5·29   | —      | —      | —      | —      | 104·13        |
| (99) Chimney sweep, p. 153  | 3·55                                      | —      | 6·03   | 16·93  | 25·13  | 38·18  | —             |
| (102) Gamekeeper, p. 156  | —   | —      | —      | —      | —      | —      | 106·26        |
| (103) India rubber, gutta percha—worker, &c., p. 157.   | 2·77                                      | 5·47   | 6·28   | —      | —      | —      | 94·80         |
| (104) Brush, broom—maker; hair, bristle—worker, p. 158.   | 3·51                                      | 6·08   | 7·93   | 11·68  | 22·72  | 39·52  | 92·29         |
| (105) Other occupied males, p. 159  | 2·46                                      | 4·36   | 6·22   | —      | —      | —      | —             |

18,558. I have prepared Table A. from pages 3-159 of Cd. 2619. This table relates to 133 occupational groups of Occupied Males in England and Wales, and also to occupation (64) Plumber, Painter, Glazier. The period covered by the facts is 1900-1902. Occupied groups.

18,559. The mode of constructing Table A. is as follows:—

Every occupation on pages 3-159 of Cd. 2619 has been examined as regards its death-rate per 1,000 living in each age-group. In those few cases where the death-rates for "Occupied" Males are not shown, the facts have been excluded. For Table A. relates solely to "Occupied" Males, not to "Occupied and Retired" Males. Each occupational group was then compared, age by age, with occupational group (64) Plumber, Painter, Glazier, as regards the death-rate per 1,000 living at each age-group. In every case where the death-rate of each of these 133 occupations was higher than the death-rate, at the same age, of occupation (64), such higher death-rate has been entered in Table A. In every case where the death-rate of each of these 133 occupations was lower than the death-rate, at the same age, of occupation (64), such lower death-rate has been omitted from Table A. and a blank space left in the seven right-hand columns of Table A.

18,560. By this mode of construction, Table A. at once discloses all those occupations whose death-rates at any age were higher than the death-rates in occupation (64) Plumber, Painter, Glazier, because no death-rates that are not higher than the death-rates in occupation (64) are entered in Table A.

18,561. This full process of investigation supplies an interesting and instructive comparison between the death-rates of occupation (64) Plumber, Painter, Glazier, and the death-rates of 133 other occupations which are included in Table A. Moreover, this comparison is shown for each age-group throughout life. We are on solid ground, and we are free from the warning of danger in Cd. 2619 that attaches to the use of a "comparative mortality figure" lacking age distinction.

18,562. Inspection of Table A. at once shows the great number of occupations and the great variety of

occupations in which the death-rates are higher than the death-rates in occupation (64) Plumber, Painter, Glazier, at one or more of the seven age-groups.

18,563. In this connection I may point out that there are only six occupations in England and Wales, out of the great number examined in Cd. 2619, where the death-rate at all age-groups is lower than the death-rate in occupation (64). These six occupations are—

- (1) Clergyman, &c., page 9 of Cd. 2619.
- (22) Gardener, &c. " 36 " "
- (32) Fishmonger, &c. " 58 " "
- (34) Grocer, &c. " 60 " "
- (36) Coal merchant, &c., page 62 of Cd. 2619.
- (63) Paperhanger, &c. " 105 " "

18,564. In all other occupations in England and Wales the death-rate at one or more of the seven age-groups is higher than the death-rate in occupation (64) Plumber, Painter, Glazier.

18,565. Look, for instance, at Occupied Males, England and Wales, in Table A. In four of seven age groups the death-rates are higher than the death-rates in occupation (64). But the group Occupied Males, England and Wales, is a great group, including nearly 30 millions of years of life at risk (page 3, Cd. 2619); and containing many professional, commercial, and other occupations, not any of which are exposed to any "industrial" risk of death. Despite these facts, occupation (64) Plumber, Painter, Glazier, can be compared with All Occupied Males with the result that at four age-groups the comparison is in favour of occupation (64), and at three age-groups the comparison is in favour of All Occupied Males.

18,566. In Occupied Males, London, years at risk over four millions (page 5, Cd. 2619), the death-rates are higher than the death-rates in occupation (64), in no fewer than five of the seven age-groups in Table A. These higher death-rates extend from age 15 to age 54. Occupied Males in London include a large proportion of professional and commercial men, civil servants, and others who are not exposed to any "industrial" risk of death.

18,567. In the group Occupied Males, industrial districts of England and Wales, Table A., the death-

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rates are higher at every age-group than the death-rates in occupation (64). This group, relating to industrial districts, contains nearly eight millions of lives at risk (page 6 of Cd. 2619), and, of the big groups of lives, it is the one with which occupation (64) may most justly be compared.

18,568. Inspection of Table A. will disclose occupation after occupation where the advantage of comparison as regards death-rates per 1,000 living in each age-group is held by the occupation (64) Plumber, Painter, Glazier.

18,569. Here is a summary based upon Table A. and relating to the 127 occupational groups for which the death-rates at all age-groups are known. In six of the occupations in Table A. the letters N.K. are inserted in one or more of the death-rate columns. This means that the death-rates are not known. And 133 - 6 = 127.

18,570. Number of Occupations in Table A. with Death-rates Higher than the Death-rates of Occupation (64) Plumber, Painter, Glazier.

|   |   | No. of Occupations. |    |
|---|---|---------------------|----|
| Death-rates higher in 7 of the 7 age-groups |   | -                   | 14 |
| " " 6 " 7 "                                 | " | -                   | 16 |
| " " 5 " 7 "                                 | " | -                   | 9  |
| " " 4 " 7 "                                 | " | -                   | 23 |
| " " 3 " 7 "                                 | " | -                   | 30 |

|   |   | No. of Occupations. |
|---|---|---------------------|
| Death-rates higher in 2 of the 7 age-groups |   | - 15                |
| " " 1 " 7 "                                 | " | - 20                |
| Total                                       |   | - 127               |

18,571. The six other occupations in Table A., where at some ages the death-rates are not known, show that in one case the death-rate is higher than the death-rate of occupation (64) in six ages out of six ages, one case in five ages out of five ages, one case in five ages out of six ages, three cases in one age-group out of six age-groups. These six occupations, with the 127 already stated, make up the total of 133 occupations having death-rates higher than the death-rates in occupation (64) Plumber, Painter, Glazier, Table A.

18,572. It is impossible to examine Table A., noting that it is based upon the officially recorded death-rates at each age-group stated on pages 3-159 of Cd. 2619, without coming to the conclusion that the death-rates in occupation (64) Plumber, Painter, Glazier, do not compare unfavourably with the death-rates of most of the other occupations in England and Wales of a greatly varied nature. While as regards occupied males in England and Wales, occupied males in London, occupied males in industrial districts, the advantages of the comparison is held by occupation (64) Plumber, Painter, Glazier.

18,573. TABLE B.

This is a summary relating to Table A. It shows for 133 occupations, other than occupation (64) Plumber, Painter, Glazier, the number of such occupations where the death-rates are above or below the death-rates in occupation (64).

| Ages.        | 133 Occupations with Death-rates above or below the Death-rates in Occupation (64), Plumber, Painter, Glazier. |                                   |                  | Percentage Results of Columns (a), (b), (c). |                                   |                  |
|--------------|--|-----------------------------------|------------------|--|-----------------------------------|------------------|
|              | Death-rate above Occupation (64).  | Death-rate below Occupation (64). | Total (a and b). | Death-rate above Occupation (64).            | Death-rate below Occupation (64). | Total (d and e). |
|              | (a)  | (b)                               | (c)              | (d)  | (e)                               | (f)              |
| 15-19        | 98   | 30                                | *128             | Per cent. 77                                 | Per cent. 23                      | Per cent. 100    |
| 20-24        | 94   | 37                                | *131             | 72   | 28                                | 100              |
| 25-34        | 71   | 62                                | 133              | 53   | 47                                | 100              |
| 35-44        | 43   | 90                                | 133              | 32   | 68                                | 100              |
| 45-54        | 35   | 98                                | 133              | 26   | 74                                | 100              |
| 55-64        | 49   | 84                                | 133              | 37   | 63                                | 100              |
| 65 and older | 100  | 33                                | 133              | 75   | 25                                | 100              |
| All ages     | 400  | 434                               | 924              | 53   | 47                                | 100              |

\* The reason why these two totals are less than 133 is that there are seven instances where the death-rates at ages 15-19 and 20-24 are not known. See Table A.

NOTE.—Observe that in four of the seven age-groups, and also for "All ages," the death-rates of the 133 occupations, as a whole, are higher than the death-rates in occupation (64). And that in three of the seven age-groups, the death-rates of, the 133 occupations, as a whole, are lower than the death-rates in occupation (64) Plumber, Painter, Glazier.

18,574. Table B. is a summary relating to Table A. It shows for 133 occupations, other than occupation (64), and for each age-group, the number of occupations that have a death-rate higher or lower than the death-rate in occupation (64) Plumber, Painter, Glazier. At ages 15-19, 20-24, 25-34, 65 and older, and at all ages combined, the death-rates of a majority of these 133 occupations are higher than the death-rates of occupation (64). At ages 35-44, 45-54, 55-64, the death-rates of a majority of these 133 occupations are lower than the death-rates of occupation (64). Thus, on balance, and during the larger part of life, the death-rates in occupation (64) compare favourably rather than unfavourably with the death-rates of many other occupations.

18,575. It should be noted that the death-rates of occupation (64) in Table A. include the deaths caused by plumbism—lead poisoning. This is a disease to which occupation (64) is more exposed than are many other occupations which have their own special risks. But despite this fact, the death-rates in occupation (64) are by no means unduly high, as has been shown in Tables A. and B.

18,576. The death-rates from plumbism can be computed by means of the facts on page 106 of Cd. 2619, relating to occupation (64).

18,577. During 1900-02, the period to which the facts relate, there were 155 deaths from plumbism during the three years upon a total of 664,251 years of life exposed to risk of death. The average yearly

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results are 52 deaths from plumbism upon an exposure of 221,417 years of life.

18,578. The death-rates from plumbism for each age-group, as computed upon the facts stated on page 106 of Cd. 2619, are shown in Table C.

18,579. TABLE C.

Occupation (64) Plumber, Painter, Glazier, Occupied Group only. Period 1900-02. Death-rates per 1,000 living: Distinguishing deaths from plumbism, deaths from other causes, deaths from all causes.

| Ages.                  | Mean Annual Death-rates per 1,000 living. |                          |                  |
|------------------------|---|--------------------------|------------------|
|                        | From Plumbism.                            | From other Causes (c-a). | From all Causes. |
|                        | (a)                                       | (b)                      | (c)              |
| 15-19 . . . . .        | ·04                                       | 1·98                     | 2·02             |
| 20-24 . . . . .        | ·03                                       | 3·74                     | 3·77             |
| 25-34 . . . . .        | ·08                                       | 5·51                     | 5·59             |
| 35-44 . . . . .        | ·40                                       | 11·16                    | 11·56            |
| 45-54 . . . . .        | ·56                                       | 20·78                    | 21·34            |
| 55-64 . . . . .        | ·38                                       | 35·35                    | 35·73            |
| 65 and older . . . . . | ·38                                       | 80·37                    | 80·75            |
| All ages . . . . .     | ·23                                       | 12·08                    | 12·31            |

(From Cd. 2619, page 106.) The mean annual death-rate from plumbism =  $\frac{\text{Number of deaths from plumbism} \times 1,000}{\text{years of life at risk}}$ .

NOTE.—At "all ages" the death-rate from plumbism above is  $\frac{1}{4}$ th part of the death-rate from all causes. If only ages

18,580. Table C. shows that the highest death-rate from plumbism in occupation (64) is at ages 45-54, namely, 56 deaths per 1,000 men at risk for one year, or 5·6 deaths per 10,000 men at risk for one year. At all ages the death-rate from plumbism in occupation (64) is 23 deaths per 1,000 living, or 2·3 deaths per 10,000 men at risk for one year. This rate is much smaller than the special death-risks that attach to various other occupations, and it is relatively trivial.

18,581. Mean Annual Death-rate per 1,000 living Occupation (64), Plumber, Painter, Glazier. All Ages

|                             |              |
|-----------------------------|--------------|
| From plumbism . . . . .     | 23           |
| From other causes . . . . . | 12·08        |
| From all causes . . . . .   | <u>12·31</u> |

It is known that the death-rates of the population of England and Wales have been decreasing for many years. It is desirable to ascertain whether or not the decrease in the death-rates in occupation (64) has kept pace with the decrease in the death-rates of the whole population.

25-64 be taken, the death-rate from plumbism (computed from page 106 of Cd. 2619) is 31 in place of 23 above. And the death-rate from all causes is then 13·99 in place of 12·31 above. At ages 25-64 the death-rate from plumbism is therefore  $\frac{31}{12·31}$ th part of the death-rate from all causes. In Table G, using the "comparative mortality figure" from Cd. 2619, the mortality from plumbism is  $\frac{31}{12·31}$ th part of the mortality from all causes in occupation (64). Thus the result based upon death-rates brings out a slightly higher incidence of deaths from plumbism than is shown by the official "comparative mortality figure" in Table G.

18,582. TABLE D.

Death-rates of Males, per 1,000 living, at ages 25-45 and 45-65, Occupied Groups, Periods 1880-82, 1890-92, 1900-02, showing the large Decrease in the Death-rates in Occupation (64), Plumber, Painter, Glazier.

|   | 1880-82. | Decrease from (a) to (c). | 1890-92. | Decrease from (c) to (e). | 1900-02. | Decrease from (a) to (f). |
|---|----------|---------------------------|----------|---------------------------|----------|---------------------------|
|   | (a)      | (b)                       | (c)      | (d)                       | (e)      | (f)                       |
| (64) Plumber, painter, glazier (occupied):— |          |                           |          |                           |          |                           |
| Ages 25-45 . . . . .                        | 11·07    | 0·60                      | 10·47    | 2·19                      | 8·28     | 2·79                      |
| Ages 45-65 . . . . .                        | 32·49    | 0·79                      | 31·70    | 5·62                      | 26·08    | 6·41                      |
| All occupied males (England and Wales):—    |          |                           |          |                           |          |                           |
| Ages 25-45 . . . . .                        | 9·71     | 0·19                      | 9·52     | 1·68                      | 7·84     | 1·87                      |
| Ages 45-65 . . . . .                        | 24·63    | Increase 2·06             | 26·69    | 3·96                      | 22·73    | 1·90                      |

Excess of Death-rates in Occupation (64) over Death-rates of all Occupied Males in England and Wales.

|   |       |   |       |   |       |   |
|---|-------|---|-------|---|-------|---|
| Occupation (64) . . . . . 25-45           | 11·07 | — | 10·47 | — | 8·28  | — |
| All occupied males . . . . . 25-45        | 9·71  | — | 9·52  | — | 7·84  | — |
| Excess of occupation (64) . . . . . 25-45 | 1·36  | — | 0·95  | — | 0·44  | — |
| Occupation (64) . . . . . 45-65           | 32·49 | — | 31·70 | — | 26·08 | — |
| All occupied males . . . . . 45-65        | 24·63 | — | 26·69 | — | 22·73 | — |
| Excess of occupation (64) . . . . . 45-65 | 7·86  | — | 5·01  | — | 3·35  | — |

(From Cd. 2619, Table VII., pages cci and cciii.)

NOTE.—Observe that the death-rates in occupation (64) have been decreasing since 1880-82 at a much greater rate than the decrease in the death-rates of all occupied males.

18,583. This comparison may be made by means of facts are contained in Table D., appended, which Table VII. on pages cci and cciii of Cd. 2619. The compares the mean annual death-rates per 1,000 living



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of occupation (64) Plumber, Painter, Glazier, with the death-rates of All Occupied Males in England and Wales during 1880-82, 1890-92, 1900-02. In this connection only two age-groups are shown in Cd. 2619, and they are repeated in Table D. These groups are 25-45, 45-65. They cover the main working period of life.

18,584. Inspection of Table D. shows plainly that as regards decrease in death-rates the advantage is largely held by occupation (64) when compared with All Occupied Males in England and Wales. From 1880-82 to 1890-92, from 1890-92 to 1900-02, from 1880-82 to 1900-02, the decrease in the death-rates in occupation (64) was in every instance much larger than the decrease in the death-rates of All Occupied Males in England and Wales.

18,585. The lower part of Table D. shows the large decrease in the excess of death-rates in occupation (64) over the death-rates of All Occupied Males that has occurred since 1880-82. This is a severe test of the death-rates in occupation (64), because the group, All Occupied Males, includes a large number of men who are not exposed to any "industrial risk" of death. But the occupation (64) stands this test.

18,586. A much fairer test is to compare the death-rates of occupation (64) with the death-rates of All Occupied Males in industrial districts. This test can be applied for the periods 1890-92 and 1900-02, with the advantage of showing the results for seven age-groups. See Table E.

18,587. TABLE E.

Showing the Death-rates, and the Decrease in the Death-rates, during 1890-92 and 1900-02. For Occupation (64) Plumber, Painter, Glazier: and for All Occupied Males, Industrial Districts, England and Wales.

| Ages.        | Occupation (64), Plumber, Painter, Glazier, Occupied only. |          |                                |   |           |                                | All Occupied Males, Industrial Districts, England and Wales. |          |                                |   |           |                                |
|--------------|--|----------|--------------------------------|---|-----------|--------------------------------|--|----------|--------------------------------|---|-----------|--------------------------------|
|              | Mean Annual Death-rates per 1,000 living.                  |          |                                | Decrease in Death-rates during 1900-02, taking the Death-rates during 1890-92 at 100. |           |                                | Mean Annual Death-rates per 1,000 living.                    |          |                                | Decrease in Death-rates during 1900-02, taking the Death-rates during 1890-92 at 100. |           |                                |
|              | 1890-92.   | 1900-02. | Decrease during 1900-02 (a-b). | 1890-92.  | 1900-02.  | Decrease during 1900-02 (d-e). | 1890-92.   | 1900-02. | Decrease during 1900-02 (g-h). | 1890-92.  | 1900-02.  | Decrease during 1900-02 (j-k). |
| (a)          | (b)  | (c)      | (d)                            | (e)   | (f)       | (g)                            | (h)  | (i)      | (j)                            | (k)   | (l)       |                                |
|              |  |          | Per cent.                      | Per cent.   | Per cent. |                                |  |          | Per cent.                      | Per cent.   | Per cent. |                                |
| 15-19        | 2.29   | 2.02     | .27                            | 100   | 88        | 12                             | 3.05   | 2.65     | .40                            | 100   | 87        | 13                             |
| 20-24        | 4.59   | 3.77     | .82                            | 100   | 82        | 18                             | 5.53   | 4.52     | 1.01                           | 100   | 82        | 18                             |
| 25-34        | 7.04   | 5.50     | 1.45                           | 100   | 79        | 21                             | 8.65   | 6.47     | 2.18                           | 100   | 75        | 25                             |
| 35-44        | 14.79  | 11.56    | 3.23                           | 100   | 78        | 22                             | 15.91  | 12.26    | 3.65                           | 100   | 77        | 23                             |
| 45-54        | 25.13  | 21.34    | 3.79                           | 100   | 85        | 15                             | 27.82  | 22.12    | 5.70                           | 100   | 80        | 20                             |
| 55-64        | 45.58  | 35.73    | 9.85                           | 100   | 78        | 22                             | 50.15  | 39.18    | 10.97                          | 100   | 78        | 22                             |
| 65 and older | 107.10   | 80.75    | 26.35                          | 100   | 75        | 25                             | 120.44   | 98.05    | 22.39                          | 100   | 81        | 19                             |

(From Cd. 2619, pages cxxxiv and cxxxix.)

18,588. Inspecting Table E., we see in the first place that at every age-group during 1890-92 and during 1900-02 the death-rates of occupation (64) were lower than the death-rates of All Occupied Males, Industrial Districts.

18,589. The actual decrease in death-rates for the two groups is shown in columns (c) and (i) of Table E. The decrease in occupation (64) was not quite so large as the decrease in the death-rates of All Occupied Males, Industrial Districts. But as the latter death-rates are higher than those of occupation (64), it is necessary to look at the proportional decrease in the death-rates in columns (f) and (l) of Table E. We see that there is but slight difference between the two occupational groups compared in Table E. when the proportional decrease in their death-rates is observed. And, as stated, occupation (64) holds the advantage over All Occupied Males, Industrial Districts, as regards lower death-rates per 1,000 living at every period of life.

18,590. Hitherto I have exclusively used death-rates per 1,000 living, preserving the distinction of age. In my opinion, as already stated, death-rates are a sounder comparative test than is any "Comparative Mortality Figure." But I will show a table of comparative mortality figures based upon page clxxxii of Cd. 2619 See Table F.

18,591. TABLE F.

"Comparative Mortality Figures," all causes of death, period 1900-02, showing various Occupations, Occupied Groups only.

| Occupation.  | Comparative Mortality Figure. |
|--|-------------------------------|
| General labourer. Industrial districts                   | 2,471                         |
| Tin miner . . . . .                                      | 2,169                         |
| Inn, hotel—servant. London . . . . .                     | 2,121                         |
| General labourer . . . . .                               | 1,987                         |
| Innkeeper, &c. Industrial districts                      | 1,945                         |
| Innkeeper, servant, &c. Industrial districts             | 1,901                         |
| Innkeeper, servant, &c. London . . . . .                 | 1,814                         |
| General labourer. London . . . . .                       | 1,808                         |
| Costermonger, hawk, &c. . . . .                          | 1,778                         |
| Inn, hotel—servant . . . . .                             | 1,767                         |
| Innkeeper, servants, &c. . . . .                         | 1,697                         |
| Inn, hotel—servant. Industrial districts                 | 1,691                         |
| Innkeeper, publican; spirit, wine, beer dealer . . . . . | 1,669                         |
| Copper miner . . . . .                                   | 1,609                         |

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| Occupation.                                      | Comparative Mortality Figure. | Occupation.                                  | Comparative Mortality Figure. |
|--|-------------------------------|--|-------------------------------|
| File maker - - - - -                             | 1,602                         | Coach, cab, omnibus service; groom, &c.      | 1,062                         |
| Innkeeper, &c. London - - -                      | 1,562                         | Butcher - - - - -                            | 1,062                         |
| Seaman, &c. Merchant service - -                 | 1,547                         | Cotton manufacturer. Lancashire -            | 1,053                         |
| Cutler; scissors maker - - - -                   | 1,460                         | Hatter - - - - -                             | 1,046                         |
| General shopkeeper - - - - -                     | 1,421                         | <b>Plumber, painter, glazier</b> - - - -     | 1,041                         |
| Pötter; earthenware, &c. Manufacture             | 1,420                         | Copper manufacturer, worker; copper-         |                               |
| Innkeeper, &c. Agricultural districts -          | 1,415                         | smith - - - - -                              | 1,041                         |
| Innkeeper; servant, &c. Agricultural             |                               | Cotton manufacture - - - - -                 | 1,037                         |
| districts - - - - -                              | 1,410                         | Slater, tiler - - - - -                      | 1,036                         |
| Lead manufacturer; leaden goods                  |                               | <b>All occupied males, England and Wales</b> | 925                           |
| maker - - - - -                                  | 1,385                         |  |                               |
| Dock labourer, wharf labourer - -                | 1,374                         |  |                               |
| Messenger, porter. Not railway or                |                               |  |                               |
| Government - - - - -                             | 1,341                         |  |                               |
| Brewer - - - - -                                 | 1,324                         |  |                               |
| Furrier, skinner - - - - -                       | 1,274                         |  |                               |
| Chimney sweeper - - - - -                        | 1,240                         |  |                               |
| Bargeman, lighterman, waterman -                 | 1,235                         |  |                               |
| Tool, scissors, file, saw, needle-maker          | 1,231                         |  |                               |
| Glass manufacturer - - - - -                     | 1,202                         |  |                               |
| Lead miner - - - - -                             | 1,199                         |  |                               |
| Brush, broom-maker; hair, bristle-               |                               |  |                               |
| worker - - - - -                                 | 1,160                         |  |                               |
| Coalheaver - - - - -                             | 1,144                         |  |                               |
| Musician, music master - - - - -                 | 1,140                         |  |                               |
| Nail, anchor, chain, &c. - - - -                 | 1,137                         |  |                               |
| <b>All occupied males. Industrial districts:</b> | 1,122                         |  |                               |
| Transport service - - - - -                      | 1,110                         |  |                               |
| Wood turner, cooper, &c. - - - -                 | 1,104                         |  |                               |
| <b>All occupied males. London</b> - - -          | 1,099                         |  |                               |
| Carman, carrier, &c. - - - - -                   | 1,094                         |  |                               |
| Gunsmith - - - - -                               | 1,087                         |  |                               |
| Inn, hotel-servant. Agricultural dis-            |                               |  |                               |
| tricts - - - - -                                 | 1,083                         |  |                               |
| Brass, bronze-manufacturer, founder,             |                               |  |                               |
| finisher, worker - - - - -                       | 1,074                         |  |                               |
| Hairdresser - - - - -                            | 1,070                         |  |                               |
| Textile dyer, bleacher, printer, finisher,       |                               |  |                               |
| &c. - - - - -                                    | 1,066                         |  |                               |

(From Cd. 2619, p. clxxxii.)

NOTE.—In addition to the 55 occupations included above, there are stated on p. clxxxii, 53 other occupations having a "Comparative Mortality Figure" lower than 925 (all occupied males). Also there are 47 other occupational groups, not stated on p. clxxxii. Of these 47 occupations the mortality in 20 of them was higher than 925, and in 27 of these occupations the mortality was lower than 925. The above "Comparative Mortality Figures" are stated to be applicable to compare one occupation with another.

18,592. Table F: shows the "Comparative Mortality Figure" without distinction of age for 55 occupations, including occupation (64). In 50 of these occupations the mortality is higher than the mortality in occupation (64), Plumber, Painter, Glazier. Among these 50 are All Occupied Males, Industrial Districts, and All Occupied Males, London. In both of these important groups the mortality is considerably higher than in occupation (64).

18,593. These results confirm those already shown for each age-group, and shown much more extensively, in Table A. They show that occupation (64) is not subjected to a heavy mortality, nor, indeed, to any excess of mortality. This group not only stands upon at least an average level of mortality, but as has been shown in Table D., the death-rates in occupation (64) have been decreasing largely since 1880-82.

## 18,594. TABLE G.

"Comparative Mortality Figure" for Males in England and Wales, 1900-02, in various Groups, and classified according to Deaths from various Causes. Ages 25-64.

| Cause of Death.                    | Occupation (64), Plumber, Painter, Glazier (Occupied Group). | Occupied Males, England and Wales. | Occupied Males, London. | Occupied Males, Industrial Districts. | Unoccupied Males, England and Wales. |
|------------------------------------|--|------------------------------------|-------------------------|---------------------------------------|--------------------------------------|
|                                    | (a)  | (b)                                | (c)                     | (d)                                   | (e)                                  |
| Phthisis - - - - -                 | 203  | 175                                | 202                     | 202                                   | 583                                  |
| Diseases of respiratory system - - | 158  | 165                                | 199                     | 248                                   | 310                                  |
| Diseases of circulatory system - - | 147  | 135                                | 145                     | 159                                   | 294                                  |
| Diseases of nervous system - - -   | 107  | 78                                 | 77                      | 100                                   | 879                                  |
| Cancer - - - - -                   | 69   | 63                                 | 86                      | 68                                    | 111                                  |
| Accident - - - - -                 | 49   | 58                                 | 52                      | 57                                    | 115                                  |
| Diseases of digestive system - - - | 54   | 54                                 | 60                      | 63                                    | 135                                  |
| Diseases of urinary system - - -   | 89   | 48                                 | 64                      | 58                                    | 112                                  |
| Influenza - - - - -                | 22   | 23                                 | 22                      | 24                                    | 31                                   |
| Suicide - - - - -                  | 19   | 19                                 | 22                      | 19                                    | 43                                   |
| Alcoholism - - - - -               | 12   | 16                                 | 24                      | 18                                    | 42                                   |
| Diabetes - - - - -                 | 7  | 9                                  | 9                       | 10                                    | 20                                   |
| Rheumatic fever - - - - -          | 10   | 7                                  | 7                       | 9                                     | 8                                    |
| Gout - - - - -                     | 7  | 2                                  | 4                       | 1                                     | 4                                    |
| Plumbism - - - - -                 | 22   | 1                                  | 1                       | 1                                     | 1                                    |
| Other causes - - - - -             | 66   | 72                                 | 65                      | 85                                    | 196                                  |
| All causes of death - - - - -      | 1,041  | 925                                | 1,099                   | 1,122†                                | 2,884                                |

(From Cd. 2619, pages clviii and clxxiv.)

NOTE.—In occupation (64), column (a), the mortality from plumbism is equal to  $\frac{1}{4}$  part of the mortality from all causes. See the note to Table C., which shows a nearly identical result independently based upon death-rates, in place of upon a "Comparative Mortality Figure."

Observe that the mortality in column (a), occupation (64), compares favourably with three of the four other groups in columns (b), (c), (d), (e).

† On page clviii this figure is given as 1,129 in place of 1,122. This 1,129 seems to be a printer's error.

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18,595. Table G. is another table based upon "Comparative Mortality Figures." The facts are taken from Cd. 2619, pages clviii and clxxiv. They show the mortality from various causes of death, without age distinction, for males aged 25-64 years. The period of observation is 1900-02. Occupation (64) is compared with some large groups of the population.

18,596. Table G. shows that although occupation (64) has a much larger mortality from plumbism than have other groups which are not exposed to the risk of plumbism—these groups having their own special risks to which occupation (64) is not exposed—yet the mortality from all causes in occupation (64) is not high. It is lower than Occupied Males, London; it is lower than Occupied Males, Industrial Districts; it is much lower than Unoccupied Males, England and Wales, and it is not greatly above the mortality for All Occupied Males in England and Wales, the latter group including all professional and commercial men and others not exposed to any "industrial risk" of death. I point out that Table G. relates only to ages 25-65, the period at which, as Table C. shows, the death-rate from plumbism is highest in occupation (64).

18,597. Table G. shows that deaths from plumbism are relatively insignificant. See also Table C. And Table G. shows that as regards causes of death much more important than plumbism, the occupation (64) compares favourably with other occupational groups in Table G. In such causes of death as phthisis, diseases of respiratory system, diseases of circulatory system, all potent causes of death, the occupation (64) compares favourably with the other groups in Table G. In cancer, accident, diseases of digestive system, occupation (64) comes out well. Similarly as regards influenza, suicide, alcoholism, diabetes, and other causes of death, occupation (64) Plumber, Painter, Glazier, easily stands the test applied in Table G.

18,598. TABLE H.

Mean Annual Death-rate per 1,000 living period 1900-1902, for various Occupied Groups of Males in England and Wales.

| Ages.            | Occupation (64)<br>Plumber,<br>Painter,<br>Glazier<br>(Occupied<br>Group).<br>(Page 106.) | Occupied<br>Males,<br>England<br>and Wales.<br>(Page 3.) | Occupied<br>Males,<br>London,<br>(Page 5.) | Occupied<br>Males,<br>Industrial<br>Districts,<br>(Page 6.) |
|------------------|---|--|--|---|
| 15-19            | 2.02  | 2.44   | 2.82                                       | 2.65  |
| 20-24            | 3.77  | 4.41   | 4.44                                       | 4.52  |
| 25-34            | 5.59  | 6.01   | 6.82                                       | 6.47  |
| 35-44            | 11.56   | 10.22  | 12.96                                      | 12.26   |
| 45-54            | 21.34   | 17.73  | 22.35                                      | 22.12   |
| 55-64            | 35.73   | 31.01  | 34.01                                      | 39.18   |
| 65 and<br>older. | 80.75   | 88.39  | 73.75                                      | 98.05   |
| All Ages         | 12.31   | 13.04  | 13.27                                      | 13.85   |

(From Cd. 2619, pages 3, 5, 6, 106.)

18,599. In Table H., I show the mean annual death-rate during 1900-02, at seven age-groups, for occupation (64) and for three other main groups of Occupied Males. This is a thoroughly comprehensive test of the mortality in occupation (64), and occupation (64) stands the test. This is made clear to the eye by the diagram relating to Table H. The mortality in occupation (64) is not at all ages lower than the mortality in All Occupied Males, England and Wales, but the mortality in occupation (64) is at all ages lower than the mortality in All Occupied Males, Industrial Districts.

18,600. TABLE J.

Showing the Actual and the "Expected" Number of Deaths during 1900-02 in Occupation (64), Plumber, Painter, Glazier. Page 106 of Cd. 2619. Occupied Group.

| Ages.        | Years of Life<br>Exposed to<br>Risk of Death,<br>in Occupation<br>(64).<br>(Page 106.) | Mean Annual<br>Death-rate<br>per 1,000 at<br>Risk, Occupied<br>Males,<br>Industrial<br>Districts.<br>(Page 6.) | Actual and Expected Number of Deaths in<br>Occupation (64) during 1900-02. |   |   | Percentage of Actual to<br>Expected Number of Deaths. |   |
|--------------|--|--|--|---|---|---|---|
|              |  |  | Expected<br>Number of<br>Deaths.<br>( $\frac{a \times b}{1,000}$ )         | Actual<br>Number of<br>Deaths.<br>(Page 106.) | Shortage of<br>Actual Deaths<br>in Occupation<br>(64).<br>( $a - d$ ) | Actual.<br>( $\frac{d \times 100}{a}$ )               | Expected.<br>( $\frac{a \times 100}{e}$ ) |
|              | (a)  | (b)  | (c)  | (d)   | (e)   | (f)   | (g)                                       |
| 15-19 . .    | 95,316   | 2.65   | 253  | 193   | 60  | 76  | 100                                       |
| 20-24 . .    | 101,193  | 4.52   | 457  | 381   | 76  | 83  | 100                                       |
| 25-34 . .    | 168,345  | 6.47   | 1,089  | 941   | 148   | 86  | 100                                       |
| 35-44 . .    | 138,471  | 12.26  | 1,698  | 1,600   | 98  | 94  | 100                                       |
| 45-54 . .    | 97,206   | 22.12  | 2,150  | 2,074   | 76  | 96  | 100                                       |
| 55-64 . .    | 47,832   | 39.18  | 1,874  | 1,709   | 165   | 91  | 100                                       |
| 65 and older | 15,888   | 98.05  | 1,558  | 1,283   | 275   | 82  | 100                                       |
| All ages -   | 664,251  | —  | 9,079  | 8,181   | 898   | 90  | 100                                       |

Based upon Cd. 2619, pages 6 and 106.

NOTE.—The standard data used above, by which to compute the "expected" deaths during 1900-02 in occupation (64), are the death-rates on page 6 of Cd. 2619 relating to 7½ millions of lives in the group Occupied Males, Industrial Districts of England and Wales, 1900-02. The result is that the deaths occurring during 1900-02 in occupation (64) were, for "All Ages" 10 per cent. below the expected number of deaths by the standard data here used. In other words, 90 deaths actually occurred for every 100 deaths expected to occur, during 1900-02 in occupation (64), Plumber, Painter, Glazier.

18,600a. Finally, in Table J., I show the results relating to the actual and the "expected" number of deaths in occupation (64) during 1900-02. This table embodies a widely-used actuarial method of testing the mortality of any group of lives. A standard set of

death-rates is selected by which to test the mortality of any given group of lives, and the expected deaths are then computed by means of the standard set of death-rates. But Table J. is self-explanatory. The result is that when the mortality of occupation (64) is

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tested by the large group, All Occupied Males, England and Wales, Industrial Districts, a suitable basis, it is found that whereas 8,181 deaths occurred during 1900-02 in occupation (64) there were 9,079 deaths expected to occur. There was a shortage of 898 actual deaths in occupation (64) during 1900-02; in other words, there were 90 actual deaths in occupation (64) for every 100 deaths expected to occur.

18,601. By the light of the facts shown in this Report, all of which are taken from or based upon Dr. John Tatham's letter to the Registrar-General, which constitutes Blue Book Cd. 2619, I am of opinion that the mortality in occupational group (64) Plumber, Painter, Glazier, is in no way excessive or abnormal, that it has been decreasing as rapidly or more rapidly than the mortality of England and Wales, and that there is a very large number of most varied occupations, many of which are believed to be ordinarily healthy, in which the mortality exceeds the mortality of occupational group (64) Plumber, Painter, Glazier. As regards mortality late in life, namely at ages 65 and older, occupation (64) compares most favourably with nearly all other occupations.

#### Occupational Sickness.

18,602. The following portion of my evidence relates to occupational sickness in various occupations in this country.

18,603. The purpose of this investigation is to compare, if possible, the sickness in occupations that are exposed to sickness arising from lead poisoning, with the sickness obtaining amongst the general population, with the object of ascertaining, if possible, whether or not the sickness from All Causes in occupations connected with risk of lead poisoning, exceeds the sickness from All Causes that occurs throughout the general population.

18,604. The first step is to obtain the necessary data for this investigation. But, although several important investigations have been made relating to sickness in various areas of this country, such as rural, town, and city areas, there has been only one important investigation relating to occupational sickness. This is the experience of the Manchester Unity Friendly Society observed during the five years 1893-97, the results of which were published in 1903. This is a most extensive investigation, covering nearly three million of years of life exposed to risk of sickness, and the following occupational groups were separately examined:-

- A. Agriculture.
- B. Outdoor building trades, &c.
- C. Railway service.
- D. Seafaring, fishing, &c.
- E. Quarry workers, &c.
- F. Iron and steel workers, &c.
- G. Mining occupations, &c.

18,605. These groups comprised nearly 1,400 separate divisions of occupation. Unfortunately, these big groups are too general in their classification of occupations to be of use in the present investigation. None of these groups can be regarded as applying specially to house painters, &c., nor to occupations exposed to the risk of sickness from lead poisoning.

18,606. Noting this lack of data, I lately applied for the loan of the cards upon which the Manchester Unity experience was tabulated. Nearly one million of these cards were prepared, each card relating to one life. It occurred to me that if I could get these cards, and sort out those that relate to house painters, &c., and then proceed to investigate the rates of sickness, &c., a most valid fact-base would then be obtained. But I was informed on 12th March 1912 that "the Manchester Unity cards were destroyed after the completion of the investigation." This destruction of data gathered at great cost seems to me a most unfortunate incident.

18,607. Thus, so far as I am aware, no adequate data exist by which to compare the rates of sickness among house painters, &c., or among those who are exposed to risk of sickness from lead poisoning, with the rates of sickness that occur in All Occupations. The records of friendly societies contain these data, but they are not available.

18,608. Sickness is so essentially a function of age that it is absolutely necessary to have the age distribution of the men exposed to risk of sickness, the age-distribution of the cases of sickness, the age-distribution of the weeks of sickness from whatever cause arising. Not any of these essential data exist as regards house painters, &c., or as regards sickness arising from lead poisoning.

18,609. The only data that I possess as regards lead poisoning are those contained in the Annual Report of the Chief Inspector of Factories and Workshops for the year 1910, page 170 of Cd. 5693.

18,610. But these data consist merely of a statement of the reported cases of sickness from lead poisoning, and the number of such cases that resulted in death, the period being 1900-10, and the facts relating to various occupations. These data are wholly inadequate. Not only is there no age-distribution, but also there is no statement even of the number of men exposed to risk of sickness. Nor is there any information as to the duration of the attack of sickness. Also, there is no information as to the sickness from causes other than lead poisoning occurring among these men who experienced some sickness from lead poisoning. Moreover, these reported cases are those occurring or contracted in a factory or workshop.

18,611. In actuarial investigations, it sometimes happens that a part of the data desired cannot be obtained. But if the main portion of the essential data be available it then sometimes becomes possible to make certain assumptions as to the nature of the missing data which do not greatly detract from the validity of the results brought out by such investigation.

18,612. But in this instance, not one of the essential sets of data is known. The number of lives exposed to risk of sickness is not known, the number of cases of sickness from all causes is not known, the duration of sickness is not known, no age-distribution is known and the only data we have are those just mentioned, namely, the number of reported cases of sickness from lead poisoning, with the deaths that occurred out of these cases.

18,613. I may say, at once, that no opinion of any validity can possibly be formed by means of these data on page 170 of Cd. 5693. No opinion, that is to say, which relates to the question whether or not the rates of sickness among house painters, &c. fall short of, or exceed, the rates of sickness in all occupations combined. We cannot even obtain a valid result relating to cases of sickness from lead poisoning that occur among house painters, &c. Because, to get even this result, we must know the age-distribution of the house-painters, &c., exposed to risk of sickness, the number and the age-distribution of the cases of sickness from lead poisoning that occur, the number and the age-distribution of the weeks of sickness from lead poisoning. The duration of an attack of sickness is an essential feature of any investigation of sickness rates. Duration of sickness is more important than the number of cases of sickness, because duration of sickness is more prominently a function of age than is the number of cases of sickness.

18,614. Thus, although I shall show some results based upon the reported cases of sickness from lead poisoning on page 170 of Cd. 5693, I state explicitly that these results do not throw any light upon the question that is the main purpose of this investigation, namely, the ascertaining whether or not the rates of sickness among men exposed to the risk of lead poisoning, such as house painters, &c., exceed, or fall short of, the rates of sickness among the general population.

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[Continued.]

18,615. In my evidence as to occupational mortality it was shown that the mortality of the occupational group, Plumbers, Painters, Glaziers, is in no way excessive. For although in this occupation there is a higher death-rate from lead poisoning than in some other occupations not exposed to risk from lead poisoning—but which have their own specialised death risks—yet this death-rate from lead poisoning is relatively trivial, and as regards other and much more potent causes of death than lead poisoning, it was clearly shown that the occupation Plumber, Painter, Glazier has a lighter mortality than many other occupations. Thus the occupation Plumber, Painter, Glazier, is enabled successfully to stand the tests of occupational mortality that were applied in my evidence.

18,616. Now, although sickness does not follow the fluctuations of mortality, yet there is a connection between the two things, both of them being essentially functions of age. That is to say, both sickness and death are largely influenced by the age of a life exposed to the risk of sickness or of death.

18,617. Thus, if we find that in any occupation the death-rates from All Causes are not in excess of normal death-rates, there is at the least a fair presumption that the sickness rates from All Causes are not in excess of normal sickness rates. This is, as I say, only a presumption, and it may be applied to the occupation Plumber, Painter, Glazier. This occupation has a low death-rate as regards several potent causes of death, and presumably, therefore, this occupation escapes the sickness that comes before death from such diseases.

18,618. As regards the mortality of the occupation Plumber, Painter, Glazier, I may point out that the death-rates shown in my evidence on occupational

mortality were those of the Registrar-General, and that as regards deaths from lead poisoning no abatement was made on account of the possible excess error arising from the cause of death being mistakenly given as lead poisoning.

18,619. That such excess error is likely to exist may be gathered from the evidence of Dr. Goadby, on 21st December 1908, given before the Departmental Committee on the Dangers attendant upon the use of Lead, &c., in the manufacture of Earthenware, and China, Cd. 5385, page 483 *et seq.*

18,620. For instance, there is question 14,812:—

“Taking the cases all round, there might be very little difficulty in saying from the previous history *plus* post-mortem examination whether a person had died from lead poisoning or not?”  
Dr. Goadby replied, “It is presumptive evidence, but it is not conclusive.”

Further questions and answers point in the same direction, namely, that there is a quite appreciable chance of the number of deaths from lead poisoning having been over-stated.

18,621. However this may be, in my evidence as to occupational mortality no abatement was made on account of this possible error. And, as stated, the occupation Plumber, Painter, Glazier shows no excessive mortality from All Causes when compared with other occupations.

18,622. And thus I come back to the presumption already stated, namely, that as regards sickness there does exist some presumptive evidence that the sickness from All Causes in the occupation Plumber, Painter, Glazier, is not in excess of the sickness among the general population.

18,623. TABLE A.

*Illustrating the necessity to obtain the Age-Distribution of the Number of Years of Life exposed to Risk of Sickness, of the Number of Cases of Sickness, and of the Weeks of Sickness, in order to test the Incidence of Sickness from any Cause in any Occupational Group.*

| Ages.              | Number of Years of Life Exposed to Risk of Sickness. | Number of Members Sick. | Number of Weeks of Sickness. | Yearly Number of Members Sick per 100 exposed to Risk.<br>$\frac{b \times 100}{a}$ | Yearly Number of Weeks of Sickness per 100 exposed to Risk.<br>$\frac{c \times 100}{a}$ | Number of Weeks of Sickness per Member Sick.<br>$\frac{c}{b}$ |
|--------------------|--|-------------------------|------------------------------|--|---|---|
|                    | (a)  | (b)                     | (c)                          | (d)  | (e)   | (f)   |
| 16-19 . . .        | 101,912  | 29,203                  | 93,553                       | 29   | 92  | 3.2   |
| 20-24 . . .        | 434,117  | 106,152                 | 389,259                      | 24   | 90  | 3.7   |
| 25-34 . . .        | 901,760  | 212,382                 | 908,481                      | 24   | 101   | 4.3   |
| 35-44 . . .        | 678,958  | 167,646                 | 956,861                      | 25   | 141   | 5.7   |
| 45-54 . . .        | 470,828  | 132,656                 | 1,097,324                    | 28   | 233   | 8.3   |
| 55-64 . . .        | 274,261  | 99,176                  | 1,355,755                    | 36   | 404   | 13.7  |
| 65 and older . . . | 133,888  | 79,251                  | 2,221,205                    | 59   | 1,659   | 28.0  |
| All ages . . .     | 2,995,724  | 826,466                 | 7,022,438                    | 28   | 234   | 8.5   |

NOTE.—This illustrative table is based upon the Manchester Unity experience during the five years 1893-97, published 1903, pages 21-139. This is the basis of the National Insurance Act, 1911.

18,624. In Table A. I show the necessity to obtain the age-distribution of the lives exposed to risk of sickness, of the number sick, of the weeks of sickness, &c.

18,625. This Table A. is based upon the Manchester Unity experience which has been adopted as the basis of the National Insurance Act, 1911. It sets out the elementary essentials of any investigations of sickness in any occupation. Lacking these essential data, no valid opinion can be formed as to the sickness incidence in this or in that occupational group.

18,626. In column (d), we observe that at middle-age the number of members sick per 100 members exposed

to risk rapidly increases. But the number of weeks of sickness begins largely to increase much earlier in life than middle-age; *see* column (e). It increases from age 20-24 upwards. At the earlier ages this is due to the increased duration of attacks of sickness, and at the later ages to the increased duration of attacks of sickness plus the increased number of attacks of sickness. Column (f) of Table A. shows how the duration of sickness per member sick increases throughout life.

18,627. As soon as these elementary considerations relating to sickness rates become known, it is at once apparent that when these data are lacking no valid opinion can be formed as to the incidence of sickness from this or that cause in this or that occupational group.

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[Continued.]

18,628. TABLE B.

The Number of Cases of Sickness from Lead Poisoning, in Various Occupations, and in All Occupations. In Factories and Workshops. Showing the large Decrease that occurred during 1900-10.

| Year.                      | Yearly Number of Cases of Sickness from Lead Poisoning. Cd. 5693, page 170. In various Occupations. |   |                            |                          | Yearly Number of Cases of Sickness from Lead Poisoning in various Occupations, per 100 of Cases of Sickness from Lead Poisoning in the Year 1900. |   |                    |                  |
|----------------------------|---|---|----------------------------|--------------------------|---|---|--------------------|------------------|
|                            | Paints and Colours plus Coach Building.   | Paints and Colours plus Coach Building plus White Lead. | Other Occupations. (d - b) | All Occupations. (b + c) | Paints and Colours plus Coach Building.   | Paints and Colours plus Coach Building plus White Lead. | Other Occupations. | All Occupations. |
|                            | (a)   | (b)   | (c)                        | (d)                      | (e)   | (f)   | (g)                | (h)              |
| 1900                       | 126   | 484   | 574                        | 1,058                    | 100   | 100   | 100                | 100              |
| 1901                       | 121   | 310   | 553                        | 863                      | 96  | 64  | 96                 | 82               |
| 1902                       | 109   | 252   | 377                        | 629                      | 87  | 52  | 66                 | 59               |
| 1903                       | 113   | 222   | 392                        | 614                      | 90  | 46  | 68                 | 58               |
| 1904                       | 81  | 197   | 400                        | 597                      | 64  | 41  | 70                 | 56               |
| 1905                       | 113   | 203   | 389                        | 592                      | 90  | 42  | 67                 | 56               |
| 1906                       | 122   | 230   | 402                        | 632                      | 97  | 48  | 70                 | 60               |
| 1907                       | 105   | 176   | 402                        | 578                      | 83  | 36  | 70                 | 55               |
| 1908                       | 95  | 174   | 472                        | 646                      | 75  | 36  | 82                 | 61               |
| 1909                       | 134   | 166   | 387                        | 553                      | 106   | 34  | 67                 | 52               |
| 1910                       | 87  | 121   | 384                        | 505                      | 69  | 25  | 67                 | 48               |
| Decrease from 1900 to 1910 | 39  | 363   | 190                        | 553                      | 31  | 75  | 33                 | 52               |

NOTE.—During 1900-10, the yearly number of cases of sickness from lead poisoning in All Occupations fell from 1,058 to 505. That is, from 100 per cent. to 48 per cent., a fall of 52 per cent. of the number of cases in 1900. As, presumably, the number of men engaged in the above occupations increased during 1900-10, the decrease in the incidence of sickness from lead poisoning, per 100 men at risk, was even greater than is shown in the above Table.

18,629. But we may make some use of the reported cases of lead poisoning on page 170 of Cd. 5693, by tabulating them as in Table B. for the purpose of ascertaining whether these cases have increased or decreased during 1900-10. Of course, this throws no light upon the question of sickness rates among persons in occupations exposed to the risk of lead poisoning, because there are no data as to sickness arising from causes other than lead poisoning.

18,630. Table B. groups the facts in various occupations, all of which are exposed to the risk of sickness from lead poisoning. In each of these groups, and in all the groups combined, there has been a large decrease in the reported cases of sickness from lead poisoning during 1900-10. Some house-painters are included in one or more of these groups, although it is not possible to state certainly in which group. Perhaps the occupation, Paints and Colours plus Coach-building plus White Lead, is the group most likely to include house-painters, &c. But, in any case, the house-painters included in Table B. are only a small proportion of all house-painters.

18,631. In my evidence as to occupational mortality, it was shown that mortality in the occupation Plumber, Painter, Glazier, has decreased more largely than the decrease in mortality for Occupied Males in England and Wales. And in Table B. we see that as regards the number of reported cases of sickness from lead poisoning, the decrease has also been great. Taking all occupations, there were only 48 cases in 1910 to every 100 cases in 1900, i.e., a decrease of 52 per cent., column (h) of Table B.

18,632. Presumably the number of men in these occupations has increased during 1900-10. If so, the large decrease in the number of cases of sickness from lead poisoning, shown in Table B., would be even

larger than it is, relatively to the years of life exposed to risk. This result is a partial confirmation of the large decrease in the death-rates of occupation Plumber, Painter, Glazier, already mentioned.

18,633. As regards sickness from all causes in all occupations, I give the following facts taken from each of the principal investigations of sickness in this country during 1871-97.

18,634. Rate of Sickness per 100 Members per Year in Friendly Societies. All Ages.

|                                       | Weeks. |
|---------------------------------------|--------|
| Ancient Order of Foresters - 1871-75  | 136    |
| Registered Friendly Societies 1876-80 | 190    |
| Manchester Unity - - 1893-97          | 234    |

18,635. It would not, of course, be permissible to state these results for all ages, as above, unless the results for each age had also been examined. They are given merely as a broad indication of the large rise in sickness rates that set in during the last quarter of the nineteenth century. And these results for all ages are confirmed by the results for each age-group. This rise in sickness is still going on, as I find when investigating the sickness rates of friendly societies during recent years of the twentieth century.

18,636. Thus the large fall in Table B. in the number of cases of sickness from lead poisoning is a much more satisfactory result than the increase in sickness from all causes in all occupations that has occurred in friendly societies, and which is still going on.

18,637. Another feature that admits of examination of the wholly inadequate data available is the number of deaths from lead poisoning per 100 cases of sickness from lead poisoning.

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[Continued.]

## 18,638. TABLE C.

Comparing the Number of Deaths from Lead Poisoning, All Occupations, per 100 Cases of Sickness from Lead Poisoning, All Occupations, with the Number of Deaths from All Causes per 100 Cases of Sickness from All Causes.

| Yearly Number of Cases of Sickness from Lead Poisoning, and Yearly Number of Deaths from Lead Poisoning, All Occupations. In Factories and Workshops. [Cd. 5693, page 170.] |                    |         |   | Yearly Number of Cases of Sickness and Yearly Number of Deaths from all Causes. In all Occupations. Manchester Unity Experience, 1893-1897. [Pages 21, 139 of Manchester Unity Report.] |                    |         |  |
|---|--------------------|---------|---|---|--------------------|---------|--|
| Year.   | Cases of Sickness. | Deaths. | No. of Deaths per 100 Cases. $\frac{b \times 100}{a}$ | Age.  | Cases of Sickness. | Deaths. | No. of Death per 100 Cases. $\frac{e \times 100}{f}$ |
|   | (a)                | (b)     | (c)   |   | (d)                | (e)     | (f)  |
| 1900  | 1,058              | 38      | 3.6   | 16-19   | 29,203             | 368     | 1.3  |
| 1901  | 863                | 34      | 3.9   | 20-24   | 106,152            | 1,815   | 1.7  |
| 1902  | 629                | 14      | 2.2   | 25-34   | 212,382            | 4,783   | 2.3  |
| 1903  | 614                | 19      | 3.1   | 35-44   | 167,646            | 5,659   | 3.4  |
| 1904  | 597                | 26      | 4.4   | 45-54   | 132,656            | 6,711   | 5.1  |
| 1905  | 592                | 23      | 3.9   | 55-64   | 99,176             | 8,036   | 8.1  |
| 1906  | 632                | 33      | 5.2   | 65 and older  | 79,251             | 11,689  | 14.8   |
| 1907  | 578                | 26      | 4.5   |   |                    |         |  |
| 1908  | 646                | 32      | 5.0   |   |                    |         |  |
| 1909  | 553                | 30      | 5.4   |   |                    |         |  |
| 1910  | 505                | 38      | 7.5   |   |                    |         |  |
| 1900 to 1910  | 7,267              | 313     | 4.3   | All ages  | 826,466            | 39,061  | 4.7  |

NOTE.—During 1900-10, the mortality from lead poisoning in All Occupations was 4.3 deaths per 100 cases of sickness from lead poisoning in All Occupations. Namely, one death out of 23 cases of sickness.

In the Manchester Unity experience, the mortality from All Causes in All Occupations, at All Ages, was 4.7 deaths per 100 cases of sickness. Namely, one death out of 21 cases of sickness.

Thus, assuming an equal age-distribution in both instances, cases of sickness from lead poisoning are not quite so fatal as cases of sickness from All Causes.

Incidentally, column (f) emphasises the necessity to consider the factor of age-distribution in any investigation of sickness rates or of death-rates.

18,639. In Table C., based in part upon page 170 of Cd. 5693, it is shown that at All Ages and in All Occupations exposed to the risk of lead poisoning, 4.3 deaths occurred per year during 1900-10 to every 100 cases of sickness from lead poisoning. Side by side with these facts, I show the experience of the Manchester Unity. In All Occupations, at All Ages, in the Manchester Unity, 4.7 deaths from All Causes occurred per 100 cases of sickness from All Causes. Thus, upon the

assumption of identical age-distribution in both sets of data, the mortality from lead poisoning per 100 cases of sickness from lead poisoning is slightly less than the mortality from All Causes per 100 cases of sickness from All Causes, in the proportion of 4.3 to 4.7.

18,640. Inspection of column (f) of Table C. again shows the necessity to distinguish the age at which sickness or death occurs, for the number of deaths per 100 men sick increases rapidly throughout life.

## 18,641. TABLE D.

Showing the Number of Cases of Sickness from Lead Poisoning, and the Number of Deaths from Lead Poisoning among these Cases, in Various Occupations and in All Occupations. In Factories and Workshops.

| Year.        | Yearly Number of Cases of Sickness from Lead Poisoning, and yearly Number of Deaths from Lead Poisoning among these Cases. In various Occupations, and in all Occupations. [Cd. 5693, page 170.] |                |   |   |                |   |                    |                |   |                  |                |   |
|--------------|--|----------------|---|---|----------------|---|--------------------|----------------|---|------------------|----------------|---|
|              | Paints and Colours plus Coach Building.  |                |   | Paints and Colours plus Coach Building plus White Lead. |                |   | Other Occupations. |                |   | All Occupations. |                |   |
|              | No. of Cases.  | No. of Deaths. | No. of Deaths per 100 Cases. $\frac{b \times 100}{a}$ | No. of Cases.   | No. of Deaths. | No. of Deaths per 100 Cases. $\frac{e \times 100}{d}$ | No. of Cases.      | No. of Deaths. | No. of Deaths per 100 Cases. $\frac{h \times 100}{g}$ | No. of Cases.    | No. of Deaths. | No. of Deaths per 100 Cases. $\frac{k \times 100}{j}$ |
| (a)          | (b)  | (c)            | (d)   | (e)   | (f)            | (g)   | (h)                | (i)            | (j)   | (k)              | (l)            |   |
| 1900         | 126  | 6              | 4.8   | 484   | 12             | 2.5   | 574                | 26             | 4.5   | 1,058            | 38             | 3.6   |
| 1901         | 121  | 4              | 3.3   | 310   | 11             | 3.5   | 553                | 23             | 4.2   | 863              | 34             | 3.9   |
| 1902         | 109  | 1              | 0.9   | 252   | 2              | 0.8   | 377                | 12             | 3.2   | 629              | 14             | 2.2   |
| 1903         | 113  | 6              | 5.3   | 222   | 8              | 3.6   | 392                | 11             | 2.8   | 614              | 19             | 3.1   |
| 1904         | 81   | 5              | 6.2   | 197   | 7              | 3.6   | 400                | 19             | 4.8   | 597              | 26             | 4.4   |
| 1905         | 113  | 4              | 3.5   | 203   | 4              | 2.0   | 389                | 19             | 4.9   | 592              | 23             | 3.9   |
| 1906         | 122  | 7              | 5.7   | 230   | 14             | 6.1   | 402                | 19             | 4.7   | 632              | 33             | 5.2   |
| 1907         | 105  | 4              | 3.8   | 176   | 4              | 2.3   | 402                | 22             | 5.5   | 578              | 26             | 4.5   |
| 1908         | 95   | 3              | 3.2   | 174   | 6              | 3.4   | 472                | 26             | 5.5   | 646              | 32             | 5.0   |
| 1909         | 134  | 8              | 6.0   | 166   | 10             | 6.0   | 387                | 20             | 5.2   | 553              | 30             | 5.4   |
| 1910         | 87   | 7              | 8.0   | 121   | 8              | 6.6   | 384                | 30             | 7.8   | 505              | 38             | 7.5   |
| 1900 to 1910 | 1,206  | 55             | 4.6   | 2,535   | 86             | 3.4   | 4,732              | 227            | 4.8   | 7,267            | 313            | 4.3   |

NOTE.—As Table C. shows, in the Manchester Unity experience, All Occupations, the yearly number of deaths from All Causes per 100 cases of sickness from All Causes, at All Ages, was 4.7. This is a test figure for those in columns c, f, i, l, above, during 1900-10. Namely, 4.6, 3.4, 4.3, 4.3, assuming a similar age-distribution in all instances. But it is probable that some of the large fluctuations in columns c, f, i, l are due to material differences in the age-distribution of the facts. Sickness and death are essentially functions of age.

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[Continued.]

18,642. Table D. states the cases of sickness from lead poisoning and the deaths from lead poisoning in various occupations, with also the number of deaths per 100 cases of sickness. This table is included in order to show precisely the facts and the mode employed.

18,643. TABLE E.

The Yearly Number of Deaths per 100 Cases of Sickness yearly. Distinguishing Cases of Lead Poisoning in Various Occupations; &c.

The Yearly Number of Deaths per 100 Cases of Sickness Yearly.

| Year.        | Lead Poisoning. In Factories and Workshops. Cd. 5693, page 170. |   |                    |                  | All Causes. Manchester Unity, 1893-97. |                  |
|--------------|---|---|--------------------|------------------|--|------------------|
|              | Paints and Colours plus Coach Building.                         | Paints and Colours plus Coach Building plus White Lead. | Other Occupations. | All Occupations. | Age.                                   | All Occupations. |
|              | (a)   | (b)   | (c)                | (d)              | (e)                                    | (f)              |
|              | Deaths.   | Deaths.   | Deaths.            | Deaths.          |  | Deaths.          |
| 1900         | 4.8   | 2.5   | 4.5                | 3.6              | 16-19                                  | 1.3              |
| 1901         | 3.3   | 3.5   | 4.2                | 3.9              | 20-24                                  | 1.7              |
| 1902         | 0.9   | 0.8   | 3.2                | 2.2              | 25-34                                  | 2.3              |
| 1903         | 5.3   | 3.6   | 2.8                | 3.1              | 35-44                                  | 3.4              |
| 1904         | 6.2   | 3.6   | 4.8                | 4.4              | 45-54                                  | 5.1              |
| 1905         | 3.5   | 2.0   | 4.9                | 3.9              | 55-64                                  | 8.1              |
| 1906         | 5.7   | 6.1   | 4.7                | 5.2              | 65 and older                           | 14.8             |
| 1907         | 3.8   | 2.3   | 5.5                | 4.5              |  |                  |
| 1908         | 3.2   | 3.4   | 5.5                | 5.0              |  |                  |
| 1909         | 6.0   | 6.0   | 5.2                | 5.4              |  |                  |
| 1910         | 8.0   | 6.6   | 7.8                | 7.5              |  |                  |
| 1900 to 1910 | 4.6   | 3.4   | 4.8                | 4.3              | All ages                               | 4.7              |

NOTE.—Assuming identity of age-distribution in the various groups compared, the deaths from lead poisoning per 100 cases of sickness from lead poisoning are, for All Occupations, slightly fewer than the deaths from All Causes per 100 cases of sickness for All Causes.

But column (f) suggests that the large fluctuations in columns (a), (b), (c), (d) are probably due to material differences in the age-distribution of the facts.

18,644. Table E. sums up the results of Table D. as regards the yearly number of deaths from lead poisoning per 100 cases of sickness from lead poisoning in various occupations. The results are then compared with the number of deaths from All Causes per

100 cases of sickness from All Causes in the experience of the Manchester Unity.

18,645. The importance of age-distribution of the facts is again emphasised by column (f) of Table E.

18,646. TABLE F.

The Yearly Number of Cases of Sickness to One Death Yearly. Distinguishing Cases of Lead Poisoning in Various Occupations; &c.

The Yearly Number of Cases of Sickness to One Death Yearly.

| Year.        | Lead Poisoning. In Factories and Workshops. Cd. 5693, page 170. |   |                    |                  | Manchester Unity, 1893-97. All Causes. |                  |
|--------------|---|---|--------------------|------------------|--|------------------|
|              | Paints and Colours plus Coach Building.                         | Paints and Colours plus Coach Building plus White Lead. | Other Occupations. | All Occupations. | Age.                                   | All Occupations. |
|              | (a)   | (b)   | (c)                | (d)              | (e)                                    | (f)              |
| 1900         | 21  | 40  | 22                 | 28               | 16-19                                  | 79               |
| 1901         | 30  | 28  | 24                 | 25               | 20-24                                  | 59               |
| 1902         | 109   | 126   | 31                 | 45               | 25-34                                  | 44               |
| 1903         | 19  | 28  | 36                 | 32               | 35-44                                  | 30               |
| 1904         | 16  | 28  | 21                 | 23               | 45-54                                  | 20               |
| 1905         | 28  | 51  | 20                 | 26               | 55-64                                  | 12               |
| 1906         | 17  | 16  | 21                 | 19               | 65 and older                           | 7                |
| 1907         | 26  | 44  | 18                 | 22               |  |                  |
| 1908         | 32  | 29  | 18                 | 20               |  |                  |
| 1909         | 17  | 11  | 19                 | 18               |  |                  |
| 1910         | 12  | 15  | 13                 | 13               |  |                  |
| 1900 to 1910 | 22  | 29  | 21                 | 23               | All ages                               | 21               |

NOTE.—Assuming identity of age-distribution in the various groups compared, there are slightly more cases of sickness from lead poisoning to one death from lead poisoning for All Occupations, than there are cases of sickness from All Causes to one death from All Causes.

But column (f) suggests that the large fluctuations in columns (a), (b), (c), (d) are probably due to material differences in the age-distribution of the facts.



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18,647. Table F. shows the yearly number of cases of sickness from lead poisoning to one death yearly from lead poisoning in various occupations. The results are then compared with the yearly number of cases of sickness from All Causes to one death from All Causes in the Manchester Unity. At All Ages, and in All Occupations, the difference between the two groups is slight, in the proportion of 23 to 21.

18,648. The proportion between number of cases of sickness and number of deaths, as illustrated by the number of cases of sickness to one death, is not so comprehensive of the facts as is the proportion of weeks of sickness to one death. The latter ratio takes into the account the duration of sickness which is necessarily omitted when only cases of sickness are regarded. The results on page 170 of Cd. 5693 give no information as to duration or weeks of sickness from lead poisoning, and thus no comparison can be made.

18,649. TABLE G.

Showing the Yearly Number of Weeks of Sickness from All Causes to One Death Yearly from All Causes, according to the first and the last investigations of the Manchester Unity Experience, 1846-48 and 1893-97. All Occupations.

| Age.         | Manchester Unity Experience. |          |
|--------------|------------------------------|----------|
|              | 1846-48.                     | 1893-97. |
|              | (a)                          | (b)      |
|              | Weeks.                       | Weeks.   |
| 16-19        | 72                           | 254      |
| 20-24        | 92                           | 214      |
| 25-34        | 96                           | 190      |
| 35-44        | 102                          | 169      |
| 45-54        | 109                          | 164      |
| 55-64        | 116                          | 169      |
| 65 and older | 139                          | 190      |
| All ages     | 101                          | 180      |

NOTE.—The above results embody alterations in the death-rate, in the rates of cases of sickness, in the duration of sickness.

The main cause of the large increase in column (b) is the increase in sickness experienced in friendly societies, accompanied by a falling death-rate.

Column (b) emphasises the need to know the age-distribution of all the facts before an opinion can be formed as to the incidence of sickness in any occupational group.

18,650. But in Table G. I show the results relating to the yearly number of weeks of sickness from All Causes to one death from All Causes, now computed for the first and for the last investigation of the sickness and mortality of the Manchester Unity.

18,651. The highest results are those which relate to the most recent years, namely, the period 1893-97. These high results are mainly due to the increase of sickness experienced by the friendly societies of this country, accompanied by a falling death-rate.

Summarisation.

18,652. Although, as has been stated, no data are available by which to measure the incidence of sickness from lead poisoning, or the sickness from All Causes that occurs among house-painters or among occupations exposed to the risk of lead poisoning, as compared with the sickness that obtains among the general population, yet the data available do suffice to show a large reduction in the number of cases of

sickness from lead poisoning during 1900-10. Also, there is presumptive evidence connected with death rates that the sickness from All Causes among house-painters, &c., is not in excess of the sickness from All Causes among the general population. Further, it has been shown that the cases of sickness from lead poisoning are not quite so fatal as the cases of sickness from All Causes.

18,653. I may mention that during the whole of my experience, covering the years 1880-1912, I have never been requested to prepare special rates of premium for sickness assurance relating to house-painters, &c. Special rates are sometimes called for in other occupations, such as miners, agricultural workers, &c. The modern friendly society, of a good class, is quite an efficient institution, with most carefully-kept registers that are closely scrutinised.

18,654. If the occupation house-painter, &c. is exposed to any undue rate of sickness, I am of opinion that I should have been called upon at some time during 1880-1912 to prepare special rates of sickness premiums for this occupation.

18,655. Beyond these statements I am not able to go for lack of data.

18,656-7. If this question of sickness in occupations exposed to the risk of lead poisoning is to be examined upon a valid basis, I can suggest no better mode than to induce a large friendly society, or a number of small friendly societies, to fill up a large number of experience cards such as that shown here.

Specimen Card.

| PERIOD OF OBSERVATION, 1907-1911.            |                             |                             |                    |                  |
|--|-----------------------------|-----------------------------|--------------------|------------------|
| .....Friendly Society.                       |                             |                             |                    |                  |
| Name.— <i>Alfred Williams.</i>               |                             |                             |                    |                  |
| Register Number.— <i>197.</i>                |                             |                             |                    |                  |
| Occupation.— <i>House-painter.</i>           |                             |                             |                    |                  |
| Date of Birth.— <i>3rd May, 1868.</i>        |                             |                             |                    |                  |
| Date of Entry.— <i>7th August, 1906.</i>     |                             |                             |                    |                  |
| Date of Freedom.— <i>7th February, 1907.</i> |                             |                             |                    |                  |
| Date of Exit.— <i>15th September, 1911.</i>  |                             |                             |                    |                  |
| Mode of Exit.— <i>Death.</i>                 |                             |                             |                    |                  |
| Cause of Death.— <i>Lead Poisoning.</i>      |                             |                             |                    |                  |
| Year.  | Nearest Age on 1st January. | Weeks and Days of Sickness. |                    |                  |
|  |                             | From Lead Poisoning.        | From Other Causes. | From All Causes. |
|  |                             | W. D.                       | W. D.              | W. D.            |
| 1907   | 39                          | —                           | —                  | —                |
| 1908   | 40                          | —                           | 1 4                | 1 4              |
| 1909   | 41                          | —                           | —                  | —                |
| 1910   | 42                          | —                           | 31 0               | 31 0             |
| 1911   | 43                          | 37 2                        | —                  | 37 2             |
| Total sickness                               |                             | 37 2                        | 32 4               | 70 0             |

NOTE.—This is a specimen card, imaginary as to the facts stated upon it, that if filled up for a large number of house-painters, &c., would enable trustworthy knowledge to be obtained as to the rates of sickness, &c., occurring among house-painters, &c. The top right-hand corner is cut off to facilitate the subsequent processes of sorting the cards, &c.

18,658. Each of these cards, measuring about 6 by 3½ inches, relates to one life. By means of the data recorded upon these cards, if they can be obtained, I should be able to investigate the rates of sickness, &c., among house-painters, &c., upon a valid basis, see, for instance, Table H., which sets out some of the absolutely essential data.

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18,659. TABLE H.

SPECIMEN TABLE.—To be based upon the data obtained by the Cards shown above, relating to the Actual and the Expected Sickness among House-Painters, &c., during the five years 1907-11. The Expected Results are based upon the Standard Experience of the Manchester Unity, 1893-97.

| Age.         | No. of Years of Life exposed to Risk of Sickness. | Standard Rate of Sickness per Member per Year (Weeks). | Ex-pected No. of Weeks of Sick-ness. (a × b) | Actual No. of Weeks of Sick-ness. | Excess of Actual over Ex-pected Weeks of Sick-ness. (d - e) | Excess of Expected over Actual Weeks of Sick-ness. (e - d) | Percentage of Actual to Expected Weeks of Sickness. |            | Actual Weeks of Sickness. Distinguishing Sickness from Lead Poisoning. |               |                     |
|--------------|---|--|--|-----------------------------------|---|--|---|------------|--|---------------|---------------------|
|              |   |  |  |                                   |   |  | Expected.   | Actual.    | Lead Poisoning.  | Other Causes. | All Causes. (i + j) |
|              | (a)   | (b)  | (c)  | (d)                               | (e)   | (f)  | (g)   | (h)        | (i)  | (j)           | (k)                 |
| 16-19        |   | .92  |  |                                   |   |  | 100   |            |  |               |                     |
| 20-24        |   | .90  |  |                                   |   |  | 100   |            |  |               |                     |
| 25-34        |   | 1.01   |  |                                   |   |  | 100   |            |  |               |                     |
| 35-44        |   | 1.41   |  |                                   |   |  | 100   |            |  |               |                     |
| 45-54        |   | 2.33   |  |                                   |   |  | 100   |            |  |               |                     |
| 55-64        |   | 4.94   |  |                                   |   |  | 100   |            |  |               |                     |
| 65 and older | Not known.  | 16.59  | Not known.                                   | Not known.                        | Not known.  | Not known.   | 100   | Not known. | Not known.   | Not known.    | Not known.          |
| All ages     |   | —  |  |                                   |   |  | 100   |            |  |               |                     |

NOTE.—This is one of various Tables that would be based upon the data to be obtained by means of the Cards shown on page 595.

Inspection of this Table will show the impossibility of forming any valid opinion as to the incidence of sickness from lead poisoning, and from All Causes among house-painters, &c., in the absence of the kind of data here described.

18,660. In the Preliminary Tables (subject to correction) relating to lead poisoning, &c., in factories and workshops for the year 1911 (Cd. 6072), the cases of sickness from lead poisoning are stated at 669 (with 37 deaths occurring); as compared with 505 cases of sickness (with 38 deaths occurring), for the year 1910. This number of 669 cases in 1911 is the highest since 1901. (See Table D., page 593.) But as no age-distribution is stated, it is of course impossible to know to what extent the increase in 1911 is due to a difference in age-distribution of the facts as between 1910 and 1911. (See the note to Table D., page 593.)

18,661. These Preliminary Tables for 1911 also state that 263 cases of sickness from lead poisoning (with 48 deaths occurring) were reported among house-painters and plumbers not employed under the Act, in addition to the 669 cases above-mentioned. The corresponding figure for 1910 appears to be 232 cases (with 35 deaths occurring) among house-painters and plumbers. (See page 170 of Cd. 5693.)

18,662. But these scanty data, lacking all the essential qualities for sound investigation, are really useless.

18,663. It should be specially noted that the area of observation upon which Tables B., C., D., E., F., are based consists of the reported cases of lead poisoning "occurring or contracted in a factory or workshop." Thus, although this area of observation includes a considerable number of persons exposed to the risk of lead poisoning, it is probable that the conditions of their exposure to risk of lead poisoning are more severe than the conditions of exposure to risk of lead poisoning that attach to the work of a house-painter. Moreover, the number of house-painters engaged in factories and workshops within the meaning of the Act is, of course, much fewer than the number of house-painters engaged outside of factories and workshops. Thus, quite apart from the impossibility [for the reasons already stated] of using the data herein shown, or any other data in the Reports upon Factories and Workshops, as any guide to the incidence of sickness obtaining among persons exposed to the risk of lead poisoning, it is additionally obvious that these data, which relate to an area of observation limited to

factories and workshops, are not applicable to house-painters as a body. This objection would hold good even if the data herein shown were of a kind that admits of the investigation of rates of sickness from lead poisoning and from all causes obtaining among persons exposed to risk of lead poisoning in factories and workshops. But, as has been shown, the data available are wholly inadequate to enable any such investigation to be made.

18,664. At present no valid basis exists by which to form any sound opinion as to the incidence of sickness among house-painters, &c. Certainly, no sound opinion can be formed upon this matter by examining the facts contained in the Report of the Chief Inspector of Factories and Workshops. The latter facts merely admit of the minor and quite subsidiary elucidations herein contained, and which throw no light upon the incidence of sickness obtaining among persons exposed to the risk of lead poisoning.

#### Occupational Mortality.

(Addendum.)

18,665. In my evidence as regards occupational mortality, I show in Table J. the usual actuarial mode of testing the actual number of deaths in any body of facts, by means of comparing these actual deaths with the number of deaths to be expected upon the basis of this or that standard of mortality employed as a test. The test in Table J. is the mortality of all occupied males in the industrial districts of England and Wales. This standard is, in my opinion, a fair test of the mortality in Occupation (64), Painters, Plumbers, and Glaziers.

18,666. But as this matter of the standard test to be employed is, and must be, a matter of opinion, I now show four additional tests of the mortality in Occupation (64). These four additional tests are shown in Tables K., L., M., N., and the four standards for these tests are as follows:—

TABLE K.—All Occupied Males, England and Wales. This includes all the professional and

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commercial males who are not exposed to any "industrial risk" of death. And in my opinion this is not a suitable test for the industrial Occupation (64).

TABLE L.—All Occupied Males, London. This standard also includes all professional and commercial males in London who are not exposed to any "industrial risk" of death. In my opinion this is not a suitable test for the industrial Occupation (64).

TABLE M.—This relates to the standard "Paper-hanger, Plasterer, Whitewasher." It is one of the six occupations in England and Wales having an abnormally low death-rate, and, moreover, this standard includes only 132,000 years at risk. For these reasons this standard is not, in my opinion, a suitable test to apply to Occupation (64), the latter occupation having an exposure of 664,000 years at risk, and not being one of the six occupations with an abnormally low death-rate.

TABLE N.—This test, like Table M., relates merely to a relatively small group of lives in the building trade. This standard includes only 101,000 years of life at risk, and it has a rather high rate of mortality. For these reasons I do not consider that this standard is a suitable test of the mortality in Occupation (64).

18,667. As regards the death-rates in Occupation (64), Painter, Plumber, Glazier, it should be noted that a considerable proportion of the "years at risk" relates to plumbers.

18,668. Referencé to page 194 of Cd. 1523 and comparison with page 106 of Cd. 2619 will show that of the 664,251 "years at risk" in Occupation (64), no fewer than 189,585 relate to plumbers.

18,669. The 664,251 "years at risk" in Occupation (64) are made up as follows:—

|                        |         | Per cent. |
|------------------------|---------|-----------|
| Painters and glaziers  | 474,666 | 71        |
| Plumbers               | 189,585 | 29        |
| Total, Occupation (64) | 664,251 | 100       |

18,670. The deaths in Occupation (64) cannot be thus separated. It is probable that the death-rate of plumbers arising from lead poisoning is in excess of the death-rate of painters arising from lead poisoning. If this be the case, the death-rates herein shown for Occupation (64) are in excess of the death-rates of painters; although, as has been shown, the death-rates in Occupation (64) are in no way abnormally high. This consideration, namely, the fact that Occupation (64) includes a large proportion of plumbers, is further evidence that the death-rate of painters is not high.

## 18,671. TABLE K. (see Table J.).

Showing the Actual and the "Expected" Number of Deaths during 1900-02 in Occupation (64)  
(Plumber, Painter, Glazier, page 106 of Cd. 2619. Occupied Group).

Standard Data = All Occupied Males, England and Wales (page 3 of Cd. 2619). Relating to  
29½ millions of lives at risk.

| Ages.        | Years of Life exposed to Risk of Death, in Occupation (64). (Page 106.)<br>(a) | Mean Annual Death-rate per 1,000 at Risk all Occupied Males, England and Wales. (Page 3.)<br>(b) | Actual and Expected Number of Deaths in Occupation (64) during 1900-02. |  |   |   | Percentage of Actual to Expected Number of Deaths. |  |
|--------------|--|--|---|--|---|---|--|--|
|              |  |  | Expected Number of Deaths.<br>( $\frac{a \times b}{1,000}$ )<br>(c)     | Actual Number of Deaths.<br>(Page 106.)<br>(d) | Shortage of Actual Deaths in Occupation (64).<br>(c - d)<br>(e) | Excess of Actual Deaths in Occupation (64).<br>(d - c)<br>(f) | Actual.<br>( $\frac{d \times 100}{c}$ )<br>(g)     | Expected.<br>( $\frac{c \times 100}{e}$ )<br>(h) |
| 15-19        | 95,316   | 2.44   | 233   | 193  | 40  | —   | 83   | 100  |
| 20-24        | 101,193  | 4.41   | 446   | 381  | 65  | —   | 85   | 100  |
| 25-34        | 168,345  | 6.01   | 1,012   | 941  | 71  | —   | 93   | 100  |
| 35-44        | 138,471  | 10.22  | 1,415   | 1,600  | —   | 185   | 113  | 100  |
| 45-54        | 97,206   | 17.73  | 1,724   | 2,074  | —   | 350   | 120  | 100  |
| 55-64        | 47,832   | 31.01  | 1,483   | 1,709  | —   | 226   | 115  | 100  |
| 65 and older | 15,888   | 88.39  | 1,404   | 1,283  | 121   | —   | 91   | 100  |
| All ages     | 664,251  | —  | 7,717   | 8,181  | 297   | 761   | 106  | 100  |

Based upon Cd. 2619, pages 3 and 106.

NOTE.—Upon the basis of the above standard data, viz., All Occupied Males, England and Wales, the actual deaths in Occupation (64) were, for "All Ages," 6 per 100 above the standard. At four of the seven age-groups the number of deaths in Occupation (64) was below the standard number of deaths. It should be noted that the above standard "All Occupied Males, England and Wales," includes all the professional and commercial males who are not exposed to any industrial risk of death. Thus the above standard is probably not a suitable test for the industrial Occupation (64). It is a test that is too severe.

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[Continued.]

18,672. TABLE L. (see Table J.).

Showing the Actual and the "Expected" Number of Deaths during 1900-02 in Occupation (64) (Plumber, Painter, Glazier, page 106 of Cd. 2619. Occupied Group).

Standard Data = All Occupied Males, London (page 5 of Cd. 2619). Relating to over four millions of lives at risk.

| Ages.        | Years of Life exposed to Risk of Death in Occupation (64). (Page 106.) | Mean Annual Death-rate per 1,000 at Risk, all Occupied Males, London. (Page 5.) | Actual and Expected Number of Deaths in Occupation (64) during 1900-02. |                                      |   |   | Percentage of Actual to Expected Number of Deaths. |   |
|--------------|--|---|---|--------------------------------------|---|---|--|---|
|              |  |   | Expected Number of Deaths. $\left(\frac{a \times b}{1,000}\right)$      | Actual Number of Deaths. (Page 106.) | Shortage of Actual Deaths in Occupation (64). $(a-d)$ | Excess of Actual Deaths in Occupation (64). $(d-e)$ | Actual. $\left(\frac{d \times 100}{c}\right)$      | Expected. $\left(\frac{e \times 100}{c}\right)$ |
|              | (a)  | (b)   | (c)   | (d)                                  | (e)   | (f)   | (g)  | (h)   |
| 15-19        | 95,316   | 2.82  | 269   | 193                                  | 76  | —   | 72   | 100   |
| 20-24        | 101,193  | 4.44  | 449   | 381                                  | 68  | —   | 85   | 100   |
| 25-34        | 168,345  | 6.82  | 1,148   | 941                                  | 207   | —   | 82   | 100   |
| 35-44        | 138,471  | 12.96   | 1,795   | 1,600                                | 195   | —   | 89   | 100   |
| 45-54        | 97,206   | 22.35   | 2,173   | 2,074                                | 99  | —   | 95   | 100   |
| 55-64        | 47,832   | 34.01   | 1,627   | 1,709                                | —   | 82  | 105  | 100   |
| 65 and older | 15,888   | 73.75   | 1,172   | 1,283                                | —   | 111   | 109  | 100   |
| All ages     | 664,251  | —   | 8,633   | 8,181                                | 645   | 193   | 95   | 100   |

Based upon Cd. 2619, pages 5 and 106.

NOTE.—Upon the basis of the above standard data, viz., "All Occupied Males, London," the actual deaths in Occupation (64) were, for "All Ages," 5 per 100 below the standard. At five of the seven age-groups, the number of deaths in Occupation (64) was below the standard number of deaths. It should be noted that the above standard, "All Occupied Males, London," includes all the professional and commercial males who are not exposed to any industrial risk of death. Thus the above standard is probably not a suitable test for the industrial Occupation (64). The fact that Occupation (64) is able to stand the above test supplies evidence that the mortality in Occupation (64) is not in any way excessive.

18,673. TABLE M. (see Table J.).

Showing the Actual and the "Expected" Number of Deaths during 1900-02 in Occupation (64) (Plumber, Painter, Glazier, page 106 of Cd. 2619. Occupied Group).

Standard Data = Paperhanger, Plasterer, Whitewasher (Occupied, England and Wales), page 105 of Cd. 2619. Relating to only 132,000 lives at risk.

| Ages.        | Years of Life exposed to Risk of Death in Occupation (64). (Page 106.) | Mean Annual Death-rate per 1,000 at Risk, Paperhanger, &c. (Page 105.) | Actual and Expected Number of Deaths in Occupation (64) during 00-1902. |                                      |   |   | Percentage of Actual to Expected Number of Deaths. |   |
|--------------|--|--|---|--------------------------------------|---|---|--|---|
|              |  |  | Expected Number of Deaths. $\left(\frac{a \times b}{1,000}\right)$      | Actual Number of Deaths. (Page 106.) | Shortage of Actual Deaths in Occupation (64). $(e-d)$ | Excess of Actual Deaths in Occupation (64). $(d-e)$ | Actual. $\left(\frac{d \times 100}{e}\right)$      | Expected. $\left(\frac{e \times 100}{e}\right)$ |
|              | (a)  | (b)  | (c)   | (d)                                  | (e)   | (f)   | (g)  | (h)   |
| 15-19        | 95,316   | 1.52   | 145   | 193                                  | —   | 48  | 133  | 100   |
| 20-24        | 101,193  | 3.44   | 348   | 381                                  | —   | 33  | 109  | 100   |
| 25-34        | 168,345  | 4.07   | 685   | 941                                  | —   | 256   | 137  | 100   |
| 35-44        | 138,471  | 11.52  | 1,595   | 1,600                                | —   | 5   | 100  | 100   |
| 45-54        | 97,206   | 19.18  | 1,864   | 2,074                                | —   | 210   | 111  | 100   |
| 55-64        | 47,832   | 32.53  | 1,550   | 1,709                                | —   | 153   | 110  | 100   |
| 65 and older | 15,888   | 72.18  | 1,147   | 1,283                                | —   | 136   | 112  | 100   |
| All ages     | 664,251  | —  | 7,340   | 8,181                                | —   | 841   | 111  | 100   |

Based upon Cd. 2619, pages 105 and 106.

NOTE.—Upon the basis of the above standard data, viz., Paperhanger, Plasterer, Whitewasher, the actual deaths in Occupation (64) were, for "All Ages," 11 per 100 above the standard. At all the seven age-groups the number of deaths in Occupation (64) was above the standard number of deaths. It should be noted that the above standard "Paperhanger, Plasterer, Whitewasher" is one of the six occupations in England and Wales having an abnormally low death-rate. See page 4 of my evidence on occupational mortality. The cause of this abnormally low death-rate is not known. It may be due to the relatively small number of years of life at risk, only 132,000. The above test is here included, although it is not satisfactory to use as a standard a body of facts that is much smaller than the body of facts to be tested.

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[Continued.]

18,674. TABLE N. (see Table J.).

Showing the Actual and the "Expected" Number of Deaths during 1900-02 in Occupation (64) (Plumber, Painter, Glazier, page 106 of Cd. 2619. Occupied Group.)

Standard Data = Wood Turner, Cooper, &c. (occupied, England and Wales), page 110 of Cd. 2619. Relating to only 101,000 lives at risk.

| Ages.        | Years of Life exposed to Risk of Death, in Occupation (64). (Page 106.) | Mean Annual Death-rate per 1,000 at Risk, Wood Turner, &c. (Page 110.) | Actual and Expected Number of Deaths in Occupation (64) during 1900-02. |                                      |   |   | Percentage of Actual to Expected Number of Deaths. |   |
|--------------|---|--|---|--------------------------------------|---|---|--|---|
|              |   |  | Expected Number of Deaths. $\left(\frac{a \times b}{1,000}\right)$      | Actual Number of Deaths. (Page 106.) | Shortage of Actual Deaths in Occupation (64). $(c - d)$ | Excess of Actual Deaths in Occupation (64). $(d - c)$ | Actual. $\left(\frac{d \times 100}{c}\right)$      | Expected. $\left(\frac{c \times 100}{c}\right)$ |
|              | (a)   | (b)  | (c)   | (d)                                  | (e)   | (f)   | (g)  | (h)   |
| 15-19        | 95,316  | 1.94   | 185   | 193                                  | —   | 8   | 104  | 100   |
| 20-24        | 101,193   | 4.46   | 451   | 381                                  | 70  | —   | 84   | 100   |
| 25-34        | 168,345   | 6.23   | 1,049   | 941                                  | 108   | —   | 90   | 100   |
| 35-44        | 138,471   | 11.69  | 1,619   | 1,600                                | 19  | —   | 99   | 100   |
| 45-54        | 97,206  | 24.98  | 2,428   | 2,074                                | 354   | —   | 85   | 100   |
| 55-64        | 47,832  | 34.70  | 1,660   | 1,709                                | —   | 49  | 103  | 100   |
| 65 and older | 15,888  | 92.82  | 1,475   | 1,283                                | 192   | —   | 87   | 100   |
| All ages     | 664,251   | —  | 8,867   | 8,181                                | 743   | 57  | 92   | 100   |

Based upon Cd. 2619, pages 106 and 110.

NOTE.—Upon the basis of the above standard data, viz., Wood Turner, Cooper, &c., the actual deaths in Occupation (64) were, for "All Ages," 8 per 100 below the standard. At five of the seven age-groups the number of deaths in Occupation (64) was below the standard number of deaths. It should be noted that the above standard "Wood Turner, Cooper, &c.," has a rather high death-rate, the cause of which is not known. It may be due to the relatively small number of years of life at risk, only 101,000. The above test is here included, although it is not satisfactory to use as a standard a body of facts that is much smaller than the body of facts to be tested.

18,675. (Chairman.) The first part of your proof deals with the mortality in the occupational group of plumbers, painters, and glaziers, as compared with the mortality in other occupations?—Yes.

18,676. Before going into any detail with regard to this, do I understand that you wish to draw the deduction that plumbers, painters, and glaziers, as a class, are not far removed from the average as regards their mortality from all diseases?—Well, I would not word it quite in that way, because I do not wish to draw any deduction. It is merely that an examination of the facts has caused me to form the opinion that it is not an abnormal rate of mortality, but I do not wish to draw the deduction. The deduction has come out of my examination.

18,677. You admit, of course, that there are a certain number of deaths from lead poisoning and diseases which are accelerated by exposure to lead?—Yes, certainly.

18,678. Then, if we could safeguard the painter against all risk of lead poisoning, do you suggest that his occupation might be more healthy than the average worker's occupation?—No, I do not think I would say that. So far as I can gather from the records of the Registrar-General, although the occupation (64) "plumber, painter, glazier" has a much higher mortality from lead poisoning than other occupations, so far as I know even then the mortality from lead poisoning is relatively trivial. It does not seem appreciably to affect the death-rate so far as I can judge. We must bear in mind that in all industrial occupations, or in most of them, there is an industrial risk, and lead poisoning appears to be the industrial risk of occupation (64). I do not think I would say that, if we could eliminate the lead-poisoning risk, therefore they would be much healthier. The influence of lead poisoning is too small as far as I can see.

18,679. But, small as it may be, they would benefit by the removal of it?—They would benefit, but I understood your question to be, would they be much more healthy if we could eliminate it. You rather emphasised that. I am qualifying my reply to your question, or being careful about it, because I do not consider the

risk of lead poisoning, as shown here in the Registrar-General's returns sufficient, taking the recorded deaths, to make any very large difference. I think I show what the difference is. It would make it better, certainly.

18,680. But, however small the difference may be, if that difference were eliminated it would be better for the painter?—I should think so. I do not really know the exact diseases that it affects because I am not a medical man, but I should say that it would be better. But they have to die from something if they do not die from lead poisoning.

18,681. Surely you do not put that forward as a reason why lead poisoning should be allowed to continue?—No; I am agreeing with your deduction—that if lead poisoning could be eliminated, it would to some extent reduce the mortality, but I do not wish to be interpreted as saying that it would greatly reduce it or bring it much below the average, or anything of the sort.

18,682. I note that you confine yourself largely to a consideration of death-rates per thousand living in each age-group?—Yes, as far as possible, so as to get the age distribution. That is very important.

18,683. The study of such figures must be combined with a careful consideration of the age distribution, must it not?—I think so. It is most important, so as to get the age distribution for lives exposed to the risk and the age distribution of the deaths that occur.

18,684. Would you say that the whole question is very much affected by a consideration of the average age at which workers enter upon employment in the occupation in question?—I do not know. I have not studied that. I do not think I would like to give an opinion off-hand about that. Some of these questions are exceedingly subtle; I do not mean that they are asked in a subtle way, but they have a very subtle result on the statistics.

18,685. I will put it in this way, then. If a painter enters his occupation at an earlier or later average age than the worker in some other occupation, a comparison of the death-rates per thousand living in each age-group would not give a true picture of the risks

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attendant on the two occupations, would it?—There I should beg to differ, for this reason: as to a painter entering 10 or 15 years later on the average, or earlier, than a worker in some other occupation, I cannot say anything; but, taking your point, if they were correctly observed, and they are approximately observed in the Registrar-General's returns, so long as you get your years of life exposed to risk at any age (it does not matter what age) and your deaths at that age, you get your correct comparison of death-rate at that particular group of age with any other occupation at that particular group of age. The point you put, whether the age at which they enter on their occupation would affect the mortality, if I may say so, does not hold water, because it does not matter.

18,686. (*Dr. Collis.*) Yes, surely it matters?—No, not if the age distribution is taken, I think.

18,687. From the medical point of view, if a man starts being exposed to a certain poison at 15 and reaches the age of 30, it will have had 15 years' effect upon him; whereas if the exposure commenced at 29 he would only have had one year's exposure?—There might be something in that from a medical point of view, but I understood the question to be put not from the medical point of view. I do not know anything about that.

18,688. (*Chairman.*) I had in my mind the medical aspect?—I cannot answer from the medical point of view. I should say that there would be something in it, but I cannot possibly answer from a medical point of view.

18,689. Is there not something in it from an actuarial point of view?—There is nothing in it from the actuarial point of view. You would not possibly know actuarially, if he entered a friendly society, or an insurance company, whether he had been exposed to the risk of lead poisoning that you mention. I should say that from the medical point of view it might have some effect, but I do not know.

18,690. But it must have an effect?—If there is any danger in the inhalation of lead at all from the medical point of view, it must be so. The man's life might be affected injuriously before he came under actuarial risk of exposure. There I agree with you, but I did not interpret your question at first in that sense. What the nature or amount of it would be, I cannot say.

18,691. In paragraph 18,575 of your proof you state that the occupation of plumber, painter, and glazier is more exposed to plumbism than are many occupations which have their own special risks?—Yes.

18,692. You then proceed to say "But despite this fact the death-rates in this occupation are by no means unduly high"?—Yes.

18,693. I can only suggest again that, if you eliminated the lead poisoning, the death-rates in the occupation of plumber, painter, and glazier would not be as high as they are to-day?—No, I should say not. I would be certainly inclined to agree with that. It would not make much difference. You must bear in mind that whether they die from lead poisoning or whether they do not die from lead poisoning, they have to die. Do not forget that. I am inclined to agree with your point.

18,694. Therefore, to follow my point, the death-rates for painters are, in the ordinary sense, unduly high?—Yes, in that sense it would be correct to say that they are unduly high to the extent of the lead poisoning. This paragraph of mine which you quoted, which rather tends to contradict the last statement of mine, but not really, takes it that each of these industries has its own industrial risk. If you eliminate the industrial risk from all industries, including the industrial risk of plumbism, then I agree that it would be unduly high to the extent of the risk of lead poisoning.

18,695. I take it that you have used the expression "by no means unduly high" in a purely statistical sense, meaning that they are not much higher than the average?—Yes, quite so. That is precisely what I mean. I should be perfectly disposed to agree with your interpretation, but not to be understood to say

that I consider them unduly high in a statistical sense.

18,696. In your Table C, paragraph 18,579, you show that amongst plumbers, painters, and glaziers, the death-rates from plumbism, taking all these, is one fifty-fourth part of the death-rate from all causes?—Yes, according to the Registrar-General's figures.

18,697. To translate that into simpler language it means that of every 54 painters, plumbers, and glaziers who die, only 53 would die if there were no exposure to risk of lead poisoning?—I should think that that would be an accurate way of putting it, but one does not like quite to say certainly that it would, because one knows that there are so many pit-falls awaiting one. But, certainly, your last statement strikes me as a correct statement.

18,698. This takes no account of the increased mortality from Bright's disease and nervous and other diseases, due to exposure to lead, although it cannot be certified as lead poisoning, because of the normal liability of men to Bright's disease and nervous diseases?—It takes simply plumbism into account. If there is any mortality caused by lead poisoning which would not be certified as plumbism, then there should be other things included as plumbism. I do not know whether it is so or not.

18,699. Even if we take that one death of every 54 which you admit is directly due to plumbism, you would not, as a humane man, say that nothing should be done to save that one man in 54?—No, I suppose I should not. I was not looking at it actually from the humane point of view. I was only looking at it from a cold-blooded point of view, to get at the inside of the question.

18,700. But we here are looking at it from the humane point of view?—A very good way to look at it too. You must forgive me for not doing so. I am a little puzzled over this thing. I feel strongly disposed to agree with what you say that on the surface, according to the Registrar-General's returns, it looks as if one death in 54 is caused by plumbism. But I wish to be rather guarded about that, because I know from many years' experience of these things, especially when you have not the original data, that it is rather risky to say yes to a question like that. It looks perfectly safe, but when you come to investigate it afterwards you find that you have fallen into some pit-fall. There are so many pit-falls in this kind of work. That is why I qualify what I say.

18,701. You appreciate the standpoint of the Committee?—Yes, I quite appreciate that.

18,702. And that we must do something to save that one life?—Presumably. I do not say for a moment that plumbism saves a man from something else. But if you look at the table, you find that occupation 64 has a remarkably low death-rate, from some very pregnant causes of disease that kill people in other occupations. It is impossible for me to say that they are saved from other causes of death.

18,703. If it is true that one in 54 dies from plumbism, we ought to try to save that one?—Yes, being careful not to drive him to death from drink, or unemployment, or something else.

18,704. Now, in the second part of your proof entitled "Occupational sickness," you lay stress on the absence of reliable statistics?—Yes.

18,705. You are not in possession of any of the death statistics of the painters' societies, are you?—No, I am not.

18,706. As this Committee have been supplied with the certificates showing the cause of death in the case of every member who has died in the two leading societies of the United Kingdom for a number of years past, you will, of course, agree that statistics based on those returns must carry great weight?—Yes, I should say so, if they are properly collated in the first instance, and properly considered, and if they have age distribution in them, and the period of exposure to risk.

18,707. In paragraph 18,616 and elsewhere, you allude to the possibility that the number of deaths from lead poisoning have been over-stated?—There

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are some statements quoted there to the effect that they may be over-stated. I do not know myself; it is not my own opinion.

18,708. You are no doubt aware that in all industries, a number of cases of lead poisoning escape diagnosis and notification as such?—I do not know about the medical side of it. I do not dispute the statement, because I do not know anything about that part of it, one way or the other.

18,709. What reason have you for believing that the number of cases which ought to be regarded as lead poisoning and are wrongly ascribed to some other cause should be less than the number of cases which are certified as lead poisoning when they ought to be put down to some other cause?—I do not know that I do believe that, and I do not think I have any reason for believing it. I think that those last two questions are perhaps a little bit inclined to magnify the effect of what I say. I am simply quoting here, am I not, mainly from Dr. Goadby's evidence? I have no reason for making that statement on my own account.

18,710. In Table B., in the second part of your proof, you give figures showing the cases of lead poisoning in factories and workshops?—Yes, that is so.

18,711. In column (d) you take all occupations; in column (b) you take the occupations of paints and colours, coach-building and white lead?—Yes.

18,712. For what reason have you so divided the occupations?—It is some time since I did it. As far as I know I did it for the ordinary actuarial purpose of comparing the class that I was asked to look at, namely, painters, people using paint brushes and paints and so on with other occupations. I should say that the data is defective from what I remember from reading factory reports. All occupations could not be considered in the light that all occupations in the death report could be considered. Speaking from memory, this is a more restricted lot of data, and it is all that are available, but it is not certainly such a big group as in the death report which covers the whole population of England. I am merely speaking from memory, but to amplify my reply to your question, the reason was a perfectly obvious one—that I wanted a standard by which to compare the group I was asked to investigate, namely, painters.

18,713. Why did you mix up paints and colours, coach builders and white lead all in the same group?—I merely took out those because I thought that they would be the most likely to be the group coming in that occupation 64. I know that it is not correct, but then you see we are dealing with defective data.

18,714. Did you prepare this information specially for this Committee?—Yes, the whole of it.

18,715. At whose instigation?—Messrs. White and Leonard, solicitors.

18,716. The solicitors acting for the white lead corrodors?—Or for the London Chamber of Commerce—I do not know which. They asked me (without in any way asking me to say one thing or the other), "Will you investigate the matter?"

18,717. You quite understand that the fact of grouping together paints and colours, coach builders and white lead rather confuses the issue for the purposes of this Committee?—I am sorry that that should be so. It had not occurred to me that it does do so, but I might say, as I think I say somewhere else in regard to the sickness report, that all these "sickness" facts are practically worthless, in my opinion. I think it shows rather a low rate. I do not attach any importance to any of this sickness business because the data is so wholly lacking in all the essentials for proper investigation, so much so that I consider all this latter part useless.

18,718. Have you considered how the curve representing cases in all occupations compares with the sectional curves showing (1) cases of lead poisoning in all occupations for which special legislation has been introduced, and (2) those for which no special legislation has been introduced?—No, I have not. As far

as I know I had not the material for it. I was terribly short of material.

(A diagram was shown to the witness.)

(Witness.) These are cases of lead poisoning without any age distribution, I suppose?

18,719. Yes?—As I say in the report, I consider it perfectly useless to compare sickness or death without age distribution. It is so much a function of age in case of sickness.

18,720. If you compare those sectional curves, you will note that the marked reduction in total lead poisoning is almost entirely due to the much more rapid reduction of cases in what I may term the regulated trades, while the incidence of lead poisoning in the non-regulated trades has remained practically stationary?—I have not investigated this, and I am bound to say that I do not regard any investigation made of sickness that ignores age distribution as worth making. That is borne in upon me by a great deal of experience in this kind of thing.

18,721. Do you think that all the legislation in the last few years affecting lead workers has been useless?—Well, I do not know what the legislation has been, you see; but I do say this, speaking quite seriously about it—as I go on to say later—I think that unless you take age distribution into account in sickness, you really cannot arrive at sound actuarial results about it. I really do not think you can. If you would like me to illustrate that I could refer you to a table. I think that my point is very important. I do not want in the least to pooh-pooch this chart; no doubt it is very interesting. I can hardly be expected to deny or confirm anything about it, but it does not take age distribution into account. It is a very serious defect in the data, not in the method of working, of course.

18,722. The practical question to us would be, if the incidence of lead is dangerous to the workman, and everyone admits that, the removal of it must be beneficial to the workman?—I think that everyone must admit that. It is obviously so.

18,723. That is really the only question we have to consider?—We obviously must admit that. If it really is a thing that is seriously injurious then it should be removed, but as far as I have been able to gather from the mortality it has not borne itself into my mind that it is so, and as regards the exceedingly defective data which I have been able to get with regard to sickness I have nothing that throws any light upon it. That is my difficulty.

18,724. Have you the same material to work upon that the Home Office has in compiling their figures?—That I do not know. I have only the supplement to the 65th Annual Report and various reports of Inspectors of factories and workshops. In the latter part of the Sickness Report I sketched out the ideal kind of data that I would like to get. The card I show there is the kind of thing one would like. I have drafted out a specimen card to enable one to get at the bottom of this. I wrote to the Manchester Unity people.

18,725. In paragraph 18,630 you say: "Perhaps the occupation of paints and colours plus coach building plus white lead is the group most likely to include house-painters"?—Yes, I do say that.

18,726. Now house-painters are not included under the Factory Act; therefore, you would not expect any house-painters to be included in the figures that you give, would you?—No, I know; and I admit that it is not quite satisfactory. I was thoroughly dissatisfied with the whole of the sickness data when I went through it. I am inclined to agree with you that that should be revised. The data is entirely defective. The whole of this sickness data is defective.

18,727. I would like to ask you who suggested to you that group?—No one. I merely made it myself. It is really not of much use.

18,728. You are doubtless aware that statistics for lead poisoning amongst house-painters are published month by month in the Board of Trade Labour Gazette, and are summarised in the annual reports of H.M. Chief Inspector of Factories?—I have not those figures; they have not been supplied to me. I have asked for information that bears upon it, but I have

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not had those and I have not investigated them. Do they include any age distribution?

18,729. No, they do not. As there is no compulsory notification of non-fatal cases amongst house-painters, the only statistics of value are the records of actual deaths. We have the actual number of deaths from lead poisoning amongst house-painters?—You want the exposures. “The only statistics of value,” you say, but I do not know about that. There must be a lot of valuable data in the records of the friendly societies.

18,730. I will not say “of value” then, but the only statistics you can rely on are the records of the actual deaths?—Yes, I should think so.

18,731. If you turn to those figures you will note that there has been no reduction noticeable?—Is that so?

18,732. Yes?—I did not know that. According to the Registrar-General there is a big reduction in deaths in group 64.

18,733. (Dr. Collis.) We are dealing only with deaths from lead poisoning?—Then I do not know.

(Dr. Collis.) The Registrar-General makes a statement upon it himself.

18,734. (Chairman.) It is borne out by the statements in the Supplement to the Decennial Report of the Registrar-General at pages cxix to cxxi?—I show, I see here, taking it from the Registrar-General, that there has been a large decrease in the death-rate in occupation 64, not specially notifying plumbism.

18,735. (Dr. Collis.) You have not touched on the point in your proof that the Registrar-General touches upon?—I do not follow what is the point.

18,736. (Chairman.) If you turn to these figures published in the Board of Trade Labour Gazette every month you will find that the deaths amongst house-painters show no noticeable reduction?—As a matter of fact I have not seen them. Does that cover periods of years, because one does not want to take a month?

18,737. Ten years?—Is there any age distribution in them? I have not seen those figures, so really I cannot speak about that.

18,738. In paragraph 18,653 you state that you have not been asked to prepare special rates of premium for sickness assurance among house-painters. That statement relates to all sickness taken together, no doubt?—It does.

18,739. Lead poisoning is the only sickness painters are specially liable to which is the subject of compensation under the Workmen's Compensation Act?—Is that so?

18,740. Yes?—You are no doubt aware that special rates of premium for insurance under the Workmen's Compensation Act are payable in respect of painters?—No, I do not know that I am aware of it, but if you state it as the fact I will take it, of course.

18,741. These rates are higher, for example, than those for plasterers, who are exposed to similar occupational risks except that there is no risk of lead poisoning?—I have not investigated that, but I am not doubting that statement.

18,742. I am only quoting that to show that there must be a very marked risk. In paragraph 18,661, I note that you refer to the fact that there were 48 deaths from lead poisoning among house-painters and plumbers in 1911 as compared with 35 deaths in 1910?—A later report was sent to me showing that those curves that we have been looking at had jumped up a lot.

18,743. However strongly you may feel that this fact is an insufficient basis for any scientific deductions regarding occupational sickness and the like, you will no doubt admit that such a number of avoidable deaths is a deplorable fact in itself?—Certainly.

18,744. (Dr. Collis.) In your proof you draw attention to the fact that many occupations are associated with special risks?—Yes.

18,745. You would agree, I presume, that we should try, if possible, to eliminate such risks from industry?—Yes, if in eliminating them you can be sure that you are not introducing a worse risk, of course there is the possibility of that. You may be removing a relatively small injury and unwittingly introducing a greater. It is quite conceivable.

18,746. I said “if possible”?—Yes.

18,747. In Table F. (paragraph 18,591) you have given us a list of those occupations which stand, for comparative mortality, above that of plumber, painter and glazier?—That is so, taken from the Registrar-General's returns, and based, as I ought to call attention to, on the comparative mortality figure, which I do not like nearly so much as death-rate comparison from an actuarial point of view, or especially the comparison of actual and expected deaths which is dealt with later on, which is the real test of all.

18,748. We are here as a Departmental Committee appointed by the Home Office. Certain of the occupations there named are under the supervision of the Home Office which deals with mines and factories and workshops?—Yes, a good many of them.

18,749. Have you noted the fact that nearly every one of the industries which comes under the Home Office has already received attention as regards industrial risk, and has had established for it, either by Act of Parliament or special regulations, some methods of trying to reduce that risk, until we finally arrive at the plumber, painter, and glazier, who appear to be the next on the list?—I have not noticed that from personal observation. I accept your statement.

18,750. So that if that statement is true—and I think I may say that it is generally—it has now come to the turn of the plumber, painter, and glazier to have the industrial risk of their occupations considered?—Yes; accepting your former statement as accurate, I should say that that would be so. May I qualify that by pointing out that, even taking this comparative mortality figure in paragraph 18,594 (you are quite well aware that the standard of the comparative mortality figure is the figure 1,000) the occupation of plumber, painter, and glazier is only 4 per cent. above the average. It is not high above the average at all.

18,750a. No, but attention has been given to the other occupations?—Quite so; at least, I accept your statement.

18,751. Now, taking your large Table A (see paragraph 18,557) you have shown us in a very comprehensive way, by extracts from the Registrar-General's published figures, the relation at various age periods between the mortality of various occupations given by the Registrar-General?—All that he gives on the pages quoted (I have not made any selection) I have taken.

18,752. Then you have shown in Table B. (paragraph 18,573) for each age period, summarising them, the numbers of these occupations where the death-rates are above or below that of the plumber, painter, and glazier?—That is so.

18,753. Do you not think it a noticeable fact that between 15 and 19, there were 98 above; from 35 to 44, there were only 43; and from 45 to 54, 35?—Would it not be better to give the percentages? It brings out your point far better. It means that of 133 occupations that the Registrar-General compares (I have taken all of them) at age 15 to 19, 77 per 100 of those occupations have a death-rate that is above occupation 64 and, at the same age-group, 23 per cent. of those occupations have a death-rate which is below—77 and 23 make up 100 per cent. Your point is that at the early age there is a very large proportion of the other occupations whose death-rate is higher?

18,754. Yes. When we get to ages 35 to 44, the percentage is 32 against 68; and at ages 45 to 54 it is 26?—Yes, that is the lowest point.

18,755. At ages 55 to 64, it is 37?—Yes.

18,756. At age 65 and over, it rises again?—Yes. That tells in favour of occupation 64. We get 75 per cent. of older men who have a death-rate higher than occupation 64, and only 25 per cent. of all those occupations have a lower death-rate.

18,757. So that during the period of life when the occupation is having its effect, namely, between 35 and 64, you have some influence in this occupation which is placing it much less favourably than it would be placed at the commencement of the occupation. That is to say, that the class who form this occupational group are favourable from the health point of view up to 25?—I see your point—up to 34.



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18,758. Very well. When the occupational effect begins to show they take a poorer position, so there must be something in this occupation which is altering most profoundly their position in the mortality curve or column?—I do not feel sure about your deduction from the facts. The facts are perfectly clearly stated, but, if I may say so, I do not think one is quite justified in drawing your deduction, because we do not know by any means from the returns of the Registrar-General that men whose ages are from 35 to 64 have entered at that period of their life with this same occupation at the back of them. It is rather a big assumption to assume it. If this were taken exclusively with regard to men who had been observed (mark the emphasis I put on the word "observed") right away through from 15 to 64, then I think I should agree to your point without any qualification. Are we justified?

18,759. We are quite as justified as in considering that the other occupations with which you are comparing them are in the same position?—No.

18,760. You have to throw the whole lot over or accept the figures as stated?—I think not. I am comparing them here at each age. I do not say that your point is wrong. It is one of those rather complex points which I quite admit on the face of it appears to be borne out by the facts. I do not object to your statement merely for the sake of objecting but solely because I know that it is a kind of deduction that it is rather risky to base on the figures.

18,761. I see your point; but we have to accept that group as being representative of each age period of employment, or the whole of the table is of no value?—I do not think that.

18,762. If you cavil at the one, surely you must cavil at the other?—But must you? It is all split up into age-groups.

18,763. I take the age-groups?—But you want to assume that it is the same classes of individuals who have been observed. That is where I am not sure, and your deduction may be rather unsound and far-fetched, I am inclined to think. I do not say that it is, but it is quite likely to be. I do not say that you are wrong in any way.

18,764. You have to make the same allowance for the other 133 occupations. This seems to me, at any rate, to bear the interpretation that I put?—My point is that the interpretation which you put seems to me to be too weighty an interpretation to base on those facts, for the reason that I have given—that those lives have not been continuously observed.

18,765. But surely if those lives have not been continuously observed, the lives at each age period of the 133 occupations have also not been continuously observed. What holds good for the age-group of one occupation holds good for the age-group of another occupation?—Certainly, but I am not prepared to admit at present that the interpretation which you have applied to occupation 64 holds good for the others. I am merely comparing the death-rates of each age-group. I wish I could make the point quite clear.

18,766. The point is quite clear. Then I must ask you, will you please explain to me why the occupation group 64 has come to take such a poor position compared with those with which it started in the earlier ages?—I do not know. It may be that, as you say (I do not say that it is so), they have come into observation at age 35 with some injury from their occupation. This is going on your own lines. I do not know that it is so, nor could I actually take that and say that that is the explanation. I should not feel justified in saying that it is. That is my point. I am perfectly willing to admit that it may be so. On the other hand, it may be one of those more or less accidental things that happen when you are taking only groups and not dealing with a big class like "all occupied males." Over and over again, when I was younger at this sort of work (I speak with entire respect to you in this matter), I used to be rather inclined to base rather big assumptions (if I may call your statement an assumption) on not quite an adequate

fact basis. That makes me rather careful about replying to your question. You may be right, of course.

18,767. I should feel the strength of your remark more if the figures did not make a gradual descent and a gradual, steady descent?—Supposing that your contention is right, why, if these men have inherited a taint, should they suddenly at 65 years and over become so very much better than others. You would think that they would die out.

18,768. At 54 the figures begin to increase?—Are you referring to Table B.?

18,769. Column (d), Table B.?—Certainly.

18,770. This is no more than you would have expected when the risk that we know the occupation is exposed to produces diseases which have certain median ages of death. They show themselves during the occupation years, and, like lead poisoning, Bright's disease, and also phthisis, do not show themselves in the later years?—That I do not know. It may be so.

18,771. Taking those things into consideration, knowing that to be the reason, seeing the age at which they have become bad, and seeing that the move is not a chance move down but a steady move down, do you not think that it is somewhat reasonable to consider that that may be the cause of the alteration in position?—Do you mean that the risk of lead poisoning may be the cause?

18,772. Yes, and its accompanying troubles?—Yes, I think that that is a possible explanation, but at the same time I would not like to say it is, by any means a complete explanation. It seems to me a reasonable statement to make.

18,773. And worth considering?—Worth considering, and certainly worth investigation if it is possible to get more accurate data. It is certainly worth further investigation. This data is not accurate. This group of plumbers, painters, and glaziers contains about 30 per cent. of plumbers. I had a plumber in my house the other day. He actually handles the lead, and eats food, and perhaps smokes, without washing his hands. This group contains about 30 per cent. (or 29 per cent.) of plumbers. You can split up the years of life exposed to risk (I have done that), but you cannot split up the deaths. The question crops up: Is a part of this unfavourable effect that you have just referred to due to plumbers? I do not say that it is due to plumbers or painters.

18,774. (Chairman.) The registrar's figures are confirmed by independent testimony from the men's trades unions, which fully confirm the statistics?—I know nothing about that. Please understand that I am merely basing my statements on the things that I have examined. I cannot attempt to controvert any outside evidence, which I know nothing about.

18,775. (Dr. Collins.) With regard to plumbers, you suggest, in paragraph 18,670, "It is probable that the death-rate of plumbers is in excess of the death-rate of painters arising from lead poisoning"?—Yes.

18,776. Why do you make that statement?—Not from any definite knowledge.

18,777. I will clear the ground by telling you that the distribution of deaths among the two classes is exactly the same?—But is the distribution of death-rate the same? The deaths may be the same.

18,778. The death-rates are the same?—I wonder how it would affect the distribution. We ought to be able to split up the deaths amongst plumbers and amongst painters and glaziers just the same as with regard to the years of risk. It might be important.

18,779. The medium age at death for both is about 44?—But you cannot take that.

18,780. I only give that fact for the moment. It does not carry us far?—I do not want to be contentious or fractious, or anything of the sort, but I know that there is, perhaps, a little more in these points than appears, and you want to be a little cautious.

18,781. In paragraph 18,586, you state that you think that a fairer test is to compare the death-rates of occupation 64 with the death-rates of all occupied males in industrial districts. From your knowledge of the occupations of the kingdom, do you really consider that it is fair to compare all occupied males in

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industrial districts with occupation 64? This is not a matter of actuarial experience but a matter of knowledge of occupations?—I say, "a much fairer test." That does not say, does it, that it is necessarily a right test? If you take "all occupied males" as the words are here used, it means all occupied males in England and Wales.

18,782. That is 10,156,976?—You include there the whole of the professional and commercial classes and many men who are not exposed to any industrial risk of death.

18,783. The professional and commercial come to 842,000?—I have not gone into that. I think that it is a fairer test to compare the death-rate of occupation 64, which has its own industrial risk, as is freely admitted, with an industrial group rather than with a non-industrial group.

18,784. Surely not. If you compare a class with an industrial risk, to get a fair comparison you want to get a similar class without an industrial risk. If you have two or three industrial risks on either side how do you get a comparison?—I do not quite agree. When you compare the actual and expected deaths, as I do later on, on several different bases, the whole gist of making that actuarial comparison is to compare a relatively small group like 64, which is under observation, with a large mixed class. It is common practice to do so. You do it with a big friendly society. You would not compare a friendly society having 50,000 or 100,000 with another similar friendly society. You would compare it with the experience of some big organised body like the Manchester Unity or Foresters. The bigger you make the bulk of exposures to risk, the better the chance you get of an accurate result. The group is mixed up with all the professional and commercial classes. In that connection may I direct your attention to a table which is actually based on this comparison. You take exception to it.

18,785. I only speak for myself, I say that all occupied males is the best comparison?—I see your point. May I direct your attention to Table J. (paragraph 18,800), which carries it a bit further, because this bears on your point. Do you admit that this is a good way of testing? It is the common actuarial way.

18,786. Yes?—If you look at the actual and expected results in percentages in that table you will see on comparing occupation 64 with this group to which you object, namely, all males in industrial districts, that during the period of observation, that is to say, three years 1900 to 1902, the actual deaths among plumbers, painters, and glaziers was 90 to every 100 deaths expected had they been exposed to industrial risks. Now do you not see that you have a fairly good margin—a margin of 10 per cent. on the right side? That tends to justify me in the comparison I have taken. I do not say that these plumbers merely come neck and neck in their mortality with males in industrial districts. I point out on the other hand that this group—plumbers—leaves a margin of 10 per cent. They are 10 per cent. below the mortality of all males in industrial districts. Does not that rather tend to show that when you compare them with the males in industrial districts, and you have a margin on the safe side of 10 per cent., which is quite a nice margin, that one is not so very far out in the comparison? It gives 10 per cent. to meet your point.

18,787. No, I do not agree with you. It does not. I maintain that they appear as 10 per cent. better than the class with which you are comparing them?—No, 10 per cent. worse. It is just the reverse of what you say. The actual number is 90, and it would have been 100.

18,788. I quite agree, but had you taken the other class, it would have been different?—I have taken them all. Let us take your group—all males in England and Wales. I do not in any way want not to observe these effects. It is in Table K. (paragraph 18,671). You have there exactly the same thing. There they are compared with all occupied males in England and Wales. There you get the reverse result. Looking at columns (g) and (h) had occupation 64 had the death-rate of all males they would

have had 100 deaths, but they had 106 actual deaths. Therefore their death-rate was 6 per cent. more.

18,789. When compared with the other they were 10 per cent. less?—Yes, they come intermediate between the two.

18,790. One shows 6 per cent. more deaths and the other 10 per cent. less?—Yes, certainly. What it tends to show is that the proper test for them (we have not one given by the Registrar-General) would lie somewhere between all occupied males in industrial districts and all occupied males in England and Wales. I do not maintain that this test of occupied males in industrial districts is the best test, but I think that it is a fairer test. I may be wrong. I think that the point lies somewhere between.

18,791. I do not follow what you call a test?—The standard data.

18,792. Do you mean that the expected and the actual have to be precisely the same?—I mean the standard data that you use for making the comparison.

18,793. So I understood?—Using as the test all occupied males in industrial districts is not the best test, although I think that it is fairer than the other. One under-states it and the other over-states it.

18,794. Why do you make that statement—that one under-states it and the other over-states it? Is it merely because one is above and the other below?—No.

18,795. You cannot say that a thing is over-stated because it is above the standard which you fix?—Certainly not, but for reasons I have already given, it is not fair in my opinion to compare the death-rate of an occupation like that of plumbers, painters, and glaziers with death-rates of all occupied males in England and Wales, many of whom have no industrial risk.

18,796. No, but on the other hand the plumber, painter, and glazier working at houses, and going a considerable distance to his work, has apparently, one would expect, a very favourable opportunity of escaping disease and occupation risk, whereas if you compare him with the man who works alongside him, the paperhanger (a small class you have drawn attention to in your proof) he is placed in an unfavourable position?—It is admitted that the painter is exposed to the industrial risk of plumbism. We have been discussing it already. Therefore I say it seems to me that it is just to compare him with a group of males which also has industrial risk.

18,797. We want to find out how much we have to weight the whole class because of the risk as compared with a class which has not that risk. That is the whole point of our investigation, and I think that your figures help us considerably to understand it. That is the point that we want to get clear?—I see. In that case you would not want to compare the plumber with a group necessarily possessing any industrial risk whatever.

18,798. We want to get rid of other industrial risks. That is the whole point?—That is all right from your point of view, but from my point of view, the actuarial point of view, I say to myself, What is the best test that I can apply to these plumbers?—I say that neither of these two tests is right, and that the proper test lies somewhere between the two. Do you see the justice of my point of view?

18,799. I see the justice of your point of view. You approach it from the point of view of actuarial tables for insurance?—Supposing that instead of coming here to-day to talk the thing over, I had to prepare the monetary tables on it, I should take probably some mean of death-rates between these two.

18,800. I see your point, but our point is to try to ascertain the exact effect of the occupation risk compared with those who have no occupation risk?—There is no possible way of getting at that except by the card system, if it can be carried out. You could eliminate the death-rates from plumbism and take out the death-rate from other causes, and then you could compare the death-rate from causes other than plumbism separately from the death-rate from plumbism, and get a very sound comparison as compared with the mortality of other trades.

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[Continued.]

18,801. Perhaps you would not agree that from my point of view, trying to get out what is the effect of this special occupation risk, occupied males in England and Wales is a little fairer standard than occupied males in industrial districts?—Might I suggest that if you want to get out the special risk from plumbism, have we not got it already in a table?

18,802. No, we have not got it?—I cannot actually say that it is a good comparison.

18,803. I only suggest that perhaps it is a better standard than occupied males in industrial districts, because there is less occupational risk with regard to the whole class?—It may be so, but from my point of view I consider it correct to compare it with an occupational risk group.

18,804. But I am considering it from my point of view?—It may be so from your point of view.

18,805. Then we should have to take into consideration the age distribution of the two classes?—Yes.

18,806. The age distribution for industrial group 64 is less favourable. From the ages of 55 upwards there are 96 in every thousand. In occupation group 64 "occupied males, England and Wales," there are from 55 and upwards 123; so that the mortality figure would be more unfavourable for occupation 64 if the age distribution was the same?—I do not quite follow that. I would not like to commit myself to any statement without having gone into it.

18,807. If there are more old people in the class, it is generally considered that the mortality in that class will be higher than if they are all young?—But I have not actually followed the figures. One would need just to go into it.

18,808. Allowing your point that paperhanger, plasterer and whitewasher, industrial group 63, is a small class, the age distribution of this class is nearly precisely the same as that of plumber, painter, and glazier, which is a help in comparison, is it not?—I do not think that it is.

18,809. I do not know. I only ask you. One is 97 and the other 96?—I have the figures split up into plumbers in one section and painters and glaziers in the other. The total agrees with the total on page 106.

18,810. (Mr. Sutherland.) What are the numbers?—You will find them in Cd. 1523, page 194, Cd. 2619, page 106. Although I have not taken them out in percentages, I have another table here that deals with it, and you would find if you took the figures out by percentage that you would get a much bigger proportion of plumbers at a younger age than at an older age. There is practically a constant decline in the years of risk. It is a noticeable point.

18,811. (Dr. Collins.) Yes, it is a very good point?—I lay no stress upon it. I merely said it in reply to your question.

18,812. Now, turning to the question of lead poisoning itself, look at Table G. (paragraph 18,594). You have the supplement to the 65th Annual Report of the Registrar-General before you, have you not?—Yes, I have it here.

18,813. You have doubtless read his special remark on the effect of lead on pages cxix to cxx. He there acquaints you with the effect of lead in producing illnesses other than lead poisoning. He draws attention to the fact that certain illnesses in addition to lead poisoning are present in those groups which are exposed to the risk of lead poisoning?—Yes.

18,814. On looking at your Table G. (paragraph 18,594), it is noticeable that, taking occupied males in England and Wales, with regard to these diseases the class we are dealing with is in excess—203 had phthisis against 175; 147 had diseases of the circulatory system against 135; 107 had diseases of the nervous system against 78; 89 had diseases of the urinary system (which I presume includes Bright's disease) against 48; 22 had plumbism against 1. And it is interesting to note a point which has appeared before the Committee several times with regard to the effect of alcohol—that the effect of alcohol is 12 only as compared with 16?—Yes.

18,815. So that this special class is in excess with regard to those special diseases, which the Registrar-General draws attention to, which are associated with chronic lead poisoning?—Yes, that appears to be so.

18,816. But with regard to other diseases, there does not appear to be any special occupation risk?—No; and in some other diseases, the death-rates are much lower than even in your test.

18,817. If we could eliminate this risk, we should have a very healthy class?—I do not know about their health, but it would of course effect a distinct improvement.

18,818. A bigger improvement than the 22 for plumbism would lead us to think?—The Registrar-General said that it is probable that at the present time practically all the deaths due to industrial lead poisoning are ascribed to that cause.

18,819. He means that the deaths of those who definitely die of lead poisoning are attributed to that cause?—I follow.

18,820. Then on page lxxix dealing with occupation group 64, he points out that occupation group 64 has shared in the general improvement of health during the last two decades, but that the high mortality from plumbism and Bright's disease which occurred ten years ago has been maintained since that date, the mortality from plumbism being 22 in both periods and from Bright's disease 72 in the first and 69 in the second of the periods. I draw attention to that because you said in your original evidence that you had no information at your disposal with regard to what had happened in this respect; but you had this information at your disposal?—I do not dispute that for a moment, but I forgot the exact point. May I refer you to Table M. Take a wood-turner and cooper as standard data. You can compare plumbers, painters and glaziers with that class. The death-rate amongst plumbers was no less than 8 per 100 lower than it would have been had they been exposed to the risk of wood-turners and coopers. Is that unhealthy?

18,821. You probably are not aware that they are exposed to an occupation risk?—I suppose they must be. I want to show the inapplicability of any one group. One paperhanger and plasterer supports your view, but one turner and cooper goes against your view.

18,822. But you do not know, perhaps, the occupation risk to which they are exposed, which I do know from examining them medically?—But you are taking a small class.

18,823. I agree with your criticism with regard to the size of the class, but they happen to be a class who are occupying the same kind of houses and working in the same premises?—Do you mean wood-turners?

18,824. No. Paperhangers and painters I am referring to?—Paperhangers is one of the six with an abnormally low mortality.

18,825. My point is that, small as the class is, it gives, as regards conditions, ventilation and the rooms they have to occupy and the hours of employment, a very close comparison?—Yes, I think so.

18,826. They are not exposed to the occupation risk of the painter—the tendency to lead poisoning?—For some reason which I do not profess to know, the paperhanger group happens to be one of the six occupations in the country with an abnormally low death-rate. I do not know the reason, but it occurs to me that it is not satisfactory, actuarially at any rate, to compare any occupation, whether plumbers or anything else, with an occupation with an abnormally low death-rate.

18,827. I agree; but I point out that their occupation is so similar that one would expect, if one knew nothing at all about the tendency of the painter to lead poisoning, to find the two running absolutely together?—Yes. There is no reason why the paperhanger should come out with a low death-rate as far as I can see.

18,828. I think there is. They get plenty of ventilation and work in fairly large rooms and where there are few people employed. There is everything to conduce to a low rate of mortality?—They are like the clergyman and the gardener then.

18,829. The wood-turner and cooper has exposure to dust of vegetable fibres which have a marked effect

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on the lungs?—Ought you not to take away the industrial risk from the wood-turner and cooper before you take it from the plumber?

18,830. We are doing so?—That is all right.

18,831. When you look at the supplement to the next Decennial Report, I think you will find that they occupy a more favourable position. I cannot say, but I shall be disappointed if they do not. Now you have suggested several times that the age distribution of the cases of lead poisoning which occur is not given?—The age distribution of the cases of lead poisoning?

18,832. Yes. It is quite true that it is not given, but may there not be a good reason underlying that?—I do not know.

18,833. I analysed over 2,000 cases with regard to the length of employment of the individual before he was attacked; 562 occurred in the first six months and 672 occurred during the first 12 months (in the 672, the 562 are included), and 226 in the second year, giving a total of 898 attacks in the first two years of employment, leaving only 1,297 attacks to occur in the remaining 48 years of employment. In other words, we know perfectly well that the length of employment, as regards this question of lead poisoning, medically, is of far greater importance than the age of the individual who is attacked, and to state the age of the individual attacked would be to give an entirely false impression and would be lending ourselves to details which people not understanding the medical aspect of the affair might be making use of for mistaken purposes?—Well, of course, I cannot say anything about the facts that you yourself have examined. I have not had the facts to examine, and cannot criticise one way or the other, but I do not think I can agree with your statement that it would be false to state the age. There may be something in your point, but I know nothing about it, because I have not any data; but I cannot see how it would be in any way false to state the age. It would be desirable, probably, to have the age sub-divided into employment if possible. It is so thoroughly well-established that sickness of all kinds is largely a function of age (and it has been established over and over again in big investigations) that I could not agree with you that it is false to state it.

18,834. Take scarlet fever as a function of age; it occurs in youth. Take tuberculosis as a function of age; it occurs at 40. If you take bronchitis, it occurs as a function of age at over 70. You cannot say that any special form of illness like lead poisoning, in its attack, is to be stated as a function of age?—No, you would not pick out any one of them. May I put it in this way: in this investigation we do not want merely to confine our knowledge to deaths and sickness from lead poisoning. It is an essential part of the investigation to find out, if it is possible, whether the deaths from all causes, and especially whether the sickness from all causes in this occupation are in excess of the normal, and, if so, to what extent. That is really important.

18,835. I quite agree, but you attack the method of tabulating our information by saying that something was not stated, and I felt that I was bound to point out to you that there were other matters to take into consideration?—I agree.

18,836. Length of employment is far more important?—I would like to see them both stated. Where you have two factors, both of which are important, you get the data so distributed that for each age you have a subsidiary qualification. I will not go into technical points; but we are actually engaged on cases where, instead of having one set of data stated for the age, you have each age group, and that age group is further subdivided. I do not know anything about what you tell me, but I should say that it should be looked into.

18,837. There is good reason for not stating the age?—While being perfectly free to admit that there is a good deal in that, I simply take exception to your words that it would be false to state the age. It would not be false to state the age, but it might be desirable to have both, and if you could only have one it might be more desirable to have the duration of

employment than the age. I do not say that it is so; I merely say that it may be so.

18,838. (Mr. Sutherland.) Do you think that the data available at the present time is adequate to form a sound opinion from on the question of lead poisoning?—The data available?

18,839. In the tables you have given various diseases. Some of these, we have reason to think from the evidence given before the Committee, would arise from the action of oil and turpentine, even if there were no lead in the paint, particularly urinary diseases, and possibly nervous diseases. If we had a card such as you suggest and we had four or five years' experience of such card tabulated, then the Government would have absolutely definite data to go upon?—I do not consider that the data at present available is of a high quality. I do not want to run it down in any way. I do not know whether you have looked at the composition of the tables in the book. The years of life and risk are picked out from the Census volume of 1901. They were then multiplied by three to give three years. That is an assumption. Then the deaths that were recorded in the country during the three years 1900 to 1902 were taken, and the deaths were divided by the years of risk, got in the way that I have stated, and these form a death rate. That is not the proper way of doing it.

18,840. It is not absolute?—It is not an actuarial way of getting at it, but it is the only thing you can do. As regards sickness, as far as my opinion goes, I say emphatically that there is no data worth having.

18,841. I am dealing with sickness only?—I have not got any data that I consider really worth investigating. I want information on cards similar to the cards referred to in paragraphs 18,656-8.

18,842. Is the Home Office method of calculating cases from tables a sound one?—I should say that it is most distinctly unsound. I do not want to be rude or anything of the sort, but I believe it to be useless. I do not say that the results are not what are brought out. I simply say I do not know. I frankly confess that I am ignorant on this matter of sickness amongst painters.

18,843. In sickness cases, all the returns to the Home Office are based on the mortality returns for the last ten years. They take a figure and they multiply it on the mortality returns. Is that accurate?—I rather wish you would not ask me those questions. I say I do not think it is accurate.

(Dr. Collis.) They are not represented as accurate.

18,844. (Mr. Sutherland.) But they are put forward in this inquiry as the number of cases?—I do not consider it sound myself.

18,845. I am asking whether in your opinion you think that is a sound basis of calculation, because the figure is stated as about 1,000 per annum on a mortality return of over ten years' experience. The cases are hypothetical?—It is the method I object to.

18,846. You think that the soundest way would be to have a period of probation, before taking any definite step, and tabulating on the basis of your card?—Yes, or a card similar to that. I would like to say something about drafting the card because we might be able to improve it. It might be possible to put in something else. That was simply drafted on my information.

18,847. The analyses and all the information before the Home Office after a period of five years, say, would be really perfect if those cards were insisted upon?—Yes, if you could get a consecutive period of observation.

18,848. Supposing that it were made compulsory by the Home Office to make these returns?—Yes.

18,849. (Dr. Collis.) You suggest rather that secretaries should be asked for information which they already possess of past sickness which has occurred amongst their members?—That is what I suggest here. Mr. Sutherland suggests that it should be made compulsory in future. It might be possible to get a good many thousands of these cards filled up, a small fee being paid to secretaries of friendly societies for giving the information. That occurs to me as the only way that I can suggest by which we can get the data.

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[Continued.]

The method you suggest of the Home Office making it compulsory would apply to the future.

18,850. This information exists?—Yes, it exists in the registers of the big friendly societies. Look at the first page of my proof under the heading of Occupational Sickness. Dealing with the matter, I say here, "Noting this lack of data, I applied for the loan of the cards upon which the Manchester Unity experience was tabulated. Nearly one million of these cards were prepared, each card relating to one life. It occurred to me that if I could get these cards, and sort out those that relate to house-painters, &c., and then proceed to investigate the rates of sickness, &c., a most valid fact-base would then be obtained. But I was informed on 12th March 1912 that the Manchester Unity cards were destroyed after the completion of the investigation." My informant was the actuary who made the investigation. All those things costing something like 10,000*l.* were burned, although there was the most valuable information in them. Why the information was burned I cannot imagine.

18,851. (*Mr. Parsonage.*) I would like to ask a question, more for my information than for anything else. With regard to getting returns from the friendly societies to estimate the amount of sickness amongst painters, the certificate would simply state the illness. It would not state "plumbism." It may be put as a disease peculiar to painters, and that painters are more liable to it, such as Bright's disease?—I suppose no data that has ever been sought for or collected has ever been perfect in its classification, but by means of drafting a card in the most careful manner that one could devise, even if you could not get from friendly societies or anybody else your facts accurately distributed between lead poisoning and non-lead poisoning (and you probably would not and could not expect to), you would get an accurate basis for investigating true rates of mortality and true rates of sickness, and if the subdivision into lead poisoning were not sufficiently accurate you would have to throw that over. You would have to find out how painters stand with regard to sickness in relation to the rest of the population, which we do not know at present. That is interesting.

18,852. Supposing you had the medical certificates of a certain number of painters in my society, which is confined to painters, and took the same number of certificates from a friendly society and made a comparison between those two, then you would find the percentage of diseases peculiarly attributable to painting?—You might, but that would not be the way to do it. The way would be to adopt my suggestion or, as Mr. Sutherland says, make it compulsory. Results appear to be sound, but very often they are not. Something hidden comes in and traps you, and you find your result is a fallacy.

18,853. (*Dr. Collis.*) Would not Mr. Parsonage's society be fairly comparable with the Oddfellows?—I do not know what his society is.

18,854. (*Mr. Parsonage.*) The National Amalgamated Society of House Painters?—Would it not be possible for that society to fill in cards? If we could get cards filled in with age distribution and so on and

take out the rates, they would certainly be comparable with the rates in the book.

18,855. You would find a larger percentage of one kind of disease running through painters than you would get in the returns from other societies?—Quite likely; but whether you did or whether you did not, whatever you found would come out without being magnified one way or the other, if you had these cards. You would have a sound basis for observing the facts.

18,856. I do not think I could get any returns at the present time. They are destroyed?—Do not you keep your registers and records? I have investigated friendly societies for 30 years back.

18,857. We keep a record of the sickness benefits paid?—And the times of sickness.

18,858. The times of sickness are kept, but we do not keep the certificates showing the cause of sickness. In my society, where we pay sickness benefit, 75 per cent. of them are not in a friendly society at all; they are in a trade union, and they get all their benefits through the trade union?—In that case you might be up against a complication with regard to the length and times of sickness. You want to get the exposures to death or sickness accurately.

18,859. They have to join our society at a certain age?—You want 5,000 or 10,000 of the cards.

18,860. (*Dr. Collis.*) You have not the cause of the invalidity, but if you had a sufficient number showing the ages of the men who have been sick and the length of time they have been sick one could make a table from that. Leaving aside the absence of medical certificates, we could get the absolute amount of sickness?—You must have the age.

18,861. (*Mr. Kinggate.*) In paragraph 18,618, under the heading of Occupational Sickness, you make a point with regard to lead poisoning, that there is possibly an excess of deaths attributed to lead poisoning. What is your reason for stating that there are possibly many cases which are attributed to lead poisoning that are not lead poisoning?—I was asked about that by the Chairman earlier, and I replied that it is not based on any knowledge or information of my own, but on evidence given by Dr. Goadby.

18,862. It should be the other way about, because there is a large number of deaths from lead that are attributed to other causes?—That was dealt with.

18,863. It is a very important point. Now, with regard to cases of sickness (Table B., paragraph 18,628), these cases that you quote are reported to the Home Office?—Those occurring in factories and workshops.

18,864. We know that there is a large number of cases not reported at all—that a great number of men suffer from lead poisoning who are not reported?—It only shows how useless it is.

18,865. Very often what the man is suffering from is stated correctly, but what the cause is is not stated. The whole of the men in my branch of the trade periodically suffer from lead poisoning, especially from gout. I can assure you of that from working for a large West End establishment?—That I have no knowledge of. It is no doubt very valuable knowledge, but I have no right to state an opinion upon it, because I know nothing about it.

The witness withdrew.

Mr. F. PISART examined.

18,866. (*Chairman.*) You are the managing director of the Maastricht Zinc White Company?—Yes.

18,867. Do you consider that the use of white lead paint is very dangerous?—Not very, if proper care is used in its application.

18,868. So that you do not consider it necessary to restrict the use of lead paints in the interests of the workers?—Yes, because sufficient care is very difficult to be taken by the painters, I think.

18,869. Do you think that if the use of white lead is allowed to continue, precautionary measures should be taken?—They should be careful to wash themselves

before eating, and they should change their clothes, and do such things.

18,870. Have you thought out any plan by which the precautionary measures are to be introduced?—No.

18,871. Do you think that zinc can displace lead as a pigment purely on the ground of superiority?—Yes.

18,872. Can you instance any country in which this has taken place?—Yes, in Sweden especially, and in Norway, where the use of white lead is disappearing, and where for the present the quantity of lead used is less than one-eighth the quantity of zinc pigment used.

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[Continued.]

18,873. By weight, eight of zinc to one of lead?—Yes.

18,874. How do you arrive at those figures?—I have statistics (handing in the following table).

| SWEDEN.                  |             |             |                                  |
|--------------------------|-------------|-------------|----------------------------------|
| Consumption of Pigments. |             |             |                                  |
| Nature.                  | 1904.       | 1910.       | Increase or Decrease in 6 Years. |
| Zinc pigments            | Tons. 3,032 | Tons. 4,274 | About 41 per cent. increase.     |
| White lead               | 511         | 501         | About 2 per cent. decrease.      |

In Sweden there are no laws against white lead, neither are there any duties on white lead, zinc oxides, or lithopone. There are no manufacturers of white lead, or of zinc pigments in Sweden. All these pigments are imported and none are exported. All the quantities named above are used in Sweden. The painters in Sweden are much more advanced and less conservative than those in England. These are the only respects in which Sweden differs from England in regard to the pigment question.

18,875. From the figures you have given us I take it that zinc pigments show an increased consumption from 1904 to 1910 of about 41 per cent., while there is a decrease of 0.2 per cent. in the consumption of white lead?—On the general quantity of pigment used, you will understand that the increase of use is always in the zinc pigment, and never in white lead. The climate of Sweden is very cold in winter, and wet; and hot in some parts of the summer. Then the colours are exposed to very great variation in regard to their elasticity. The importation of zinc oxide during last year in Norway (in Sweden we have not the figures at present for last year) was 1,352 tons. The importation of white lead was 114 tons. The importation of lithopone was 200 tons, but this last figure is only estimated. The exact quantity of lithopone imported cannot be ascertained as it is not classified separately, but is included under the general term "chemical products." There is a small works in Norway producing about 440 tons zinc oxide per annum, these works also manufactured in 1911 only about 30 tons white lead. There are no laws against white lead in Norway, but there are duties on both zinc and lead pigments. As in Sweden, the question as to which pigment is preferred rests with the painters, who, as is shown by the above figures, have adopted zinc pigments in preference to white lead, after having investigated the matter.

18,876. Have you any knowledge yourself of the methods of painting in Norway and Sweden? Do they differ?—No; they are quite the same.

18,877. Have you any knowledge yourself that the zinc pigments make paint that is as serviceable as lead?—Yes. If that were not the case, as there is no law prohibiting white lead in Sweden or in Norway, you would certainly have people using white lead.

18,878. Is the zinc paint used in Norway and Sweden cheaper than that made from lead?—The same difference would exist in Norway and Sweden as in England; it all depends on the market price of the lead and zinc, because, as in England, there is no duty there.

18,879. Are we to understand that the reason why zinc paint is so much in use in Norway and Sweden is because it is better?—Yes; the painters have tried it. Twenty years ago our import in Sweden was only a quarter of what it was in 1910. That is only because painters have interested themselves in new products and tried them. They find that the new products are good, and give good results.

18,880. Do you think that the durability of the paints made from zinc pigments is as great as that of

paint made from lead?—Evidently. If that were not the case, I do not see any reason why painters in Sweden and Norway will not use white lead; because, as I told you before, there is no law or anything at all forbidding or restricting the use of white lead, either for inside work or outside work.

18,881. You know that France has prohibited the use of white lead from January 1st, 1915?—Yes.

18,882. Is there a Commission sitting in France at the present time?—Yes. At the present time it is finishing. From December to the end of March there was a Commission sitting in France with regard to the enforcement of the new law at the end of 1914.

18,883. Has the report of that French Commission been issued?—The Commission have finished their work, and now they are endeavouring to legally and clearly define the words zinc white and lithopone so as to avoid fraud.

18,884. Has the report of the Commission been issued publicly?—Yes, in the French papers—"Le Matin," "Le Journal," and other papers.

18,885. Could you send us a copy?—I have here the articles which have been adopted by the Commission.

18,886. Could this Committee obtain an official copy of the report of that Commission?—Yes, any member of the Committee could.

18,887. It is available now for anyone to apply for?—Yes. For the present the Commission is finishing its work. The decision of the Commission is to come into force in a few months. It will be enforced before the white lead law comes into force.

18,888. Could you tell us the date when the report was signed?—Yes, I have the date and the wording adopted at the meeting of the 25th March 1912. It is the wording of the French Commission on the suppression of fraud in the sale of products used in painting: "Article 4. The description 'zinc white' (blanc de zinc) with or without qualification shall be applied exclusively to oxide of zinc used in painting and containing not more than five parts of impurities derived from the ore in 100 parts. Such impurities may consist of lead compounds provided they do not exceed 3 per cent. calculated as metallic lead (Pb)." For lithopone they say: "The description 'lithopone' with or without qualification shall be applied exclusively to the product containing in each 100 parts of mineral matter, 99 parts at least of compounds of zinc and barium sulphate. The latter shall be derived exclusively from the barium sulphide used in the process of manufacture. The products must not be sold unless the labels and invoices state the composition in terms of zinc sulphide."

18,889. Are we to understand that the substance of the new French report is that the restriction of lead is strictly limited to a content of not more than 3 per cent. calculated as metallic lead (Pb). This is a very new thing, and no doubt the French Commission was much impressed by the existing situation in Sweden and Norway, where they are using a very large quantity of zinc oxide with a small percentage of lead.

18,890. Do you think that pure zinc oxide paint can replace white lead paint for all purposes?—Yes.

18,891. But is there not any tendency for the pure zinc to crack with a changing temperature?—Yes. When we say "pure zinc" we must make some reservation because you can have pure zinc oxide which is not a pigment at all. It is not the chemical composition of a pigment that is important, but also, in a greater degree, its physical properties.

18,892. May I put it in this way: Do you think that pure zinc oxide without any addition is a suitable pigment for a climate such as that of England?—But it depends on the physical properties of the pure zinc. It is impossible to say yes or no without making experiments. You can have very pure zinc obtained by the wet process that is no pigment at all. On the contrary, you can have another zinc which is a very good pigment, although not chemically pure.

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[Continued.]

18,893. Do you consider that the addition of, say, 4 per cent. of lead would check any tendency to crack?—Yes.

18,894. Do you consider that a zinc oxide containing less than 4 per cent. of lead oxide would be a suitable pigment for making paint for use in England?—Yes.

18,895. Do you state that quite positively?—Yes, absolutely; and I will tell you later the reason, if you wish.

18,896. Can you support that statement? For example, can you point to any important buildings, either in this country or abroad, which have been painted with zinc paints containing not more than 4 per cent. of lead?—Mentioning only public buildings, I might mention the Belgian Government buildings for the railway department. As you know, the railways belong to the State in Belgium, and the Belgian Government a long time ago decided to suppress white lead.

18,897. Was that in 1904 or 1903?—In 1903 they suppressed white lead in their building department, and the suppression of white lead was during only one year—1903. They came back to white lead for five years.

18,898. From 1903 to 1908?—Yes. They changed the specification to zinc oxide containing 4 per cent. of lead salts. From that time they never came back to white lead.

18,899. From 1908, when they adopted the formula containing up to 4 per cent. of lead, they have adhered to that up to the present time?—Yes.

18,900. Do the Belgian State Railways use lead paints on their rolling stock?—A long time ago they did.

18,901. How many years ago is it since they used lead for their rolling stock?—I cannot say exactly. The question of consumption by the rolling stock department is not, by far, so important as the consumption for the building department, and the conditions are very different.

18,902. Do you think that zinc paint containing not more than 4 per cent. of lead is as durable as white lead paint, both internally and externally?—Yes, I do.

18,903. Would such a paint have the same covering power as a lead paint?—I think it has greater covering power.

18,904. (*Mr. Sutherland.*) Do you mean, spreading power or covering power?—With three coats, the quantity of white paint to make a black surface white is less when you are using zinc oxide with 4 per cent. of lead than when you are using white lead. In Belgium the railways are always increasing, and the consumption of zinc by weight is smaller than the consumption of lead when they were using lead.

18,905. (*Chairman.*) If the use of lead in paints were restricted by law, do you think that the price of zinc would rise?—Yes, perhaps 2l. a ton.

18,906. Will you explain why?—It depends on whether there is a law which will suppress white lead in a short time or a long time. If you say it will be not for five years, I do not think that there will be a rise in the market, because makers will be prepared to furnish it.

18,907. Taking two years as the time, what would you say?—Perhaps you would have a small rise of about 1l. or 2l. per ton.

18,908. Would the increased demand for zinc necessitate the use of high-grade zinc?—I do not think that it will necessitate a great use of high-grade zinc, but perhaps at the beginning that will be necessary. I think that it would change in one or two years.

18,909. So that you do not think that the increase in price will be permanent?—No.

18,910. Do you think that the price would fall after a year or two?—Yes. The reason why I think so is this. In the statistics with regard to metallic zinc, the consumption of the world in 1901 was 507,000 tons; in 1910 it was 823,000 tons. The quantity of lead used in 1901 was 859,000 tons, and in 1910 it was 1,115,000 tons.

18,911. The increase is 62 per cent. in the case of zinc, and 29 per cent. in the case of lead?—Yes. From the above figures it will be seen the increase in

metallic zinc is 6·2 per cent. per annum during the 10 years 1901–1910.

18,912. Can you tell us anything about the quantity of white lead used in the United Kingdom?—I have two figures. I have 55,000 tons, and from another source 65,000, so I take the mean, 60,000. If this is replaced by 30,000 tons of zinc oxide—containing, with the loss by manufacture, 27,000 tons of zinc—and 25,000 tons of lithopone containing, with the loss by manufacture, 6,000 tons of zinc—an increase of 33,000 tons of zinc is equivalent to only 4 per cent. of the actual consumption of the world. I speak only of metallic zinc. In addition, many ores which cannot be used for making metallic zinc can be used for zinc oxide making or for lithopone making. There are many ores which cannot be used for metallic zinc making. There are ores containing lead or copper that can be used, but which are not used at present for zinc oxide and lithopone.

18,913. Do I understand you to mean that the price of zinc would fall because of the increased amount of zinc oxide which would be made from very low-grade ores by the direct process?—Yes, for direct process zinc oxide.

18,914. Would there be a tendency to re-open mines which are now useless because the ore in them is not good enough for making metallic zinc?—Certainly, a great number.

18,915. I suppose you would say that in the event of the prohibition of lead, sufficient zinc oxide could be made by the indirect process, that is from metallic zinc?—Yes. You can have a large quantity of zinc made by the indirect process, because the quantity of zinc turned into zinc oxide is not important, in comparison with the general output of metallic zinc of the world.

18,916. Supposing that lead up to 3 per cent. was permitted, could sufficient zinc be produced by the direct process to supply the full demand in this country in, say, a couple of years?—Yes, in two or three years.

18,917. But if the percentage of lead allowed was increased to, say, 4 or 5 per cent., would that make any difference?—It would be much easier for the direct process makers to find the ore.

18,918. You are quite sure that if these low-grade ores were brought into use, the supply of zinc would be ample, and the price would be reduced below what it is to-day?—Not below, but to about the same.

18,919. Do you think that lithopone can replace lead for interiors?—Yes, with advantage.

18,920. But does it retain its colour sufficiently well?—Yes, absolutely, in water paints and oil paints.

18,921. And outside too?—Not so well.

18,922. Is it as durable as lead for interiors?—Perhaps not. I do not think that lithopone paints can be washed so many times as lead paints.

18,923. Is lithopone paint as durable for interiors as zinc paint with the addition of 4 per cent. of lead?—I think that zinc paints with 4 per cent. of lead will be much more durable than any other paints.

18,924. (*Mr. Sutherland.*) Do you mean with 4 per cent. added lead?—Not at all. It is lead absolutely intimately mixed with the zinc. I mean lead obtained in the same sublimation as the zinc.

18,925. (*Chairman.*) Is lithopone largely used in France and Germany?—Yes; the import of lithopone in France has doubled in one year—last year.

18,926. Do you know the exact figures of importation?—Yes; there are more than 5,000,000 kilos, or 5,000 tons, used in France at present.

18,927. How does the consumption of lithopone compare with that of zinc oxide and lead carbonate?—In France only they are using 25,000 tons of white lead, 8,000 tons of zinc oxide, and 5,000 tons of lithopone.

18,928. Is there an ample sufficiency of lithopone available at a reasonable price?—Yes. Until this year the lithopone business was very poor, because there was too much lithopone on the market. This year, on account of the Lead Combine, which raised the price of white lead very high, lithopone is more in demand than it was before.

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[Continued.]

18,929. (*Mr. Sutherland.*) You are convinced that zinc can replace lead?—Yes.

18,930. Have you any practical experience of it?—Personally, no. My convictions are based on experience of countries like Sweden, Norway, and France; and the Belgian Government, and the Dutch Government are using a good deal of zinc oxide. Especially has that been the case on the Belgian State Railways in the last five years.

18,931. There are large amounts of both zinc oxide and lithopone used in this country, are there not?—Yes. I cannot say the exact figures.

18,932. I do not want exact figures, but it is a large quantity, is it not?—Yes.

18,933. Can you tell the Committee how it is that no one has ever succeeded in manufacturing zinc oxide in this country on a large scale at all?—I should think it is because competent people have perhaps never tried it.

18,934. But if there is a market for a product and it is a profitable product, why should not they try it?—I do not know.

18,935. There have been very large experiments tried here, and they have failed?—I have not seen the work and I cannot say.

18,936. There have been very large experiments tried, and large sums of money lost in trying to establish zinc oxide works here, but they have failed. Now why is that? Is it because they have been making these experiments without the addition of 4 per cent. of lead?—In England I know they are making lithopone, and I do not see why—

18,937. Yes. I am not dealing with lithopone, but I am dealing with zinc oxide?—Having no knowledge of how these experiments were carried out I cannot express an opinion.

18,938. We have had witnesses here who have dealt with the question—gentlemen who are competent to speak on the point. I want to know, if it is a profitable article, what you think is the reason why we cannot succeed in making it?—I do not know. You have a good quality of coal in South Wales, soft coal, and I do not know why it is. We are making it; and from time to time we are using coal from the south of Wales.

18,939. The ——— people are making it, and making large fortunes out of it every year?—That is zinc oxide.

18,940. They are dealing with spelter?—The ——— are making 100,000 tons of metallic zinc and 8,000 to 10,000 tons of zinc oxide.

18,941. It is the finest zinc oxide in the world, is it not?—I cannot say that.

18,942. They are pre-eminent in the manufacture of zinc?—Yes.

18,943. And the ——— Company adopt the direct process?—I think it better for myself not to speak upon that as it is not my business.

18,944. But you come here to give us your opinion on zinc. Are there not many grades of zinc oxide?—Yes, there are.

18,945. They are of various grades, representing various qualities?—With regard to whiteness.

18,946. Would not that make a difficulty in standardising paint?—Not at all. London is a very important market for zinc oxide. There are various qualities. If the quantity is five times more, it will be quite the same.

18,947. In London, if we want to specify genuine white lead we specify genuine white lead, and we know what we get?—People will have it from one place and not from another.

18,948. Possibly, but if it is sold as pure white lead, it has by law to be pure white lead?—Yes, perhaps. You see what they have done in France. An absolutely pure zinc oxide does not exist. Absolutely pure zinc oxide is only something made for the pharmacist.

18,949. But you can get commercially pure oxide up to 99 point something?—Yes. The French Government has taken special steps on this question. It is very easy for a chemist to make pure zinc oxide, but often it has no value as a pigment.

18,950. Now, I understood you to tell the Chairman that zinc oxide would do all that was required of a paint for outside purposes in London?—Yes.

18,951. What knowledge did you speak from?—From the experience of the Belgian State railways. I do not think that there is much difference. Everybody who is using our zinc in London is very satisfied with its qualities when used for outside work. But I cannot speak of what I have no personal experience of.

18,952. But you come here to speak on paint, and you said that zinc was quite equal to lead for outside purposes, did you not?—I told you on what basis I have formed my opinion. If you want an opinion on the subject you should ask painters who are using it. I do not wish to be questioned from the manufacturer's point of view. I have no personal experience with regard to making paint. We see such a large public body as the Belgian State railway suppressing all white lead.

18,953. The Belgian State railway is the only one that you cite?—You have the building department in France.

18,954. In the case of lithopone, are there not very many grades of lithopone?—There is only one grade. It is obtained by the precipitation of zinc sulphide and barium sulphate. From this combination you have only one grade.

18,955. You have enormous variations in quality, have you not?—They are different with every different maker. It is the same with white lead.

18,956. If you specified lithopone, you would have no guarantee of its being up to a standard?—It is the same thing with white lead.

18,957. No. If you specify genuine white lead, the London Chamber of Commerce will insist on your getting it, or it will apply to the courts. Now, with regard to zinc oxide, when you said, in answer to the Chairman, that it depended on its physical property, what did you mean?—I meant that you can have pure zinc oxide which has not so good physical property, and is not so good for paint. The purity is not a standard.

18,958. It is a standard in one way. It is a standard of purity, but it is not necessarily a standard of paint excellence?—That is what I mean.

18,959. When you said that a certain weight of zinc oxide would go a greater distance than the same weight of lead, what did you mean? Did you mean that you could give three coats instead of two?—I meant, with the same number of coatings, the quantity of paint which is used to cover a black surface and make it white is less for zinc oxide than for white lead.

18,960. With the same number of coats?—Yes, with the same number of coats.

18,961. Your statement is contrary to that of many of the witnesses we have had before us?—My opinion is based, not on my personal experience, but on experience of painters and experts.

18,962. I have the testimony of an expert here. I asked, "Can zinc oxide be used in absolute purity, or is it improved by carrying another body with it?" He said, "You mean if you got approximately pure oxide of zinc, would it be the best pigment you could get?" I said "Yes," and he answered "No, it would not"?—I know that some people in America are using a small quantity of sulphate of barium.

18,963. With zinc oxide?—Yes.

18,964. You would not take America as a standard place for paints, would you?—I do not know.

18,965. You do a good business with Holland?—Yes.

18,966. Both zinc white and white lead are used by painters there?—Yes.

18,967. They are familiar with both?—We are selling to them. We do not know what they are using.

18,968. But you know that they are familiar with both?—Yes.

18,969. Have you seen anything of the Dutch report?—Yes.



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[Continued.]

18,970. The Commission took seven years to examine into the point, and they came to the conclusion that in some instances zinc cannot be used with the same satisfaction as lead. Do you agree with that?—No. I have no personal experience.

18,971. That weakens your statement to the Chairman, and if you withdraw that statement, that ends the case. You stated that zinc oxide was good for any position in London?—I have heard that often.

18,972. But you have no experience?—I have no personal knowledge.

18,973. So we cannot attach much weight to that testimony?—No. I think that it is preferable for the Committee to have evidence from people who are experts on this question.

18,974. (Chairman.) I understand that you base the confidence with which you stated that zinc oxide, with the addition of 4 per cent. of lead would answer, on the fact that the State railways in Belgium use it, and Norway and Sweden almost exclusively?—Yes, absolutely. I do not see what will be the difference between Belgium and Sweden and Norway, and one part of London or another part.

18,975. I take it that with regard to the conclusion of the Dutch Commission, and the evidence that was produced before that Commission, you are not aware whether they had tried in their experiments the addition of 4 per cent. of lead?—I do not know exactly what they did.

18,976. (Dr. Collis.) Is the process by which you make zinc the direct method?—We are making it by both methods.

18,977. Can you make a satisfactory paint by the indirect method?—Certainly.

18,978. Which compares well with the ——— product?—Certainly.

18,979. You also make by the direct method?—Yes.

18,980. Is there any patent in either of the processes you are carrying on?—No.

18,981. So that it could be manufactured over here by another company easily?—Yes, absolutely. There is no patent at all. Each one of the processes is more than 50 years old.

18,982. You find no difficulty in producing by the indirect method and competing with the ———?—Not at all. German manufacturers also are making by the indirect process, and they have very good customers in England, I think they import to England, perhaps, eight times more than the ———.

18,983. The zinc white made by the indirect method imported to England, you think is eight times the amount to-day imported by ———?—I think so. I am not quite sure, but I think so. The total export of Germany of the product of the indirect process is, I think, about 18,000 tons, and the total production of

the ——— about 10,000 tons. In England Germany has very large customers. The ——— is selling more in France than in other countries.

18,984. Can you see any reason why it should not be manufactured here in England if the demand increases?—Not at all. I do not see any difficulty if the proper means are taken.

18,985. Are you likely to come here and make it yourself?—Yes, certainly; why not, if there is a large market?

18,986. There would be a large market possibly?—It depends on the restrictions that you decide on.

18,987. But you would yourselves consider the question of coming over?—Certainly.

18,988. (Mr. Sutherland.) Mr. Ricker-Devroede, in giving evidence a month ago, said: "What I say is so true that, although at the commencement of this law, which was passed in 1909, only white lead was used for the State railways of Belgium, within recent months we have had so much trouble with zinc white that an order for 60,000 kilogrammes of ground white lead has been placed by the works at Malines, the largest workshop of the State railways in Belgium, about 3,500 workmen being employed there"?—I will ask the Belgian Government.

18,989. (Chairman.) I wish you would. You have made the statement, and I would like you to verify it?—The last tender for pigment was placed last February, and it was for 100,000 kilos. of zinc oxide, and no white lead at all.

18,990. (Mr. Sutherland.) Mr. Ricker-Devroede said, "within the last few months"?—I do not know that the Belgian Government can place an order without asking for tenders. It is not the custom of that Government.

18,991. (Mr. Mason.) Can you suggest a reason for ——— exporting zinc to this country instead of manufacturing zinc oxide here?—I think the quantity that they export to England is not sufficient to have a separate-works; but I am not authorised to speak for them.

18,992. Did I understand you, in answer to the Chairman, to say that the price of zinc would rise for two years owing to the production being insufficient, but that at the end of that time the price would fall to the normal figure when the production rose?—Yes.

18,993. Is there no likelihood of there being a zinc ring, or combine, if your competitors, the lead ring, were abolished?—We have at present zinc combines.

18,994. If it has put up the price of lead, is it not likely that equally the price of zinc would be put up?—I do not think so, because there are so many makers; but it is impossible for me to reply to such a question.

18,995. Do you think that we shall not suffer—that zinc will not cost us more, so to speak?—I do not think so.

The witness withdrew.

Mr. GASTON DEPIERRES examined.

18,996. (Chairman.) Are you the managing director of the Indestructible Paint Company, Limited, Norway Wharf, Limehouse, E. P.—Yes.

18,997. And president of the Paint and Varnish Society?—I am a past president.

18,998. Have you had a long experience as a paint and varnish manufacturer?—Yes, nearly twenty years.

18,999. Have you studied the properties of both white lead and zinc paints from a scientific and technical point of view?—Yes.

19,000. Does your firm manufacture both lead and zinc paints?—Yes.

19,001. Have you any special interest in zinc paints as against lead paints?—I have no interest on either side.

19,002. Have both lead and zinc paints been in use for a long time?—Until the middle of last century white lead was practically the only pigment; but since then white zinc has come into vogue, and has been gradually more and more used.

19,003. Are there any defects in white lead?—Yes.

19,004. What are they?—First of all, its poisonous nature, and, secondly, the susceptibility of white lead to sulphur gases, and also its tendency to chalk and become powdery.

19,005. In regard to the susceptibility of white lead to sulphur gases, does that cause blackening of the paint?—Yes.

19,006. Can you tell us the cause of this chalking?—The cause of the chalking is mainly due to the carbonic acid contained in rain water, and also the action of sodium chloride contained in sea air. The principal chalking is due to the catalytic action of white lead, which is known as a magnificent catalizer, and induces continual oxidation of the linseed oil.

19,007. Is it, in your opinion, possible to do without white lead altogether for painting?—Undoubtedly it is possible.

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Mr. GASTON DEPIERRES.

[Continued.]

19,008. Why do you say that?—I am firmly of opinion that it is quite possible to produce practically every class of paint, any kind of paint, without using white lead. I do not wish to say that white lead has not its place for some paint and for some purposes; I would not say that it is not a very excellent pigment; but if to-day white lead were suppressed I am sure that our houses would be painted equally as well as they are now painted, and that we should not suffer; and very probably in twenty years' time we should almost have forgotten the existence of white lead.

19,009. Are there any countries in Europe where the consumption of white lead is very small?—Yes. You have heard from Mr. Pisart his experience in Sweden. I need not repeat it. His evidence would hold good.

19,010. Then you hold strongly that white lead is unnecessary to-day as a pigment?—I think that you can undoubtedly do without white lead.

19,011. If you are forced to?—If you are forced to. If you are not forced to, naturally it will always be used. A lot depends on how you are putting the question to me.

19,012. I mean, could it be dispensed with without detriment to the stability of buildings?—Yes, I would say that it is possible to do without white lead without detriment to the stability of buildings.

19,013. What substitutes do you recommend to be used generally in place of white lead?—For the present we have only two substitutes, zinc oxide and lithopone.

19,014. Has zinc oxide been used widely as a substitute for white lead?—Yes, it has been used for many years as a substitute for white lead, and to-day it is more largely used than ever, I think.

19,015. How do you account for the fact that a large number of witnesses, particularly master house-painters have told us that they have made repeated experiments with zinc white, and have found it to fail, both with regard to durability and covering properties?—I think that it is entirely due to the lack of technical knowledge amongst house-painters.

19,016. How is zinc oxide manufactured?—It is manufactured by two processes, the direct process and the indirect process. In the direct process it is obtained straight from the ore without passing through the metal stage. I read a paper before the Paint and Varnish Society in 1910 fully explaining these two methods.

19,017. Will you please describe the direct process, briefly?—Oxide of zinc is obtained straight from the ore without passing through the metallic stage. In this process a low class ore is used, and generally the zinc manufactured by this process contains from 2 to 4 per cent. of lead salt.

19,018. Basic sulphate of lead?—Yes, basic sulphate of lead.

19,019. What is the indirect process?—The indirect process is starting from spelter and distilling the spelter in a retort to transform it into zinc oxide. That process is adopted by many—the Vieille Montagne, for instance.

19,020. How do the products of the two processes compare with each other in price?—You will readily imagine that direct zinc must be cheaper than indirect zinc; that stands to reason.

19,021. To what extent is it cheaper?—There might be a difference of about 2*l.* a ton.

19,022. What percentage would that be?—About 8 per cent. cheaper.

19,023. Which do you consider the better product for paint-making?—As far as I am concerned, I think that direct zinc is a long way better than indirect zinc.

19,024. What are the qualities which make it better?—It is a very much better pigment. Direct zinc possesses physical properties which indirect zinc does not possess. It is more opaque, and there is no doubt that its properties are due to intimate combination with lead salts which produces a special physical state, which it is impossible to obtain by the indirect process.

19,025. Does it cover better, and is it more durable?—Yes, and it covers better than white lead. I showed that in my lecture. I showed blackboards painted white. The opacity of the direct zinc oxide is greater.

19,026. You make that statement with great confidence?—Yes; I can substantiate it by proof.

19,027. You make it with confidence in the presence of Mr. Sutherland?—Yes.

19,028. Why is zinc oxide made by the direct process better in this respect than that made by the indirect process?—I have explained that it is on account of the special physical properties of the oxide.

19,029. What is the reason of the difference between the two varieties of zinc oxide?—Most probably the presence of a small amount of lead salt alters the physical properties.

19,030. (Mr. Sutherland.) The process is slightly different?—Yes.

19,031. That probably produces the physical difference?—Undoubtedly. In the case of zinc oxide produced by the direct process the oxide seems to be formed in an atmosphere containing a slight amount of lead, and on that account the physical property of the oxide is altered. Even a man who is not an expert can immediately detect the difference between a handful of oxide made by the direct process and oxide made by the indirect process. The oxide made by the direct process is soft, greasy and unctuous; whereas if it is made by the indirect process it is harsher. There is a different feel about it; it is not quite so soft.

19,032. (Chairman.) What proportion of lead compounds do you find in good zinc paints?—I do not think it ought to exceed 5 per cent., and that should not be added lead salts. It should be the lead present in the process of manufacture.

19,033. Would you tell us whether the presence of 4 per cent. of lead compound is objectionable and likely to cause injury to health?—Four per cent. is so small.

19,034. Is it the fact that the Belgian, Dutch, French, Swedish and Swiss Governments' specifications all admit of 4 per cent. of the lead compound?—I could not say anything about Switzerland, I am not quite sure about that; but the Dutch, Swedish, Norwegian and French Governments admit 4 per cent.

19,035. In specifications for zinc paints in this country, is it usual to allow a small proportion of lead compound?—It is not usual, and in my opinion that is a very great mistake. I must say that I have read the specifications of large public bodies—I cannot mention names, but I know of cases where many hundreds of tons of zinc oxide are ordered, and the stipulation is that the zinc oxide should be absolutely pure—99½ per cent. of pure zinc oxide. I know that it is mixed with white lead—half-and-half—that is a perfectly ridiculous thing. The paint manufacturer is not at all obstinate in this respect, and if we had not a stipulation of that description, which is perfectly ridiculous, we should then be able to use direct zinc oxide, which is a most excellent pigment, and the difference in price would undoubtedly be a very great advantage.

19,036. Would an allowance of 4 per cent. of lead compound be an improvement?—Yes.

19,037. Would you go so far as to say that the failure of master house-painters to succeed with zinc oxide paint is because they have not had the 4 per cent.?—I would not go so far as that, but if what I have indicated had been the practice, no doubt a good deal of the prejudice that has existed against zinc oxide would have been removed.

19,038. Can you tell us anything about lithopone?—Yes.

19,039. Has it been very severely criticised?—Yes, no pigment has been more so, and none has survived condemnation so well.

19,040. What kind of painting work is it specially suitable for?—It is principally used for interior work and water paints, and also for under-coating.

19,041. You do not consider it as good as zinc oxide?—No, not for outside work, but if it is properly

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[Continued.]

mixed I think that lithopone has a very great future, and would be really quite as good as white lead.

19,042. You say in your proof that it is excellent for interior painting. Can it be used for exteriors?—It is more or less used now. An enormous improvement has been made in the manufacture of lithopone. You must remember that the lithopone of ten years ago and the lithopone of to-day are practically two different pigments. It is now used a little for outside work, and I have not heard many complaints. Its photogenic properties are to a great extent against it.

19,043. (*Mr. Sutherland.*) Do you mean by that, its liability to change?—Yes, to change from white to grey and return to whiteness again.

19,044. (*Chairman.*) Has lithopone pigment a good body?—A very good body indeed. It has excellent covering power.

19,045. What is lithopone principally used for in practice?—For interior paints and water paints.

19,046. You have told us that your firm manufacture both lead and zinc paints. Have you supplied zinc paints for any length of time?—Yes, we have supplied zinc paint for a great many years. My firm are contractors to the Admiralty, and we have supplied thousands of gallons of paint to the Admiralty; I am talking of zinc paint at the present moment. We have obtained contracts for supplying paint for the five super-dreadnoughts that are being built in this country at present by the Admiralty, at the Thames Ironworks, Beardmore's, and Armstrong Whitworth's. In all cases the paint that we have supplied is a zinc paint. Our last order from the Admiralty, a month ago, was an order for 7,000 gallons. That, of course, gives you an idea of the amount of zinc paint used. I may tell you that the paint supplied to the Admiralty is manufactured from direct zinc oxide. We have obtained absolutely the greatest number of points for excellency.

19,047. (*Mr. Sutherland.*) In competition?—In competition. It does not all depend on the quality of the zinc, and so on, but on the mixing. Many things are necessary for producing good paint.

19,048. (*Chairman.*) Can zinc paints be used in a similar manner to ordinary paints?—No, you require special knowledge—I do not say special chemical knowledge or technical knowledge, but you cannot use zinc paint exactly in the same way as you can use white lead.

19,049. (*Mr. Sutherland.*) Would you apply that to lithopone as well?—Certainly.

19,050. (*Chairman.*) Would it be difficult for a painter to apply zinc paint?—It is not difficult. He could be taught how to apply it, and he could get into the habit of doing it. I know that many painters have no trouble with zinc paint at all.

19,051. How does the cost of zinc oxide paint, prepared for use, compare with that of ordinary lead paints?—To-day it is cheaper, but I should say that there is very little difference in price, taking normal conditions.

19,052. Does the zinc paint deteriorate when stored for any length of time?—No, it does not at all. Do you refer to ready mixed paints?

19,053. Yes?—If it is properly made it can be kept for a long time.

19,054. For how long?—Two or three years. We have agreed with the Admiralty, that if any of such paint settles within two years we will take it back.

19,055. Can you say the same with regard to lead paint?—No, indeed you cannot. That is common knowledge.

19,056. To what extent do they differ?—Do you mean from the point of view of keeping?

19,057. Yes?—I am talking of ready mixed paint. With white lead paint the lead, naturally being heavy, falls; and there is also a hardening action.

19,058. For how long would you guarantee that lead paint would keep?—It all depends on its constitution.

19,059. You have told us that you give the Admiralty a guarantee of two years with regard to the keeping properties of zinc paint. What guarantee would you give with regard to the keeping properties of lead paint?—I would not give any guarantee at all.

19,060. What is the covering capacity of zinc paint as compared with that of lead paint?—Do you mean by that, spreading power or covering power?

19,061. Spreading power?—The spreading power of white zinc will be practically 20 per cent. more than that of white lead.

19,062. Does it retain its colour for a length of time unchanged?—Certainly. Oxide of zinc does not change on exposure.

19,063. Is it a suitable base for mixing with the pigment or colouring ingredients in common use by painters?—Certainly; most decidedly so. It is much better than white lead.

19,064. Can it be used with the same vehicle and thinners as the painter would use for ordinary lead paints?—Yes. It can be used, like white lead, with linseed oil and turpentine, and the necessary quantity of liquid driers, such as manganese, lead-manganese, cobalt, or nickel siccativ.

19,065. Do you generally send it out ready mixed?—Most of our business is done in ready mixed paints.

19,066. Will you please give us particulars of a few buildings where your paints have been used, first for internal decoration?—There are so many that I should have difficulty in making a selection, but I should be very pleased to send you a list.

19,067. Can you tell us whether your paints, which, as you have told us, have been successfully applied, were applied over former coats, or priming coats, of white lead or not?—In many cases they have been applied over coats of white lead. In some cases they have been applied on the top of under-coatings which we have prepared, these under-coatings sometimes containing white zinc and white lead, and sometimes only containing white zinc. In other cases the under-coating has been a composite paint.

19,068. Have you noticed any material difference when the paint has been applied over an under-coating of ordinary zinc paint?—No. Provided that an under-coating is properly made and is suited to the surface that it is intended to be applied to, as it would be in our case if we prepared it, we should not notice a difference.

19,069. Is there any great difficulty in preparing an under-coating from white zinc?—It is difficult, but an experienced manufacturer would have no difficulty in preparing an under-coating from lithopone or zinc oxide.

19,070. Will you give us the names of a few buildings where your paints have been used for exteriors?—Yes.

19,071. When you give us the names, will you make quite sure that the priming coats have been other than lead?—Yes.

19,072. Will you also give us the dates when the exteriors were painted?—Yes.

19,073. To sum up, then, so far as your experience goes, do you assert that you have found your zinc paints to be efficient substitutes for ordinary lead paints?—Yes.

19,074. If the use of white lead were prohibited by law, would this embarrass you in any sense?—Not in the slightest.

19,075. Or would it embarrass your customers?—No, it would not.

19,076. (*Dr. Collie.*) Would there be any difficulty, in specifying in your specifications for zinc paints, in getting a pure article, the specifications being on the same lines as you follow to-day? In the future, for instance, if the French principle was adopted, would there be any difficulty in obtaining a definite standard to follow for zinc paints?—I can hardly imagine a better method of securing pure zinc oxide than the formula adopted by the French Government.

19,077. You think that such a definition could be used by artists and decorators in specifying the product which they want when they want a zinc paint?—Yes.

19,078. Would there be any greater difficulty in obtaining a pure product than there is to-day in obtaining pure white lead?—No. You are never sure that you are going to get genuine white lead if it is specified to-day.

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[Continued.]

19,079. (*Mr. Sutherland.*) You could enforce it? You could not enforce it; how could you do it?

19,080. By taking people to court?—But you could not prove it.

19,081. If you sell a brand of lead as pure that is not pure, that can be proved?—The lead would be pure, but the pigment might be a miserable one.

19,082. I follow?—You would have the same difficulty with zinc oxide as you have with lead. You might specify genuine English white lead, or you might specify genuine English white zinc; but by that definition you would no more safeguard yourself than you are at the present moment guarded against fraud (as I may describe it) when you specify genuine English white lead.

19,083. (*Dr. Collis.*) If you were using zinc as a base, and you were limited with regard to the final product to 5 per cent. of lead, would there be any difficulty in obtaining the requisite colours for decoration, for instance, red colours?—I do not follow you.

19,084. If the final paint you were going to put on was not to contain more than 5 per cent. of lead, would there be any difficulty in obtaining, for instance, red colours in particular?—Do you mean, can you make any colour with zinc oxide manufactured by the direct process containing 4 or 5 per cent.?

19,085. I suggest that the final product must not contain more than 5 per cent. of lead?—You mean direct?

19,086. Would there be difficulty in preparing bright vermilion, for instance?—Bright vermilion does not contain lead.

19,087. I mean bright red colours?—White lead is constantly used for producing colours.

19,088. You use red lead and orange leads largely?—You are going from white lead to red lead and orange lead. If white lead and orange lead were prohibited, you mean?

19,089. Yes?—I understand you now. It would be more difficult, but not impossible.

19,090. Do you think that you could obtain the range of colours that is obtained to-day?—Yes, provided that you did not bar basic chromate of lead, that is to say, orange chrome.

19,091. That would probably be largely permitted?—It would be very much dearer, of course.

19,092. The red colours are a difficulty, I understand?—Some years ago the colour manufacturer had practically only at his disposal the scarlet and the azos. He had more or less fugitive dyes. The dyes were precipitated or mixed with barytes, orange lead or red lead. We have now entered on a different phase. In the old days the azos faded very rapidly and left the base, and became dark and blackened very soon on exposure. Since then enormous discoveries and improvements have been made by dye manufacturers, and we have now not dyes but actual pigments, and it is possible to produce permanent reds. It is possible to get a red equal in brilliancy and more permanent when exposed in a polluted atmosphere like that of London, without any red lead or orange lead at all. These azo-compounds, not being merely dyes but actual pigments, have a body and obscuring power, and they form excellent paints, without having to go back to the old red lead and orange lead.

19,093. Are they dearer?—No. You have at your command now a range of red without the use of red lead or orange lead.

19,094. (*Mr. Gardner.*) Without any lead salts?—Yes; without lead salts, except perhaps lead acetate or nitrate, used sometimes in the precipitation. I am talking of improvements which are not much more than two years old.

19,095. (*Dr. Collis.*) Would there be any difficulty with the blues?—No. White lead or white zinc are not used for blues. We use so-called "reduced" blues, celestial blues, Paris blue, and so on. All those are cheap pigments with a certain percentage of barytes. White lead and zinc do not enter into the composition.

19,096. For the chromes and yellows, if chromate of lead could be used to a reasonable extent, you

would be all right for all the colours?—Chromate of lead is used in such a small quantity. I do not think that the restrictions should go so far as forbidding the use of it. It is a very useful thing.

19,097. (*Chairman.*) Is chromate of lead very expensive?—No, it is not very expensive. It is a most excellent pigment.

19,098. (*Dr. Collis.*) If the use were not prohibited, would it not be likely to be used by some people indiscriminately?—No; that is quite impossible.

19,099. If you had the blues, the reds and the chromes, you could obtain all the other colours by combination?—Brunswick greens are composed of lead chromates. I do not think that the restriction ought to go so far.

19,100. (*Chairman.*) Would you say that there should be prohibition if you had permission to use lead chromate?—It would not disturb me in any way. As a manufacturer, even if you included chromate of lead, I should not find myself in any difficulty at all in producing a complete range of colour, but I would not go so far as to say that it would not disturb the economic conditions.

19,101. What do you mean by "disturb the economic conditions." Do you mean that it would increase the cost?—It must increase the price of greens, certainly, but not of blues.

19,102. What sort of increase would that entail?—I should think that it would increase the price of greens by certainly 15 to 20 per cent.

19,103. (*Dr. Collis.*) If the limitation took the form of prohibiting lead expressed in solubility in gastric juice (the Thorpe test), chromate of lead is very insoluble by that test, and you could have large amounts of chromate of lead?—I do not think that the prohibition should go so far as chromate of lead.

19,104. You would be able to keep well within 5 per cent.?—Yes.

19,105. What is the form in which lead occurs in the zinc made by the direct process?—It occurs as a basic sulphate.

19,106. Then it only reaches about 4 per cent.?—Yes.

19,107. You do not know what the solubility of basic sulphate is?—In the acids contained in the stomach, do you mean?

19,108. Yes?—I am not prepared to give evidence on that. I am not a medical man.

19,109. The Thorpe test is made in a chemical laboratory. What is taken is the solubility to 25 per cent. hydrochloric acid solution. The basic sulphate is not so soluble to that test as lead carbonate, which is 100 per cent. soluble to that test. The 4 per cent. of lead which you might have in the directly made zinc, would allow perhaps another 3 per cent. of lead to be added for staining purposes?—I see your point.

19,110. You would have scope for adding a stainer?—I take it, that if you ever came to draft out a specification, you would consult practical men, paint manufacturers, and it would be possible to arrive at a nicety. When you had settled the principle the adjusting of these things would be quite simple.

19,111. The lead compounds which are used for staining, themselves have a low solubility?—Yes.

19,112. The reds have not?—No.

19,113. (*Mr. Sutherland.*) Is there any topic in Heaven or on earth on which there is a greater diversity of opinion than on the matter of paint?—There is great diversity of opinion, I am quite sure.

19,114. You said that zinc paint had 20 per cent. more spreading power than white lead, but you did not tell us whether it had more obliterating power?—I also say more covering power.

19,115. More obliterating power?—Yes, more obliterating power.

19,116. Coat for coat?—Yes.

19,117. With less paint?—Yes.

19,118. Your opinion is contrary to that of a large number of people?—I am quite aware of that.

19,119. Mr. Mason, who left early, gave me a question to ask you. The Chairman asked you about the solidifying of lead paint and zinc paint?—Yes.

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[Continued.]

19,120. If you had zinc paint ground in oil in paste form in a wooden tub, or if you had the same thing with lead, what would happen?—Any man who puts lead or zinc oxide ground in oil in paste form in a wooden tub is an ass.

19,121. It is a common practice?—It is common practice.

19,122. Do you say that if he put zinc in he would be an ass?—Why should he do it with white lead?

19,123. Because it is the custom of the trade?—But if it is ridiculous, why should he do it? Are you aware that if you put white lead ground in oil in a paste form in a wooden tub, the wood will absorb a certain quantity of the linseed oil.

19,124. A little bit?—It does not matter how much. To that extent you rob the white lead of a certain amount of linseed oil. The man who opens it says, "This is good stuff. Look how hard it is." It is ridiculous.

19,125. It is the practice, is it not, to send white lead out in that way?—Yes, but as we become more intelligent we are doing away with the old state of things. White zinc if properly ground will keep quite as well as white lead.

19,126. In a wooden cask?—I do not know.

19,127. If you put it in a drum it will?—Suppose you put it in a paper bag, for instance, it will not keep.

19,128. With regard to the Dreadnoughts, what do you say about the under-coating?—That is prepared by the Admiralty. Experiments are being made at the present moment by the Admiralty with under-coating prepared by various manufacturers, but no report has been published. The proportion approximately is half white lead and half white zinc.

19,129. Lithopone?—Zinc oxide and thinners, linseed oil and turpentine, and a certain proportion of driers.

19,130. Is that for the hull?—For the inside and part of the outside, the gun mountings and so on.

19,131. What you supply is in the nature of enamel?—Yes.

19,132. Your business, in substance, has lain in the direction of ready-mixed paints?—Yes; that is the tendency of the paint trade in general—to supply the prepared article to the painter or builder, who is quite incapable of mixing his own paint.

19,133. You would not like that to go out to the painters, would you?—I have said it in my lectures. Every man to his trade. Why should he not buy the paint ready mixed?

19,134. It has been the practice to buy the paint in paste form?—Yes, more so in past years, and less as we advance.

19,135. Lithopone is not sold to painters in paste form, is it?—Yes, very largely.

19,136. Do you mean mixed?—It is sold at 2*l.* a ton.

19,137. Stiff?—The demand for it is becoming so enormous that manufacturers are not able to cope with it. Painters are astonished at the results they are getting. I would not recommend them to use it for the purposes for which they are using it, but they are finding out that they have a pigment of great obscuring power. In the last four or five years we have made more progress with driers than we had made in the previous fifty years. Progressive paint manufacturers are to-day taking advantage of new discoveries to supply the painter and the decorator with liquid driers which can be mixed with every paint, and give the most excellent result. The old-fashioned paste drier is dying away.

19,138. We concede the value for inside work, but the value of lithopone paint for outside work has to be demonstrated?—I admit that; I am with you there—that it has not yet been demonstrated. But lithopone to-day is not what it was ten years ago. We used to call it in the olden days "Griffith's White." It is vastly superior to what it was, and there is no reason to suppose that lithopone manufacturers are not going on improving their product. If it is used outside, I would say use it for under-coats, and not indiscriminately.

19,139. Is there much made in this country outside the water-paint people?—There are three manufacturers at the present moment.

19,140. All the rest is imported?—Yes.

19,141. If prohibition of white lead occurred and three years' grace were given, do you think that the facilities for making zinc oxide and zinc white are such that the demands of the trade could be met?—I should say that there would be no difficulty in finding the capital in this country.

19,142. But that is not the solution of the problem?—Nor is there any difficulty in finding raw material. I know a great many people in the paint trade and the chemical industry, and I cannot say that I know anybody who could at once, to-day, start a white zinc factory; but I do not think that it is impossible. M. Pisart told you that he would be quite prepared to do it, and other people would be prepared to do it; I should think. The manufacture of zinc oxide is a simple process, and it is not secret.

19,143. How is it, then, that it has never been made in this country, where there is a big market for it?—The reason is probably this. Some years ago the quantities used were small and not what they are to-day. I should think that it would not pay a man to start a zinc factory unless he could make at least 10,000 tons. With the very keen competition from abroad, and with the possibility of excellent investments that capitalists have had, they thought very probably that the starting of a zinc oxide factory was, after all, a poor venture, and nobody thought of doing it. I should imagine that to be the reason.

19,144. That would not relieve the difficulty of the situation, if we could not get paint?—But that would never arise.

19,145. If white lead were prohibited, I mean?—If white lead were prohibited, I am sure that it would not disturb the economic conditions at all, except on the side of the white lead corrodors.

19,146. You know that the Admiralty are the largest users of white lead?—Yes, and they use less and less.

19,147. They have not abandoned it?—They have not abandoned it yet.

19,148. Do you think that they will?—I should not be at all surprised if they abandon it.

19,149. Are you conversant with the experiments that the National Association of Master House Painters made?—I am not personally conversant with them, but I have spoken with my friend Mr. Smith about them, and in various quarters. They are not taken very seriously.

19,150. In soft climates like Plymouth, where you would say the conditions are beautiful, the lithopone panels absolutely perished?—Very likely. For the seaside lithopone is not a good pigment.

19,151. Is zinc oxide better for that purpose?—Yes.

19,152. Fortified by varnish?—All pigments when fortified by varnish keep better, certainly.

19,153. I concede that. In all cases we found that the protective coat — ? I cannot discuss your experiments, but I have heard from practical men that they could not be taken as serious.

19,154. We did not disclose any names. We felt that the experiments might have been more scientific, but they had their value?—All experiments have their value. Did you experiment with zinc oxide?

19,155. One panel was zinc white?—Did not you experiment with zinc oxide?

19,156. No. We shall after the Report?—If you do experiment with zinc oxide, you should experiment with not only one zinc oxide but more than one; because as there is a difference in white lead, so there is a difference in zinc oxide.

19,157. Do you know Professor Baly's lecture?—No.

19,158. It was published in the society journals. His evidence here, and that of others, is that there is an emanation from paint that is not lead but is very noxious in its operation, and that it proceeds from the effects of oil and turpentine and drier?—Very likely.

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[Continued.]

19,159. And he thinks that possibly a large number of cases of what is called lead poisoning, arise from this?—But it is not cumulative, is it? Take, for instance, the vertigo you get.

19,160. Two or three witnesses have stated that the same symptoms would arise from zinc paints; and in one case a gentleman said that if you mix sand with oil, turpentine, and drier, you get the same result?—At certain times I have known cases where men have suffered from the effects of varnish fumes or turpentine fumes, and at other times they have had no effect. It all depends on the physical state in which you find yourself at the time. No doubt the diagnosis of plumbism very often has been mistaken, but that does not destroy the argument that lead is poisonous.

19,161. As a man who knows the trade, do you think that the Committee has data enough upon which to make a recommendation for the prohibition of white lead?—I do not know what data you have. I do not know what evidence you have, or whom you have seen.

19,162. But taking your knowledge of the trade, do you think that there is sufficient data as to the noxiousness of white lead to justify a recommendation for its prohibition?—I am not prepared to say that I am for complete prohibition, as I have said; but I am certainly

for very very stringent regulation, not so much with regard to the manufacturer. I think you can regulate factories perfectly well with Government inspectors, and all that, and really bring the danger of plumbism in factories to a minimum. But even with strong restrictions, it will be difficult with painters. I certainly think that strong restriction should be imposed. I do not see how you are going to cope with rubbing down. It is an impossible problem to me.

19,163. (*Chairman.*) Supposing that the Committee find that any set of regulations will be ineffectual, or at any rate, will not be completely successful in removing the dangers, would you agree to prohibition?—I do not think that the country would suffer at all. No doubt in every big change someone has to suffer.

19,164. But speaking broadly?—Speaking broadly, I think that in ten years' time we should forget that white lead had ever been used.

19,165. (*Mr. Sutherland.*) Would you welcome its prohibition?—No. We are not interested in the grinding of white lead or white zinc.

19,166. (*Chairman.*) Prohibition would be the easiest solution for all concerned, would it not?—That is the easiest solution, and the most effective. You do away with it by a stroke of the pen.

The witness withdrew.

## THIRTY-SECOND DAY.

Friday, 10th May 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

LORD HENRY BENTINCK, M.P.

Mr. E. L. COLLIS, M.B.

Mr. W. G. SUTHERLAND.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

Mr. A. L. O. FELL.

Mr. O. KINGGATE.

Mr. W. ROBINS.

E. A. R. WERNER (*Acting Secretary.*)

Dr. COLLIS in the chair for a short time.

Mr. WILLIAM CAIL examined.

19,167. (*Chairman.*) Do you attend to-day to represent Cail's Bitmo Company, Ltd., of Newcastle-upon-Tyne?—Yes.

19,168. Do you manufacture leadless paints?—No, not paints.

19,169. Will you give us a list of the principal compositions which you manufacture and the purposes for which each is intended?—We manufacture practically two compositions of a bituminous nature. The first is a solution which is used as an ordinary paint. That is a sample to show its flexibility (*producing a specimen*). That is used either as ordinary paint or as a priming coat when the second composition which we manufacture is used.

19,170. Would you call this a paint?—We call it a solution.

19,171. I only ask because you said that you did not manufacture leadless paint?—Yes.

19,172. This would be a paint not containing lead?—Yes.

19,173. So that you do manufacture a leadless paint?—Yes, if you call that a paint.

19,174. The purpose for which it is used is as a paint?—Yes. The second composition is an enamel which is put on in nearly a boiling state. (*The witness handed another specimen to the Committee.*)

19,175. Is this one coat?—One coat.

19,176. It is a thick coat, is it not?—Yes.

19,177. What is the thickness of it?—One-sixteenth or a shade more. It depends on whether it is on a

vertical or on a flat surface. There is more on a flat than on a vertical surface because on a flat surface it does not run.

19,178. Is that paint on iron?—That is on a piece of iron. That is painted after the iron has had a first coat of the solution. The solution sinks into the pores of the iron and enables the hot enamel to get a hold of the iron, otherwise the hot enamel would not stay on.

19,179. These are the two compositions to which you now draw our attention?—Yes.

19,180. Do you make Bitmo enamel for ships' bunkers and floors under boilers, &c.?—Yes.

19,181. That is the last specimen you showed us?—Yes.

19,182. And Bitmo covering for tank tops under engines and boilers in ships?—Bitmo covering and Bitmo cement vary very little from the enamel. They have a higher melting point and a rather higher specific gravity. That has a smaller percentage of pure bitumen in it.

19,183. They are modifications of the enamel?—Yes, to meet the circumstances of each case.

19,184. The Bitmo cement for bilges flat of bottom, &c., is again a slight modification?—Yes.

19,185. We may take it that Bitmo enamel is made in three grades?—Yes.

19,186. And the other will be Bitmo solution for exposed deck holds, peaks, funnels and tanks?—Yes.

19,187. That is the first sample to which you drew our attention?—Yes.

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MR. WILLIAM GAIL.

[Continued.]

19,188. The paint. Are all these compositions intended especially for the use on ships, and iron and steel work generally?—When we first began to make them our intention was to use them entirely for ships, but since the use of them has so widely extended they are very largely used on land work now all over the world wherever there is metal to be protected from corrosion.

19,189. The compositions are essentially for applying on metal and on no other substance?—In a few cases they are applied on wood, but they are essentially for metal.

19,190. What is the effect of applying them on wood?—If the wood is dry, before you get a smooth surface you have to put about three coats on, it sinks in so much. The first two coats are comparatively dull. The first coat very nearly vanishes. The second gives a dull covering. You have to give a third coat. It is to preserve the wood and make it practically watertight.

19,191. Are these compositions applied in the same way as ordinary paints?—The solution is applied in exactly the same way as ordinary paint, but in applying the solution you have to be more careful in getting absolutely dry surfaces and absolutely free from rust. All the rust or scale must be chipped off so that you get down to the bare iron.

19,192. And the enamels?—The enamels are applied hot. They cool so rapidly that if you take a brush stroke six or eight inches in length, before you get down to the bottom the top is solid and cold.

19,193. When the customer receives your enamel he receives it in a hard block?—Yes.

19,194. Which he has to melt and then apply, and, as he applies it, it sets?—Yes. He has to melt it with a certain proportion of oil according to the purpose for which it is going to be used—that is a certain proportion of coal oil not linseed oil.

19,195. Is it shale oil?—It is not exactly a shale oil; it is a coal oil of a high specific gravity.

19,196. Is it a Scotch oil, or is it obtained elsewhere?—It is a product of the distillation of tar.

19,197. Obtained from ordinary coal-gas tar?—Yes.

19,198. Is Bitmo solution intended to be used with a first coating of red lead?—No.

19,199. Is it possible for anyone using Bitmo solution to dispense with the use of lead entirely for painting iron and steel work?—Certainly.

19,200. What is the composition of your non-poisonous paint so-called, to which you first draw our attention?—The composition is various kinds of bitumen. We at the present time have about four or five kinds of bitumen.

19,201. From Trinidad and elsewhere?—Trinidad and Mexico, and we get some very good from Germany and Manjak which has a very high melting point indeed. It depends on the purpose for which it is wanted and what part of the world it is going to a certain extent.

19,202. Are the supplies sufficient to meet all likely calls that may be made upon this material? Is there plenty of this bitumen?—I think there is plenty, but the price has been going up very much lately.

19,203. The paint is sent out fluid, is it not?—Yes.

19,204. It is mixed with something else to bring it into solution?—No, it is never mixed with anything else. It is applied exactly as it is sent out.

19,205. But the bitumen is otherwise solid?—It is sent out in solution. When I say it is in solution, part of it is in solution and part of it is in suspension.

19,206. Are volatile substances used for this purpose?—Yes, naphthas.

19,207. Do you recommend this paint to be used in closed places at all?—It is used in the peaks of steamers which are very difficult to do (they are very much enclosed) and in the tanks and underneath the boilers. Sometimes a tank is 30 or 40 feet long. It is a great deal sub-divided and it only has one man-hole at one end and another at the other. The ventilation is very bad. You can only get trained men accustomed to the fumes to work there. It irritates the throats of men not accustomed to the work and makes them cough.

19,208. Do you issue any warnings to the men?—We have had practically the same men for 17 years. They know more about it than I do.

19,209. Do I understand that this paint is not sent out to the public, but is only applied by your own men?—It is sent out to the public, but where it is sent out to the public it is generally used in the open air or where there is no danger. Nearly all ship work is done by our own men by contract. The construction of each ship varies so much, and the cost of applying it varies so much, according to the construction of the ship, that it is almost impossible to quote so much per 100 square yards or 100 square feet, the wages run so differently according to the construction of the ship. We always get a builder's plan sent to us, which we measure ourselves, and estimate.

19,210. Are there any lead compounds in your paints?—None.

19,211. Are leads driers added?—No.

19,212. Do you use turpentine for thinning?—No.

19,213. Is your composition substantially a carbon paint?—Yes.

19,214. Is your composition rust proof and damp proof?—That is a very crucial point that we have been trying to establish for many years. I can only answer that by referring to repeat orders. I think that repeat orders are the best answer to the question.

19,215. Yes; but is that your claim?—That is our claim.

19,216. (Mr. Gardner.) What happens when they want to examine the skin of a vessel after it has been painted with the enamel?—They chip some off.

19,217. As they do with ordinary paint. When it is chipped off do you find rust underneath?—They chip the enamel off to get at the skin.

19,218. Do you know if the skin underneath is rusted. Is it quite clean?—Yes, when there has been perfect adhesion. A great deal depends upon its being applied in the first instance on thoroughly dry and clean surfaces. If the contact is good the enamel lasts as long as the friction will allow it to last. In the coal shoots and so on, it wears off with friction.

19,219. What process is adopted to clean the steel plates before you apply your stuff?—Chipping and cleaning with steel brushes.

19,220. It is not red leaded first, and then the red lead cleaner off to take the scale off?—No. You could not put this on where there has been an oil paint unless every scrap of the oil paint was taken off.

19,221. How do you get the scale off a plate?—The mill scale?

19,222. Yes?—Leave it on.

19,223. What happens to it?—Nothing.

19,224. It seals it up?—Yes. We had a case the other day where bunkers were opened out after 11 years. The plate had just the mill scale on the same as the day it came out of the mill.

19,225. When you chipped off the bitumen, you would take the mill scale with it, and clean the plate then?—I do not think so.

19,226. When it gets a touch of oil behind it, the scale comes off?—There is a pitch oil, not a linseed oil, in the composition of the enamel; but you can hardly call it an oil. As it is put on, the heat is momentary. It becomes solid after that. The oil is not there as an oil. The oil is there in combination with the bitumen.

19,227. (Chairman.) How long does the paint composition take to dry?—It depends on the condition of the atmosphere, and the current of air—the ventilation.

19,228. Exactly, but take an ordinary room, or the hold of a vessel. It is not done in an ordinary room, of course?—Three or four hours probably.

19,229. It would take longer if it was in an enclosed place?—Yes.

19,230. What is the longest time it would take for the paint to dry?—I should think if it was in a small peak absolutely enclosed, and it was on a muggy winter's day when the air was loaded with moisture, it might take three or four days before it became hard.

19,231. Is either of the compositions affected by sulphur and acid fumes such as are present in the smoke of cities?—Our own works have been up 16 or 17 years. They face the river. They are corrugated

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[Continued.]

iron, coated with the solution. They were painted when they were put up and they have never been touched until quite recently, when some of the roofs were done over again. The sides have never been done again at all.

19,232. Had they been done, do you remember, before I visited your factory?—I do not remember.

19,233. I remember being shown parts which they said had been done for many years?—The vertical parts have never been done a second time since the place was built.

19,234. I saw those?—The roof plates have gone to a certain extent. We have some very big lead gutters, and the plates came down inside the gutters rather low. The outside of the plate was protected with the solution, but the inside of the plate was not. The plate went according to the height of the water in the gutter. During those 17 years it had gone from the inside of the plate. It was an ordinary galvanized iron plate. That was the only place that we found where it had gone.

19,235. So you would say that the acid fumes and the sulphur in the atmosphere and the smoke of chimneys does not affect your paint?—Here is a testimonial from the Norddeutsche Textil-Werke Aktien Gesellschaft, Darmstadt, Germany. They get it regularly from us. This is an order. (Handing the same to the Committee.)

19,236. Do you wish to put other papers in at the same time?—Nos. 6, 7, 9, and 10 all bear upon that question. Perhaps if you read No. 10 that will be sufficient.

19,237. No. 10 is from A. G. Green, ironfounders and engineers, Rotherham: "We have used your Bitmo solution on the whole of our premises for the last three years, and found it the most serviceable material we have had. Previous to using it we tried several special paints and solutions, as the fumes from our casting shop acted on the galvanising of the sheeted roofs and caused the sheets to corrode very quickly. We put on a new roof three years ago, and painted the sheets before fixing, and they are now as good as when they were done. Using your solution has saved us a good deal and we can recommend it with confidence."—Those will go on to the notes. Do those shorthand notes become public?

19,238. Yes?—I do not suppose that any of the writers of those would object to having their testimonials made public, but, as a matter of right and wrong, I ought to ask.\*

19,239. We cannot accept them as evidence unless we have the opportunity of publishing them?—Would you object if we wrote to them and asked if they had any objection?

19,240. Certainly not?—I do not suppose that they would object, but some of these things have been given without any idea of testimonial.

19,241. Exactly?—Here is one. We did a ship a good many years ago, and they are going to alter the ship to carry motor spirit in some of the bunkers. They could not get our staff off. Here is a letter from the superintendent engineer to know if we could recommend anything to dissolve it in case they could not chip it off. I thought that the best testimonial we ever had, but it was not given as a testimonial.

19,242. Will the composition stand as well as lead paints in trying positions?—That, again, is a thing that we say it will do.

19,243. We want your opinion?—But I do not want to push our things to the detriment of anybody else's. I am chairman of a bridge company which has one of the high steel bridges over the River Tyne. The bridge was reconstructed about twelve years ago.

19,244. Is that down below the new King Edward VII. bridge?—No, the next bridge higher up.

19,245. On your left as you come across the King Edward Bridge?—On your left coming from the South and facing North. It has been painted twice. It has

never been properly chipped and cleaned when painted by ordinary painters. I determined to have it properly done this time. I lent my own men to the bridge company, and they painted it in the way in which it should be done. I did not get any profit out of it. Here are some pieces of rust that were chipped off the steel girders underneath. The paint remained on the top, but the rust had been going on underneath the whole time.

19,246. Was this your paint originally?—No.

19,247. Another party's paint?—Yes. This was on the top of the piers.

19,248. This shows rust underneath. Do you know whether the metal had been properly cleaned before the composition was applied?—My impression was that it had not.

19,249. Failure here may have been due to the wrong cleaning. Perhaps it was not necessary with the kind of thing that was used?—No. On part of the bridge now, I am going to have about five or six different paints put—the best lead paint, the best white lead paint, &c. Those are all linseed oil and turpentine paints. I am going to have some varnish paints and some of our solution. Personally I believe that our solution will be the best, but, being chairman of the company, I do not like to say too much. But I have told the other directors what I intend to do, and they thoroughly agree that the trials will be very useful in the future.

19,250. How long will these trials require?—I would say six years.

19,251. This Committee will not be able probably to acquaint themselves with the result of the test?—Not unless they sit so long.

19,252. How does your paint compare with lead paints in regard to its covering power? What do you say about your composition first?—One hundredweight will cover about 2,000 square feet of old iron or old steel. That is in the case of an old ship, going through her survey. It will cover about 2,500 feet of a new ship with new plate, or 3,500 feet of ordinary galvanized iron roofing.

19,253. How does that compare with lead paints?—It has a much greater covering power than that of lead paints.

19,254. Lead paints made up with linseed oil and turpentine would not cover to the extent that you are claiming here for your paint?—No.

19,255. Do you know what they would cover?—I should not think that they would cover half as much, roughly speaking.

19,256. (Mr. Gardner.) The two things are not comparable at all. You cannot compare a tar paint for covering power with a lead paint or a leadless paint. The tar will obliterate much more than the lead will?—But these are not tar paints, excuse me. They have absolutely no tar in them.

19,257. We call them tar paints?—You do, but it is an incorrect name. It is not fair to the paint.

19,258. You could not put paint on the top of your Bitmo solution?—If you put it on when it is fresh it gradually discolours the paint. If you allow it to be exposed to the weather for two or three months, then you can paint on the top without discolouring the paint.

19,259. (Chairman.) In your opinion its covering power is about twice that of an ordinary oil paint?—I should say at least twice.

19,260. How does the cost of your paint compare with that of lead paints?—That is a difficult thing to say. I can give you the exact cost of our paints, but lead paints vary very much according to their degree of purity or degree of adulteration, and also according to the linseed oil market. A few years ago it was 20l. a ton. Lately it has been up to 45l.

19,261. What is the price per hundredweight of your paint?—35s.

19,262. (Mr. Parsonage.) Ready for use?—Yes, ready for use.

19,263. (Chairman.) That is the paint, not the enamel? What is the price of one hundredweight of paint to-day?—About 32s. I should think; I do not know.

\* This witness wrote under date 28th May 1912, saying all the writers of testimonials referred to were willing for the matter to be published.



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[Continued.]

19,264. Do your customers tell you it is no more costly to paint with the leadless paint than to use lead paints?—They have never told us so.

19,265. Over what period have your compositions been in use?—17 years.

19,266. Do I understand that you have had no complaints from customers on the score of the durability of your paint?—No, I do not think that we have had any complaints. It is quite possible that somebody may have found it not to suit him, and may simply have dropped off sending us orders.

19,267. Can you name a few of your most important customers who have expressed their satisfaction with the compositions and have given repeat orders for them?—Here is one list of a few representative firms—Armstrong Whitworth & Co., Ltd.; John Brown & Co., Ltd.; The Consett Iron Company, Limited; Clayton Sons & Co., Ltd.; Coppee Co., Great Britain, Ltd.; Coke Ovens, Farnley Iron Company; Easton, Gibb and Son, Ltd.; H.M. Rosyth Dockyard; Hendon Paper Works; Robert Haggie & Son, Ltd. (Rope Manufacturers); Koppers Coke Oven Co.; Low Moor Company, Limited; Leeds Forge Company, Limited; Leeds Tramway Company, Limited; Manchester Corporation; Metropolitan District Railway; North Atlantic Steamship Company, Limited; Northern Counties Electric Supply Company; Otto Helginstock Coke Oven Company, Limited, Crigglestone, Wakefield; O. A. Parsons & Co., Ltd. (Turbine Works); Port of London Authority; Sharpe & Co., Ltd. (Engineers); South Kirkby, Featherstone and Hensworth Collieries, Limited; South Metropolitan Gas Company; Sheffield Coal Company, Limited; Stewart & Lloyds, Ltd. (Tube Manufacturers); Skipworth, Jones and Lomax Co. (Steel Works); Taylor Bros. & Co., Ltd. (Engineers); Werner, Pfeleiderer and Perkins, Ltd.; Washington Chemical Company; Cayzer, Irvine & Co., Ltd. (Shipowners). Those are a few representative firms.

19,268. Are your compositions used on gasometers at all?—Yes, I think they are, but I could not say for certain. The gasworks do get them. Here is a list of some names with the different purposes for which they are used. I do not propose to read the names but the purposes for which they are used.

19,269. The purposes for which they are used will interest us?—Roofs, ships, &c., contractors' work, tramway corporations, engineering, iron and steel works, collieries, quarries, potteries, &c., gasworks and sundry manufactories. Those are all inland.

19,270. Do you advertise your compositions largely?—No; we hardly advertise at all.

19,271. Do you find that unnecessary?—It may be foolish; it may be prejudice on my part; but I do not believe very much in advertising. I rather believe in

saving the money on advertising and putting it into good material and good work. I think in the long run you build up a more sound business.

19,272. As regards the size of your factory, are you well occupied with orders?—We are very busy indeed. During the last week we shipped two orders, one of about 90 tons to Germany, and another one of 70 tons to the United States.

19,273. Your factory at present is not a large one, is it?—No, it is not, but it is so arranged that we turn out a large amount of stuff.

19,274. (Mr. Fell.) I understand that you are using this in connection with some tramway work. What is it used for?—They use it for protecting the motors beneath the body of the car, I think.

19,275. Do they use it for the trucks?—For the trucks, and I think that it has also been used in the centre of some of the roofs between the double roof.

19,276. I take it that this paint is not used in the ordinary way for painting woodwork?—No, it is not used for painting woodwork except in rare instances. The only case where I know of it being used for woodwork, apart from rough work, was in a fish hatchery where they could not keep the tanks tight. It was a trout hatchery. They used our composition; it has given perfect satisfaction, and they have never had any trouble since.

19,277. Where the motors get hot, if you use the compound, does it stand the temperature all right?—At the Consett Ironworks we did a lot of their flues which take the hot air into the blast furnaces, which tubes had a dull red heat. The composition stood perfectly well at that temperature.

19,278. You have only one colour, namely, black? At the moment we have only black. We are busy experimenting to try to get others, but the difficulty is that all the bitumens contain more or less sulphur. We are trying now to find a bitumen free from sulphur. Sulphur disfigures most colours.

19,279. Has any of your paint compound been used for painting motor carriages; ordinary automobiles, for instance?—Not that I know of.

19,280. Not for steel bodies?—Not that I know of. With regard to a great deal of what we sell, we do not know where it goes to. It is used in connection with acid and in connection with heat. We are sending a very large quantity out to the Rand and have been for the last twelve or thirteen years. That is used for two purposes. On the Rand they have no brick chimneys, but all steel chimneys. It is used for protecting steel chimneys, and for protecting the cyanide works, where they crush the gold out. It is used in the acid process where they dissolve the gold out.

The witness withdrew.

Mr. ARCHIBALD VICKERS examined.

19,281. (Chairman.) Do you attend to-day as the representative of the firm of Archibald Vickers, Ltd., paint and varnish manufacturers?—Yes.

19,282. Do you manufacture leadless paints?—Yes.

19,283. Is your paint intended to be used as a substitute for white lead in paints?—Yes.

19,284. What is the composition of your non-poisonous paint?—Do you mean the pigment or the binder?

19,285. It is the pigment we specially desire to ask about?—It is a zinc base.

19,286. What vehicle is used?—Many; such as wood oil, linseed oil, sunflower seed oil, menhadyn oil and so on.

19,287. Are there any lead compounds in your paint?—None—well, not willingly put in. But there is a question of lead in zinc at times. You have had that question raised here before, I expect.

19,288. Certainly?—You may get 2 per cent. or 3 or 5 or  $\frac{1}{2}$  per cent. I am going to do away with lead if I can. When I get any lead salts I get into trouble generally, even with the lead drier.

19,289. Do you find zinc made by the direct method as satisfactory as zinc made by the indirect method?—I may be a little bit prejudiced on the question. I will

not say I am not. We have heard so much from the makers of the direct as against the other process that we are all wrong if we do not fall into line with them. I am a little inclined to take a free course and not be semi-frightened almost at times into using a zinc that they say is the only perfect one on the earth. There are other zines.

19,290. What is your experience as regards the respective values of zinc made by the direct and the indirect methods?—I am rather inclined to have the pure zinc, and I know where I am.

19,291. You prefer the indirect method?—Yes.

19,292. Do you use lead driers?—No. I have stopped it. I have had trouble with it.

19,293. Do you get satisfaction with the driers you at present use?—Yes.

19,294. Do you use turpentine for thinning?—Not much.

19,295. To a slight extent only?—Yes.

19,296. Do you get sufficient covering power without the use of either red or white lead?—Certainly.

19,297. How does the cost of your paint compare with that of lead paints?—Under ordinary conditions or under the conditions of to-day do you mean?

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[Continued.]

19,298. I suppose that it is fairer to take the conditions of to-day?—I know that this investigation has been going on for months. If the same question had been asked twelve months before the white lead makers had this little convention, as they call it, the position would have been very different from what it is this morning.

19,299. Could you give the position twelve months ago and also the position to-day?—I was buying lead at about 18*s.* 10*s.* when I used it. The selling price of lead this morning is about 2*s.*

19,300. Twelve months ago what was the price of your paint as compared with lead paints?—There was not much in it then, I think.

19,301. And to-day?—I can beat them.

19,302. By how much?—It is rather difficult to know how much one can beat them by. They have a fixed price. I can beat them on their fixed price considerably.

19,303. It is fair to take their present price?—I can beat them, and I should be pleased to.

19,304. By how much?—I do not know what their present price is to-day. That is just it. Only this morning I went to buy a sample to bring here. I saw a piece of paper on a wall "Over 5 cwt. of lead" so much, "Under 5 cwt. of lead" so much and so on. What their cost of production is and what they are selling at are different things. I can beat their price on the market easily by 5*l.* or 6*l.* a ton.

19,305. Do your customers tell you that it is no more costly to paint with the leadless paint than to use lead paint?—Those that I have quite taught how to use zinc paints, yes. Those that will not listen to reason say that it costs a great deal more because they have never tried it. Many men to-day will not listen to argument.

19,306. Does it take long to show a painter who is accustomed to use lead paints, how to apply zinc paints?—No, certainly not. In a great many cases—hundred and hundreds—they use it, and do not know when they are using lead and when they are using zinc. They have no knowledge of it. If they once get an idea that a packet of stuff brought to them is zinc they are down on it. If they have a long name on a tin with a very pretty label they say, "This is the stuff." They are using zinc all the time and do not know it.

19,307. You suggest that some customers will not listen to your teaching with regard to the way in which it is to be applied?—Speaking bluntly on the matter, they are so extremely ignorant—a lot of them.

19,308. But if they did not know the difference between the two when they got them, it would not matter?—They are so used to buying their paint by weight and you cannot put the same amount of weight into a gallon package of zinc as into a gallon package of lead, and directly paint comes on a job or goes out to a contract they find that they are 8 lbs. or 10 lbs. gravity wrong on a gallon. They say, "It is costing us " 5*s.* a pound; we can mix lead paint for 3*s.*; we cannot afford to pay 2*s.* a pound more."

19,309. I understand your argument. Over what period have your paints been in use?—Seven years.

19,310. Have your paints been found to be durable?—Yes.

19,311. For outside purposes?—Yes, under certain conditions.

19,312. Under what conditions?—It is very difficult to answer. You can put the same paint out of the same kettle in three or four different positions and localities. Three will be right and one wrong.

19,313. Will the same thing happen with regard to lead paints?—Yes, I think so. I had a case last week at Brighton. I was sent for to the West Pier. At the end of the pier there was a concert hall that was painted with zinc. Right down the centre of the pier there was a sort of lean-to glass shelter with seats both sides. That had been painted with lead. The pier building had been washed with powdered monkey-brand. I should have thought that that was bad enough to break any paint up. The surface looked splendid, but it had lost its gloss. You could wipe off the white lead paint with your hands all down the centre. I was there with Mr. Gibson, the director. They were re-painting. I showed him where the concert

hall was perfect. They had always sworn by lead; but for their pier captain they had an old naval man who knew all about zinc, and he induced them to send to a certain firm, not my firm, for some zinc last season or the season before and it was an eye-opener to them. It stood splendidly, while the other had all gone to dust.

19,314. Were the two supplied for re-painting in the same season?—Yes.

19,315. (Mr. Parsonage.) Southsea pier is now being done with zinc paint?—One of my agents from Portsmouth has just told me so.

19,316. It will get a fair test there, I should think?—Yes.

19,317. (Chairman.) Have you had no complaints on the score of durability?—Yes, I have had complaints; we all have; so have the white lead makers. It is no good hiding that point at all.

19,318. Can you name a few of the most important customers who have expressed their satisfaction with your leadless paint, and have given repeat orders for them?—Yes. I will tell you what I am prepared to do. You can send anyone you like down to the ledger room and pick out any names you like and write to them; take them *holus bolus*. That is far better than my giving you a few picked names. You can go and pick out names for yourself. That is fair anyhow.

19,319. Yes, but we wanted to put them on the shorthand notes?—I deal with over a thousand buyers of paint. Jarvis's of Hackney Road did a very big job with my paint. I asked him about the big job that he did down at Devon.

19,320. Could you give us one or two in different positions. The one you mentioned was probably a private house?—A private house.

19,321. Can you tell us of a big factory where your paint has been used?—It is very difficult very often for me to know where my paint goes.

19,322. I quite follow that. Could you give us a good outside job, for instance, in one of the industrial towns. That is the sort of thing we like. You can look the point up?—If you will give me a few of the sorts of jobs you want I will pick them out.

19,323. Outside pieces of work in an industrial town, Sheffield, Manchester, Liverpool, or London, or somewhere like that. Then give us a piece of private work; then work in a factory where it is exposed to severe tests with regard to temperature and moisture?—Very well.

19,324. (Mr. Sutherland.) Give us a seaside place where it has been used for three years outside?—Yes.

19,325. (Chairman.) Then where it has been exposed to the fumes of railways?—Sulphuretted hydrogen?

19,326. Sulphurous acids (SO<sub>2</sub>)?—And ammonia?

19,327. Yes, at the gas works?—I have never tried white for gas works. Red oxide is used.

19,328. Metal work as well as woodwork?—Yes.

19,329. If you can send those in to the Secretary we will have them added to your answer on the notes. We will not trouble you with the names of the thousand people that you deal with?—My point was that there should be no collusion. You could pick your own names.

19,330. We do not suspect you of any collusion?—I want to be fair.

19,331. You were good enough to offer to give a demonstration to show the comparative behaviour of lead and zinc paints in actual use?—Yes.

19,332. Will you please, before actually proceeding with the demonstration, explain to the Committee what you propose to demonstrate?—The position is this, gentlemen. I do not believe personally that the decorator has any great objection to zinc at all; I think that a lot of it is ignorance. I have met several men who have been up here, and I have heard their views of things. I have also met men who are to come and I am going to tell you what I think about it now I am here.

19,333. (Mr. Sutherland.) Have you been coaching them?—No, but I have been listening. My experience of decorating is a pretty big one. One man very well known in London said yesterday that he had no time to teach his men, as he was too busy.

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[Continued.]

Let me tell you an experience that I had. I brought out a paint called "Body White" which was made of lead, and then I brought out a zinc paint, and sent it out as "Under-coat White." I found that if I sent that paint out as "Under-coat White" they would not use it. If I sent it out as "Body White" they would use it. All a man thinks about is the weight. Thousands and thousands of people will tell you they never use zinc, and do not mean to, and that they have never done so, but you see dozens of gallons in their shops.

19,334. A painter does not regard enamel as an oil paint but as a finishing coat?—Where would you make the line of demarcation between an oil gloss paint and an enamel finishing paint?

19,335. There is a marked difference?—In the label.

19,336. And in the price?—And in the actual finish.

19,337. Yes; in the finish there is a very marked distinction?—Do you suggest that zinc paints are going to be made simply straight from linseed oil?

19,338. That I will ask you later on?—It all hinges on that point, does it not.

19,339. (Chairman.) Would you explain what you propose to demonstrate?—The only point I wish to show you is the point that decorators are always grumbling about enamel and saying that no matter how you manipulate zinc you cannot get oblitative power.

19,340. Zinc oxide?—Zinc oxide or sulphide of zinc and barium. I have not brought any lithopone because the more I play with lithopone the less I like it.

19,341 (Mr. Sutherland.) You are going to demonstrate with pure zinc oxide?—Yes.

19,342. Plus? Is it secret what else is in the paint?—There is no secrecy about the paint. Any decent chemist can find out what it is in a couple of days so it is no use trying to keep it secret. If you have zinc oxide for interior work or very fine barytes for exterior work and make a mixture rather stronger than lithopone mixture on the same lines, you have not all this bye-play of chemistry to deal with. These are actually wet (producing some boards). There can be no mistake.

19,343. (Chairman.) What is the difference in these two?—This is a finishing coat and under-coat on black. That is under-coat and body finishing coat. It is a little glossy. There is very little difference between those two really. One is a body and one is an under-coat. This is a finishing coat on under-coat on priming.

19,344. What sort of priming?—Zinc right through. This is under-coat on priming. That is the same thing only it has a black line.

19,345. (Mr. Sutherland.) This is a thicker coat?—It has not been put on by a professional man. I purposely did not have it done by a professional man. One of the men in the laboratory did that. That is the fairest way. Now that is 50 per cent. of zinc oxide and 50 per cent. of filler. A body paint was made up and a gloss paint was made up from a zinc, not a lithopone.

19,346. Was it barytes?—It might have been, or blanc fixing.

19,347. (Mr. Sutherland.) Blanc fixing is whitening, but it is very different from ordinary commercial whitening?—If we can produce a good result what does it matter? I have been at it now for years.

19,348. (Mr. Gardner.) Is that zinc?—Yes. This is under-coat on priming; I have not a scrap of lead in my works, not a half-pennyworth. But (here the witness produced several tins) feel the gravity. We have had to come down to what the painter wants.

19,349. (Chairman.) You have made it heavy because the painter wants it heavy?—Yes. He will not have it light.

19,350. (Mr. Parsonage.) How do you get the weight?—With filler.

19,351. (Mr. Sutherland.) What is the filler? Is it secret? Is barium heavier than lead?—No, but we have weighted it. What about straightforward barytes?

19,352. I do not understand?—What about a paint made from barytes; is there anything very awful?

19,353. I have no experience of a paint containing nothing but barytes?—I knew you can buy paint at 111. a ton—so-called paint.

19,354. (Mr. Parsonage.) Will this settle?—No. The whole trick in the making of paint is to make a medium that will suspend the pigment.

19,355. That is the greatest trouble?—Yes; it is the biggest trouble we have had, but we have overcome it.

A demonstration followed.

Sir ERNEST HATCH in the chair.

19,356. (Mr. Sutherland.) Do you think that zinc oxide alone (not zinc paint) can take the place of genuine white lead?—What medium?

19,357. As a paint, without particularising any medium?—For inside work there is absolutely no question; for outside work, yes, when it is mixed with proper and suitable mediums.

19,358. What do you mean by that?—It wants a preponderance of oil, and I think that there are better oils than linseed in that case.

19,359. Your paints are zinc oxide, not lithopone?—I have used a lot of lithopone, particularly for under-coatings, and I have come to the conclusion that I am going to say good-bye to it. I find lithopone a most uncertain mixture. You might get lithopone that you think is perfectly all right, but when you have had it in use some time you get, according to my idea, a sulphurous compound emanating from it. If you are clever enough to make a hard gloss film, my idea is that the sulphur gets behind, and discolours the whole thing. With body work you do not find it. You do not find it when you break down lithopone for under-coating for interior work. I believe that opening it out sets free the gas or the acid.

19,360. Does that destroy the photogenic action?—No. Last Saturday, a very nice sunny afternoon, I took nine samples of lithopone out, some thinned down with water, and some with oil, and tried them. Some of them went within twenty minutes.

19,361. The feature of lithopone is that you may paint your room and it may be beautifully white in the morning; in the afternoon it is grey; at night it may be white again. It is the action of the light on the lithopone. A customer of one of our past Presidents had a drawing room painted. The customer rang him up in great trepidation; it had gone grey. He could not go at once to see it. When he got there it was normal?—You get that outdoors.

19,362. This was on the windows where the sun struck the window-cases?—Yes. I have had that in 20 minutes.

19,363. You meet the defect of zinc oxide as a covering pigment by adding what you describe as a filler. What is that filler?—Inert base silica. I have tried all sorts—silica, barytes, asbestine. The molecules or atoms of zinc oxide have a certain shape. I want to find a filler that will adjust itself to them.

19,364. What is the action of this filler on the application of paint?—None.

19,365. Yes?—Do you mean that it makes it rather gritty?

19,366. No; it makes it easier to apply?—I see what you mean now. Are you talking about flat or gloss paints?

19,367. Both. Gloss paints particularly?—I agree that the filler eases it out. It takes that fluffiness out of it.

19,368. It gives it a body?—Yes, a key.

19,369. When you said that painters do not know when they are using zinc or lead, you meant such paints as yours and other makers?—Yes.

19,370. That is because of the filler you put in?—How many decorators' shops can you go into in England and find pure zinc oxide?

19,371. You probably would not find any pure zinc oxide at all in thousands of them?—No. You would find lithopone or mixtures of zinc.

19,372. If you get a pure zinc oxide paint and do not tell the painter what it is, will he not detect the difference?—Certainly he will.

19,373. That qualifies your answer tremendously, does it not, when you said that if you did not tell the painter he would not know?—Zinc base paint was the first remark I started with. Do not get away from

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[Continued.]

that point. My paint is made from a zinc base; you have just said yourself that you cannot find a pure zinc paint.

19,374. Practically here they do not use it?—No, but you find zinc mixtures.

19,375. In Holland they use pure zinc oxide. They mix it for themselves, and they use zinc paints and lead paints in common, and are masters of both. But a witness told us that on wet grounds and under like conditions lead paint was the best. He had no bias towards lead paint except his experience. He was a man with very large experience?—Lead paint was the test, he thought?

19,376. Yes, under any circumstances?—I do not agree with that at all.

19,377. I was quoting from Mr. Nooijen's experience?—Did he say that under equal conditions it was the best?

19,378. Yes, that under equal conditions it was the best?—I do not agree.

19,379. Then you said that painters were "extremely ignorant." Do you wish to qualify that?—I am not talking about the masters. I am talking about the men.

19,380. But a good master controls his own business, does he not?—Perhaps my experience of painters is unfortunate.

19,381. Mr. Gardner and Mr. Parsonage will deal with the men. I will deal with the masters?—That is a different thing altogether. My great experience of paint work has been amongst practical decorators, not the West End type of people, but the smaller class of men.

19,382. (Mr. Parsonage.) Many of them are not painters?—Many of them are not painters.

19,383. (Chairman.) You say, I understand, that a great many men who use paint are not qualified painters?—Yes, they are not painters.

19,384. (Mr. Sutherland.) Whatever they may be in the West End of London, or whatever they may be in London, does not exhaust this country. There are plenty of master painters throughout the country, and in Scotland, who are perfectly competent to conduct their business?—Can you contrast the class of men you meet in the suburbs of London with the class of men you meet in Scotland?

19,385. I am not dealing with the suburbs of London, but with the whole of the trade. These men are thoroughly competent, and control the business, and do a fine decorating business. They have come here, and one and all of them have told us that they have had experience with zinc, that it has failed them, and that they are perfectly satisfied that there is no pigment equal to white lead?—I quite expect to hear that.

19,386. You would not put that down to ignorance, would you—that preference for white lead?—Let us try to get at it in another way, as you are very strong on this point. Take 100,000 brush hands. After all, it is the brush hand who settles the case.

19,387. No, the master painter does not allow the brush hand to settle the case for him?—Yes, he does.

19,388. (Chairman.) What do you wish to establish by your reference to brush hands?—We have great trouble in selling zinc paints because the brush hand or the foreman comes to the master and says, "This thing is no use," and the thing is thrown out, without the slightest chance of being fairly and squarely tried.

19,389. (Mr. Sutherland.) The master painter who knows his business does not allow his workmen to determine what they are to use. You make a claim that the men are ignorant. My point is that the master controls his business, and his experience leads him to the conclusion which I have put to you?—I do not differ altogether from you, but I maintain this: you go into a town and find excellent master decorators and excellent master painters, but if you were to analyse the amount of paint the men use, and take a percentage of the practical men on the one hand and of the unpractical, or botchers, on the other (call them what you like), you will find that there is a far greater percentage of botcher hands than practical men amongst them. Go to Brighton, Southampton, or

London, or any part you like at this time of the year—

19,390. (Mr. Parsonage.) Or Glasgow or Edinburgh?—I do not know about Edinburgh and Glasgow. Take the men painting park railings and so on. How many practical men would you put on to do that sort of work. Take marbling, for instance.

19,391. Mr. (Sutherland.) You said that painters are accustomed to regard paint by weight?—Yes.

19,392. Is not the prepared paint trade relatively quite a modern introduction?—Yes, it is not old. It is five or six years old.

19,393. For the last few years at all events painters have not bought by the gallon, except enamel paints?—Yes.

19,394. The painter bought his paint and lead and oil and turps in bulk previously?—Do you think that he has bought all the articles you have mentioned by weight?

19,395. Up to within the last eight or nine years prepared paints were rather for amateurs?—Yes, quite right.

19,396. Up to then a master painter stocked his pigments and his thinners in bulk?—Yes, and put them together himself.

19,397. So that his attitude towards zinc and lead paints was not at all influenced by weight per gallon, because he never regarded it from that standpoint?—No, he did not; but the trouble is that when men send their paints out to a job they book up so many pounds of paint to a job.

19,398. Yes, and so with thinners, and with stainers?—Yes; and how many men know the gravity of linseed oil?

19,399. How does your answer bear on the question?—A good deal.

19,400. I am not talking now of the relative merits of prepared paints and paints mixed by the master painter?—I make up at my works at 3½d. a pound.

19,401. (Mr. Parsonage.) You mean that when a man takes up a kettle of paint and it is light, he thinks it is not good enough, and he wants the weight in it. I do not see how that affects the question in any way?—Except as one of the prejudices of the painter.

19,402. Yes, we know it is a prejudice?—Yes.

19,403. (Mr. Sutherland.) Do you think that zinc oxide paint is better for sea atmosphere than lead paint?—Yes, I do.

19,404. Do you know that the Office of Works, which is a great advocate of leadless paints, painted the Menni Bridge, which is exposed to the sea air, with five tons of lead last year?—I should not doubt that if they have painted the bridge with lead. They may have painted hundreds of things with lead paint where zinc would have been better. That does not alter it.

19,405. It shows that they had not confidence in it?—Was it white?

19,406. Yes?—I think to paint ironwork with white lead is not a good idea.

19,407. It is red lead underneath. It has almost inches of paint on it?—Is Sir Henry Tanner at the Office of Works?

19,408. Yes?—I painted the Duke of York's Schools for him with zinc.

19,409. I am talking about the seaside?—I mean the schools at the seaside, right on the coast near the Convict Prison at Dover Castle.

19,410. Who painted the structures you mentioned on the Brighton Pier?—I do not know.

19,411. Was it a contractor?—I fancy they do their own painting.

19,412. Do you think that zinc paints would lead to the suppression of the operative painter and the introduction of the amateur?—No, I do not think so for a moment.

19,413. (Chairman.) You said just now that zinc paints could be used for exteriors provided that there was an increase of oil in the mixing?—Yes.

19,414. Would that entail any extra cost?—Yes, by weight, but not per yard super.

19,415. With regard to the intrinsic worth of the paint, would the additional oil make it more expensive?—It would depend on whether a man brought by

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[Continued.]

measure or bought by weight. If it is per yard super, no.

19,416. Have you had any special experience in zinc paints applied to exteriors?—I have been selling paints now for seven years in London, and making them. Lately they have all been zinc.

19,417. Do your customers use an increased amount of oil?—I send mine all out ready for use.

19,418. You use an abundance of oil?—Yes.

19,419. Is that the reason of the success of your paint?—Yes. Everything depends on the medium.

19,420. (Mr. Parsonage.) Speaking of increased cost, would not the cheapness of the pigment, the filler and the zinc, balance the extra cost of the medium?—I do not think that it will cost any more money than lead paint.

19,421. One would balance the other?—Yes.

19,422. And it would not cost any more?—The zinc itself, up to the last Trust, was more money than the same amount of lead; perhaps 10*l.* more. With linseed oil down at a normal price 16*l.*, 18*l.*, 20*l.*, or 22*l.*, you could make paint as cheaply from zinc as from lead, by measure.

19,423. But not by weight?—Not by weight, and the decorator will have it by weight. I find lithopone a most treacherous thing to deal with. It is a splendid white, and a splendid coverer, and for interior work it may be all right, but certainly not for outside. There may be some people who have found out some trick we do not know.

19,424. It is a question of medium?—It is a question of medium every time. I believe that road

sweepings with a proper medium would stand. If you can get a varnish that will hold them, I believe that road sweepings or dust out of the corridors would be all right. I am not at all sure if barytes is not one of the best things we have to deal with, tinted properly. I see in some of the American tests the barytes came up certainly a good deal better than some of the others.

19,425. It all depends on the medium?—It all depends on the medium. That is the point. There are other mediums besides linseed oil.

19,426. Take, not the men who are fetched in casually, but a proper painter, he would have no difficulty in using your paint?—Not a bit.

19,427. He could apply it just as if it was lead?—Yes. There is nothing very tricky about the tins I brought up.

19,428. Nothing whatever?—Nothing whatever. If I did not show you which was the lead and which was the zinc you would not know.

19,429. You could tell by the colour, but not by the difference in working?—No.

19,430. There are many towns in Lancashire where a man is not allowed to work unless he has served an apprenticeship?—That is what they told me.

19,431. The men know the business entirely right the way through, and they are the best men in the shop in many cases, because they go to the technical schools?—Yes.

19,432. London is not a fair criterion?—That is the criterion I am working on. I was not taking the country generally.

### At the London County Council Tramways' Central Repair Depot, Charlton, S.E.

Mr. W. READMAN examined.

*Car No. 807 painted with zinc.*

*Car No. 815 painted with lead.*

19,433. (Chairman.) What is your opinion with regard to these two cars?—The colour is as good, in fact better, in the zinc, but the paint shows slight cracking in all cases in the zinc.

19,434. If lead were prohibited, would you consider that painting a car with zinc would, generally speaking, be as good as painting a car with lead?—In general appearance zinc is as good, but there is a slight cracking. That is the drawback.

19,435. Have you any lead in the paint?—None whatever.

19,436. Do you consider that the cracking might be obviated by having four or five per cent. of lead added?—I cannot say whether it would be any better.

19,437. For how long have these cars been painted?—They were painted on 29th April 1911.

19,438. Can you give us the formula for the zinc paint?—Yes. Pure zinc and thinners were used, viz., zinc oxide ground in oil thinned with equal parts of elastic carriage varnish and turps.

*Car No. 955 painted with zinc oxide.*

*Car No. 957 painted with white lead.*

19,439. When were these cars painted?—No. 955, on 29th April 1911, and the other about the same time.

19,440. What was the formula of the zinc paint used?—The same as in the other case.

19,441. Have both cars had the same sort of wear and tear?—Exactly the same sort of wear and tear.

19,442. Which is in the better condition?—There is not a lot of difference in the general appearance, but there is slight cracking in the zinc oxide.

19,443. Will that slight cracking increase as time goes on?—It will not get any better. It is difficult to say what will happen.

19,444. Were they painted on a lead base?—Yes.

19,445. That applies to all the cars you are showing us at this depot?—Yes.

*Car No. 401 painted with white lead.*

*Car No. 415 painted with zinc.*

19,446. Have these cars had the same wear and tear?—The same wear and tear for twelve months.

19,447. Which do you consider is in the better condition?—Of the two, the lead is actually in the better condition.

19,448. What is the objection to the zinc paint?—A slight cracking.

19,449. But, in general appearance, are they about the same?—Yes, the general appearance is very much the same.

19,450. What is *this* paint on the panels of No. 415?—Crimson lake.

19,451. Is there any lead in this. This is more cracked?—The lake is a very bad drying colour, and is of rather a soft nature. When the varnish comes on the varnish is quicker drying.

19,452. (Mr. Kinggate.) What condition was the car in when you placed it on? The crack might come from the filling. It might not be the outside coats that are cracking at all?—There were no cracks. I can confidently say that.

19,453. (Chairman.) One car has been painted with lead paint, and the other with zinc. The car painted with lead paint has not cracked so much as the car painted with zinc. Would you consider it a better test if the colours were painted on absolutely plain wood?—A much better test.

19,454. (Mr. Sutherland.) In both cases the cars were in an equal condition?—Yes, about equal condition.

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Mr. W. E. IRELAND.

[Continued.]

### At the London County Council Tramways' Bow Shed, E.

Mr. W. E. IRELAND (Rolling Stock Superintendent, London County Council Tramways) examined.

*Cars Nos. 1620, 1621, 1622, 1623, 1624, 1625.*

19,455. (*Chairman.*) For how long have these cars been in use?—About six months.

19,456. Were they all painted at about the same time?—Yes.

19,457. Were all these painted with zinc white throughout?—Yes.

*Cars Nos. 1254 and 1255.*

19,458. Were Nos. 1254 and 1255 painted with lead

about the same time?—Yes; No. 1254 was painted in the first instance by Hurst Nelson, and Co.

19,459. What is your opinion about the condition of these cars?—Personally, I see very little difference from a wearing standpoint between the zinc and the lead paints.

19,460. Could you say positively that the zinc white ones are as good as the ones painted with lead?—Yes, that is so, after six months' wear.

## THIRTY-THIRD DAY.

Tuesday, 21st May 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

Sir GODFREY BARING, BART., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. C. RICE.

Mr. A. GARDNER.  
Mr. J. PARSONAGE.  
E. A. R. WERNER (*Acting Secretary.*)

Mr. JOHN ANDERSON examined.

19,461. (*Chairman.*) Do you attend to-day as the representative of the London Association of Master Decorators?—Yes.

19,462. You are the president of that association, are you not?—Yes, I am the president for this year.

19,463. You are aware that we have already heard a very large number of master house-painters?—Yes, I have heard of it.

19,464. What is the nature of your business, and where is it carried on?—It is carried on at 4, Clarendon Grove, South Kensington. The nature of the business is the usual London builder's and decorator's business.

19,465. What is the average yearly number of painters employed by your firm?—The average number last year was about 110.\*

19,466. Have you been in the painting trade a good many years?—Yes, ever since I was 11 or 12 years old—nearly 43 years.

19,467. Have you known any cases of lead poisoning or painter's colic?—Yes.

19,468. Have your men had occasional days of sickness, possibly due to lead?—Very seldom and very slight.

19,469. Do you have periodical medical examinations of your men?—No.

19,470. Then how do you know that they have not had occasional days of sickness due to lead?—The only reason is that when a man is away ill he generally reports what is the matter with him. I want to know, and he would let me know if he was away with colic or whatever it was.

19,471. I suppose you have from time to time a certain number of men who are away off duty through illness?—Yes.

19,472. And that might be owing to the lead?—No, I should certainly know if it was owing to the lead.

\* The witness has subsequently corrected this to 51. See also Questions 19,827-9.

19,473. Why?—I know the majority of my men more or less intimately.

19,474. Would the men be quite sure whether they were suffering from lead poisoning or not?—They generally know. I do not ask for a doctor's certificate. I certainly think that I should know if they were away from lead poisoning.

19,475. Have they ever reported to you that they were suffering from anything approaching lead poisoning?—Yes.

19,476. They have?—Yes. I have had claims. When I say that I have had claims, I have had probably three or four in the last 10 years, speaking roughly.

19,477. Do you mean to say that you have only had three or four cases where the men have come to you and told you that they were suffering from lead poisoning?—Yes.

19,478. Do you think in your own mind that that is the whole of the number who have been so suffering?—I think so. I think that I am not far out. I had a man the other day who was told that he was suffering from lead poisoning. He was attending the hospital for another complaint, and he did not know as a matter of fact that he had lead poisoning.

19,479. That is the sort of thing I mean. Has that sort of case recurred time after time?—I do not know—not very frequently. This man has worked for me for 25 years. He is a very good man.

19,480. Why should there be only one such case? Might there not be many other cases?—There might, but I should know pretty well immediately a man is away. I should want to know why he is away.

19,481. You are not a doctor?—No.

19,482. How do you know, then, whether it is a case of lead poisoning or not?—I interview a man who is away for any little time to know why he should be away. I am interested in the men.

19,483. Would you ask him his symptoms and all the rest of it?—I would ask why he was away.

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Mr. JOHN ANDERSON.

[Continued.]

19,484. Why do you take such a kindly interest in your men?—I have about 63 men who have worked for me on an average 11 years. My business is an unusual one.

19,485. Is it not unusual for employers to take such a minute and careful interest in the people whom they employ?—When you have men working for you for many years, I think it is not unusual.

19,486. I am glad to hear it?—My business is one that makes it most important that I should know all about my men.

19,487. Do you think that that feeling prevails generally in your trade?—I am afraid not. It would be better if it did.

19,488. I suppose you will admit that the risk of lead poisoning among house-painters constitutes a very real danger, and one that should be removed?—No, I do not.

19,489. You do not admit it?—No, I do not admit it a bit. It is very seldom, as far as I know, that they suffer from it. It is very rare, seeing the number of men employed.

19,490. Have you noted that 284 deaths of painters were definitely certified as due to lead poisoning in the 10 years ending 1910?—No, I have not.

19,491. When you say that you do not think it serious, you do not know how serious it is?—I am only speaking of my own experience. You said 284 in 10 years?

19,492. Yes, in the years 1901 to 1910, and 36 deaths in 1911. So when you tell the Committee that you do not think that there is very much danger of lead poisoning amongst house-painters, you speak only from your own experience?—Yes, and my own knowledge of the trade generally.

19,493. But how far does your own knowledge go?—I have obtained it from a large number of decorators whom I am associated with. We naturally talk together about that sort of thing.

19,494. But do not you think that the number of deaths from lead poisoning is rather serious?—No, I do not. In my lifetime I have only known of one case.

19,495. But the figures I have given to you show a serious state of things, do they not?—I do not know how they are obtained, or under what circumstances.

19,496. If they are quite accurate, are they not very serious?—I would take them as accurate; I would not like to say that they were not, but so much depends on how many men that covers. The chances are that some of the men who have died would have died if they had been in some other trade, probably. That is my opinion.

19,497. But the point is that we have this large number of deaths certified as due directly to lead poisoning, and I ask you whether you do not think it a very alarming and lamentable situation?—No, I do not, I must say. I do not think that it is so dreadfully serious, and I think it is more likely to be on the decrease.

19,498. But that is not the point. I am not speaking about what you think. I am asking you about these particular figures. I thought that, as president of your association, you would have gone into all these figures. Do you not take any interest, as an association, in the general health of the painter?—I am afraid that we have not done so. I may say that our association is rather a young one, only four years in existence, or hardly four years, and I must say that we have not gone very closely into the health of the men up to now.

19,499. Then, in your view, things might remain practically as they are?—I do not think that there is any very great need for any drastic alteration, because I think that even the men themselves are improving in their habits compared with what they used to be years ago.

19,500. Then, how do you account for the number of deaths in 1911 exceeding the number of deaths in any other year that they have been recorded?—It is very difficult to account for, unless they have been more accurately noted in that particular year.

19,501. That is not the case?—Insurance has brought the thing more to the front probably.

19,502. You are only speaking of generalities?—I am only speaking of generalities.

19,503. You are not speaking from any definite knowledge?—No.

19,504. So that, in that respect, your opinion is not worth much?—Perhaps it is not in that respect, but my experience in connection with the trade has been all my life, you see. I could not give evidence on absolute figures.

19,505. Yet you say, without having any knowledge of definite and accurate figures, that in your view it is not serious?—I do say so.

19,506. From your own experience?—From my own experience.

19,507. But, as president of your association, do you not think that you ought to have had sufficient knowledge to form an opinion?—It would be very difficult for me to get an opinion unless I circularised the whole of the association.

19,508. Take the Board of Trade returns. They are serious enough?—I am afraid that not many of us read those, or know anything about them as a matter of fact.

19,509. (Mr. Sutherland.) Or see them?—I see them, I think.

19,510. (Chairman.) You are not sure whether you read them, I think you said?—I read them sometimes. I do not go through all of them.

19,511. When I pointed out the number of deaths, you did not know it?—I did not know it definitely.

19,512. If you read them, you do not read them very carefully?—No; I have no occasion. The thing is not brought to my notice particularly. I cannot quite see the very dreadful importance that you apparently attach to it.

19,513. You do not?—No.

19,514. You say that without having any real knowledge of the actual state of things?—Only knowledge as far as my own men are concerned, whom I have known for many years, and the fair number that I employ.

19,515. Do you know that there were about 2,000 cases of lead poisoning in your trade reported to the Home Office voluntarily without any legal compulsion whatever during the same 10 years?—No, I do not.

19,516. Is not that a very alarming situation?—It seems rather a large number, certainly, but how many does that cover? What is the proportion? If that was out of 5,000, it would be a very large number; but if it is out of 200,000, it is another matter.

19,517. Do not you think these 2,000 people's health worth saving?—Yes, undoubtedly.

19,518. Do you not think that something should be done by the Home Office to alleviate this terrible number of cases of illness?—If anything could be done to save those lives, I would certainly agree.

19,519. (Mr. Sutherland.) Not 2,000 lives, 2,000 cases?—All masters would endeavour to save their men from any illness. They would not treat it recklessly.

19,520. (Chairman.) You agree that something might be done?—I agree that something might be done, but I do not see the very great necessity.

19,521. What am I to take from that? You agree that something should be done to alleviate the seriousness of these 2,000 cases of lead poisoning, yet you tell me in the next breath that you do not think it very important. What do you mean?—You mentioned figures to me which have not been brought to my knowledge, to begin with. Then, again, I am only speaking from my own experience, and in connection with the trade as to the number of cases that occur.

19,522. When you read that answer to my question, you will see how extraordinarily involved it is?—Yes.

19,523. It is not a direct answer. I have got you to admit, after a little trouble, that this lead poisoning evil amongst painters is rather serious. You have also agreed that something should be done to alleviate it?—Yes, if it can be done.

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19,524. Do you mean that?—Yes. I do not wish to disregard it.

19,525. Something should be done to alleviate the suffering which is incidental to house-painters?—Yes, if it can be done, I agree, undoubtedly.

19,526. We have got to it at last. Now, there are two alternatives; one is prohibition of lead, and the other is drastic rules to prevent suffering?—Yes.

19,527. Have you thought which of those alternatives would be the better?—No, I am afraid that I have not for this reason. To begin with, I think that it would be very difficult indeed to prohibit lead altogether. The general public would suffer considerably.

19,528. But do you think that the general public would suffer as much as the men do now?—Possibly not.

19,529. Do you not think that the men should be considered before the general public? I quite agree.

19,530. And if prohibition was the only alternative, this Committee ought to advocate it?—If that was the only alternative, it would have to be adopted, of course.

19,531. Would you like me to go through in detail the precautionary measures which would have to be introduced, if lead is allowed to be used in the industry as hitherto? I am quite willing to listen, and to answer any questions, certainly.

19,532. First of all, there is the provision of overalls by the employer, who would be responsible for seeing that they were regularly washed? Yes. That would be a very difficult matter, and of course that is done by the men now to a very great extent.

19,533. I wish you to understand that, in other industries where lead is permitted to be used, the employers provide the overalls for the men, and see that they are properly washed?—In a different kind of trade, I expect.

19,534. Would you find it very difficult in the house-painting trade to enforce that rule?—Yes, on account of the way in which the men are distributed about all over the country pretty well. I do not say that it is impossible, but I do not see how you could do it.

19,535. You could not do it yourself?—It would be very, very difficult. At busy times we have 40 or 50 jobs on, and men scattered about in all directions. They are taken on this week and off the next.

19,536. Now we come to the provision of a meal room. Care would have to be taken that in no case whatever would the men be allowed to take their meals in a room where lead is used, where painting is being done, for instance. Do you think that that would be very difficult to enforce?—Very difficult in many instances.

19,537. Would it not be impossible in some cases?—It would be impossible in some cases. We paint outside, and we are not allowed inside the house. The lead is in a cellar, or goodness knows where the lead may be used, but not in a room.

19,538. You agree, I suppose, that, at the present moment, a large number of men are obliged to have their meals in a room where they are working?—That does prevail probably to a certain extent, but I should say a very small extent. More often there are other rooms that they could have. It occurs sometimes, but the majority of the men do not do it if they can get meals elsewhere. My men do not.

19,539. But it occurs in some places where there is no other room for them to use?—Yes. But I would like to qualify that. It does happen on jobs, but the large majority of the men do not have their meals on the job at all.

19,540. I am speaking of the men who do?—In London there are so many facilities for having meals in coffee shops or somewhere near, which they use frequently.

19,541. In the country districts it would be much more difficult, I suppose?—It would be much more difficult.

19,542. Next you would have to make provision for a proper place to keep the overalls where they would

not contaminate food or outdoor clothing? While the work is in progress?

19,543. And where they will not collect unnecessary dust when not being worn. Could such a provision as that be enforced?—Again that would be very difficult.

19,544. Would it not be almost impossible in some cases?—In most cases it would be possible.

19,545. But would it not be impossible in some cases?—In a few cases it would be impossible.

19,546. Tell us the few cases in which it would be impossible? Where outside painting is proceeding. We go to a house to do a drawing-room only some times. We gain admittance by going up a ladder outside into the drawing-room, and do not go into the other parts of the house at all. It would be difficult in a case of that kind for the men to have their things hung up somewhere else, and they are hung up in the room.

19,547. Then there is the provision of cloak-room facilities, so that clothing put off during working hours, the ordinary outdoor clothing, shall not under any circumstances remain in a room where lead is being used. Would that be possible to enforce?—The same answer applies.

19,548. Now, I suppose, you will agree that it is very important for the men to have proper washing accommodation?—Certainly.

19,549. Could that always be provided?—I think there is not much difficulty about that. It all depends on what you call "proper washing accommodation." They would not have a lavatory basin fitted up, and that sort of thing.

19,550. I would say at least one basin or other utensil for every two or three men, and a regular supply of clean hot water, soap, and towels, and above all nail-brushes?—To begin with, they do not have nail-brushes and they do not have towels, and there are some occasions when it is even difficult to get hot water, but there is a plentiful supply of cold water in the ordinary way, and soap, and if they do not have towels they usually use wash leathers, which are generally supplied.

19,551. Have you ever known them use their pocket handkerchiefs?—They might sometimes do that even, but they generally wipe on the leather or on their aprons and that sort of thing.

19,552. It is a highly dangerous process if they wipe their hands on their pocket handkerchiefs?—Highly dangerous, provided they happen to have been doing any dry rubbing down.

19,553. Provided that they have any paint on their hands. It is not a question of dry rubbing down?—I daresay that you have been told before that we have plenty of painting work where there is no painting going on as a matter of fact. That is rather paradoxical, I know. No paint is used at certain times of the year.

19,554. I am speaking of the ordinary painter with hands smeared with paint. It is very important that he should remove that paint. Can you assure the Committee that in every case provision could be made for that?—You are touching on a tender point. A decent ordinary good painter does not smear his hands over with paint. I should be terribly annoyed if I saw a man with hands smeared with paint. I should go to him at once and complain to him and say: "Why are you so careless? I will not have it."

19,555. I am not speaking of ideal men, but the ordinary run of painters, who necessarily get daubs of paint on their hands and fingers. Take the ordinary run of painters in London painting bridges and other work?—They get smothered sometimes. They are hardly painters.

19,556. To go back to my original question, can you be quite sure if the Home Office allow the use of lead, that provision shall be made for supplying the men with hot water? They cannot rub off paint with cold water. Do you think that they can?—To a very great extent—the small portion that is there.

19,557. But do you think that they could wash off paint in the winter with cold water?—Yes, they could.

19,558. In winter?—Yes, I have done it, and it can be done. If a man is smothered with paint and



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it is hard on his hands and dried on, it is difficult to get it off with cold water, I admit. Most painters carry a piece of rag in their pocket. If they happen to touch their hands with paint they wipe their hands at once, and there is not much to come off when they wash.

19,559. What do they do with the rag?—Carry it about during the day and then throw it away.

19,560. They carry it about the whole day?—Yes.

19,561. Do you think it possible to provide nail-brushes, clean towels and soap, in every case?—Undoubtedly it would be possible, but I think it would be rather difficult, and that sort of thing would considerably increase the cost of the work. That is one of the points, of course.

19,562. I am taking your point by point, because I want you to say when I come to the end of this which you prefer, and which you think would be the better and cheaper—these rules and regulations or prohibition. Now another point is, that provision would have to be made for the avoidance of dust?—Yes.

19,563. Some means would have to be devised for getting rid of any dust which the men might breathe?—Yes.

19,564. Do you think it is possible, in every case, by means of exhaust draught or anything like it, to remove the dust from the men while they are at work?—There again it would be very difficult. I am sorry to keep on saying "difficult" to these things.

19,565. I appreciate the position. I know myself that it is difficult?—It is the solid truth. You could have fans, but look what it means.

19,566. You say it is difficult, but would you go so far as to say that it is absolutely impossible?—I would not say that it is impossible.

19,567. I am speaking of the dust generated from lead paints. When you say that it is not impossible, what would you do to remove the dust from a room that you rubbed down, for instance?—To begin with, we have but very little dust.

19,568. I am speaking of the dust that is there. You said just now that it was very difficult, but not impossible. I want to know how you would go about to do it?—In the present days of electricity and so forth, it is possible to have a fan in the room, and drive the dust out of the room, of course, the same as you have a fan in hot weather anywhere. I have a fan in my room that I live in, when it is very hot. You can extract the warm air, and you can extract the dust.

19,569. Where would the dust go to? Do you think that a fan like that would remove the dust?—It would carry it out of the room.

19,570. Where would it go to?—It would carry it out of the room, away into the air and distribute it. You would not put it in a waste-paper basket.

19,571. Supposing that there was dust in this room, and we were anxious not to breathe it, would it help matters to have a revolving fan?—If you caused a current of air it would help matters, undoubtedly.

19,572. Would the dust go out of the window, or out of the door, or up the chimney?—Up the chimney probably; but the dust is very small after all.

19,573. But it is the dust that does the harm. You may think it small; other people may think it large?—I agree.

19,574. We have got it all mixed up or churned up by draughts in the air. Now, where does the dust go?—Out of the window, or up the chimney, or out of the door or other parts of the place where the men are not working.

19,575. And a good deal down the men's throats?—While it is being extracted?

19,576. (*Sir Godfrey Baring*.) It is all churned up, and it may settle again in the room?—There is so little. I will qualify that. With good work there is very little, but with rough work a lot. To qualify that again, rough work is not rubbed down. That is the point. It is only first-class work that you have to rub down.

19,577. (*Chairman*.) You have not satisfied me that the dust which has been churned up by the draught will be removed?—If it is in a draught it will

be carried out of the room. You think that it might be churned up and still stop in the room.

19,578. You see the dust is all in the air of the room?—Yes.

19,579. If you open the door, will it go out there?—If you had a fan put in the window and opened the door, the bulk of the dust would go out at the window, if you had a draught.

19,580. Would you have a portable fan?—Yes. You ask if it is possible, and that is what I say.

19,581. How would you drive it?—By electricity.

19,582. Where would you get the motive power?—From a plug in the room.

19,583. But supposing you have no electricity?—I am talking of houses that have, and the bulk of our houses have.

19,584. I am talking of houses that have not?—That is another matter. If you have not got it you cannot have it; that is a certainty. But there are very few houses in good property in London which do not have electricity. If you made it a regulation, it would be possible to have the electric wire carried to any part of the house, and you could put it on to a fan if you wanted. It would be quite possible.

19,585. (*Dr. Collis*.) Would you keep a special motor for every district in which you were painting, to drive your fan?—The fan would be driven by the electric current that is supplied to the house.

19,586. But every electric light supply supplies its current at a different voltage and alternation, and you would fuse your motor and everything else, if you put it on to a system to which it was not adapted?—No, excuse me.

19,587. Excuse me, yes?—If you wanted a fan for that purpose, you could put it on to the ordinary lamp. The process of dry rubbing is only an hour or two in a week.

19,588. But the same motor will not drive on the different systems?—Yes. I admit that you would have to pay the extra cost for the current above what you would have to pay if you had a separate cable. In Kensington it is 6d. for ordinary supply and 2d. for heating purposes.

19,589. You would have to have special wiring and resistances?—Wherever there is a plug in a room that would light an ordinary lamp that would drive a fan.

19,590. But surely you know that, when you have electric light put through your house, you have to tell the individual who is supplying the light, the alternation and the voltage of the current?—Certainly.

19,591. Then he supplies you with lamps for that voltage and for that alternation?—Yes.

19,592. You cannot put your electric motor on to any supply casually and expect your fan to go?—Yes, it will at certain voltages.

19,593. But you have to know the voltage for every district, and you will have to have a special motor and fan for every district you go to?—That would probably occur.

19,594. I only wish to put that point. You would have to have a different fan for each district?—Certainly.

19,595. That is what I put to you?—Yes. It would be very widely distributed.

19,596. (*Chairman*.) That would be a very expensive matter?—Undoubtedly.

19,597. That is your only suggestion for removing the dust?—Yes.

19,598. Now with regard to the fumes in burning off. Is burning off absolutely essential?—In many cases, yes. There are processes where we do not burn off a great deal. As it is now, there is material for stripping off paint.

19,599. Burning off is obligatory in some cases, is it not?—No.

19,600. Can you do without burning off altogether?—You can do without burning off, undoubtedly. There are plenty of materials supplied for stripping paint from woodwork or any material without burning off.

19,601. Would that be as cheap as the ordinary burning off?—There is not a great deal of difference.

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19,602. Would it be more expensive?—A little more expensive.

19,603. It is another little amount to add to the cost?—Yes, that is it.

19,604. Now I will take you to another point. In addition to these regulations that I have suggested, there would have to be periodical medical examination of the workpeople, say once a month?—Yes.

19,605. Which would have to be paid for by the employers?—Yes.

19,606. Would there be any objection to that?—That again means a question of cost, the cost of getting the men together for the medical officer to see them. Who is to pay for their time in going to a given point?

19,607. The employer would have to pay for that?—Then the customer would have to pay it.

19,608. That would be left to you?—Well, there is no doubt about it that the customer would have to pay.

19,609. Then with regard to this same point, in the pottery industry, regulations have recently been issued to protect the workers from the dangers of lead. In addition to having periodical medical examination, the employers have agreed to give compensation to any worker who is withdrawn from work by the doctor's orders on account of doubtful health. Let me give you an illustration of what I mean. Supposing that a doctor examines a workman, and says, "Look here, you have not got lead poisoning, but you will very soon have it; I must suspend you for a month"; the employers in the potteries have agreed to give that man compensation for that month. Do you think, as the president of your association, that your colleagues would agree to a similar regulation?—I am afraid that they would not be so generous.

19,610. (Mr. Sutherland.) They would have to, if it were the law?—It would want a lot of fathoming. It is very difficult.

19,611. (Chairman.) Taking all these points into consideration—and there are many more—would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed, or, as an alternative, that the use of lead should be prohibited, or very closely restricted?—In the interest of my clients, I should say regulations.

19,612. Notwithstanding the cost?—Notwithstanding the cost.

19,613. In the interest of your clients, do you say?—In the interest of my clients. I qualify that by saying that I am of opinion that any other material would not be so durable or so satisfactory and want so seldom renewing as lead does.

19,614. Give me your answer in regard to the interest of your colleagues?—I think that their opinion would be much the same.

19,615. It must be one way or the other?—Yes.

19,616. Would you prefer the Home Office to say, "Now, these men are suffering very greatly from the use of lead in paint; we will prohibit the use of lead, or rather we will let you have as much as 4 or 5 per cent. of soluble lead in general use," or "these rules must be enforced, and you must guarantee, as employers, that they will be carried out." Which would you prefer?—I think, personally, that that is a difficult question in a way. For one reason I would rather that lead be abolished, because if it were abolished every employer would be treated the same without any looking after. I am afraid, personally, that a great many might say they would prefer regulations, but then they would dodge them all the time, and the man who tried to abide by them would be handicapped by the man who was not doing it. That is a point that I am rather keen about.

19,617. You say that very seriously?—I do say that very seriously.

19,618. It points, does it not, to the Home Office introducing prohibition?—Yes, it points to abolition of lead, because I see the difficulty of enforcing regulations. When I say "regulations," reasonable regulations might be enforced, but I cannot see for the life of me how you are going to look after every man to see that

he is fulfilling the conditions. That is the difficulty I find about it.

19,619. (Sir Godfrey Baring.) I understand that when you came here you were not impressed with the serious character of lead poisoning?—No.

19,620. It did not occur to you that it was a serious matter?—Not so serious as the Chairman has led me to believe in a way, but even now I do not see the seriousness of it.

19,621. Even now?—Because, as far as it comes within my own supervision or cognisance, the cases are so few and far between. Sometimes it will affect one man much more quickly than it will another.

19,622. Have not the figures which the Chairman has quoted to you rather modified your views—2,000 cases in ten years, 36 deaths in 1911?—I do not think that it has altered my opinion very much.

19,623. You do not think that any special effort is necessary to grapple with this evil?—I certainly think that it would be advisable not to let it go on. I should not agree to shutting our eyes to the thing, and not troubling at all about it. That would not be wise, and I would not go so far as that. But I think that there are other methods than even the Chairman has suggested by which the state of things might be improved.

19,624. What sort of methods?—For instance, the education of the workman to a very great extent, which our association is endeavouring to do.

19,625. That would be a gradual improvement?—It would be a gradual improvement. They are educating themselves in that respect. I was talking to my foreman last week, knowing that I was coming here. He has been with me for many years. I asked him about his experience of lead poisoning and that sort of thing. He said at once that as far as his knowledge went, he considered that it was decreasing considerably from what it was years ago. The cases are more notified than they were years ago.

19,626. The figures do not bear that out?—Figures were not taken years ago.

19,627. They have been taken for a considerable time now, and there have never been so many deaths as last year?—20 or 25 years ago my foreman, who is an experienced man, heard of more cases of lead poisoning happening then than he hears of now. It is owing to the better conditions of living and better conditions all round. Men have become more educated, more thoughtful, and more sensible than they used to be in that respect.

19,628. You suggest that the only requisite to secure improvement is the education of the working man?—That is one, not the only thing. If the Home Office were to circularise firms more than they do, and allow the men to know what is going on, and how they could preserve their health better, and avoid this and avoid that, it would be better. Unfortunately, the painting trade is a very fluctuating trade. The men are out of work for a large portion of the year, and some of them are badly fed. In Scotland I understand the deaths are not so many. There better conditions prevail, I understand. For instance, the men there have an hour for breakfast, instead of, as our men, half an hour, and they have more time to be more cleanly, and more tidy over their things generally than if they have to scamper off and scamper back.

19,629. The masters give a longer time for meals?—It is not a case of the masters giving a longer time. The men are paid by the hour, and they would not be paid for breakfast.

19,630. They prefer a short meal time, you think, in this country?—I do not know that, but it is the custom of the trade. Even with drastic regulations, if the men will not follow them and difficulties are put in the way, they will not get on so well. I think that the men should be educated.

19,631. You would look rather seriously on these precautions being enacted by Home Office Order, because of the increased cost?—Increased cost and the difficulty of carrying them out thoroughly. I have to compete with a man who might not do it, and if I did it I should be at a disadvantage.

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19,632. Many of these precautions could not be carried out in country districts?—Many of them could not be carried out in country districts.

19,633. For instance, electric fans. A large number of the houses in country towns are lit by gas only at present?—Yes, I believe so.

19,634. (*Dr. Collis.*) There is one point that a little astonishes me. You say that your impression is that lead poisoning in the painting trade has been getting less in recent years?—That is the experience that I have myself, and also the experience of my foreman, who is more intimately connected with the men than I am, and mixes up much more with them. Only last week I was asking him the question, and he was distinctly of opinion that there were not so many cases prevailing now as there used to be. Another thing is that many kinds of paints are used now that are not lead paints more than there used to be.

19,635. The Registrar-General states in his last supplement that there has been no alteration whatever in the house-painters' and plumbers' occupations?—In how long?

19,636. Between 1891 and 1901? Ten years.

19,637. You speak of being yourself not much acquainted with the occurrence of lead poisoning among the men. What illnesses are you acquainted with among the men?—Colds, or an attack of rheumatism, and all sorts of different complaints of that kind.

19,638. What do they die of?—I am happy to say that not many die. One or two have died of old age more than anything else.

19,639. We are not contending here that men die more from lead poisoning than from anything else, but they do die?—Undoubtedly.

19,640. And yet you have no particular information of their dying at all. So I am not astonished that you have no information of death from lead poisoning?—I had a man die the other day who had been working for me for 23 years. He died because he was getting very old; and he had been a painter all the time.

19,641. But men do not all die over 70, unfortunately. You say that the amount of dust which comes off is very slight?—Yes, with good work.

19,642. I mean that. If you were getting up a front door in the West End, would there be very little dust?—Yes, and with a front door there is very seldom much lead about it at all. There are not often white doors.

19,643. I am thinking, not of a white door, but of a coloured door. A dark green door would probably contain lead, would it not?—There is very little lead in that.

19,644. And yet we are told that non-lead paints will not stand outside?—Unless it was a white or light colour there would be very little lead in it at all. It would be painted with other ingredients, vegetable stainings, and so forth, which do not contain lead at all. That would be the case with dark greens and that sort of colour.

19,645. Then what is the difficulty in not using lead for the outside for high-class work?—It is not required. In some circumstances it is required, where it is done with light paint.

19,646. Supposing that you are getting up a front door with light colour?—That is very rarely done, not one in a hundred would be done with light colour. If you walk round the streets you will not see many doors with light colour.

19,647. There are a good many in Wimpole Street and Harley Street?—I do not think that you would come across many white doors.

19,648. Light ones?—It depends on what you call light; but there is very little lead. I do not say that there is none.

19,649. The door I am thinking of particularly has no lead, but I was interested in watching the man at work. There would be no particular difference in the amount of dust given off, I presume, whether there was lead in the paint or no lead in the paint?—There would be much less dust.

19,650. Why should that be so?—Detrimental dust, I mean.

19,651. But there would be dust, would there not? If it is not lead dust, it is not detrimental particularly.

19,652. But the point, now, is the amount of dust that comes off in rubbing down? I saw a man rubbing down a stucco column. He was smothered in white like a miller, but it was only whitening and size. He was putting it on and rubbing it off again.

19,653. The amount of dust that was given off in the case of the door I watched seemed a very fair sample of the amount of dust given off in dry rubbing down?—A front door requires rather more rubbing down than inside-work. It gets more blistered and wants more filling up, and so forth. Inside rooms and doors do not get blistered with the sun like the front door does. It is getting rid of the imperfections that occur through blistering and heat that necessitates the rubbing down that you mention.

19,654. What would a man use for filling up the woodwork, in a case of that sort?—All sorts of concoctions, some of which would be white lead.

19,655. How about the rubbing down?—There again, it is very slight, there is so little of it.

19,656. There were a good many patches on the door that I had under my observation?—The filling up would not be all white lead.

19,657. But they would use some?—They would use a little, no doubt. If they use a great deal it makes it very, very hard, and much more difficult to rub down.

19,658. If that was a fair sample of the dust that is coming off in high class work (and you have referred to high-class work) it is very considerable, it seems to me?—Then I say it does not prevail inside to the same extent, or anything like.

19,659. I was not speaking of that. The dust was all coming towards the man, as he rubbed with glass-paper; whatever his position, he was constantly inhaling it. Now in starting to educate a man, what line would you take? Would you teach him not to breathe?—Many men, when they are at work, work with their mouths open. If they would shut their mouths that would stop a good deal of the trouble. They are eating it. If they did not do that, you might say they would breathe it up their nostrils.

19,660. Yes, because the air has to go into their chests?—A man should take precautions not to stand so that it blows over him. It does not always blow straight on to him.

19,661. I was watching to see how I could tell him to keep out of it, but I could not see how he could keep out of it?—Was there no draught?

19,662. None at all. It was a quiet day with the usual conditions that prevail in a London street?—If the men knew that they had to use certain precautions in doing certain work, they would have better health perhaps than if they did not use them.

19,663. But what line has the education to take? It has to take practically the line that they are not to breathe?—I do not agree with that.

19,664. That is the inevitable conclusion. Lead poisoning occurs more from dust than in any other way, and I do not see how the men are to get out of the way of the dust. Therefore, what line is the education to take?—You would have to try to educate them to be very careful. You say you do not see how they could keep out of it.

19,665. The man said that for that coat he might have used wet pumice. I said, "What would you use later?" He said, "I am obliged to use dry glass-paper for the other coats. If you watch other men doing it, you will not see very much difference?"—The rubbing down process is not a lengthy one comparatively. The number of hours a man is working at rubbing down in a week are not very considerable. It all depends, of course, on the work a man is doing.

19,666. If there was more, we should hear undoubtedly of a great deal more trouble; but it is probably sufficient to account for what we do hear. I understand that you can talk to men about washing and care, but I cannot quite see how you can educate

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men not to breathe? A man might be educated as to the best kind of food he should have food more suitable for his complaint.

19,667. (*Mr. Sutherland.*) With regard to the front door that Dr. Collis spoke of, the first process would be a wet process, unless you were burning off?—Or stripping off by other processes.

19,668. With reference to the other point that the doctor was speaking about, the protection of the door does not so much depend on the paint you put on it as the subsequent coats of varnish taking front doors that are well got up?—I should say so.

19,669. The comparison does not exist between a front door well got up and ordinary white lead painting? Such as sashes and frames, which are not varnished.

19,670. You could not establish any conclusion from that?—No.

19,671. Now, could you tell me how the Home Office could enforce prohibition with regard to painters unless they stopped the source of supply to manufacturers?—I am afraid that I could not. It would be very difficult to carry out and very drastic.

19,672. It would mean a large staff of inspectors to look after it?—Undoubtedly.

19,673. (*Chairman.*) You are talking now without any knowledge of what the Home Office procedure would be; so that it is not much good giving your opinion on a matter of that sort, although you may if you wish. You are not qualified to speak about what the Home Office can do about that. The Home Office have not made up their minds?—I can see some difficulties; that is the only thing.

19,674. (*Mr. Sutherland.*) You can see the point that I see—that there would be very considerable difficulty. You would prefer regulations in the interests of your clients, but not in the interest of yourself as a master painter. I understand you feel that the use of lead gives you a better job, and a more durable job?—Undoubtedly.

19,675. And therefore it is in the interest of the public that lead should be retained?—Yes, that lead should continue to be used. I think that they would suffer if lead was abolished. The work would have to be done much more frequently, and would be much more costly. It would be better for me in a way, because it would mean more work.

19,676. But it would not enhance your reputation?—It would not.

19,677. Ultimately it would recoil on the master painter as well?—Yes.

19,678. (*Chairman.*) If all the master painters were in the same position it would not recoil on any one of them?—No.

19,679. (*Mr. Sutherland.*) Now, with reference to the periodical medical examination which the Chairman indicated, on the question of cost and convenience, the position would be met, in many cases at all events, by transferring the men to work that did not involve the use of paint, such as stripping, staining, and distemping?—If the man was in a delicate condition, you mean?

19,680. If he was showing symptoms of lead poisoning, and the doctor said, "Now this man is threatened with lead poisoning," it would not be necessary for him to be sent off on holiday; but it would be possible to comply with the conditions by putting him on to some work that did not involve the use of paint. There is no difficulty in that?—Not at all. It may be interesting for me to say that at the present moment I am doing eight large new houses at the corner of Brook Street, and Gilbert Street, Grosvenor Square. Some of the men are not very strong. If they were working where new painting was going on, priming and so on, for six weeks on end, they would feel the effects. The other day a man was not very well. My foreman, Mr. Protheroe, said: "I think the rubbing down has had some little effect. I am taking him away from Brook Street where he has been two or three weeks." We take that into consideration.

19,681. (*Sir Godfrey Baring.*) What would he do then?—Go to a job where there was not so much rubbing down to be done.

19,682. (*Mr. Sutherland.*) Not necessarily painting?—Not necessarily painting.

19,683. (*Chairman.*) You have told us that you are a kindly humane employer, but you rather suggested that your sympathetic feelings did not prevail throughout the whole of the trade?—I said I am afraid not.

19,684. I am sure what you told us is correct; but that does not help us very much?—Very well.

19,685. (*Mr. Sutherland.*) Scientific and medical witnesses have satisfied this Committee that there are no lead fumes from burning off?—I have heard that.

19,686. There is no volatilisation of lead until you get to a temperature of 700 or 800 degrees; so that there cannot possibly be any lead fumes from the burning off?—I should think not, according to that.

19,687. According to these same authorities, who, I think, have proved their case, if the use of lead is abolished there would be paint poisoning which is very hurtful to the system?—In consequence of using oil, turps, and other concoctions?

19,688. Yes, because of the emanations given off from them. They are not lead poisoning?—They would create illness or unpleasantness, you mean?

19,689. Nausea, headache, colic, stomach, and urinary troubles, and kidney troubles?—Yes.

19,690. And so if the Government abolished the use of lead, they would be up against trouble?—Yes.

19,691. If white lead were abolished, you would be up against these troubles which may in the past have been classified as lead poisoning?—I cannot speak as to that. I cannot differentiate between them.

19,692. In July next, according to all portents, the new Insurance Act comes into operation, and every case has to be recorded, to ensure benefits under the Act?—Yes.

19,693. Two thousand cases have been voluntarily reported. The estimate is that during the ten years 1900 to 1909 there were something like 10,000 cases, but these cases are not actually reported cases. They are cases that are estimated on the basis of fatals, taking the ratio which is known in other trades where compulsory reporting is necessary. Do you not think that it would be better for the Home Office to be absolutely sure of their data, and defer any decision on this point, except regulations, for a term, and get the returns which we shall get through the Insurance Act, definitely disclosing the painter's risk in a tabulated form?—I should think that we should get much more authentic evidence then, probably.

19,694. We should get absolute evidence, undoubtedly?—I should think so.

19,695. At present, except with regard to fatals, we have calculated on an estimate only?—Yes.

19,696. (*Chairman.*) Would you advocate regulations in the interim?—Yes.

19,697. You have said that they cannot be enforced?—I have said that it would be very difficult to enforce them.

19,698. That is the same thing, is it not?—I did not say that they ought not to be enforced, or that I would not enforce them, but there would be difficulty.

19,699. The difficulty with regard to getting rid of dust from a room, for instance?—It would be difficult to enforce a thing like that, undoubtedly, if you could not do it.

19,700. (*Mr. Sutherland.*) Except for the effect on the health, is there, in your opinion, any possible competitor that could replace white lead?—Not that I know of.

19,701. Is it your opinion that zinc paint could replace white lead for interior work, without serious inconvenience?—It could replace it, but it would be more costly for the client.

19,702. For inside work?—For inside work.

19,703. For outside work you are quite convinced that there is no efficient substitute?—I feel quite convinced of that.

19,704. You are familiar with large Scotch painters?—Yes.

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19,705. Many of them have appeared before this Committee, and they have substantially told us that they use nothing but white lead, and substantially they have no experience of lead poisoning?—Yes.

19,706. The statistics for Scotland sustain that, outside the Glasgow area. Dr. Legge himself said that, except for Glasgow, there was very little lead poisoning?—There was only one death last year, or the year before—I cannot remember. I was at the Conference and talked with them, and they said that the small death-rate was extraordinary.

19,707. Can you give any reason to the Committee why lead should be so hurtful in parts of England and why it should be so innocent in Scotland?—My only idea about it is that I should say that the Scotchman is much more careful. To begin with, the Scotch painter would be a better mechanic.

19,708. A better trained man?—A better trained man than the English painter. I do not know, as a matter of fact, but I think it is more or less the fact that their employment is more regular in Scotland than it is in London, for instance. I am speaking more or less of London. They are not out of work, I think, in different parts of Scotland so long as they are in London. The physique of the men and the kind of living to a great extent render them liable to this sort of thing.

19,709. Lancashire, London, and Birmingham are the three deadly areas in our whole country?—Yes.

19,710. Outside that the risk is a very slight one?—Yes.

19,711. (Chairman.) Do you know that?—No.

19,712. You keep on saying, "Yes"?—I only say "Yes" because of the form of the question.

19,713. (Mr. Sutherland.) Do you think it possible that painters could dispense with dry rubbing down? Supposing that the Home Office prohibited dry rubbing down, which Dr. Legge tells us is the source of 90 per cent. of the trouble, and the Home Office said, "We will make it penal to rub down by the dry process," do you think that the trade could meet the case by some other process?—To a very great extent, if not wholly, I daresay it could, but there again it would be difficult.

19,714. I know that there are difficulties?—If you paint a door to-day or to-morrow you cannot rub that down wet the day after.

19,715. (Mr. Parsonage.) How long would you take?—Cannot you do it the day after?—I have never tried it.

19,716. (Mr. Sutherland.) That is just it; you have not tried it?—I have not.

19,717. (Mr. Parsonage.) Many of the employers here have stated that they could?—What have they said about regulations?

19,718. (Mr. Sutherland.) Every change of custom is bound to cause some inconvenience and some recasting of methods?—Naturally.

19,719. If the Home Office made it a penal thing to do, do you not think that the trade would meet the case in some way?—It might be possible.

19,720. Rubbing down dry is a fertile source of poisoning?—If the Home Office issued an order that no dry rubbing down was to be done, it would be up to the men to report it if it were done. It would be perhaps easier to carry that out than some other things.

19,721. (Chairman.) Do you think that the men would make such a report?—I should think that they would.

19,722. Would not they be liable to be cautioned, or something?—I think that it could be done without even the master knowing who had reported, if it were necessary.

19,723. (Mr. Sutherland.) If it were the law, the men themselves in their organisations would see that they were not penalised for reporting?—Naturally.

19,724. Every decent master painter would endeavour to carry it out as far as he could?—Every decent master painter would carry it out as far as he could. Some would not trouble, and would take the chance.

19,725. Now with regard to the provision of overalls by the employer, to which you objected, do you not think it unnecessary?—Yes.

19,726. Most decent painters provide overalls?—Yes.

19,727. Why should the Government go out of its way to force employers to provide for men who are careless?—I do not think that they should.

19,728. (Chairman.) I only told you that the Government had enforced in other industries, with the consent of the employers, the provision of overalls?—I suppose that the regulations in the house-painting trade would be abreast of other new regulations. In some industries it would be quite easy for employers to provide overalls, and have them properly washed and so on, but in the painting trade it would be difficult.

19,729. (Mr. Sutherland.) You attach great importance to education?—I attach more importance to it than I do to any regulations or anything else that you have.

19,730. In that case, you would have the labelling of all lead compounds as dangerous?—Yes; there are various ways. We have not gone into the matter very, very carefully in that respect, but I think education a very great point. Unfortunately, the idea prevails to a very great extent with the public generally, and in fact with masters who do not understand the trade at all, that anybody can paint, and therefore uneducated men come in who do not understand the trade at all. If trade societies were more stringent about their men and were more amalgamated, and did not let anybody come in who did not know anything about painting, it would be better for the men.

19,731. Would it be a hardship on the men to make it obligatory to provide themselves with overalls or jackets?—I do not think so.

19,732. The decent men do it now?—The decent men do it now.

19,733. It would be soreing up the trade at that end of it?—It would be an advantage to the trade.

19,734. Would not you make it compulsory on clients to provide facilities for the men washing and having a separate room for a mess-room and cloak-room when painting was being done?—Would not that meet the difficulty?—That would help, no doubt.

19,735. (Chairman.) Is it reasonable to suggest that you are going to make a law, making it obligatory, with penalties, on the part of the householder to provide rooms for men to wash and keep their clothes in?—Do you think it reasonable to suggest such a thing?—I think it is.

19,736. Would you like to have a provision made that, if a plumber came to your house, he should have a room set aside to have his meals and put his clothes in, and all the rest of it?—So much depends on what he has to do. Why should the client get off scot-free? Why should he have the work done at his pleasure and convenience without any inconvenience, and the men suffer in consequence?

19,737. But does he not pay for it?—It is one way or the other.

19,738. You do not think that they would object?—I do not think that they ought. When you speak about washing and provision of washing accommodation, I do not know whether you are aware that the Water Board have been much more stringent lately in compelling masters to pay a water rate for the use of water in cleaning down fronts of houses, putting a penalty on it really. That is official procedure.

19,739. Such a procedure as Mr. Sutherland put to you would involve inspection from house to house?—While work was in progress.

19,740. Yes. Do you think that the British public for one moment would accept such a state of affairs?—You would have to have very close inspection to see that it was carried out. That is what regulations would mean.

19,741. (Mr. Sutherland.) Should not the British public bear part of the burden?—I think so.

19,742. Why should the master painters bear it all?—The master painters should not.

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19,743. (*Sir Godfrey Baring.*) Could it not be done with a little adjustment of the charges?—(No answer reported.)

19,744. (*Mr. Sutherland.*) There are situations where it could not be done unless facilities were given in the house. Supposing that a householder refused to give facilities, what would be the position? The provision of nail-brushes and towels would not be a difficulty, would it?—No; but there again, who is going to collect the towels, and keep them clean? I am afraid that I am more against regulations the further I go.

19,745. The foreman could see to it, could he not?—If you are going to have so many dozen towels scattered all over the jobs and collected every week, what does it mean?

19,746. You have the same difficulty with brushes?—No. The brushes go to a job for five or six weeks, but the towels would have to be collected and cleaned weekly. That is an additional cost against the clients.

19,747. In many cases, you do not experience difficulty in getting facilities for washing?—No.

19,748. Only in a few cases?—Only in a few cases.

19,749. That is all the more reason why, if regulations are insisted on, these obstinate people should be compelled to give you facilities?—I have known instances where a customer would forbid a man to put his coat inside the door. They will not have them in the place. I think that that is very arbitrary.

19,750. (*Chairman.*) You would have to put a clause in your contract providing for that when you accept the job?—Then they would go to the man who did not put it in.

19,751. (*Mr. Sutherland.*) But if it were made compulsory, it could be on every contract form?—Yes, it could be if it were made compulsory.

19,752. From your long experience, you know that white lead is a material which you can absolutely depend on as a paint base, I suppose?—Undoubtedly.

19,753. Is there anything else that you know of, if white lead were prohibited, that could take its place?—Not to take its place generally.

19,754. If it were prohibited, would not the painting trade be thrown on to proprietary paints?—Undoubtedly.

19,755. Unless the abolition of white lead occurred, what is to prevent proprietary paint manufacturers putting white lead into paint in large quantities?—If it is prohibited, that would not be allowed, I take it.

19,756. Unless it was prohibited at the source, it might occur?—Yes.

19,757. A witness told us that that was commonly done—that people bought zinc paint, and 50 per cent. of it was lead?—One of my objections to using made-up paint is that you do not know what there is in it. Some of it may be lead all the time.

19,758. Do you know that the Admiralty and the War Office are the largest consumers of white lead in this country?—I do not know that they are. I will take it from you.

19,759. (*Mr. Rice.*) You do a very high-class trade in painting?—Yes.

19,760. In fact you are rather a swell among painters, are you not?—I think I am. At least, I do not think I am; I am sure I am.

19,761. Therefore it is a tender point with you to see a man with paint on his hands?—Yes.

19,762. But you have seen men with paint on their hands?—Yes.

19,763. Therefore you admit that there is a certain danger amongst painters—not necessarily your painters—by reason of getting paint on their hands?—Yes.

19,764. How do you propose to deal with that danger?—In the way of making the men cleaner, do you mean, or to prevent it?

19,765. How do you propose to deal with that danger in any way?—I do not quite see the point of the question exactly.

19,766. The point of the question is that the man who gets paint on his hands is in danger from that paint. That you have admitted. How do you

propose to deal with that danger?—When it does arise?

19,767. Yes?—You mean, when he gets ill by having the paint on his hands?

19,768. I mean, when he has the paint on his hands?—I do not quite follow what you want me to answer, really.

19,769. I only want an answer to the question?—The only point is to educate the man so that he does not get paint on his hands. I maintain that a good painter does not get paint on his hands. He might get a little, but nothing to speak of.

19,770. You admit that we have to take things as we find them, do you not?—Yes.

19,771. You admit that there are men who get a lot of paint on their hands; you have admitted that that is a source of danger, and I want to know how you propose to deal with that danger?—I only say, by educating them not to get the paint on their hands.

19,772. So that the way of getting rid of the danger is by educating the men not to get the paint on their hands?—Yes. A painter who is not a painter slobbers the paint all over the place. If you saw a proper painter you would see that he used his tools in a proper way, and differently from the so-called painter, who slobbers the paint all round the pot, and so on.

19,773. We have to take things as we find them. There are men who get paint on their hands?—So-called painters.

19,774. You think that they should be educated not to do it?—Yes. They might eat it, for instance. You would educate them not to do it. Some do not appreciate the danger, I believe. You would teach them that it is unwise.

19,775. You said that one of the difficulties of prohibition is the suffering of the general public. How would they suffer?—Because the work would cost more to do, and it would have to be done more frequently, and it would not be so durable as if done with white lead.

19,776. Assuming that regulations were enforced, you admit that there would be extra cost of the work by reason of these regulations?—Yes, naturally.

19,777. Can you give us any comparison between the extra cost of complying with the regulations and the extra cost of painting the work more frequently?—It would be very difficult, I am afraid, off-hand.

19,778. Do you think that there is anything in it?—To begin with, I do not know what the regulations are going to be, and even if I did it would be very difficult to estimate the cost.

19,779. Taking the regulations foreshadowed by the Chairman: the overalls, with regard to which you see such great difficulties, the supply of hot water in all cases, the provision of meal rooms, &c., &c., exhaust fans driven by electricity, and so on, you admit that that would be a very costly proceeding?—Undoubtedly.

19,780. Have you ever tried to buy poison?—Not to my knowledge.

19,781. If you had, you would probably have found difficulty in getting it?—I suppose I should.

19,782. Do you not think that there would be as great difficulty in getting white lead, if it were prohibited, as there is in getting poison?—I suppose that there would.

19,783. Really, you had not considered your reply to Mr. Sutherland when you said that you could not see how a regulation could be made to prohibit white lead?—I did not say that, I think.

(*Mr. Sutherland.*) That was not my question.

19,784. (*Mr. Rice.*) That was the purport of the question?—I do not remember it. I do not see what the difficulties would be in prohibiting white lead.

(*Mr. Rice.*) The point was that it would be difficult to make restrictions for the prohibition of white lead.

(*Mr. Sutherland.*) Unless you cut it off at its source.

19,785. (*Sir Godfrey Baring.*) The difficulty was with regard to zinc paint containing lead?—If lead were prohibited, zinc paints from abroad, for instance, which had lead in them would not be allowed, I take it.

19,786. (*Mr. Rice.*) You said that first-class work only was rubbed down, and that rough work was not

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rubbed down. Can you give the proportion of work that is not rubbed down?—I meant that some work would be scarcely rubbed down at all and hardly ever see glass-paper.

19,787. But what proportion?—I could not give you the proportion.

19,788. Have you no idea?—So much depends on the class of work. Some work would scarcely ever be rubbed down at all.

19,789. I am speaking of the proportion to the whole of the painting work. Have you any idea as to whether half the work is rubbed down and half not rubbed down?—In poor neighbourhoods, and so forth, there is very little rubbing down done at all; that is with the poorer class of work. Good class work is almost all rubbed down; but so much is not necessary, because a good painter spreads the colour in such a way that very little rubbing down is needed. An indifferent painter puts it on so roughly that more rubbing down is required.

19,790. You admit the difficulty of using the fan in many cases?—Yes.

19,791. Where only gas is provided, an electric fan could not be used?—I admit that.

19,792. In many houses where there is electric light, there is not a plug on the skirting or somewhere else?—There are very few but what have a plug.

19,793. Bedrooms?—Some of the bedrooms would not have; but there are very few good class houses that do not have plugs somewhere. They would not be in the servants' bedrooms or in the basement, but in the reception rooms. It is possible to have a long length of wire to attach to the fan.

19,794. Which would mean additional expense?—Yes.

19,795. That would have to be added to the more frequent work that was required?—Yes.

19,796. Now periodical medical examination would be a very costly item?—Undoubtedly.

19,797. Do you see any difficulty in getting the men together to be examined?—Who is going to pay their wages while they are going to be examined? Unless the doctor is going to walk round to every job it would be very difficult.

19,798. Even if the doctor went to every job, the cost of examination would be something?—The men would have to be collected together, and wait to see the doctor, and then go back to their work, and so on.

19,799. You are quite prepared to say that anyhow it would be a very costly item?—Yes.

19,800. Now in speaking about the interest of your clients, you suggest that there should be regulation?—Yes.

19,801. Why?—Because I say that the work done with lead is much more durable than the work done with the so-called ready-made paints or zinc paints.

19,802. That is only a question of expense?—Yes.

19,803. You admitted that these regulations would materially add to the cost of painting, and you can form no opinion as to which is the dearer, whether more frequent painting or painting with regulations?—It is rather difficult to give an opinion off-hand; so much depends on the kind of regulations which would be enforced. If they were very drastic they would be more costly.

19,804. More costly than more frequent painting?—Yes.

19,805. Have you conducted any comparative tests of white lead and zinc white?—Not recently. I used to use zinc white years ago; but that does not cover so well, and does not last so well. I discontinued it on account of the cost, some years ago.

19,806. You have not conducted tests recently?—No reliable tests.

19,807. So you cannot say absolutely that zinc white is not so durable as white lead?—No. I know of tests.

19,808. Not personal tests?—I have not used zinc white recently.

19,809. Then it is only from hearsay that you say that white lead is more durable than zinc white?—Not exactly hearsay. I have had more or less proof submitted to me in reference to it.

19,810. But you have made no tests yourself?—I am referring to the National Master House Painters' Association tests. Tests were made with zinc white paints and other kinds of paints against white lead. The result was distinctly in favour of white lead.

19,811. Not necessarily in your own case, but in many cases, a rush of work demands the employment of anyone you can get, pretty well?—Yes.

19,812. You realise that, having a large number of men at one time and a smaller number at another, the regulations if imposed would be extremely difficult and costly at those times?—Yes.

19,813. It would really prevent the rapidity with which the work would otherwise be done?—It would, I think, to a very great extent.

19,814. The men would have to be called up for medical examination, and that would prevent the work being finished so rapidly and quickly as if they were allowed to go on without interference?—It would make a little difference, but not a great deal.

19,815. But it would make some difference?—It would make a difference.

19,816. (*Mr. Parsonage.*) Who takes on your men and discharges them?—The painters, do you mean?

19,817. Yes?—To a very great extent my head foreman. I take on some and the managers take on some. It all depends.

19,818. And the foreman and managers also discharge them?—They also discharge them.

19,819. You may have a good many men in your employ that you would have no knowledge of whatever?—I would hardly say that. We keep a record of all the men working for us.

19,820. Time sheets?—Not only time sheets. We have recently established record cards. We refer back and give preference to men who have worked for us before over men who have not. We always try to do that.

19,821. For how many years have you had the record cards established?—The last two years.

19,822. In the spring time you get a great rush of men taken on for a job and discharged?—Yes.

19,823. You have no means of knowing anything about the personal health of these men at all?—Probably not, if they come on for a short time.

19,824. That would apply to the majority of the men that you employ, would it not?—No, I do not think that it would apply to the majority.

19,825. About what percentage of the men would you employ constantly?—The average number of men that I employ during the busy time, something like six months of the year, is 75, and in the slacker six months about 38.

19,826. The average?—Yes.

19,827. You gave us the average number of men that you employ as 110 in answer to one of the early questions. Now you say 38 to 75?—Did I say 110 altogether, or painters?

19,828. You said that the average number of painters you employed was 110?—Not painters, I think.

19,829. (*Chairman.*) The question I put was the average yearly number of painters?—If I said an average of 110, it was a mistake. I am sorry if I did. It should be 51.

19,830. (*Mr. Parsonage.*) I have a little knowledge of your firm, and it struck me at the time that it could not be right?—I misunderstood the question, or I answered too quickly.

19,831. There are times in the winter when you have not half a dozen men on?—That has never happened.

19,832. Not so low as that?—Not so low as that.

19,833. Seventy-five per cent. of the men you employ in the spring time are taken on by your foreman, and discharged by him, and you would have no knowledge of them whatever?—I would know more about them than that.

19,834. You would not know them if you saw them again?—I might not know 75 per cent. of them, but I should know many. Speaking off-hand, the men I know very little about would be about 25 per cent. In our neighbourhood, as you know, the men come regularly in the spring and the autumn. They come

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on in the busy time and go off in the slack time. We have them repeatedly; therefore, we get to know them.

19,835. You do not know whether they have suffered from lead poisoning in the intervals, or what has happened?—No.

19,836. So really you could not say anything about their average health?—Not in the interval.

19,837. Now with regard to the education of the worker, we will assume that the employer is educated to the dangers of lead, and requires no education to instruct him to allow time for washing hands or providing washing accommodation and all that?—No.

19,838. And yet he does not do it?—I doubt that.

19,839. You would not allow your men to leave off five minutes before breakfast or dinner to wash their hands?—But they do, whether I allow them or not.

19,840. I know they do, but they are not supposed to?—It is not a printed rule, but a general rule nevertheless. I should not be surprised if I saw a man doing it.

19,841. (*Sir Godfrey Baring.*) Would your foreman object if he found a man washing in his work time?—I do not think that he would; if it was a few minutes before his dinner hour.

19,842. (*Chairman.*) Some employers might object?—Some employers might. Some must not leave off until the whistle blows. They come off the job and wash somewhere else.

19,843. (*Mr. Parsonage.*) In your opinion the man who gets lead poisoning most frequently is the man who has not had experience or knowledge of the trade, but simply comes into it, as in London, in the spring, without serving any apprenticeship or anything of the kind—just a rough painter?—Yes, to a very great extent. Some men might be very good mechanics, but they are delicate and would be more susceptible.

19,844. Would you make it a condition of employment that men should belong to a trade union and show some qualification?—If I saw any advantage in it, I would.

19,845. You have admitted that men who learn the trade and follow it regularly are better men?—Yes.

19,846. But would they be less liable to lead poisoning?—I think so, if they knew the trade thoroughly.

19,847. Mr. Sutherland mentioned Lancashire, London, and Birmingham as the three places where lead poisoning is most frequent. In no place in England is apprenticeship carried out more than in Lancashire. In many towns in Lancashire a man must prove that he has served five years in the trade before reaching the age of 21, and must be a member of a trade union, and yet we have more cases in Lancashire even than in London?—I am surprised to hear that.

19,848. So that the education of the worker has not much to do with it. Mr. Sutherland, I think, will agree that there is really as much lead poisoning in Lancashire as anywhere?—Although they are more qualified men in Lancashire?

19,849. Yes?—Than in any other part of the country?

19,850. Yes, Lancashire and Yorkshire. They will not admit a man into the trade unless he proves that he has served an apprenticeship; and in many of the towns there are technical schools where they go to receive instruction; but yet they suffer from lead poisoning more than they do in the country places?—More than in London, where you do not know of an apprentice scarcely?

19,851. As much as in London, at any rate, and far more than in a country town where they get fresh air. So that the education of the worker does not prevent lead poisoning?—I would qualify it by saying, education that would teach them to avoid running needless risks in the way of stopping paint all over them, as they do, I am sorry to say, sometimes. They are educated in the wrong way. They may learn how to do the work, but not how to do it while taking care of their own health.

19,852. You want them to get over the work as quickly as possible?—Naturally; every man does; but not to the detriment of their health, I hope.

19,853. You spoke of dry rubbing down and a good painter putting the paint on so that it required very little rubbing down. How about when he has to put two coats on in one?—That sort of thing does not come within my province.

19,854. There is a good deal of it?—You mean putting on a very round coat, and trying to make it cover as good as two coats?

19,855. Yes?—That is not a proper way of doing it.

19,856. Taking lead poisoning and what is termed "paint poisoning," paint poisoning would not cause paralysis or dropped hands?—I could not tell you about that.

19,857. So you would agree that lead is really the cause of the poisoning?—I do not know. I presume it is, but I do not know.

19,858. The wash-leathers that the men use for washing their hands are the same leathers as are used for washing the paint?—Yes.

19,859. A man has been rubbing a door down with pumice-stone; he has been washing the door, and a certain amount of lead off the door is moistened and on the leather. You see it, white, on the leather sometimes, and he uses the same leather for washing his hands?—That is very far-fetched, I think. I do not think that you get much lead on the leather. After the door has been washed down he uses the leather for the purpose of drying the work. Is there any dust on it? In old work there is not much dust to come off, but in new work you may get a certain amount of lead. No dust arises in rubbing down with pumice-stone and water. It is all moist and wet. The dust arises when you use the dry rubbing down process.

19,860. There is no dust, but you soften the surface of the paint by rubbing down with pumice-stone, and you finish off with a leather, and the man uses the same leather for washing his hands?—If a man got dust on the leather, I would say that he had not properly done the work. The dust would come off in the rinsing down, before he used the leather.

19,861. Not dust, but particles of paint?—That would come off before he used the leather, I should say.

19,862. (*Mr. Gardner.*) I take it that you are a practical painter, and have served your time to the trade?—I am a practical painter, but in the last few years I have not done any painting. I could paint with the majority.

19,863. As a young man you went through the mill?—Yes, I was born in it.

19,864. You are one of the highest class of painters in London?—I think so.

19,865. And yet in your shop, where you have the best conditions prevailing, you have had three or four claims for compensation, since lead poisoning has been put under the Workmen's Compensation Act?—Yes, in the last three or four years.

19,866. You said 10 years in your examination-in-chief; but it is only five years since the Act came into force?—Yes.

19,867. So that, even with the best conditions, you still have had claims?—We still have claims, but very few and far between.

19,868. You do not keep apprentices?—No; there is no opportunity. When I say "no opportunity," it is not customary in London. I am sorry, but it has dropped out very considerably. We are trying to introduce it now at the present moment. We are doing all we can by our association to get apprentices.

19,869. I suppose it is only since this inquiry into the dangers of lead poisoning has taken place, that your association has taken up the question of educating the workmen as to the dangers?—They have not taken up the question of educating boys or improvers from that point of view, as a matter of fact. It has not been taken up on account of lead poisoning, but principally on account of their trying to create better workmen generally.

19,870. If you do not get them as apprentices, do you wish to train them after they are journeymen?—Yes, to improve their workmanship.



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Mr. JOHN ANDERSON.

[Continued.]

19,871. You spoke about Scotland. You seem to have an admiration for the painter in Scotland. You said that he had better conditions. What better conditions have the painters in Scotland than the painters in London in the better class shops?—Better conditions inasmuch as the hour for breakfast is of great importance.

19,872. Could not that be introduced in London?—Yes.

19,873. How many hours per day do the men work in London?—Nine hours is the regulation day. Painters work rather long—10 or 11.

19,874. Supposing that they have two breaks for meals in Scotland of an hour each, could not that be arranged here, if it would help to benefit their health?—Yes, no doubt.

19,875. You also expressed the opinion that the men who come into the trade late in life are most subject to lead poisoning. Would you have a restriction that nobody should be allowed in the trade without an apprenticeship?—That would be rather difficult to start off-hand, would it not?

19,876. But you said the union ought to be more strict?—I wish they were.

19,877. If they were, would not we hear a good deal about trade-union tyranny?—Who hears about trade-union tyranny?

19,878. We do?—I have not complained about that.

19,879. Now, how many oil paints are there in the trade that have a vegetable basis and no lead at all?—Most of the dark colours have no lead in them.

19,880. Have they not?—Black, green, and blue, and some of the dark colours.

19,881. What are green and blue composed of?—They are mostly vegetable colours.

19,882. Are they?—Yes, green and blue would be. It all depends on what kind of blue. A light blue may have lead in it, of course.

19,883. I am not speaking about carbonate of lead or white lead, but there are salts of lead in it?—You might have oxide of lead.

19,884. Brunswick green, for instance. The only colour I know of, if you can call it a colour, which has a vegetable basis is black—as far as my knowledge

goes of what is used in the trade?—And lead in greens?

19,885. Yes, lead in greens and lead in yellows?—I have something to learn yet.

19,886. (Dr. Collins.) How about Brunswick green and all the chromates?—I should have thought that there was very little lead, if any at all, but I am not a chemist.

19,887. (Chairman.) Have you recently found that the insurance companies have increased the premium for painters?—Yes, I have.

19,888. Can you tell us to what extent?—Here is a letter that answers the question (*handing a letter to the Committee*).

19,889. This letter says: "For general building work the rate is 30s. per cent., and, for painters, 35s. per cent."? Perhaps 2s. 6d. might be put down as representing the risk of lead poisoning?—Yes.

19,890. That is from the Sun Insurance Company?

—Yes. I have been told that it is in consequence of lead poisoning that the rates have been increased so considerably. Two years ago the rate was 20s.; then it was increased to 30s. This year it was increased to 35s. They say there that it is not in consequence of lead poisoning so much as it is in consequence of the number of small accidents that occur to painters that do not occur to men in other trades, owing to the way in which painters go about. They do not get the same security and facility with regard to scaffolding as other trades do.

19,891. It says here, with regard to painters, that the chief elements of risk are, the use of ladders, cradles, and the nature of the structures used in connection with the work, as compared with those employed in ordinary building?—That is what I mean.

19,892. And also, to some slight extent, the risk of lead poisoning?—Yes; it says "to some slight extent."

19,893. (Mr. Gardner.) It may be information to you to know that in our society in Scotland we pay 13 weeks' sick benefit for accident, and the cost has been something like 6½d. per member per year. So that that is not a heavy liability?—No.

The witness withdrew.

Mr. C. E. WILKINSON examined.

19,894. (Chairman.) Do you attend here to-day as a representative of the London Association of Master Decorators?—Yes, I believe that that is my position.

19,895. We have just had the president of your association here. Do you come to supplement his evidence?—I have not the least idea what it is, I am sure. I take it that I come with my own individual evidence, as far as that is concerned. I have no knowledge of his experience or his ability to answer questions.

19,896. You are possibly aware that we have already heard a very large number of master house-painters and decorators?—No, I am not aware of it.

19,897. Have you satisfied yourself that the danger of lead poisoning amongst house-painters constitutes a very real danger; and one that should be removed?—No, I am not satisfied at all in that direction.

19,898. What is your business and where is it carried on?—My business is that of a decorator chiefly. I am what is known as an ordinary London jobbing builder, which comprises more than one trade. I was apprenticed as a decorator, served as a journeyman, became foreman, then manager, and finally an employer. I have had 31 years' experience, 16 years as an employer.

19,899. Have you known any cases of lead poisoning or painter's colic?—No.

19,900. What is the average yearly number of painters employed by your firm?—About 20.

19,901. It is very small?—Twenty per week. It varies from 15 to 50, probably. It may be a little more. That is painters. Then I employ other trades.

19,902. Have you known no cases of lead poisoning?—Never in my experience, and I have had many hundreds of men—never a single instance of it.

19,903. Have your men had occasional days of sickness possibly due to lead?—No; I have at least ten men in my employ who have been 25 or 26 years employed who have never had a day's illness. I can produce them.

19,904. Do you have periodical medical examination of your men?—No, I never consider it necessary.

19,905. How do you know that they have not had occasional days of sickness?—By the fact that they are always at work. I am speaking of ten or twelve of my men who have never lost a day's work.

19,906. What about the rest of them?—Those I cannot speak about. They are discharged in accordance with the pressure of business and the variations of business.

19,907. They might possibly have been ill from lead poisoning?—They might, but I have no knowledge of it. I think I should have heard of it.

19,908. You know, I presume, that lead poisoning frequently undermines the health without immediate violent symptoms arising?—I believe that lead poisoning is a serious matter.

19,909. Do you know that the incidence of lead poisoning is published month by month by the Board of Trade?—No; I know that there are some reports, but I have not any personal knowledge of them.

19,910. You said just now that you did not think that the incidence of lead poisoning was very serious?—Personally I do not think that it is serious.

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Mr. C. E. WILKINSON.

[Continued.]

19,911. Have you read the reports of the Board of Trade on lead poisoning?—No.

19,912. Then you do not know how serious it is? No, but I may judge from my own personal experience, which I consider to be fairly large, and I am not going further than that. I must say that I have not a great deal of faith in statistics.

19,913. Would you have faith in the death certificates of doctors?—Knowing instances where certain cases have been said to be lead poisoning, and also knowing that those particular cases have been proved not to be lead poisoning, I am afraid that I am somewhat sceptical.

19,914. Do you know that, during the last ten years, 284 deaths of painters have been definitely certified as due to lead poisoning? No, I am not aware of it. The point is, what is the percentage.

19,915. And in 1911 there were 36 deaths?—No, I was not aware of that.

19,916. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office, voluntarily without any legal compulsion whatever, in the same 10 years?—No.

19,917. I am sure you will agree with me that all this sickness and death is very deplorable?—Certainly. I would like to know the proportion.

19,918. It is not a question of proportion?—You mean that the fact alone is deplorable.

19,919. Yes?—Is that amongst house-painters?

19,920. That is amongst house-painters?—I should say that it was deplorable, certainly.

19,921. I suppose you would agree that the Home Office must do something to remove the danger?—Yes; on that statement it is sufficiently obvious, I think, that something should be done.

19,922. There are two alternatives which the Home Office can adopt: one is to prohibit the use of lead or restrict it to a very small percentage; and the other is to issue regulations similar to those which obtain in all other industries where lead is used. I suppose you agree to that?—Well, with my experience I think that regulations, which of course the workmen have to share the responsibility of as well as the employer, are all that is necessary. It is a question of the cleanliness of the individual workman.

19,923. I want you to answer my question. I said there are two alternatives. I gave them, and I suppose you agree that one or the other must be adopted to remove the danger?—I should be inclined to agree to the latter proposition; but I am not aware at the moment what those regulations are. I am speaking advisedly.

19,924. I will tell you. First of all there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed?—That is not practicable, and it is not necessary. The workmen themselves do it.

19,925. It is no good your stating that it is not necessary. I am only putting to you regulations such as are enforced in other trades?—In the painting trade it is not practicable.

19,926. I want you to get quite clearly in your mind that I am telling you now what regulations obtain in other industries where lead is permitted to be used, and as the amount of lead poisoning is greater in the house-painting trade than in these other industries, the regulations will not be less stringent, and they may be made more so. I am going through them one by one, and shall be very much obliged if you will give me your opinion about each one. We, secondly, come to the provision of a meal room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used. What do you say to that?—That would be done where it is possible, as it is done now; but there are cases where it is not possible. The responsibility does not rest on the employer, but a good deal on the employer's customer.

19,927. I want to know whether such a regulation could be generally enforced?—I do not see why it should not be enforced, but there may be difficulties. I am sure there would be difficulties.

19,928. I suppose you agree that at the present moment a large number of men are obliged to take their meals in the room where they are working?—Yes. Frequently there are objections to their doing otherwise.

19,929. That is, of course, a highly dangerous thing to do?—Well, I rather differ.

19,930. I will put it in this way: in the opinion of the Home Office, who have disallowed that practice in other industries where lead is used, it is highly dangerous?—Yes, but the conditions in which lead is used in other industries may be entirely different from those existing in the painting trade.

19,931. It is a question of dust generated in the rooms, which the men breathe?—There again I might disagree with you as to the amount of dust generated.

19,932. The third provision is a proper place to keep the overalls where they will not contaminate food or outdoor clothing, and where they will not collect unnecessary dust when not being worn. Do you think that that is practicable?—No, not in the painting trade; it may be in others; but you see the painting trade is not carried on in a factory. That must not be lost sight of.

19,933. Then there is the provision of cloak-room facilities, so that clothing put off during working hours shall not under any circumstances remain in a room where lead is used?—I give the same reply to that as in the other matters, the impracticability of carrying it out.

19,934. I suppose you agree that it is most important to provide proper washing accommodation for the men?—It is always done. They always find means for washing themselves.

19,935. Would you say quite positively that it would be always possible to provide hot water?—No, not hot water, but every self-respecting painter carries a towel and soap in his bag, and he is always using water in his business, and good soap with cold water I have always found in my own practice sufficient.

19,936. Would you agree, as an employer, to take care to ensure for each of your workmen proper washing appliances, clean towels, nail brushes, and soap?—Well, if it was a regulation I daresay it could be done; but the painter is not a dirty man by any means. He is obviously a clean man if he is really a painter. I think that there are difficulties in the way of making regulations, and I think it unnecessary. A painter who is a painter carries these. I was taught as a boy to carry my towel and soap with my tools.

19,937. Do you mean to say that any considerable number of painters carry soap, towels, and nail brushes in their bags?—The majority of my men do, I guarantee. I do not say all. It is very much easier to make the regulation for the men to do it than for the employer.

19,938. The employer is responsible?—The employer could go to the bag and see that it is done.

19,939. (*Mr. Parsonage.*) In this bag they carry some of their tools and the overalls that they use in their work, with the towel?—Yes.

19,940. And their food?—No. Their kit bag is on the job. They do not carry the kit bag to and from home.

19,941. (*Chairman.*) But if the case is as put to you, the overall would contaminate the towel and the clothing?—A man only puts the overall into his bag when he is travelling from job to job. A job lasts for weeks. He hangs it up where he has been working.

19,942. How does he get the overall cleaned?—He takes it home weekly, or at the most fortnightly.

19,943. Provision would have to be made for the avoidance of dust: some means would have to be devised for getting rid of any dust which the men might breathe. Do you think it is possible in every case, by means of an exhaust draught or the like, to remove the dust from the men while they are at work?—No; it is impossible. I think that the question of dust, if I may say so, is quite exaggerated.

19,944. You are entitled to give your opinion, but it is not the opinion of a very large number of witnesses who have come from your trade?—Good painters' work requires very little rubbing down, which generates dust.

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[Continued.]

19,945. You think it impossible to provide any means of removing the dust?—Not by exhaust.

19,946. Can you suggest any other way?—Only by eliminating the necessity for rubbing down, which causes the dust.

19,947. Could you dispense with rubbing down?—To a large extent, according to the quality of the painting.

19,948. Could you dispense altogether with dry rubbing down?—You can moisten the glass-paper with turpentine. That is frequently done. Lead dust does not float about.

19,949. Certainly it floats about?—It will come right straight on the floor.

19,950. If the men are doing a ceiling, for instance?—They do not rub down a ceiling.

19,951. You have paint on ceilings?—But there is no dust from a ceiling. That is my practical experience, and I am a painter.

19,952. Do you say that there is no dirt on the men's hands, and no dust?—I have seen it myself?—Dust from the painting of a ceiling?

19,953. I have seen a man stippling?—But that is not dust; that is splashes.

19,954. But he gets the stuff on his face, and that dries and generates dust? [No answer reported.]

19,955. (Dr. Collis.) Do you say that, because dust is composed of lead, it necessarily falls to the floor?—Yes.

19,956. Explain how in file-cutting, when they are working on a solid lead bed of nothing but lead, you can find lead in the dust on the top of the beams 6 feet above the man's head. Such an extraordinary statement as you make forces me to ask you to think again. Just because a particle happens to contain lead do you think it will not float in the air?—If it is small, it will float about the room. Just because lead is heavy, that does not show that a particle of lead would not float about in the air?—But it would fall very rapidly.

19,957. I gave a simple case of the lead beds and the lead on the beams?—Is there no other reason for it. Are there no draughts? Are there vacuums, for instance?

19,958. No more draught than there is in this room?—Is an experience of 31 years of practically no value?

19,959. I could take you into some of the potteries where they have had no cases of lead poisoning for many, many years; and to others, much better works, much better equipped, and everything up to date, where they have a crop of cases every year?—It is very extraordinary.

19,960. (Chairman.) Now, in addition to what I have told you, periodical medical examination would have to take place, say, once a month, and that would be insisted upon at the expense of the employer. Would you agree to that?—It seems another tax on the trade. I think it might be a good thing.

19,961. You think that it might be a good thing?—Yes, I think it might be a good thing.

19,962. Now in the pottery industry, in addition to medical examination, the employers have agreed to give compensation to any worker who is withdrawn from work by the doctor's orders on account of doubtful health. Let me give you an illustration of what I mean:—Supposing the doctor examines a workman and says, "Look here, you have not lead poisoning, but you are very near it; I must suspend you for a month"; the employers have agreed to give that man compensation for that month. Would you agree to give similar compensation under similar circumstances?—Well, I suppose that it would be a question of insurance. I do not see that one could take that risk in ordinary business.

19,963. But you would not mind the cost?—Not if it became a regulation; I suppose not.

19,964. Taking all these points into consideration, would you say that you would prefer that the industry should be regulated by special rules such as I have foreshadowed, or, as an alternative, that the use of lead should be prohibited or very closely restricted?—I think that I should prefer regulation to prohibition.

19,965. You have told me that you cannot enforce these regulations?—Many of these regulations, I think, are impracticable. I mean a regulation.

19,966. I will put it to you again. Would you prefer regulations such as I have foreshadowed—the whole of them—or prohibition?—I do not think that prohibition is possible. I think that the regulation should be modified. I must give you a qualified answer.

19,967. Will you please answer the question?—I cannot give a yes or no answer to a thing like that.

19,968. Why cannot you?—Because I do not agree with some of the regulations.

19,969. I will put it in this way:—do you think the regulations could be enforced?—Not those that you have foreshadowed. They could not all be enforced. I think that some of them are impracticable.

19,970. If the Home Office felt that, unless the whole of the regulations were enforced, the health of the workpeople would still be in danger, you would not be surprised if they, under the circumstances, said, "We must have prohibition"?—I should not be surprised.

19,971. You would not?—I should not; because I do not think that the regulations are workable as you lay them down.

19,972. (Dr. Collis.) What regulations would you suggest, if you do not agree with the experience of the Home Office over something like 20 years now, in the way of protecting workers in lead from the danger of lead poisoning?—I could suggest no table of regulations. I did not anticipate the question. They should be modified to suit the requirements of the working of the particular trade.

19,973. In what way?—Some of the regulations appeal to me as being quite impracticable in working, and could not be followed. How would you enforce them?—Your system of inspectorship would have to be so detailed that I do not think they could be carried out.

19,974. You appreciate the idea that these are not regulations produced by sitting down at a table and agreeing as to what you think is likely to be of value, but they are the accumulation of our efforts of over 20 years, since the first regulations for the manufacture of white lead were brought into existence?—They may be quite reasonably carried out in some particular industries.

19,975. That is not my point, if you will kindly follow. These regulations are the accumulation of experience gathered over 20 years of the incidence of lead in producing lead poisoning. Whether they are applicable to this trade is another question, but they are what the Home Office has found necessary to protect the worker from the danger of his occupation. Your contention is that, when you leave the trades within the factory walls for which regulations have been introduced, and come to the house-painter, they become impracticable?—Yes, to some extent.

19,976. You have no other suggestion to offer by which the worker may be protected equally well. You see the dilemma?—I quite see and appreciate the difficulty.

19,977. Here are our long experience and the regulations which the Chairman suggested to you. We know the protection that they will give. You say that they are impracticable?—Yes.

19,978. There is the dilemma?—Quite.

19,979. Have you any way out of the dilemma?—Understand that I am speaking from my own experience. I cannot speak from the experience of anyone else.

19,980. Exactly?—My experience is that the properly trained painter is a very decent man, and he is not influenced in his health by the use of white lead. Consequently, a lot of these regulations are not necessary.

19,981. We have definite evidence from societies contrary to that, and in other ways?—But have you gone into the status of the man who is ill; is he a trained painter, and does he rank properly as a painter.

19,982. You are asking questions, instead of me, at the present moment. The incidence of lead poisoning in the definite unions and societies of painters is high?

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[Continued.]

We have it in the Registrar-General's statistics distinctly?—I should not accept that.

19,983. You ask me, and I give the figures as far as I know them?—I should not accept that altogether as an opinion to be followed, for the reason that I am not sure that all the best painters are in the trade unions.

19,984. Have you any other figures to give us; I shall be only too pleased?—I have only experience of my own employees.

19,985. An experience of 25 employers, even over 30 years, cannot be set against the experience of societies and the Registrar-General's figures dealing with thousands of men?—One has had hundreds of men through one's hands in the time.

19,986. But this is thousands of men in the same time?—Yes, I allow that.

19,987. Here is our dilemma. In other trades means are taken for protecting the workpeople. You say that those are impracticable in your trade. What is your solution?—My solution is proper training and education of the painter in cleanliness and things of that nature.

19,988. What would you educate them in?—Chiefly in cleanliness and in the material they are using, and taking precautions—which a decent painter would.

19,989. Have you yourself studied the question of lead poisoning and the method by which it is contracted?—If it is contracted at all it is contracted from the dust.

19,990. Would you educate the painter not to breathe?—Oh no, no, no.

19,991. How then would you educate him not to get the dust into his mouth?—The question of rubbing down is of vital importance; and there is not so much as is generally thought.

19,992. Whenever I see a man painting, I find more than the witnesses have generally told us in the Committee room?—Then the man is not a proper painter.

19,993. I give a good deal of my time to the study of dust. How much is 3 milligrammes? Can you see 3 milligrammes in the air? Would you know that it was there? It is a question really of what you consider much. Dr. Legge, after many years' work, told us that 3 to 4 milligrammes of lead is the utmost amount that may pass into the human system with safety, but it is practically unappreciable *quæ* dust. That is where you are making a mistake—in neglecting what is a most important point; and, consequently, I must bring you back again to our dilemma, and how you are going to help us out of it. If these regulations are impracticable for your trade, to protect these men from the breathing of 3 to 4 milligrammes of lead per diem, what are we to do? Education is not going to do it. It would help, of course?—A properly painted door or wall, or whatever it may be that is painted, if painted by a thoroughly trained painter, requires but little rubbing down. As I said just now, I think that the question of rubbing down is very much exaggerated, and there is not the amount of dust generated that you suppose.

19,994. Do you think that there is less than 3 to 4 milligrammes?—I am not prepared to say that.

19,995. You have come to give evidence. We presume that you have come to give evidence on important points to help us?—Yes.

19,996. (Mr. Parsonage.) In one part of your evidence you say that the painter who is a painter is a very decent man?—Yes.

19,997. Clean?—Yes.

19,998. Then, again, you speak of educating them in cleanliness in order to avoid lead poisoning?—Yes, still further educating them. There are a great number of so-called painters whom I should not consider painters from the point of view of ability in the trade.

The witness withdrew.

Mr. J. J. HONEYMICHON examined.

20,017. (Chairman.) Do you attend here to-day as a representative of the London Association of Master Decorators?—Yes.

19,999. You consider that they require educating?—Yes.

20,000. In your own business do you wish to know, when you take a man on, if he has served apprenticeship to the trade?—Not now, because it is so seldom that they have done so. You judge from their work.

20,001. You take on any man who comes along?—In most cases we judge by appearance, and so on; and by their work, when they commence work.

20,002. What is the standard rate of wages that they are paid?—8½d. or 9d.

20,003. Do you employ men at 8½d.?—Yes, and 9d.

20,004. According to the abilities of the workman?—Yes, chiefly.

20,005. I know places where they pay 9d., and one price only. You will agree that a good workman can get a higher rate of wages?—Yes.

20,006. And he can get a longer run of work?—Yes.

20,007. Yet, even in the case of these good workmen, who get the higher rate of pay, there is lead poisoning?—Is that so?

20,008. Yes?—It is not my experience. I have been particularly fortunate.

20,009. There are three places in the country where lead poisoning is more frequent than anywhere else. I agree that in London far too many men are called painters who are not painters. In Lancashire the apprenticeship system is in vogue to-day, and in many towns in Lancashire and Yorkshire a man cannot get a job in a decent shop unless he has served his apprenticeship to the trade, and he must be a member of the trade union; but yet in Lancashire we have more cases of lead poisoning than in any other part of the country except London. These men are technically trained men; trained in technical schools, and they are qualified men?—That surprises me.

20,010. (Mr. Gardner.) You agree that overalls are necessary for the men, although you do not agree that the employer should provide them. Can you tell us why it is that we see so many painters in the London streets without overalls painting outside?—Those are men whom you should not class as painters. That is the unfortunate position. They are only more or less painters' labourers. It is an extraordinary term for a painter, but they are not what I should call painters, and I probably should not employ them.

20,011. In going along the street, if you saw a man on a ladder or working at a shop front without overalls, you would say he is not a painter?—It is customary in most shops for the men to wear overalls.

20,012. (Mr. Parsonage.) What do you term overalls—the long blouse and the apron?—Yes. That is what I take it is being referred to.

20,013. (Mr. Gardner.) Yes. You also told us that the painter is really a clean man. Would it astonish you to be told that we have been informed repeatedly here that he is very dirty, and that the lead poisoning is due to his dirty habits?—I cannot call them painters. There are a number of men in the painting trade who are not painters. We must draw the line in that respect. I do not consider them as painters.

20,014. Does that mean that you think that if a man suffers from lead poisoning he is not a painter but an importation into the trade?—I should expect to find that the chief sufferers from lead poisoning are this class of man rather than the properly qualified painter.

20,015. Would you agree to a restriction that no man should be allowed to enter the trade after he became an adult without previous training in his youth?—I think it is a very good suggestion.

20,016. As a master painter, you would agree to that?—I think that it is an excellent suggestion, particularly as I have the education of the painter at heart.

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20,019. Have you satisfied yourself that the danger of lead poisoning amongst house-painters constitutes a very real danger; and one that should be removed?—Well, not altogether a real danger.

20,020. Then I must tell you what the dangers are. But, first, will you tell us what is the nature of your business, and where is it carried on?—In various parts of the country, as regards general building and painting.

20,021. What is the average yearly number of painters employed by your firm?—I should say 40.

20,022. How long have you been in the painting trade?—Twenty-three years.

20,023. Have you known any cases of lead poisoning or painter's colic?—Not in connection with our own firm, but we have known cases.

20,024. Have your men had occasional days of sickness possibly due to lead?—No.

20,025. Do you have a periodical medical examination of your men?—No.

20,026. Then how do you know that they have not had occasional days of sickness from lead?—We have had no complaints from them.

20,027. They might have had them without your knowledge?—Certainly.

20,028. Do you know that lead poisoning frequently undermines the health without immediate violent symptoms arising?—No, I do not know that.

20,029. The incidence of lead poisoning is published month by month by the Board of Trade; do you see the Labour Gazette issued by them?—No.

20,030. Has your association, to your knowledge, taken any action in regard to the incidence of lead poisoning with a view to its diminution?—The association is so young that we have not done very much as regards it. We have simply had this matter brought up recently, but nothing has been done yet.

20,031. When did you have the matter drawn up?—It was first brought up about six years ago.

20,032. (Mr. Parsonsage.) Where is your business?—Queensdale Road, Holland Park.

20,033. (Chairman.) How many firms are there in your association?—At the present time about 90.

20,034. Do you know how many painters they employ?—No. Application was made with regard to that some time ago; but I am not the secretary and I do not know.

20,035. Do you know that in the Labour Gazette issued by the Board of Trade there have been 284 deaths of painters noted, whose deaths have been definitely certified as due to lead poisoning?—In what period would that be.

20,036. In the ten years ending 1910?—That is not very large.

20,037. But I ask you the question; do you know that?—No.

20,038. And that there were 36 deaths from lead poisoning in 1911. You did not know that?—No.

20,039. Do you know that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily, without any legal compulsion whatever, in the same ten years?—No.

20,040. And that probably there is a much larger number of cases than those reported?—Undoubtedly.

20,041. I am sure you will agree with me that all this sickness and death is very deplorable?—It is not a very large percentage of the number engaged in the painting trade.

20,042. But the actual fact of this sickness and death, you must agree, is lamentable?—It is, of course.

20,043. Now the steps which can be taken to remedy this seem to be, either to do without lead compounds altogether or limit them, say, to 4 or 5 per cent. of soluble lead; or very strictly regulate the trade. You agree, I suppose, that those are the only alternatives?—Well, I suppose so, if there is no other remedy. Something would have to be done.

20,044. In the one case lead poisoning would disappear from your occupation altogether—under prohibition?—Yes.

20,045. In the other the remedy could only be partial, and would further depend on the stringency of the regulations and the thoroughness of their enforcement. Do you agree to that?—Yes.

20,046. Now I will tell you exactly what these regulations would be, based on the regulations which have been recently issued for a trade in which lead is used: First of all there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed. Would you agree to that?—That would be rather impossible.

20,047. Secondly, there is the provision of a meal room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is used?—That could not be applied in the ordinary painting trade.

20,048. I suppose you agree that at the present moment a large number of men are obliged to have their meals in the room where they are working?—No, I do not, not in any case.

20,049. What do you mean by not in any case?—They are not obliged to have their meals in the room where they are working; in fact, they do not now.

20,050. But where would they have their meals if they are working on a job where there is no other room at their disposal?—It is very seldom that there is any part of a house that they can get to to have their meals, and they usually go out to their meals.

20,051. But supposing that they do not go out?—Then there is always some place other than the place where they are working.

20,052. But is that always the case? A great many witnesses who have been here told us that there are occasions when there is no other room available?—Well, I have not found it so.

20,053. Then there is the provision of a proper place to keep the overalls where they will not contaminate food or outdoor clothing, and where they will not collect unnecessary dust when not being worn. Would you agree to making a provision of that sort? Is that a possible provision?—Yes.

20,054. Then there is provision for cloak-room facilities, so that clothing put off during working hours shall not under any circumstances remain in a room where lead is used?—That would only apply to a paint shop where there are usually only one or two men employed.

20,055. No. It would mean that a workman would not be allowed to hang his coat up in the room where he is painting?—But you see at this time of the year, for instance, when it is nearly all outside painting, perhaps there are only three or four men on each particular job.

20,056. I am speaking now of indoor painting?—You may be only doing one or two rooms in a certain house, and that is the part where the men are engaged. Such a regulation as you put to me is impossible.

20,057. I suppose you agree that washing accommodation is very necessary?—Yes.

20,058. Would it be always possible to have a supply of hot water?—No, not on each individual job.

20,059. Would it be possible for the employers to supply clean towels, nail brushes, and soap for the workmen?—That would not be a very great trouble.

20,060. Then it would be possible, would it?—Yes, that would be possible.

20,061. Now let me take you to another point. Provision would have to be made for the avoidance of dust. Some means would have to be devised for getting rid of any dust which the men might breathe. Do you think it possible in every case, by means of an exhaust draught or the like, to remove the dust from the men while they are at work?—No.

20,062. In addition, periodical medical examination of the workpeople, say once a month, would be insisted on at the expense of the employer?—Well, that, I daresay, would be possible. It would not want so many men, because work would be so expensive that there would not be so much of it done.

20,063. In the pottery industry, in addition to medical examination, the employers have agreed to give compensation to any worker who is withdrawn from work by the doctor's orders on account of doubtful health. Let me give you an illustration of what I mean. Supposing the doctor examines a workman, and says, "Look here, you have not lead poisoning, but you are very near it; I must suspend

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"you for a month"; would you agree in the painting industry to give compensation for that month?—No I do not see how that could be done.

20,064. I must ask you to be kind enough to remember what I have suggested to you would be the regulations or something approaching them. You have told us that in a great many cases it would be absolutely impracticable to carry out these regulations. Then I would ask you, would you agree to regulations such as I have foreshadowed, being perfectly sure that they will be carried out in every instance, or if not, would you rather have prohibition?—Well, it would not be possible to carry them all out.

20,065. Then if the Home Office felt that the danger could not be removed without such regulations, there would be no alternative for them but to recommend prohibition?—That would be all right, provided that we had a suitable substitute.

20,066. No; it is not a question of a suitable substitute. We are here to make suggestions for the removal of the danger to the workpeople which it is admitted is lamentable?—Yes.

20,067. I have told you that there are two alternatives—you may suggest a third—I do not know; one is prohibition, and the other is regulations. You have told us that regulations such as I have foreshadowed are impracticable, so that there is no alternative but to prohibit?—The regulations could be modified.

20,068. I wish to inform you that the number of cases of lead poisoning in the painting trade is greater than in any other trade in which lead is allowed to be used. I can scarcely conceive that this Committee or the Home Office would be likely to introduce regulations of a modified type, or less effectual than those which obtain in other industries. So that I ask you again which of those alternatives you would take, bearing in mind that the cost of these regulations would, I imagine, come to practically the same as the cost of the extra painting which I am told would be necessary if lead were prohibited. So that your clients would have to pay the extra cost one way or another, I take it?—Yes. Well, it certainly would mean, either way, very much less business.

20,069. That is a question which you cannot speak about yet. You do not know whether people would pay the extra cost or not. You do not know whether they would have their houses painted less frequently or not. But that is not the point. I want to know which of the two alternatives you prefer?—I certainly should not favour prohibition.

20,070. Then the corollary of that is that the men must go on suffering?—Well, I do not think that, taking the great number of painters, the suffering is very great.

20,071. But you have admitted that the cases which I have presented to you are lamentable?—Of course they are, but in the painting trade as far as house-painting is concerned I do not see that the percentage is very great.

20,072. You do not think that the rules which I have suggested are practicable?—Not all of them.

20,073. And you will not agree to prohibition. What have we to do to remedy this evil? Have you anything else to suggest?—The only thing, of course, is, as I say, if a suitable substitute can be found, to do away with the poisonous qualities of lead, or modify the regulations.

20,074. But do not you think that the question of finding a substitute devolves on the employers?—That is a thing that is being tried now. There are several.

20,075. Have your association taken this up collectively to try to find a substitute?—I believe that each individual member is trying different things.

20,076. But you do not know?—No.

20,077. You had better not say, then?—I know two or three individuals have.

20,078. The chairman of your association, who has been here to-day, says that he has not tried them personally?—That I gathered from him the other day.

20,079. But other members have?—It is a question of time.

20,080. This question of lead poisoning has been going on for a great many years, and you apparently have not made any great efforts?—The question has not been taken up, as it has not directly affected us.

20,081. I suppose that the advent of this Committee has quickened you a bit?—It certainly has wakened things up, more especially the manufacturers.

20,082. (Dr. Collis.) What experience have you yourself of paints which do not contain lead?—Principally zinc paints.

20,083. Have you used them much?—Only just recently, except for the finest white work, in which we have used zinc for years.

20,084. What is the proportion of your work which is the finest white work?—A very small percentage.

20,085. And it is only for that that you have employed zinc?—Yes.

20,086. I presume you mean enamels?—No, for flat work.

20,087. How does it stand?—It stands well. It keeps its colour better than lead.

20,088. Has not that experience induced you to try it on other work?—No, for the simple reason that it has not such good covering power as lead.

20,089. You say it stands well, and keeps its colour better?—Yes. It is more expensive to use. You have to give more coatings with zinc than with lead.

20,090. What kind of zinc have you used?—Zinc-white oxide.

20,091. You do not know whether it is the direct or indirect method of manufacture?—No.

20,092. So that you have not gone much into the question of seeking after it?—No, not very much.

20,093. Therefore you are hardly in a position to say that there is no substitute for lead?—No.

20,094. Yet you have made that statement to the Chairman?—As regards the present conditions of painting, I mean.

20,095. But apparently you have not given them any trial at all personally?—The only thing I say is that zinc is too expensive to work.

20,096. Is it too expensive at the present price of white lead?—Yes.

20,097. (Chairman.) Is that your only objection to a substitute for lead—the expense of it?—The expense of it, because it requires more coats.

20,098. Is that the only objection you have to it?—That is the principal objection.

20,099. (Dr. Collis.) White lead has risen very considerably in price during the last twelve months, has it not?—Yes.

20,100. What are the comparative prices to-day, gallon of paint per gallon of paint, ready for use?—That is a thing I have not gone into.

20,101. (Chairman.) But you must know that when you say it is more expensive? [No answer recorded.]

20,102. (Mr. Sutherland.) You do not buy the paint except by weight?—No. The present price of lead is 28*l.*, I know.

20,103. (Dr. Collis.) To get any information on the point as to whether it is more expensive, you must know the cost of a gallon of each of the two paints?—You can hardly get at it by the cost per gallon.

20,104. How else can you get at it?—You take the quantity of lead, oil, and turps used on any particular job. That is how the comparison is got at with regard to zinc. In outside work, for instance, where it has been tried, it was tried under a certain architect, and in place of two coats we had to give four, which meant a very large increased cost of labour apart from materials. I am speaking of zinc.

20,105. You do not know what zinc you were using?—Zinc-white oxide, supplied by the manufacturers.

20,106. Zinc white varies as much as white lead varies. Some white leads are good, and some are bad. Your evidence is rather vague. You have stated that there is no real substitute for lead, but you have no really scientific evidence on the point?—I have not said that there is no substitute for lead.

20,107. I thought you said it to the Chairman?—There are substitutes; but I said a substitute equal to lead, or I meant that.

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20,108. But you have no personal experience on the point. We all know what everybody talks about, but you have no personal experience of an experiment scientifically carried out to compare the various brands of zinc to-day on the market with the various brands of lead on the market, as regards their value?—That is a thing I cannot tell you anything about.

20,109. You understand that that is of very vital importance?—Quite so.

20,110. But you, as a man having been in the trade for a considerable period, have no information upon it?—We do not have time to test qualities like that. We know from experience the quality of material that we have before us when we open lead or zinc.

20,111. You must forgive us if we think that painters and decorators have not studied the question, it is rather difficult for us, therefore, to take the general impression of the trade that nothing can be used except lead, if such experience as you and others give us is all that we have to go upon. We naturally look to you, as being users of the material, to know what materials there are for use in your own special trade, in which you surely should be specialists, and not we. If you have never tried any scientific experiments, you will see the obvious conclusions that we must draw?—Quite so.

20,112. It is rather putting up, if I may say so, a bogey than a thing which you know is absolutely a scientific fact. We cannot very well consider a bogey. We want scientific facts. You have no experience of lead poisoning occurring in the trade?—Not in our own business.

20,113. How does your insurance stand to-day, taking what you pay to cover yourself under the Workmen's Compensation Act?—We are paying 20s. per cent. in the London and Lancashire.

20,114. (Mr. Parsonage.) Is there any difference made with regard to painters?—No; that is covering the whole trade.

20,115. (Dr. Collis.) A general rate?—Yes. It covers plumbers, and painters, and all.

20,116. What is the proportion of men that you employ altogether who are painters?—Two-thirds would be painters.

20,117. What illnesses do your men have?—We have a pretty healthy lot. At the present time we have one complaining of rheumatism and lumbago, and that is all.

20,118. (Mr. Parsonage.) A painter?—No; he is a bricklayer.

20,119. But we are only referring to painters?—I was speaking generally.

20,120. (Dr. Collis.) Do not they have anything the matter with them?—We have very little illness amongst them.

20,121. But I want to know what illnesses occur. You have said that you have no acquaintance with lead poisoning. What experience have you of other sickness and illness?—I do not know of any. A man is away sometimes for two or three days with a cold, or something like that, but we have no illness.

20,122. You do not suggest that human beings employed by you are different from all other human beings in the nation, and never have any sickness or illness?—I cannot recall a man being away for more than two or three days, and then only with a cold, or something of that description. I remember a man some time ago who went to have a tooth drawn at the hospital, but I know of no illness at all. Some of our men, painters especially, have been in the shop for over 30 years.

20,123. You have not studied the question of illness among your men?—There is no necessity to do so.

20,124. But illness must occur with regard to every class?—We are not in touch with the whole of them the whole year round. Amongst the regular staff I do not know of any illness at all.

20,125. We are not suggesting that the influence of lead is the only influence in your trade, but you have observed no other illness. Therefore, it is quite obvious that illness due to lead was not observed. You have given a definite opinion, but you have not made any scientific observation on the point on which you are

giving evidence?—Painters may be at the shop perhaps three months in the early part of the year, and we may not see them again until the latter part of the season, when they may be here perhaps another two months.

20,126. As regards illness in general among your men you have no information, so it naturally follows that you have no information on the question of lead poisoning?—No.

20,127. (Mr. Sutherland.) Master house-painters do not buy their paint by the gallon, except in the way of varnish and proprietary paints?—Varnish is the only thing that we buy in that way.

20,128. And enamels?—Yes.

20,129. And proprietary paints like Gay's and others?—Yes.

20,130. So that you cannot institute a comparison?—No.

20,131. You buy your base in bulk, you buy your turpentine and oil in bulk, and mix your own paint?—Yes.

20,132. If painters were forced to buy by the gallon it would mean a complete change in the custom of the trade, would it not?—Yes.

20,133. A recasting of values and estimates?—Yes.

20,134. You have told us that you painted a house which required four coats of zinc paint to do what had previously been done with two?—Yes.

20,135. So that in addition to the additional cost of the paint, you had a very serious additional cost of labour?—Yes.

20,136. Your contention is that this increased cost of paint would act in the way of reducing the amount of painting done?—Yes.

20,137. Now, if regulations were drawn up, a very eminent medical scientific witness who has been before us says it might be possible to devise regulations for practically cutting down the poisoning to nil. They should be reasonable regulations, such as would not hamper the trade and bring it to a standstill?—If they were reasonable regulations, it would be different.

20,138. You do not think it reasonable that the masters should provide overalls for the men, for instance?—No, that is a thing that the men do themselves now.

20,139. It is the general custom for the men to provide overalls?—Yes.

20,140. You have never heard any objections to it on the part of the men?—No. We are very particular with regard to the men's overalls, and if a man has got them dirty or appears on a job with them dirty, he is very soon told of it.

20,141. Most decent shops insist on the men having overalls and coming with them clean on Monday morning?—Yes.

20,142. That is the universal practice, is it not, throughout the country?—Yes; a man's business is known by the appearance of his men as much as his work.

20,143. So that any regulations could safely embody the present practice without hurting the men, whilst still guarding them on that point?—Quite so.

20,144. So that that would not be an obstacle?—No.

20,145. The difference is very marked where the trade is confined, as in the pottery district, to factories or works, and where the same overalls are kept in one place?—Yes.

20,146. You would have difficulty in tracing your overalls, would you not?—We should not find half of them.

20,147. Some men would resent wearing overalls that were used by other men?—I do not know that the ordinary type of painter would object.

20,148. A lot of men would that I have met?—Provided that you supplied the painter with them, I think he would consent.

20,149. On the ground of not having to buy them or wash them himself?—Yes.

20,150. Could you tell us what danger would arise if the clothes were kept in the paint shop? Nothing is given off from the lead in bulk, and the turpentine and the oil you keep sealed in bottles, so that if the paint

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shop was used also as a place for hanging the private clothes in; nothing could get on to those in the way of dust because there is no dust there; is there?—No.

20,151. So that that would meet the case?—Yes.

20,152. If regulations were enforced, do not you think it would be reasonable to make it compulsory upon the householder, when you are doing work, to give facilities for washing and a separate room for meals?—Yes, quite so. It is a thing that is often done now. In many cases they provide a proper place for the men to have their meals and also to hang their clothes, but there are some houses where they almost object to the men going near a sink to wash, and in those cases they have to use a pail of water in the room where they have been painting before they go out.

20,153. But if the question is so important to the health of the painter, do not you think that the general public should be brought in to do their share in giving facilities?—Certainly.

20,154. Is there not a big assumption in favour of white lead, because almost every master-painter of experience who has come before us has expressed himself strongly in favour of it as against any other substitute?—Yes.

20,155. If white lead were prohibited, we should be thrown on to all kinds of compounds which manufacturers wished to put forward?—Yes.

20,156. In your opinion, is it good for the preservation of outside work and properties which are painted that this should be the case and that the trade should be forced to use an inferior paint?—No, more especially for outside painting.

20,157. Now zinc has had a free market in this country, and pretty well in the world, as a competitor with lead. If it has the qualities that are claimed for it, how is it that it has not replaced lead?—Because it has not the same body.

20,158. Exactly. It has not the qualities that are claimed for it?—It has not the qualities of lead.

20,159. Do you think that lead could be abolished for inside work without any serious loss?—I think that for inside work it could. Zinc could take the place there, but for outside work I fail to see that zinc would answer that purpose.

20,160. (Chairman.) You have already told us that it requires double the amount of zinc paint compared with that would be required of lead paint. Does that apply only to outside painting?—Yes, only to outside painting. For inside painting it would not make a serious difference.

20,161. (Mr. Sutherland.) There are a lot of zinc sulphide paints, lithopone paints, which could be used for inside work which are admittedly not useful for outside work, and it is on that basis that you answer?—Yes.

20,162. You referred to the finishing of work with zinc paint. That was for inside work?—That was for inside work.

20,163. And it was on the top of a lead grounding?—No; it was all zinc.

20,164. Right through?—Yes. That was where the least part of the work had about nine coats of paint. It was very fine finished work.

20,165. Do you draw a distinction between zinc-oxide paints and lithopone paints?—No.

20,166. Do you know the distinction?—No.

20,167. Lithopone paints cover very much better than zinc-oxide paints. They are not pure zinc?—I follow.

20,168. (Mr. Parsonage.) What is the average number of painters that you employ?—I should take the average as about 40.

20,169. Throughout the year?—Throughout the year.

20,170. Are there any large firms in the London Association of Decorators like Whiteley's or Waring's or any of those?—No.

20,171. It is a local association, mainly in Kensington?—No. It is founded to try to get together the whole of the trade in London, representing nearly 3,000 firms.

20,172. (Mr. Gardner.) They are not drapers?—No.

20,173. They are all practical painters in the association?—Yes. One of the principal objects of the association was to fight against the drapers.

20,174. (Mr. Parsonage.) Was the work which took four coats to cover it instead of two coats of lead outside work?—Yes.

20,175. What class of men were employed on it?—Painters.

20,176. Did you pay the standard rate of wages?—Yes.

20,177. *9d.* an hour?— $8\frac{1}{2}d.$

20,178. That is not the standard rate?—The recognised rate.

20,179. Do you think that a man who can use lead paint can use zinc paint equally well?—Yes.

20,180. I take it that it was zinc oxide that you referred to?—Yes.

20,181. These men that you paid  $8\frac{1}{2}d.$  an hour to could use the zinc oxide just as well as they could lead?—The four men in charge of each job are all paid *9d.*, but our ordinary rate is  $8\frac{1}{2}d.$

20,182. The standard rate in the West End of London is *9d.* an hour?—We are outside the West End, you see. We are in the districts which are not affected; at least, we are not termed "in the West End."

20,183. Are many of the firms in your association in the West End?—Yes.

20,184. A good many of them would pay *9d.* an hour?—Some of them. For instance, our late president, Mr. Campbell, paid *9d.* to all his men.

20,185. That is the firm of Campbell and Smith?—Yes.

20,186. A man who can get *9d.* an hour does not work for  $8\frac{1}{2}d.$  You do not get the best class of men for  $8\frac{1}{2}d.$  That is why I asked you about some of the leading firms. The class of men that you were employing may have had something to do with the fact that you did not make a satisfactory job with zinc, and that you had to give four coats instead of two. You cannot possibly get a man to work for a less rate of wages if he is a good man. If a man can get two or three shillings a week more, he will not work for  $8\frac{1}{2}d.$  There is a stigma on men who take less than the standard rate?—With regard to some of the men we get who come from the West End who have been getting *9d.*, we could put painter's labourers on who would do better work.

20,187. It is astonishing then that they can get the money they do?—You see, they have to pay *9d.* in the West End.

20,188. That shows that the master painters do not know their business?—Well, it is left to a foreman. He has in many cases a few who work for him, and it does not matter what class of work they do. You do not get all first-class work done in the West End, you know.

20,189-90. Surely if the men who are working for  $8\frac{1}{2}d.$  could get the standard rate, *9d.*, they would insist upon it?—Not always.

(Mr. Rice.) Mr. Chairman, I object to the words "standard rate of *9d.*" There is not a standard rate of *9d.*

(Mr. Parsonage.) Buffers pay  $8\frac{1}{2}d.$ , but the standard rate for decorators is *9d.* That is what I meant.

The witness withdrew.



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MR. JOHN MILTON.

[Continued.]

Dr. COLLIS (*in the Chair*).

Mr. JOHN MILTON, 136, Maida Vale, examined.

20,191. (*Dr. Collis.*) Do you attend here to-day as a representative of the London Association of Master Decorators?—Yes, I do.

20,192. You are possibly aware we have already heard a large number of house painters and decorators?—Yes, I believe so.

20,193. And you have, I presume, some special information that you wish to draw our attention to?—No, no special information. I believed that I was going to be rather led instead of being examined in any other way. I believed that you were going to ask my own experience as a practical man. I have had no information from anyone who has been here, if that is what you mean.

20,194. No, I do not, but I thought that perhaps you had some special information which you would give to us that others have not given, as you have come here after we have heard so many already?—No. I will answer questions to the best of my ability.

20,195. Have you satisfied yourself whether the danger of lead poisoning amongst house painters constitutes a very real danger, and one that should be removed?—It constitutes a danger, but the danger is so remote that I have hardly met it in my experience.

20,196. What is the nature of your business, and where is it carried on?—I am a house decorator at 136, Maida Vale.

20,197. What is the average yearly number of painters employed by your firm?—I have now about a dozen.

20,198. How many would you have in the slack season?—About a dozen in the slack season, and about 30 in the busy season.

20,199. Then you average somewhere about 22?—Yes, about that.

20,200. How long have you yourself been in the painting trade?—About 35 years.

20,201. Have you known any cases of lead poisoning or painter's colic?—I have seen two or three cases of colic.

20,202. Among your own men?—Not among my own men, amongst men whom I have been over. I was a foreman in a large way before I was in business for myself, but since I have been in business for myself it has not been in a very large way.

20,203. (*Mr. Parsonage.*) For whom have you been foreman?—Aldin Brothers and Davis, the same firm as Leslie & Co., as it is now, and for Rawlings Brothers, Kensington.

20,204. (*Dr. Collis.*) In past years, have you seen cases of lead poisoning?—I have seen them in a way, but they have not been very pronounced at all. They have been there. They have been existent.

20,205. How many cases have you seen?—About two.

20,206. Among your own men you have no knowledge of any such cases?—Among my own men I have had none whatever.

20,207. How long have you been working on your own account?—About five years.

20,208. During that time have you had any claim made against you at all by any of your men?—Not for lead poisoning; I had one slight claim for about a week. A fellow fell through a skylight and hurt his head, but he was not a painter.

20,209. Have your men had occasional days of sickness?—I have never seen sickness in men working for me.

20,210. Have your men had no occasional days of sickness at all?—None whatever.

20,211. Then they are a very healthy lot?—Yes; they use plenty of soap and water.

20,212. When you were a foreman, did the men never have occasional days of sickness?—I never knew of it.

20,213. Do not painters ever have any illness?—They may, but I have not experienced any of them being so through lead poisoning, or anything of the kind.

20,214. I did not say lead poisoning, but any illness?—I have known them, I suppose, to stop away with a touch of Monday-morning headache, or something of the sort.

20,215. Have you ever known a man die of consumption in the painting trade?—Yes.

20,216. (*Mr. Sutherland.*) One of your own men?—No, I have never had any illness amongst my own men at all.

20,217. (*Dr. Collis.*) Not while you were foreman either?—No, not while I was foreman.

20,218. Do you know that in the ordinary population one man in ten dies of consumption?—I had no idea that the proportion was as big as that.

20,219. You see placarded all over London, on every hoarding: "Come and help the consumptives. One man in every ten dies of consumption." It is so publicly known that I should not have thought anyone could miss it?—I think that your figures are a little exaggerated.

20,220. They are from the Registrar-General's figures. If you have no information of an illness which is as prevalent as that, it is quite possible that you also have no information about an illness which is admittedly not so prevalent as that, and yet may exist—that is to say, lead poisoning?—There is no doubt that lead poisoning exists, but I think it does not exist to such a great extent.

20,221. (*Mr. Sutherland.*) It does not come your way?—It does not come my way.

20,222. (*Dr. Collis.*) Nor does consumption, apparently. Do you have periodical medical examination of your men?—No.

20,223. Then how would you be able to know that these occasional days of sickness, which you admit they do have, may not have been due to the influence of lead?—I do not think that I have said that my men have occasional days of sickness, have I?

20,224. I thought you did?—I said that I have known men stay away on Monday mornings, but I would not say that it was through sickness. In our line they are as healthy as in any other line, if they are at all clean in their habits.

20,225. Take it all round, you have not made a close study of the health of your men as regards the question of illness. You are not alone in that?—I do not think I have made a study of it at all, really.

20,226. You know, I presume, that lead poisoning frequently undermines the health without immediate violent symptoms arising?—Yes, I have heard so.

20,227. Do you know that the incidence of lead poisoning is published month by month by the Board of Trade in the "Labour Gazette"?—Yes, I have heard that, but I have not seen any figures of it.

20,228. You have not looked it up?—I have not studied it at all. The only time that I studied the lead poisoning question at all was when I went in for hygiene, when I was passing through the sanitary institute. It was drawn to our attention a good bit then, more so than ever it has been through contact with the men.

20,229. You have not noted, then, that 284 deaths occurred among painters during the ten years which ended in 1910, and that there have been 36 further deaths in the year that closed last—1911?—All due to lead poisoning?

20,230. Definitely certified cases of lead poisoning, in which inquests were held?—That would be about one in 2,000, would it not—or not so much?

20,231. I was drawing attention to the total amount rather than the case incidence?—Would that include makers of paints as well as workmen?

20,232. No—workmen; house painters only. The plumbers are taken out of that?—It seems a lot, when in the course of about 30 years' experience no actual friend has ever died of it.

20,233. You have no information, perhaps, of an actual friend of yours dying from consumption, either?—Yes, I have.

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Mr. JOHN MILTON.

[Continued.]

20,234. You told us that you had not—I mean in the trade?—No, not in the trade.

20,235. Although you have not information, the thing may be going on; however, I am not surprised that you have had no cases amongst your employees because in some of the potteries, in fact a large number of the potteries of North Staffordshire and Scotland, they have had no cases at all, and then quite unexpectedly, without any warning, a firm which has been immune has had quite a crop of cases. In addition to these cases of deaths which I have given you details of, do you know that about 2,000 cases of lead poisoning in your trade were reported in the Home Office voluntarily without any legal compulsion whatever in the same ten years?—That is about 200 a year.

20,236. You understand that in factories and workshops the cases which occur have by law to be notified to the Home Office?—Yes, I believe so.

20,237. This compulsion does not exist with regard to house painters who are outside the Factory and Workshop Act, but the practitioners of the country have of their own free will voluntarily notified to us some 2,000 cases?—I take it that you are not including coach painters with house painters.

20,238. I am only taking house painters. Coach painters' shops are under the Factory Act. Now, having regard to what I have told you, it is fair to assume, is it not, that a larger number of cases would be reported if it was legally necessary to notify them?—I have not the slightest doubt that there are cases of lead poisoning; we all know that.

20,239. I draw your attention to the point, because I think you will agree that all this sickness and death is very deplorable. Now there are only two possible means of dealing with the evil, or we can only think of two possible means: One is by establishing a code of regulations, and the second is by the prohibition of the use of lead in paint, or rather the restriction of its use within narrow limits. Can you suggest any third alternative?—Not a third alternative. I do not see how we are going to do without white lead. Up to now we have nothing that will take its place for outside work. For inside work there is nothing to hinder it.

20,240. If you have no third alternative, which of these two that I have put to you would you prefer?—I would rather have its restriction within narrow limits. I do not think that a code of regulations would be suitable at all in our trade.

20,241. The restriction which has been suggested, you should of course know this when you are answering the question, is the prohibition of the use of lead to the extent of more than 5 per cent. of solubility in the paints used. That is the narrow limit that I meant. As a matter of fact, the 5 per cent. gives you larger play than 5 per cent. for colour purposes; but as regards white lead it is 5 per cent.?—You would only be allowed to use 5 per cent. of white lead in the colour. Is that what I understand?

20,242. (Mr. Sutherland.) Greens, browns, blues, and that sort of thing?—We do not want it at all for colours.

20,243. (Dr. Collis.) It would give you larger scope for using lead salts for colour purposes, but in using white lead it would restrict you to 5 per cent. in zinc or anything?—I am sorry to hear that, because I do not see what will take the place of white lead for outside work, although I am not a lover of white lead exactly. We can do quite well without it for inside work, and I would not mind seeing it abolished altogether for inside work.

20,244. If the whole trade was in the same position, the public only would suffer?—Yes.

20,245. You as an individual would not be affected any more than the others?—There is one thing I would like to mention just now that I mentioned the other night at a Paint and Varnish Society's meeting. I believe that if a better medium than we have at present in the way of oil and turpentine was found, we could do without white lead for outside work. Oil and turpentine are not the best medium to be found by any means. I use at present whites which are not white lead. I find by using white boiled oil and a good lot of varnish, and the like of that, that I can

get a better paint for standing purposes than with white lead.

20,246. For outside purposes?—I have not risked my reputation with regard to outside work yet, except in my own place, where I used it two years ago, and so far it is all right.

20,247. For window sashes, for instance?—Yes, sashes and all the lot—outside.

20,248. The experiment has not disappointed you, so far as you have been able to judge?—It has not disappointed me. I have tried it on the gates of our workshop facing the sun, so far with good result.

20,249. Had the paint which you used some special preparation as regards the vehicle?—Yes.

20,250. Had you to put more coats on than if you had been using a white lead compound?—No. It covered just as well. The medium is a little more expensive. There is a great deal of prejudice in our trade with regard to trying anything new, but I am rather keen on trying anything new, and I experimented with this by myself, and through a lot of these little experiments by myself I have found out things that other people are right dead against.

20,251. (Mr. Sutherland.) What was the paint?—Line's white.

20,252. It is not zinc oxide?—Not pure zinc oxide. There is zinc oxide in it. I am trying to find out if I can circumvent some of the white lead beauties. They have put up the price of white lead about 30 per cent. against us.

20,253. (Dr. Collis.) If you can succeed, we as a Committee shall find ourselves out of work, and we shall not be sorry?—Many men, many minds, of course. There is something to be said for and against white lead. There is certainly a danger, but the danger in my opinion is very very small, and I think it is mostly with the man himself, if he is not clean.

20,254. (Mr. Sutherland.) You mean the danger of poisoning?—The danger of poisoning.

20,255. (Dr. Collis.) You have been dealing with it quite apart from the health point of view?—Yes.

20,256. Just to see if you can find something that will do as well, or possibly better, at a lower price?—Yes. If you believe all the makers of these whites, they are all better than white lead, but you cannot believe them without trying them. None of the whites up to now will stand like white lead.

20,257. Was your house covered with two coats?—Yes.

20,258. Just as if it had been painted with lead?—Yes. I did not even use turpentine; that was six shillings a gallon at the time, and I would not use it at all. I did not use it for twelve months.

20,259. (Mr. Gardner.) You used a substitute?—Yes.

20,260. (Dr. Collis.) How long, in the ordinary way, would you let your house stand without being painted?—About two years. It would go three years, but I do the front when I am slack once a year. It was not done last year. I am letting the back stand now as an experiment. It has stood quite as well as white lead.

20,261. It has run for the usual time that you would allow your house to run?—Yes.

20,262. If you had not been trying an experiment you would have painted it this year?—Yes.

20,263. So that with regard to your own house the paint really has stood the full length of time that you would allow for paint in the ordinary way?—Yes; but not with the same medium.

20,264. It required different treatment?—Yes.

20,265. It seems that zinc does call for different treatment?—It wants different treatment. It wants a different medium.

20,266. One of the reasons why it perhaps has received a good deal of obloquy is because it is treated the same as white lead?—Yes. It does not give it a fair chance at all if you do that.

20,267. (Mr. Sutherland.) Do you think that, apart from this particular experiment, white lead cannot be abolished with safety for outside work?—Yes.

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[Continued.

20,268. But inside it can be dispensed with?—Yes. I would not like to risk my reputation without it for outside work at present.

20,269. I understand that you put special oil and varnish to your paint?—Yes.

20,270. Would it not add very considerably to the cost if all the painting in London had to be prepared with special boiled oil and more varnish?—This particular white will cover half as many yards again as white lead.

20,271. Do you know if what you used was zinc oxide?—What I used was not pure zinc oxide.

20,272. For inside work have you bought pure zinc oxide?—Yes. The covering power is not so good.

20,273. Had you to give additional coats?—I was not using zinc oxide by itself, but as a finishing coat.

20,274. Inside?—Inside.

20,275. Do you know that a great number of these whites with different names all come from the same source?—Yes, I believe so.

20,276. The bulk of these proprietary whites have lithopone as a base?—Yes.

20,277. The general opinion expressed by men who know, who have been before this Committee, is that for inside work lithopone is very convenient and very effective?—I have just finished a job with it now, and it is all right.

20,278. But for outside work it is not as good as pure zinc oxide?—What I am trying the experiment with is with a proper vehicle; you can manage quite as well.

20,279. Plus varnish?—Yes.

20,280. That adds very much more to the cost of the job? The pigment is cheaper than white lead is at present, and it will cover half as many yards again as white lead will. I would take a job on at the same price as for white lead.

20,281. You are not prepared to risk it for outside work?—No, not yet. I must try it a bit longer.

20,282. It needs further experiment?—Yes, it needs further experiment.

20,283. (Mr. Rice.) When you speak of the prejudice with regard to using made-up paints, do you refer to the prejudice of the employer or to the prejudice of the workman?—I do not think that I said prejudice with regard to using made-up paints, though I have a great prejudice against them myself. I said that there was a prejudice in our trade against introducing anything fresh.

20,284. What do you mean by "anything fresh"?—I will give you an instance about a bit of a squabble with a very eminent architect in London once over red lead in priming. I would not use it. He said that he was going to condemn my work if it was not used. I called it an abomination. He said: "Everybody uses it. What is the matter with it?" I said: "It is a relic of the past." When I went into the trade first of all they used red lead and glue for knotting to cover up the knots. That was before the days of white enamel. In another case I sent an order to the shop that the work was not to be primed with red lead. It came on the job primed with red lead, and it had rather a jarring effect on my nerves. The red lead was eating its way through four coats of white lead and two coats of enamel. We had to do it twice. When I called attention to it the man said: "It is the correct thing to do. Architects specify it."

20,285. (Mr. Sutherland.) How long ago?—About eight years ago.

20,286. Was that red lead?—It was sent out as red lead.

20,287. (Mr. Rice.) Would there be any prejudice on the part of workmen with regard to painting a house with white lead and using zinc as a base?—Not a bit.

20,288. Would there be prejudice on the part of the employer?—I think so. It is one of the things that die hard, but the prejudice would have to be got rid of.

20,289. You would not feel the prejudice?—No; I would not mind seeing the last of white lead to-morrow if I could get a good medium to stand as well, but I do not know what will stand as well.

20,290. Speaking of the house which you have painted with what I may call the "Milton paint." I

presume that it was put on white lead?—Yes, on the top of the other paint.

20,291. You paint your house every two years I take it?—Yes.

20,292. Not as a matter of necessity?—To make it look smart.

20,293. For smartness, as I thought. The last time you painted it, did you paint it with a white-lead body?—Yes.

20,294. Do you think that the result which you have obtained is a fair result to expect from "Milton paint," seeing that it had a good white-lead body?—Yes, I think so. I will give you an idea of how it would be. Last summer was a very severe summer for paint exposed to a southern aspect. There is a job I have had to do this year over again, that I generally do once in two years for a regular customer. The paint is actually eaten away through the heat of the summer. The doors of my workshop are the same. I am leaving them till I am slack.

20,295. Was the white-lead eaten right away before you applied the "Milton paint"?—It was not so much the white-lead as the medium—the oil. If there is a great deal of sun on any particular work the oil vanishes first, and sometimes the white-lead will dust off. I have known, even in the case of an ordinary wall, after a severe summer of sun, that the next year you could dust the white-lead off—genuine white-lead.

20,296. I take it that you have a rather high-class trade?—All classes.

20,297. You have very capable painters, I take it?—Yes.

20,298. You pick out the best men and employ them?—The best I can find.

20,299. Are they of cleanly habits?—I always insist on that.

20,300. Do they wear overalls?—Yes.

20,301. How often are the overalls washed?—Once a week.

20,302. Who pays for the washing?—The workmen themselves.

20,303. Would you object to paying for the washing if you had to?—If it was general I do not suppose that I would object, but the men rather pride themselves on seeing themselves in clean overalls on Monday mornings.

20,304. If everyone had to do it you would not object to pay for washing the overalls?—I would not object, but it is rather hard with double insurance.

20,305. (Mr. Rice.) Would you be prepared to find overalls for the workmen as well as paying for the overalls to be washed?—That would simply be equal to giving a rise of wages, would it not?

20,306. It would mean finding overalls for them?—I would not have anything to do with that.

20,307. You would object to that?—Yes.

20,308. Do you provide any facilities for the washing of hands?—Yes, always plenty of soap and plenty of water, and if they use plenty of those there is no fear of lead poisoning.

20,309. Do you give them hot water?—They can have it if they like.

20,310. But do you provide facilities for hot water?—Yes; if there is no gas-ring I give them a little oil lamp, one of those little things that you stand a pot on.

20,311. That is for general use?—For size and so on. They always require a fire.

20,312. It is not specifically for heating the water and washing the hands, is it?—No. I do not know that it is so very essential to have hot water if a man washes four or five times a day, and keeps his nails close cut and trimmed.

20,313. Do your workmen wash their hands three or four times a day?—They wash before they go to breakfast, before they go to dinner, and before they go to tea. That is three times, and I dare say they wash when they get home at night.

20,314. But I mean how many times a day do they wash when they are at work?—Three times.

20,315. Do you supply towels?—No.

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[Continued.]

20,316. What do they wipe their hands on?—Leathers.

20,317. Do they use them for the sole purpose of wiping their hands?—They use them for general work.

20,318. The same leathers?—Yes, if they are not too dirty.

20,319. They wipe their hands on the leathers that they wash the paint-work with?—Yes.

20,320. Who supplies the leathers?—I do.

20,321. Let me tell you what the regulations would include. The regulations would include the provision in every case of hot water, nail brushes, clean towels, the supply and weekly washing of overalls, and periodical medical examination of the workmen?—I would not mind the periodical medical examination of the workmen, but I would object to the provision of towels and all that on a job. It would be all right in a workshop, but I do not see how you could do it otherwise.

20,322. You are quite clear that regulations such as I have suggested would be very onerous?—Yes, in regard to house painters.

20,323. And such as you could not adopt?—Yes. I will tell you how you could not adopt them. I am very sorry to say it—

20,324. Bearing that in mind, would you prefer regulations to the prohibition of white lead?—I would rather have the prohibition of white lead.

20,325. (Mr. Gardner.) Is this the first that you have experimented with pale boiled oil?—No, I have used it for years.

20,326. It is the first time that you have tried it with zinc or lithopone?—Yes. I would not like to try the stuff without it.

20,327. It is not much more costly, you think?—No.

20,328. It is quite customary to put in varnish when you are doing an outside job and want a good finish?—I very often do.

20,329. Where you are using lead?—Where I am using lead.

20,330. (Dr. Collis.) So if it was used with zinc it would not be altogether a new thing?—No, it would not.

20,331. Would using it with zinc paint add to the cost of outside painting?—It would not add much.

20,332. (Mr. Parsonage.) You are more progressive than the majority of the employers?—Well, I have been an actual worker myself, and I know pretty well every wrinkle in the painting trade.

20,333. (Mr. Gardner.) Where did you come from?—Aberdeen.

The witness withdrew.

## THIRTY-FOURTH DAY.

Wednesday, 22nd May 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (Chairman).

Lord HENRY BENTINCK, M.P.

Mr. E. L. COLLIS, M.B.

Mr. W. G. SUTHERLAND.

Mr. F. O. RICE.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

E. A. R. WERNER (Acting Secretary).

Mr. JOSEPH DEVINE (75, Framfield Road, Hanwell) examined.

20,334. (Chairman.) What practical experience have you had in the house-painting trade?—I went to the trade when I was about 12½ years old, and have worked at it, with the exception of a month occasionally, all my life since.

20,335. How many years is that?—Roughly speaking, about 30 years.

20,336. What branch of the National Society of Operative House and Ship Painters are you connected with?—No. 1 London Branch.

20,337. Have you any personal knowledge of lead-poisoning?—Yes. I have been affected several times myself, and I know others who have also been affected.

20,338. Can you tell the Committee anything about your symptoms when you get an attack of lead-poisoning?—Yes. It starts with an acute pain (perhaps not so acute at first—it seems to grow) in the stomach, accompanied by vomiting, and one loses appetite. The first time, I remember, I did not know what it was, and I thought that it was a cold, or a chill or something. I took brandy, and the brandy eased it for a little while, but it kept returning. I tried salts, which did not seem to have much effect at first, and they made me vomit. I saw a chemist on one occasion, and he advised me to go to a doctor. The doctor ordered me to go to bed, and have hot fomentations put on and an injection, and they gradually soothed the pain in that manner. A complete description of the first symptoms of lead-poisoning and its treatment ought to be distributed amongst all lead-workers. With regard to that, I would like to say this: If I had at the time known the symptoms of lead-poisoning, I could have saved

myself a very great deal of pain; I believe so now. I would have taken doses of salts more frequently. Afterwards I had an attack once when I was away in the country, and I took 12 ounces of salts in one week, and that, I believe, kept me from being laid up in bed. I kept taking a strong dose of salts every time I felt the least indication of it. I knew instantly when the lead-poisoning was coming. The complaint may be cured, but its effects are permanently weakening to the internal organs.

20,339. Has it been so in your case?—Yes; I am sure of it. I am not well now. I am suffering now from lead-poisoning. In fact I have been compensated for lead-poisoning.

20,340. Are you a very careful and clean worker?—Always particularly clean.

20,341. Did you always wash your hands regularly?—Yes, before each meal.

20,342. Did you use a nail brush?—Yes.

20,343. Have you had any experience of lead-poisoning among members of your branch?—Yes; I know that several of them have had lead-poisoning.

20,344. Can you give us the number of members in your branch, and details of the lead-poisoning cases which have come to your knowledge, in connection with those members?—I can tell you in a vague way. I did not visit them when they were sick, but I know of three cases of lead-poisoning. One died of lead-poisoning, and his widow was compensated. It affected his heart. It generally weakened his heart, so that he gradually wasted and died. The other man gets periodical attacks of something in his legs, so that he

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[Continued.]

cannot walk properly—in his legs and hands. One hand swells, and he seems to lose all power in that hand.

20,345. And the other case?—The other is an elderly man. He is very bad, and he gets sickness and general weakness.

20,346. Have you only known of three cases of lead-poisoning?—Those three I know intimately; there are others, but they live at such great distances from the branch that I do not see them often.

20,347. What period do these three cases cover?—I should say during the past three or four years.

20,348. How many members are there in your branch?—Between 150 and 200, I think; I am not sure.

20,349. (Mr. Parsonage.) About 170 in your branch?—Yes; in the one branch; but there are 30 branches in London.

20,349a. (Chairman.) I am speaking of your own branch?—I know members of other branches which meet not far from us.

20,350. Will you name the principal causes which, in your opinion, contribute mainly to the prevalence of lead-poisoning among house-painters. Before you answer that question I want to ask you this: You have told us of three cases of acute lead-poisoning. In your opinion, were any other members of your branch suffering in a less acute form?—Yes. On one job where I was there were twelve of us, and all those were members of my branch. Two of them had to come home. One has died since. I was forgetting those men. With regard to the others, all the men had lead-poisoning, not in an aggravated form, because a doctor was brought, and he took immediate steps to stop it. They themselves did as I did; they took salts.

20,351. Have you known of other cases where men have had slight seizures from lead-poisoning?—Yes; there are many cases like that where men have had slight seizures, and they have stayed away for a few days without going on the sick club. They have stayed away for a few days and taken purgatives.

20,352. Will you name the principal causes which, in your opinion, contribute mainly to the prevalence of lead-poisoning among house-painters?—Lead gets into the stomach through the mouth or the nostrils, in consequence of flitting work over-head.

20,353. Please explain what you mean by "flitting" work?—Using paint which is made of white lead broken up in turpentine, and a little varnish or gold size put in just to bind it, otherwise it would rub off in a powder. It would practically fall off in a short time if it were not for the gold size or varnish. Being made up with turpentine makes the work very light, and it splashes about and falls down in a fine spray in doing over-head work; when looking up at ceilings it falls down on the face.

20,354. Do you mean that you inhale the spray when you are flitting?—Yes.

20,355. Do you think there is any danger in the wet paint itself, from the smell or fumes, or from fine particles which may form spray when the lead paint is applied?—Yes, from the fine particles. I do not know about fumes. Possibly there is danger there. I believe that it brings on a kind of headache and sickness. I have frequently felt that.

20,356. But you do not necessarily attribute that to lead?—No; it may be the fumes.

20,357. Of the turpentine?—Yes.

20,358. What other processes do you consider very dangerous?—Rubbing down, with glass-paper, work which is filled with lead—rubbing down white-lead filling and inhaling the dust; and the same may be said about rubbing down flat work with glass-paper.

20,359. Do you think there are other causes of lead-poisoning?—Through small particles of lead remaining on the tips of the finger even after washing, if one is not extremely careful, and then being dissolved by butter or other grease on the bread, and then conveyed to the mouth. It is impossible to do certain kinds of work without getting some of the material on the finger tips.

20,360. Is sand-papery the only process in which there is dust? Does the making up of stoppings and

mixing of paints give rise to dust?—Yes, it does, because it sometimes falls about and gradually gets into powder, and then of course the dust rises.

20,361. Do you consider lead paint on the clothing to be another cause of poisoning?—Yes, I believe it is, because it breaks up and forms dust afterwards; and you never know where it is going to.

20,362. Do you consider the process of stippling an unhealthy one? Is there much spraying of paint when this is done?—Yes; it is impossible to avoid spray when you stipple. You batter it; you knock it.

20,363. Do you knock it? Do you not simply push the brush?—Yes, you knock it like that (*describing*). You make a row.

20,364. (Mr. Gardner.) You hammer the paint on to the work?—Yes; it is practically hammered to make it even.

20,365. (Chairman.) Are you quite sure there is a good deal of dropping from this process?—Yes; it is impossible to avoid it. It spreads out in a very fine spray—very tiny particles.

20,366. Have you anything to say regarding burning-off? Do you think there is any risk to health involved in this operation?—Yes. On one occasion I was one of twelve victims of lead-poisoning contracted through rubbing down work which had been scorched with a burning-off lamp. The men doing the work were enveloped in a cloud of finely powdered lead; which, although it had been on the work for many years, and then thoroughly burned by lamp, still contained as much poison and produced the same effects on the victim as newly made white lead. I would like to add that the danger would have been minimised if each man had used a lamp and taken off the work while it was hot. In that case one man went round the work and applied the burning-off lamp and scorched it all and raised it off the work, and then other men were sent to scrape the paint off and leave the wood bare—to scrape it and rub it down with glass-paper. If the man who scorched it had taken it off while it was in a soft state, there possibly might not have been so much powder; but there would have been a certain amount of powder after it had fallen to the ground, because it powders even then.

20,367. (Mr. Gardner.) You mean that there would not have been as much dust as there was if it had been taken off while it was hot?—That is right.

20,368. (Chairman.) To sum up this part of your evidence, you attribute lead-poisoning to various causes, mainly to inhalation of the dust produced in sand-papery, and in mixing materials and such operations?—Yes.

20,369. Partly also to inhaling the spray of lead paint. And, further, to contamination of hands and food and clothing?—Yes.

20,370. I will now ask you to what extent these causes of poisoning can be obviated?—I do not know how they can be obviated.

20,371. As regards the dangerous process of sand-papery between the application of one coat of paint and the next, is it quite impossible to dispense with this and replace it by a wet smoothing process?—Yes, it is impossible, I think; because if you rub it down wet you tear the paint away again. You cannot get paint hard enough to rub down wet under perhaps about twelve months. You can get the paint dry, but you cannot get it dry enough.

20,372. We have had a good deal of evidence from master house-painters in which they have expressed a contrary opinion to that which you have just given to the Committee?—Well, that is my view. If you start rubbing down new paint with pumice stone and water you tear it away again.

20,373. How are mouldings and curved surfaces rubbed down?—With glass-paper.

20,374. Stopping and also old hard paint-work are sometimes rubbed down wet, I believe?—Yes.

20,375. Why cannot this method be applied to newly painted work between the coats?—Because of what I said just now—owing to the softness of the work.

20,376. (Mr. Gardner.) If you took powdered pumice stone and water and felt, how would that affect

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new work between coats?—I think it would rub it off much about the same as the other.

20,377. (Mr. Parsonage.) Not so badly as pumice stone not powdered?—No, not so badly as pumice stone not powdered. It is sometimes used on enamel, but you have to wait for a week or two before the enamel is sufficiently hard to apply it.

20,378. (Chairman.) You mean to tell us that pumice stone and water would, in your opinion, tear and damage newly dried paint which has not had time enough to harden completely?—Yes.

20,379. Is dry sand-papering cheaper than wet rubbing down, do you think?—Yes, I think it is. This process is elastic. You can do as much or as little as the price and the value warrants. They frequently tell a man: "Do not spend much time on this." The cheapness depends on the amount of time that is spent on it.

20,380. (Mr. Gardner.) Generally speaking, dry rubbing down is much cheaper than wet rubbing down?—Yes, I think it is.

20,381. (Chairman.) Next, as to spray from the brush; for example, when you are painting ceilings having moulded or relief work upon them, and when you are doing stippling, how could you protect the painter from such spray?—I do not know that it is possible or practicable to give any protection. Some people advocate the use of respirators; but in that case the thing would get clogged, and probably be more dangerous than doing without it. It would have to be handled in order to be placed there. I do not know of any protection.

20,382. And a respirator, I take it, would not prevent the spray falling on to other parts of the man's face. Can you tell us how and where colours are usually mixed?—Lead is broken up in a pail first of all, with turpentine generally—it depends upon what the work is—and then it is strained in order to get all the grit out of it and make it cleaner. It is then poured out in pots, when they get the colour decided on, for each man to use. In the evening it is brought back and the things are kept clean by pouring it back into the pail.

20,383. Is there any way of safeguarding the worker against breathing dust in this operation?—No, not that I know of.

20,384. Then you hold that there are some necessary operations in which the worker cannot be fully safeguarded?—Yes.

20,385. That no regulations whatever will remove the danger?—I think that is so.

20,386. Are there many processes in which the painter cannot avoid getting his hands soiled with the paint or stopping materials?—I do not know how many processes. In stopping he cannot very well avoid getting it on his fingers, and even when he is using the brush he cannot very well avoid it always. We always carry a bit of rag to keep our hands clean even while we are working, and generally a clean man scrapes his tools to get them clean. But there is not any time generally allowed for that sort of thing.

20,387. Do you think that the provision of washing conveniences, and the regular cleansing of the hands, is important?—It is extremely important. I think that things are better now than they were. Employers are making a little better provision now. It may be probably through the knowledge that this Committee is sitting. It may be that, I do not know; but it is quite noticeable that, instead of one pail for twenty men to wash their hands in, you will probably find two now, or it may be three in some cases where they are extra scrupulous.

20,388. Should hot water always be available?—It is not always possible. It is not always available.

20,389. I ask you should hot water always be available?—It is certainly better to use hot water for washing. It brings the dirt off better.

20,390. From your own knowledge, can you get paint stains off your fingers without using hot water?—Not very well. With a little oil you can.

20,391. You have told us that you are a very careful man, although you have had several attacks of lead poisoning?—Yes.

20,392. Have you always been quite sure of removing the paint stains from your fingers when you have not been able to obtain hot water?—No, I cannot say that I have been quite sure, because sometimes you get fine particles of white lead on your fingers, which are so small that they are practically invisible. I am of opinion that if I get the finest particle of white lead in my system I will be laid up now, even if it is so small that it were impossible to see it with the naked eye.

20,393. Are you a very susceptible subject?—I think so now. I believe that a person once having had lead-poisoning is more likely to get it again than a person who is sound in health.

20,394. If you are painting the outside only of a house, and are not allowed to go inside to wash, it might be impracticable to get hot water in those circumstances?—Yes. They do not always like us to go inside when we are doing the outside; in fact we are very often forbidden.

20,395. Is food often kept in the pocket of a working coat and eaten in a place where paints are being used?—Yes, simply because there is, frequently, nowhere else to put it. There is no other provision.

20,396. Is it frequently impracticable to have the use of a separate place as a meal room?—Yes, it is.

20,397. Can you tell us how frequently such a case has come before your notice?—There is always, when painters are about a house, a scarcity of room—or practically always—because we want one room, at least, or one place under cover to keep our colours in—to keep the material. And then, again, in the house itself, they have made some provision for us by doing with a room less themselves in the household, in order to have the room done that we are working on. If we are outside, they do not like us to come inside at all. There is always a scarcity of room.

20,398. You mean that you may be obliged, owing to climatic conditions, and the fact that there is no inn available, to have your meals inside the house. I want to know how frequently, when that is the case, you are obliged to have your meals in the room where painting is being done?—It is an everyday occurrence.

20,399. Do painters usually wear overalls while at work?—Yes; it is a common practice.

20,400. What kind of overalls do they wear generally?—Always a long blouse and an apron, or, in the absence of an apron, a pair of overalls to cover the trousers.

20,401. Is that generally the case?—Yes, generally. A man who came on a job without a blouse would not be considered a decent workman.

20,402. But are there a number of men who come on a job without blouses?—No; it is a very rare occurrence. A man might in the spring-time, when he is hard up and had had a bad winter, be minus a blouse for a day, but somebody would lend him one, or he would get one.

20,403. I have watched painters lately. I have seen a good many painters who have not had a full blouse on, only a short jacket and no overalls to the trousers. In your opinion that is not general?—No, it is not general. Labourers sometimes wear short jackets.

20,404. How are these overalls kept clean?—As a rule they are washed once a week.

20,405. Are they washed at the painters' homes?—Yes; generally a man takes them home with him once a week.

20,406. How are the overalls taken home?—Sometimes in a bag and sometimes in a piece of brown paper.

20,407. Is the bag kept specially for carrying the overalls to and fro?—For carrying tools.

20,408. He puts the overalls in the same bag as his tools, does he?—Yes.

20,409. So that the overalls may receive some dust from the tools?—If the man is a good workman he keeps his tools pretty clean. As a rule men are more particular about their tools than they are about most other things. You do not see a working-man put tools in his bag which have lead or paint on them.

20,410. What becomes of the overall when the man has ceased work for the day?—He just hangs it up in the colour shop. There is nowhere else generally

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20,411. Does he ever hang it up in the room where he has been painting?—Yes; he hangs it up on a trestle, or a pair of steps sometimes.

20,412. I suppose that there is some lead dust on an overall when it has only been worn one day?—Yes.

20,413. Is that dust likely to be disseminated when he puts the overall on the next day, and is he likely to breathe any of it?—Yes, it is quite possible.

20,414. Do you, however, consider that the greatest danger arises from the dust and spray made in the course of the man's actual work?—Yes; I attribute the greatest danger to the dust.

20,415. How can the evils arising from such dust and spray be removed?—I do not know, I am sure. So long as you are using white lead, the white lead is bound to get into fine particles. The only way I know is to leave off using lead. I cannot think of any other way.

20,416. You have told us that there is no way, that you know of, of removing the danger of dust and spray?—Yes.

20,417. Could the painting processes which chiefly give rise to spray, such as stippling work, be prohibited, or at least so restricted as to remove the danger?—You could prohibit stippling, but there would be some danger from laying the work on without stippling it, so long as you use white lead.

20,418. (Mr. Sutherland.) Do you mean for ordinary painting?—Yes.

20,419. Laying off?—Laying the work on with ordinary brush.

20,420. (Mr. Parsonage.) It would be a difficult matter to do a large ceiling without stippling?—Yes.

20,421. (Mr. Sutherland.) You are dealing with a ceiling?—Yes, or stippling walls. You could not very well do a wall without stippling it.

20,422. The walls of this room are not stippled?—Are they not?

20,423. (Chairman.) Would it be a good thing to have periodical medical examination by a surgeon having power to suspend men who are afflicted by lead-poisoning in its early stages?—No, I would not be in favour of that myself, because you could not very well examine a man every day. If you had the doctor round every fortnight you might have men dead in the interval. Lead-poisoning does not wait until the doctor is coming round.

20,424. Would it be practicable to make a medical examination of the men, say, once a month, taking into account that they are spread all over the country at different jobs?—It would be a big undertaking, and a costly one, too, because there are so many little jobs going on and some people would think it a nuisance to have a doctor coming to the house because they were just having a few days' work done by a couple of painters.

20,425. The doctor would not necessarily come to the house. The painter would probably have to go to the doctor, or some arrangement would have to be made to mass the men together for the doctor to examine them?—I see.

20,426. What is your main objection to a system of medical examination?—I do not know. I have never thought of that part of the subject really.

20,427. Is much compensation for lead-poisoning claimed under the Workmen's Compensation Act?—Yes.

20,428. (Mr. Sutherland.) Do you know that of your own knowledge?—Yes. I have been in receipt of compensation myself.

20,429. (Chairman.) Can you tell the Committee what amount of compensation has been paid in your own branch?—I am not sure. In my case I received 100l. not very long ago.

20,430. Are there many other members of your branch who have had compensation?—One man I know received 90l.; and in the case of another man, who died, his widow received, I think, 240l. I forget the details of two other cases now.

20,431. Do you find that the men are quite willing and anxious to claim compensation?—I do not know about that, I am sure. I have never discussed that with them.

20,432. I will put it the other way; do you find men reluctant to claim compensation?—I have known one or two men who have been reluctant to claim compensation when they have thought that the complaint would soon pass off, or that they would soon get better.

20,433. Why should they be reluctant to claim compensation which must obviously be to their advantage?—Well, it is difficult to say, unless there might be a thought behind the man that it would militate against his getting work afterwards. There may be some thought like that.

20,434. Have you ever heard of such a case?—I never had any hesitation myself, speaking from my own experience and my own thought about the matter, in claiming compensation. The doctor said that I was suffering from white-lead poisoning, so I sent the claim in.

20,435. Has it acted adversely to your getting work?—Well, you see, I am not properly better though I have started work. I am doing a little, but I have not been to shops where I usually work to apply for work. The insurance people might raise the premium against people who have been afflicted; but I do not know from my own experience that they do that, or that it would have any effect.

20,436. To sum up, so far as the methods of painting in vogue to-day are concerned, do you assert that it is impossible to stamp out the evil of lead poisoning without replacing the lead by some non-poisonous substance?—Yes, I think it is impossible.

20,437. Have you yourself had any experience in the use of non-poisonous substitutes for white lead?—Yes. There are many patent painting materials on the market, but a workman has very little opportunity of ascertaining what proportion of lead, if any, they contain, as most of them have been introduced chiefly from the point of view of cheapness. Some of the materials I have used are much more economical than lead, being more easy to use, and consequently more work can be accomplished in a given time; but whether such work is more durable than lead I am at present unable to say, without going into some special investigations.

20,438. Have you formed any opinion as to their practicability for general use?—Yes. I think it is quite practicable to use substitutes for lead, even for outside work. I used to think that there was nothing like white lead for outside work, but I believe that outside work can be protected, and is protected now, by enamels and varnishes.

20,439. Would it be always practicable to have enamels and varnish for outside painting?—Yes, I think so. You can get varnish made with any gloss.

20,440. Do you know whether it would be more costly to enamel any varnish outside painting?—It would not be any more costly.

20,441. Do you know that?—I am certain it would be more economical.

20,442. But with regard to its initial cost?—Perhaps the initial cost would be more—a coat of varnish extra; but it would be more durable, more lasting.

20,443. Would it retain its colour longer?—That is another point altogether. Colour has nothing to do with durability.

20,444. But surely the appearance of the house has a good deal to do with the subject?—Yes.

20,445. If you say that enamelling lasts longer but gets a dirty colour, it would not satisfy the owner of the house, would it?—With regard to colours, I would not like to say anything.

20,446. You have told us that, when you are working with lead paints, you feel ill effects upon yourself?—Yes.

20,447. Have you noticed any difference when you are working with substitutes?—Yes. I do not know whether it is general amongst other men, but lead affects me; but when I am working, say, with distemper I do not have that sort of feeling.

20,448. My question had reference to a substitute for lead—zinc, say?—It does not have the same effect on me. Using zinc white, for instance, does not have the same bad effect as white lead.

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- 20,449. We have been told that a painter who is used to lead paints may, at first, find some difficulty in applying zinc and other leadless paints. Do you find any difficulty in using zinc and other leadless paints?—No.
- 20,450. Do you think that any such difficulty should occur, either with zinc oxide or lithopone paint?—No.
- 20,451. (*Dr. Collis.*) When you had the illnesses to which you referred, how were the bowels? Were they opened easily or not?—No, they were not.
- 20,452. What was the longest period that you can recall during which you had constipation?—Do you mean the longest period between the motions of the bowels?
- 20,453. Yes?—Three or four days.
- 20,454. Was it the effect of medicines which you had taken?—It was the effect of hot water poultices and hot water fomentations and an injection.
- 20,455. You had to have injections?—Yes.
- 20,456. Into the lower bowel?—Yes.
- 20,457. To get action of the bowels?—Yes.
- 20,458. Have you often had to have such injection?—No, not since.
- 20,459. You have always since been careful?—Yes. I take medicine when I feel the least indication. I take medicine quickly. My liver is all wrong now. That is the effect on my system.
- 20,460. What induced you to have those injections? Was it the doctor's orders?—Yes, the doctor sent a nurse in the first place.
- 20,461. To give the injection?—Yes.
- 20,462. Have you ever heard of any of your fellow-workmen being similarly troubled?—Yes, I have.
- 20,463. And having had to have injections?—Yes.
- 20,464. I lay stress on that, because it quite fixes the diagnosis of lead poisoning. You never get obstinate constipation from turpentine. Was the piece of work to which you referred where the doctor came to see twelve men, in London?—No, in a place called Bedule in the North Riding of Yorkshire. The house was called Thorpe Peril.
- 20,465. Was it the employer who sent for the doctor because the men were getting ill, or how was it that the doctor was called in to see you all?—I could not say as to that: I forgot.
- 20,466. It was some years ago?—Yes; it was in 1892.
- 20,467. (*Mr. Sutherland.*) Was it a London employer?—Yes.
- 20,468. (*Dr. Collis.*) I understood you to say that the doctor was called in to see all the twelve men. Did you send for him yourself, or the foreman, or how did the doctor come to see you all?—I forget now.
- 20,469. Referring to another point, is varnish used to any extent in lead paints which are used for outside purposes now?—Yes; the work is often varnished after it is painted; a little varnish is often put in the paint.
- 20,470. Often put in paint used for outside purposes to-day?—Yes.
- 20,471. When you are using substitutes for lead, is more varnish or about the same amount put in?—I could not say whether it is more or the same amount. It is varnished afterwards.
- 20,472. But is the varnish incorporated at all with the paint itself?—I think it is in the case of some of these patent paints.
- 20,473. (*Mr. Sutherland.*) But you do not know?—No.
- 20,474. (*Dr. Collis.*) I only want what you know. You know of your own experience that varnish is used to-day to a certain extent in some lead paints which are used for exterior purposes?—Yes.
- 20,475. But you are unable to say whether more varnish is wanted for the other paints except as regards the last coat?—I could not say whether more varnish is wanted to mix up with paint, but I should say that any substitute wants varnishing afterwards—or, I do not know about any others.
- 20,476. (*Mr. Sutherland.*) For outside work?—Yes.
- 20,477. (*Dr. Collis.*) You think that those paints generally require a coat of varnish to finish?—Yes.
- 20,478. And lead paints do not always require that coat of varnish?—Yes.
- 20,479. (*Chairman.*) You are not an expert paint mixer, are you?—No; I do not know anything about substitutes.
- 20,480. (*Mr. Sutherland.*) There is not much broad work varnished outside, is there; I mean walls. Stucco is not varnished, is it?—No.
- 20,481. It is generally done with oil paint, and left at that?—Yes.
- 20,482. What substitutes have you had experience with?—Zinc.
- 20,483. What sort of zinc; because "zinc" is a very wide term. Do you mean zinc oxide or lithopone?—Zinc oxide. There are a lot of substitutes for lead which I really do not know the names of. I know they are substitutes for lead.
- 20,484. But your evidence is not of value on that point?—Perhaps not.
- 20,485. Generally speaking the wall surfaces of London which are painted, are painted with oil paint, and are not varnished afterwards?—Yes, that is right.
- 20,486. Varnish is an exceptional thing for special situations, is it not, like front doors and sashes?—Yes, woodwork, shop fronts and sashes.
- 20,487. It does not apply to general painting. Now have you ever heard men complain of having to provide overalls? They have never regarded the necessity to provide overalls as a hardship, have they?—It is the general custom to provide and wear overalls.
- 20,488. There is no complaint amongst decent men that they have to provide them. Have you ever heard a complaint about the accepted custom? Has it ever in your experience appeared to the men to be a hardship that they should provide their overalls?—No, I do not think so.
- 20,489. Or washing?—No, I do not think that it is considered a hardship. It is quite the custom for the men to provide overalls.
- 20,490. So that in any recommendations, if we retained the custom of the men providing their own overalls, we should not be introducing any hardship to the workmen?—No, I do not think so.
- 20,491. And the workmen generally have the overalls washed every week, do they not?—Yes.
- 20,492. They come with clean overalls every Monday morning?—Yes; there is no obligation.
- 20,493. But it is the practice?—The man who does not do it is not regarded as being quite a decent fellow.
- 20,494. He is a marked man. You have never experienced, and I understand that you do not know of, any case where a man has suffered from lead poisoning and has been penalised by employers refusing to take him on?—Well, you see I have not followed closely every case of lead poisoning that I know, because of the distances apart.
- 20,495. You do not know of any such case?—Honestly I do not know of any such case. There may be cases that I am not acquainted with for that simple reason. I live about 10 miles away; we live so far apart. Whether I shall be able to get a job as easily as before, I do not know. I live at a place called Hanwell.
- 20,496. Are you still under the doctor?—No. I still owe the doctor for some treatment.
- 20,497. That is quite another question. A good many people besides painters owe doctors money?—I would not hesitate for a moment if I felt any of the old trouble. I should go to him without any hesitation.
- 20,498. Do you think that if you had regarded the first symptoms of lead poisoning when you had them, and had sought to meet them in the early stages, you would have avoided the serious consequences?—Yes. If I had known exactly that it was lead poisoning, and had known exactly what to do, I should have saved myself a good deal of trouble.
- 20,499. So that any regulations and literature circulated amongst the trade and any provision for informing the men and guarding them against the dangers attaching to the use of lead, would really help the men?



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—Yes, I daresay they would. You are not always sure that it is lead.

20,500. What do you mean by that?—I did not know, and did not believe, that I had lead poisoning at first. I drank brandy. I kept drinking a shilling's worth of brandy. It soothed my pain for a little time. I did not dream for a moment that it was lead poisoning till the doctor told me. It would be difficult for a man himself to know that it was lead poisoning; but generally speaking I should think you could not do any harm by circulating precise knowledge.

20,501. It would put the men on their guard, would it not?—Yes.

20,502. (*Mr. Rice.*) Is this the first illness you have had?—No; I have had three attacks from white lead.

20,503. Three bad attacks?—Yes.

20,504. Is this the first illness that you have claimed compensation for?—Apart from an accident. I had an accident.

20,505. But I mean from white lead poisoning?—Yes; it is the first time I have claimed for lead poisoning.

20,506. Was there any reason why you did not claim in the previous cases?—I do not think that the Act was in force then.

20,507. I see; it was before the Act came into force? Do you think that if painters had literature sent to them by any of the authorities, they would be able to intelligently understand it and take measures against lead poisoning to prevent it?—I do not think that painters are less intelligent than the rest of the community. I think they would be able to understand anything that was written properly.

20,508. And understanding it, do you think that they would be willing to take precautions?—Yes, I think so. I think that painters as a rule are reasonable.

20,509. Do you think that they are different from other workmen?—No, I do not think so.

20,510. You have worked on buildings?—Yes.

20,511. You have seen scaffolders and other men working on scaffolds?—Yes.

20,512. You have seen them take risks, as they do by reason of familiarity with the constant danger which they are in. In other words, they become used to the danger and do not take the usual precautions which the employers wish they should. Have you ever noticed that?—Well, yes. There is a good deal of variation amongst workmen.

20,513. Do you think that painters would be different from other men employed on buildings?—I do not say that they would be different, but I say that they are much the same as other workmen. Painters have to take risks, from the nature of their work.

20,514. But my point is that you often see men taking risks because they are familiar with them. Rather than go up one ladder and down another they will sometimes jump across?—I have seen men take foolhardy risks at times.

20,515. Do you think that painters would be the same as other men in that respect?—I do not wish to set up painters on a pedestal as being better than other men. They are normal human beings. Some would take more risks and some would be more careful.

20,516. With regard to an answer you gave the Chairman, you said that it was possible for men to die between the periodical inspections—in a fortnight's interval?—Yes.

20,517. Have you ever known men to die in a fortnight? Is the disease so malignant that on one Monday it cannot be seen that a man has the complaint, and yet the following Monday fortnight he may be dead?—Yes.

20,518. It is as malignant as that?—Yes.

20,519. (*Mr. Parsonage.*) With regard to dry rubbing down between coats, have you ever seen turpentine used with glass-paper to moisten the glass-paper?—No, that is not a usual process.

20,520. It is not a usual custom at all. You possibly may have seen it done?—Yes; I have done it myself; but it is no good.

20,521. It would not answer in a general way at all?—No. I have done it for a little special job, when I could not afford to wait for the stuff to harden.

20,522. You have been asked questions with regard to cases you have known in your own branch. You belong to other branches in London just as much as to your own branch?—Yes.

20,523. Taking it generally, you would come across many men who suffer from lead poisoning apart from men who are members of your own branch?—Yes.

20,524. If literature was circulated amongst painters and they took notice of it and were ever so careful, that would not prevent lead poisoning, would it?—No, it would not.

20,525. It might make the men more careful. The main thing would be to tell them the symptoms, so that they could provide against getting dangerously ill?—Yes.

20,526. But it would not be any preventive of the disease itself?—No.

20,527. You do not think that there are any regulations possible that would prevent lead poisoning, except the prohibition of the use of lead?—No, I do not.

20,528. With regard to circulating literature, that would be mainly instructions to the painter with regard to cleanliness?—Yes, I suppose so—telling him to take a dose of salts occasionally when he found that he had pains.

20,529. (*Mr. Sutherland.*) And the labelling of all materials that contained lead as poisonous would be part of the procedure?—I see.

20,530. (*Mr. Parsonage.*) You generally work in the West End of London, and mainly in large decorators' shops?—Yes.

20,531. Not so much on building work; so you would not come in contact with building work generally?—No, I have never been on building in the West End.

20,532. Have you found it a general practice for the employer to allow time for washing hands, and to provide proper facilities?—No, they do not do that properly. The men sometimes sneak the time, but it is not given willingly, nor are there facilities for washing. The facilities for washing are better now, but they are not quite first class even now. They do not get enough clean pails and water, and the men who have to bring the water sometimes have to carry it long distances, and they do not like doing it in their own time.

20,533. Do you remember Warnings doing the Waldorf Hotel?—Yes.

20,534. Do you remember the case of a man named Smith who was taken ill at that work. You probably would not know, as he belonged to the Central Branch?—No.

20,535. He died in three days from lead poisoning. He was a fine healthy-looking man. They were working night and day at the Waldorf Hotel. An inquest was held and a *post-mortem* examination, and the verdict was "Death from lead poisoning." I saw the man six days before, and he was a fine healthy-looking man then.

20,536. (*Mr. Gardner. (To the witness.)*) When an operative painter is working on a job and gets a substitute for white lead to use, he does not always know what that substitute is, does he?—He very rarely knows.

20,537. For instance, if I, as an employer, send you down to a job, I do not tell you whether it is Griffith's white, Dixon's white, zinc oxide by direct process, or indirect, or anything else?—No.

20,538. I just say, "There is some stuff; you put it on" ?—That is right. If a painter inquired he would be considered impertinent.

20,539. He does not know what he is putting on?—That is right.

20,540. When you mix your paint you do not always use the same quantities of the different mediums on every job. In some jobs you may have more oil, and in some jobs more turpentine?—Yes.

20,541. You vary the quantity according to the job?—Yes, according to the work.

20,542. The same thing applies to making up with varnish or not. You vary the quantity of varnish in the paint according to the job?—Yes.

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[Continued.]

20,543. You might on one job put as much varnish into a lead paint as on another job into a zinc paint, and vice-versa?—Yes.

20,544. With regard to the washing of overalls, where are the overalls washed when they are taken home? They are generally boiled with soft soap, are they not?—Yes, generally with the other clothes.

20,545. Where are they boiled?—Generally in a copper in the back kitchen of the house.

20,546. Have all the painters in your own district got back kitchens with coppers attached to them?—That is another question altogether. I would not like to say.

20,547. I want to know where they are washed?—I know where mine are washed. We have a copper in our back kitchen at home; but in London there are many apartments where they have not washing accommodation and the overalls would be taken to the baths and washhouses.

20,548. They would not wash them at home, you think?—They could not, very well. There are plenty of workmen's houses in London where they have not the slightest accommodation for washing.

The witness withdrew.

Mr WILLIAM F. WALLIS (Brommend Works, Maidstone), examined.

20,557. (Chairman.) Do you attend to-day as a representative of the National Federation of Building Trades?—Yes.

20,558. You are possibly aware that we have already had a very large number of master house-painters and decorators as witnesses?—Yes, I have heard that you have.

20,559. Have you satisfied yourself that the danger of lead poisoning amongst house-painters constitutes a very real danger, and one that should be removed?—As far as my observation goes, I have not satisfied myself that it is of very great importance.

20,560. What is the nature of your business?—We are builders and contractors.

20,561. Where is your business carried on?—At Maidstone.

20,562. What is the average yearly number of painters employed by your firm?—It varies very much. At the present time we have between 60 and 70. I think you might take it that our average would not be very much more than 25. It depends on how you take the average.

20,563. How long have you been in the painting trade?—We have been painting since 1889. That is 23 years.

20,564. Have you known any cases of lead poisoning or painter's colic?—Yes. I have made inquiries. I find, in 23 years, only four cases of lead poisoning.

20,565. When did you begin to make enquiries?—When I heard that I was to be called as a witness.

20,566. Did you ever make any enquiry into the condition of health of your workpeople?—No. As far as I know there was nothing of any importance to attract my attention to the matter. Cases are few and far between.

20,567. How do you know that they are few and far between if you did not enquire?—We should have known of them in the ordinary course if they had been frequent. We should have known of the serious cases, I take it.

20,568. Would you know of any slight cases?—I do not know of any slight cases.

20,569. They have not come to your notice?—They have not come to my notice. They have not been reported.

20,570. Have your men had occasional days of sickness possibly due to lead?—That I cannot tell you; they are casual men. Our painting jobs very rarely last more than a few weeks. The fact of a man staying away for a day would not be reported to me, and there has been no sufficient number stay away to make it of sufficient importance to be regarded.

20,571. You know, I presume, that lead poisoning frequently undermines the health without immediate

20,549. (Mr. Parsonage.) They boil them in the saucepan sometimes?—They may do that.

20,550. (Mr. Gardner.) Do you know of cases of overalls being boiled in the same pot that people may use for cooking food in afterwards?—No, I have no knowledge of that.

20,551. It is quite a common practice. You roll up your overalls, and take them home; you have a good deal of lead dust on them, and are you not carrying danger into the home?—Undoubtedly.

20,552. When you unroll them, the dust is shaken all over the place?—Yes.

20,553. And you give the family a share of the trouble?—Yes.

20,554. (Mr. Parsonage.) When you have carried your food, as men generally do in London to their work, have you ever noticed the food taste of the paint?—Yes; it is never the same. You never enjoy food that is carried out—or I never do.

20,555. The food is carried sometimes in the bag that you keep your blouse in as well?—Yes.

20,556. And it might easily become contaminated with the dust in that way?—Yes.

violent symptoms arising?—Yes; I have understood that that is a general thing.

20,572. Do I understand you to say that your labour is casual labour?—We keep very few permanent hands.

20,573. So that you would not know whether, after they had been on a job with you and a job for someone else, they suffered from lead poisoning or not?—I have painters who have been with me the whole time. They are only few in number. They are leading hands. They have never suffered from lead poisoning.

20,574. The incidence of lead poisoning is published month by month by the Board of Trade; do you see the Labour Gazette issued by them?—No. It never occurred to me to look there for the statistics. I have been trying to find statistics on the matter.

20,575. When you say that you do not think lead poisoning is a serious question, it means that you have not studied it. You do not know?—I know that there is an average of 25 to 30 deaths per annum, but that is something less than one in 1,000, and it did not occur to me that that was a dangerous or alarming proportion.

20,576. Did it not occur to you that it was worth while trying to prevent that one death in a thousand?—I cannot say that it did. We have to take risks.

20,577. But not unnecessary risks?—We do not think the risk, when we take it, is unnecessary; but we do not go through life without them.

20,578. Have you noted that 284 deaths of painters have been definitely certified as due to lead poisoning in the ten years ending 1910; and 96 deaths in 1911?—I was not aware of it before this morning.

20,579. Are you also aware that about 2,000 cases of lead poisoning in your trade were reported to the Home Office voluntarily without any legal compulsion whatever in the same ten years?—I know there was an average of about 150 to 200 a year, but that seemed a small number.

20,580. How did you obtain that information?—From reading an article somewhere; I forget now where. It was an extract somewhere which I made a note of. It was probably in a newspaper in answer to a question. Mr. Gladstone said in answer to a question that there were 557 cases in four years. That is about 140 a year.

20,581. (Mr. Sutherland.) Is that house-painters?—Yes, house-painters and decorators.

20,582. (Chairman.) Now I am sure you will agree with me that all this sickness and death is very deplorable?—Yes. We do not wish at all to increase the ordinary risks of life in any shape or form.

20,583. There seem to be only two possible means of dealing with this evil of lead poisoning: one is to

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[Continued.]

issue a code of regulations; and the other is to prohibit the use of lead, or rather restrict its use within narrow limits, as for example by forbidding the use of paints containing more than 5 per cent of soluble lead compounds. Do you agree that those are the only two alternatives?—I can see no other.

20,584. Which of the two alternatives would you suggest we should adopt?—The only efficacious one, or that is likely to be efficacious, is the prohibition of white lead.

20,585. Do you think it practicable to issue a code of regulations which could be adopted by master house-painters and their men?—It entirely depends on the regulations. It is quite practicable to issue a code; it is another thing to get the regulations carried out.

20,586. But taking into consideration the kind of work that is done in remote corners of the country and the fact that workmen have to do painting in single rooms, houses where there is no proper accommodation for washing and the rest of it, do you think that it would be practicable for the Home Office to issue rules expecting them to be carried out?—It depends entirely on whether the rules are reasonable. As far as my observation goes, I have never seen one of our jobs where there was not washing accommodation or separate messing accommodation for the men. But I am not an ordinary house-painter or decorator. I do not have that class of work.

20,587. Shall I tell you what the rules are, say, in the pottery industry?—I understand roughly that they have to provide accommodation for washing, which is always done now since people have begun to study the question.

20,588. I think you may take it that the rules which obtain in the pottery industry are somewhat similar to the rules which may be introduced in the painting industry. First of all, there is the provision of overalls by the employer, who is responsible for seeing that they are regularly washed. Would you agree to that?—That does not present any difficulty. Ninety-nine out of 100 of our painters use their own overalls.

20,589. But they will have to be provided by the employer?—That would not present any difficulty.

20,590. And the overalls would have to be washed by the employer; the point being that it has been decided by expert witnesses that it is highly dangerous for these men to be allowed to take their overalls home to be washed?—I quite understand that.

20,591. Would that present any difficulty?—No. It is a matter of expense, which would have to be allowed for in our estimates.

20,592. Then, secondly, provision would have to be made for a meal room, care being taken that in no case whatever are any of the men allowed to take their meals in a room where lead is being used or where painting is being done. Would that be practical?—I should not see any very great reason against it myself. It is invariably done on our jobs, I may say. What would happen in the case of a small house being painted I do not know. I should assume that there would be one room to which they could go.

20,593. You must not assume?—This is all hypothetical. You must assume, surely.

20,594. No, you must not assume. I want to know whether you think that such a rule could be enforced?—Yes, I should think that was a rule which could be enforced, because the men themselves would fall in with it.

20,595. That is not the question. Could you in every instance be quite sure that a separate room could be provided for the men to take their meals in?—Possibly not in every instance, but in by far the great majority of instances I should think you could.

20,596. What would you suggest we could do in those instances where they could not provide a room?—The rule would probably be ignored if it were found to be impossible.

20,597. So that the rule would break down in some cases?—Yes, in some cases.

20,598. Then the next is this: provision would have to be made for a proper place to keep the overalls after working hours, where they would not contaminate food

or the men's outdoor clothing and where they would not collect unnecessary dust when not being worn. Do you think that such a provision could be enforced?—Yes, I should think that that could reasonably be enforced.

20,599. Could you tell us what you would do in cases where there is no room for the workmen to take their meals in?—There would be one room, surely, for them to hang up their overalls, would there not? I can hardly conceive of a case, even in a small house, where they could not hang up their overalls. The smaller the house, the fewer the painters. They could hang up their overalls in the kitchen or scullery or one of the out-buildings.

20,600. You are going to transfer the danger from the painters to the other occupiers of the house?—That is so.

20,601. That would not be very good for the occupiers of the house?—You could arrange that the overalls should be kept away from the food. I should imagine that there would be no difficulty in getting an out-house or bicycle-house to hang them up in the dry. Provision of a special place means providing a shanty.

20,602. It would present great difficulty?—Yes.

20,603. Then there is provision for cloak-room accommodation, so that clothing put off during working hours shall not under any circumstances remain in a room where lead is used?—That presents greater difficulty even than the overalls, which would already be tainted. It would not be necessary to keep them apart. These might be hung up in the same room as the overalls.

20,604. That would be objectionable?—Yes.

20,605. You consider proper washing accommodation to be very important?—Yes.

20,606. The provision in the pottery trade—and as, I have told you, I do not suppose that the Home Office would issue regulations that would be any less drastic—enacts that one basin or other utensil shall be supplied to every five men?—That is ample, one would think.

20,607. Do you think that that would be possible?—I think it would er on the side of amplitude.

20,608. I did not ask that; but do you think that it is possible?—Everything is possible.

20,609. You can hardly say that, can you?—You cannot say that it is impossible.

20,610. I want to know whether you think it would be possible to adopt that throughout the trade?—I doubt whether it would be adopted strictly. There would be washing accommodation provided, but I doubt whether you would get one utensil to every five men.

20,611. Would it be possible to provide hot water?—Yes, I think so.

20,612. In every case?—Yes; in all the cases with which I am more specially connected it is quite possible to provide hot water, and it is provided.

20,613. I do not want you to speak for other places, but from your own knowledge of the trade, do you think it is possible to provide hot water in every case?—Hot water is always available at meal time. I have never known a case where it would not be possible to do it.

20,614. Would the employers allow certain time for workmen to wash their hands?—Yes; that is quite the custom.

20,615. Out of the time of the employers?—Yes, three or four minutes before knocking off time.

20,616.—They would not mind having that enacted by law?—No. We should have to put up with it if it was enacted by law.

20,617. Ten minutes?—Five minutes is ample if proper washing accommodation is provided.

20,618. Would the employers agree to provide nail brushes, soap, and towels?—I have never had nail brushes asked for.

20,619. Nail brushes are most important, because lead paint gets under the nails and remains there?—I quite see the importance of it.

20,620. Do you think it would be possible to be quite sure that all these towels and soap would be regularly supplied clean to the men?—All that the employer could undertake to do would be to supply them.

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[Continued.]

20,621. He would have to put them in the hands of somebody who would see that they were distributed at the right time, and so on?—I take it that they would be with the water and the towels.

20,622. You think it quite possible?—Yes.

20,623. To whom would you give such a task?—The foreman painter would see that he had the necessary accommodation. He would ask for it and get it.

20,624. If you had a country job, would the foreman painter take so many towels down?—Yes.

20,625. He would take so many nail-brushes and so much soap down with him?—If it were in the regulations he would have to do it.

20,626. But would it be always done?—That I cannot say.

20,627. As you said just now, it is quite easy to make regulations but the difficulty is to enforce them?—Yes.

20,628. Now I will take you to another point: provision would have to be made for the avoidance of dust. Some means would have to be devised for getting rid of any dust which the men might breathe. Do you think it is possible in every case, by means of an exhaust draught or the like, to remove the dust from the men while they are at work?—I think it is quite impossible.

20,629. Now with regard to the fumes in burning off and the spray which may be breathed in certain operations, what would you suggest as a remedy for that?—I can suggest nothing for that. If you have anything in the shape of a draught they cannot use the burning off apparatus.

20,630. In addition to these regulations, periodical medical examination of the work people, say once a month, would be insisted on at the expense of the employer?—That would be very onerous.

20,631. Then in the pottery industry, in addition to medical examination, the employers have agreed to give compensation to any worker who is withdrawn from work by the doctor's orders on account of doubtful health. Let me give you an illustration of what I mean: Supposing the doctor examines a workman and says, "Look here, you have not lead poisoning yet, but you are very near it; I must suspend you for a month"; in such a case the employers have agreed to give that man compensation for that month. Would you agree to give similar compensation under similar circumstances?—Well, not willingly; but if it were a regulation we should have to conform to it.

20,632. Now taking all these points into consideration, would you say that you prefer that the industry should be regulated by special rules such as I have foreshadowed, or, as an alternative, that the use of lead should be prohibited or very closely restricted?—I am decidedly in favour of prohibition. We are quite over-pestered, one may say, with rules and regulations in factories now, and the more they accumulate the more increasingly difficult it becomes to see that they are carried out.

20,633. (Dr. Collie.) Have you used, to any extent, paints which do not contain lead?—Practically not at all.

20,634. So you have no experience of their value?—No.

20,635. (Mr. Sutherland.) The medical examination would probably work out at about 6d. a man per term, whatever it was, say a month. That would not be very onerous, would it?—No, not if it worked out at that sum; but I do not know that it would.

20,636. The provision of overalls is already made by the men?—Yes, by the best men.

20,637. And there is no reason why they should not continue to be made responsible, in any reasonable regulation, for doing what they have always done?—Yes.

20,638. There would be no hardship?—No, there would be no great hardship there.

20,639. With regard to country jobs and the provision of washing accommodation, on all your country jobs you send the foreman. He represents you and has complete charge?—Yes.

20,640. He would take the towels and nail brushes and distribute them?—Yes. I do not see any great hardship in that.

20,641. You have to guarantee that the men would have the facilities?—Yes, we would have to guarantee that the men would have the facilities. I could not guarantee that they would avail themselves of them.

20,642. Not even with the best regulations?—No.

20,643. If you give the men the facilities, your obligation to the law is met, if it is the law?—Yes.

20,644. In most houses you get an empty room for the men to dine in, and so on?—Yes. I have never known a case where it was not available; but I do not do small work.

20,645. If a regulation was made, would it not be reasonable to compel the householder to give the master painter facilities for rooms?—Yes.

20,646. Should not they bear part of the burden as well as the master painter?—I should think that that was quite reasonable.

20,647. You have no knowledge of substitutes?—No.

20,648. So you do not know what you would be going on to if white lead were abolished?—No. We have used zinc white, but in very very small quantities. All our work is done to specification, and I have not seen a specification where anything but white lead and oxides were specified.

20,649. That is the architect's specification?—That is the architect's specification.

20,650. Do you think that it would be a serious thing to the trade to be compelled to abandon the use of lead?—Well, painters generally are very much averse to giving up the use of white lead.

20,651. (Mr. Parsonage.) Do you mean employers?—The painters themselves. If you ask them as to a painting medium, they say there is nothing like white lead. I have asked several lately. They all say the same.

20,652. (Mr. Sutherland.) They know from long experience that it is good?—They know that as a practical material for getting good results there is at present nothing on the market, so I understand, which can approach it.

20,653. (Mr. Rice.) You are in a large way of business?—Yes.

20,654. And your knowledge would be really of large buildings where mess rooms are provided not only for painters but for other tradesmen?—Yes.

20,655. The hot water that is provided, is not provided especially for the painters to wash their hands, but is available for meals, or any other purpose?—Yes.

20,656. You have no knowledge of the methods of small employers, I take it?—No, I have no knowledge beyond what one sees in going round; but I cannot speak of that.

20,657. You agree that regulations, if enforced, would increase the cost of work?—Undoubtedly.

20,658. (Mr. Parsonage.) You say that painters say that they prefer white lead to any substitute?—Yes, from the point of view of good work.

20,659. And yet you say that you have practically tried no substitute?—I get my opinion from having asked painters.

20,660. You have asked men in your employ?—Yes, since I knew that this Committee was sitting I have asked my foreman painters what their opinion is of substitutes for white lead, and they one and all have made the same reply—that nothing gives such satisfactory results from a decorative point of view as white lead.

20,661. Have these foremen been in constant employ for you?—Yes. Not one of them has been at work for us for less than ten years.

20,662. How can they possibly have any knowledge of substitutes when you say that you do not use them, and they only work for you?—That is a point, certainly.

20,663. That is what I want to know?—They have the general knowledge of the trade.

20,664. They are just as ignorant as yourself, if they have never used the things?—Do you mean that there have been recent substitutes?

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[Continued.]

20,665. I am speaking of zinc oxide?—They all know zinc oxide and they all condemn it.

20,666. You have used very little of it?—We have used very little. Our oldest man is 72 years of age. He must have had a good deal of experience before he joined us.

20,667. There have been great improvements in that in the last few years. It is different from ten years ago?—Of that I am ignorant.

20,668. These men would not have more knowledge than yourself, so that evidence would not be very valuable?—No.

20,669. Now did you say that you provided towels for the painters?—Yes.

20,670. That is the first time I ever knew it?—They are provided, and they are provided, I assume, by our firm. They are there, I know.

20,671. Do you send towels out to the jobs?—That is a detail, but I know that the towels are there. I have seen them being used; in fact I have used them myself.

20,672. On a job?—On a job.

20,673. I am very glad to hear it. It is the first painting firm I have ever known who sent out towels to a job. If we have had evidence that others do it, I may have forgotten it?—The foreman is allowed the discretion to provide soap, towels, and water.

The witness withdrew.

Mr. T. McHUGH (99, Merton Road, Bootle), examined:

20,681. (Chairman.) Do you attend to-day as a representative of the National Association of Master House-Painters and Decorators?—Yes. I am on the Council of that Association.

20,682. You are probably aware that we have already heard a great number of master house-painters and decorators?—Yes.

20,683. Have you satisfied yourself that the danger of lead poisoning amongst house-painters constitutes a real danger and one that should be removed?—Yes. I have been of that opinion for a very long time.

20,684. There seems to be only two alternatives for dealing with the evil: one is to issue a code of regulations somewhat similar to that which has been introduced in the pottery trade?—Yes.

20,685. And the second is to prohibit the use of lead, or rather to restrict its use within narrow limits, as, for example, forbidding the use of paints containing more than 5 per cent. of soluble lead compounds. Which of these two alternatives do you think we ought to adopt?—I would go in for the total prohibition of white lead; or, next to that, I would let it be limited to using no more than 5 per cent., as you have just suggested.

20,686. (Dr. Collins.) Have you had any experience of the use of paints which do not contain lead in your own work?—Yes, zinc oxide, which everybody knows does not contain lead; and there are greens, ochres, and browns and other paints which can be made without using white lead.

20,687. What is your experience of the value of such paints for outside work?—It is pretty well understood amongst the trade that it is not absolutely necessary for interiors, but for outside work there is a feeling that there is nothing better than white lead as a body.

20,688. What is your feeling?—I have tried zinc white where white is required, and if it is well mixed with varnish I think it is almost equal to white lead. I look upon it in this way: in years gone by large buildings were mostly coated with stucco or cement and such buildings with cement fronts had half a dozen coats of paint. Plenty of white lead was used in those days. Those buildings are now getting obsolete. In modern buildings the outside is mainly constructed of stone, Carrara, composition marble, terra cotta, and that sort of thing. Very little white paint is now required outside—principally on window sashes and such like.

20,674. You have never heard a workman objecting to provide overalls, have you?—They do not all, but by far the great majority provide them.

20,675. And they are always quite willing to provide them?—Yes.

20,676. The reason for the employers providing the overalls is to eliminate the danger that arises from the workman taking them home to be washed, and so taking the danger of lead poisoning into his home when the overalls are washed along with other clothes?—Yes, I understand that.

20,677. It is not a question of any objection on the part of the workman at all?—No. They frequently wear their overalls much too long. I have told them of that occasionally.

20,678. I wanted you to understand that it is not a question of the workmen objecting to it, but it is to prevent the danger from their taking them home. When you spoke of it being easy to provide a separate room, and so on, you have not had experience of London work?—No.

20,679. You know that sometimes, when doing a drawing-room, you are not allowed to go into the house but you have to go up a ladder and through a window?—Yes.

20,680. You cannot even go through a door in the area. In such cases it would be difficult or impossible to get a room?—Yes. If you are doing only one room in a house it would seem to be impossible.

If there is good pure zinc oxide with plenty of varnish, in my opinion it is quite as good as white lead paint.

20,689. Would that cost much more to apply than painting with lead with less varnish?—I do not think so. Zinc paint costs a little more in market value, but there is more bulk. Even with white lead paint we use varnish to get a nice glossy effect. If you put a little varnish with zinc white paint, to my mind it has almost as good a body.

20,690. To get the same effect from zinc paint as from lead paint, is there much difference in the amount of varnish that requires to be added?—Not much.

20,691. So the question of difference of cost is not very great between the two?—In my opinion it is not.

20,692. As prices rule to-day probably zinc would be cheaper?—Taking the present prices of lead, yes. There is no doubt that if white lead was totally prohibited the price of zinc would go up unless a substitute was found. If prohibition was announced the manufacturers would concentrate their minds on getting a good substitute. Many manufacturers are trying that now. They are continually sending you samples of goods which they claim are equal to white lead.

20,693. You do not consider that there would be any very great upheaval in the house-painting trade if such a prohibition came in with a certain time allowance?—No, quite so—not with a reasonable time. I am a member of the Liverpool Master Builders Association; and President for this year. The Association has about 400 members and comprises all branches of the Building Trade, including the painting trade of the City. You have already had evidence from two of our representatives who were sent here. We resolved that we would rather vote for total prohibition of white lead than be hedged in with any onerous regulations or restrictions. In a factory you can carry out restrictions.

20,694. (Chairman.) There is a great difference in that respect between house-painting and factory work?—Take my case for instance. Our jobs may lie within an area of ten miles. There may be a job here, another a mile away, and another two miles away, and so on, three or four men working on one job, and three or four working on another. It would be absolutely impossible to carry out any Government regulations. You would have to leave it to the workmen to carry

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[Continued.]

them out, and they might not be carried out; or you would have to have an inspector to go round. I have read, as a citizen of Liverpool, of lead poisoning, and I have known two or three inquests held on men who have died of lead poisoning. I am supplied every month with the Government Labour Gazette, and I see from that the number of cases throughout the country is simply appalling. The study of long life and good health should be placed on a higher plane than the exigencies of commercial requirements, especially if a substitute can be found.

20,695. (*Mr. Parsonage.*) Zinc oxide is being more largely used in Liverpool, is it not?—Decidedly.

20,696. During this last year or two especially?—Yes. I might mention in support of that, with regard to enamel work, that nearly every paint manufacturer has a special form of enamel that has a basis mostly composed of zinc. To get good results, it is necessary to use zinc as a body before using the enamel. In the old days you would put a gloss coat of white lead, and have flatted white lead, and so on. Nowadays it is nearly all zinc with enamel on top of it. In nearly all new buildings coming on now, water paint is used on the walls, say in a building like this, with ornamented relief plaster decorations. So to my mind there is less necessity year by year than in the past to use white lead. Twenty years ago I would have said it was impossible for a painter to do without it, but we are gradually drifting away from that.

20,697. A good workman finds no more difficulty in using zinc paint than in using lead?—None whatever. I should be astonished for any painter to say that he did not understand how to use zinc paint or apply it. If he did not do good work, I would say that he was an incompetent man, and I would have no room for him.

20,698. If a man is a painter he can apply both?—Yes. In every well-regulated shop zinc oxide is there daily. We have the two things lying side by side.

20,699. I believe that in Liverpool you insist on having painters?—I hope so.

20,700. Have you any understanding with the Painters' Union to employ trade unionists?—Yes. We have just entered into a new agreement for four years, that the Master Builders' Association, which, as I said before, comprises the painting trade, will employ none but trade unionists. On the other hand, the union painters have pledged themselves to work for none but members of the Master Builders' Association. The object of that is to try to lift the trade from the rotten state it has got into. Take Corporation contracts, schools, and public buildings of that kind; we have evidence at different times of an employer employing one man and 15 apprentices, or something like that, or taking on apprentices and improvers wholesale, and discharging when slack. We have tried to stop that. We have agreed to employ only one apprentice for every four operatives. That is for the general uplifting of the trade, and I think that the public will gain by the arrangement in the long run. I do not want anyone to imagine that we are trying to fleece the public in any way. We know that the public is fleeced when it gets shoddy work, and thinks that it is getting work done cheaply. If the public will accept the lowest standards, it is not really getting work done cheaply. There will be more scope under our arrangement for an elderly man. A man who is a little on in years, over forty years of age, is practically crushed out at present.

20,701. There have been a good many lead poisoning cases in Liverpool?—Yes, there have from time to time, especially among ship painters. The danger lies not so much in outside work, but in confined places where doors, windows, and everything must be closed to get a good result—with no dust flying about.

20,702. (*Mr. Rice.*) Did I understand you to say that you were President of the Association of Master Builders in Liverpool?—Yes.

20,703. As well as a representative of the Master Painters' Association?—Yes. I am on the Council of the National Association of Master Painters. That is the question the Chairman asked me at first. I am also the President of the Liverpool Master Builders Association, which comprises the painting trade of the city as well as all the Branches in the building trade. The building trade, I need hardly tell you, comprises a number of trades. In Liverpool we have them all grouped into one Association.

20,704. Did you have a meeting to discuss this question?—Yes, we did.

20,705. Was it the unanimous wish of the builders to have prohibition instead of regulation?—Yes, it was. Our two representatives, Mr. Frank Griffiths and Mr. Morton, two large employers in Liverpool, were elected to give you gentlemen evidence accordingly. I was asked to go at the time but I could not manage it.

20,706. Why did the Liverpool Association of Master Builders discuss this question?—It came in the first place from the National Association. We are federated in different parts of the country to what are called "County federations," and then with the National Association of Building Trades Employers of Great Britain and Ireland, the offices of which are here in London. Mr. White is the Secretary. I am also on the Council of that Association. The question was discussed in London, and then the result was sent out to all the federations and the local associations. It was unanimously, I think, agreed throughout the country, or it was fairly well agreed, that rather than have any further restrictions on the trade they would have total prohibition. That conveys to my mind that it is not absolutely necessary to use white lead. We can have substitutes if the law declares that lead must not be used. With regard to employing trade unionists, we have agreed with the painters, and now we are negotiating with the plumbers, and we have every hope that the same arrangement may be carried out.

20,707-12. (*Mr. Parsonage.*) The men have breakfast now before they start?—Yes. We have a full run from eight o'clock, and go right through for four hours, and from one to half past five; and we consider that there would be quite as much work done in the four hours as before. Our starting time was seven o'clock in the summer. In the winter we had two or three starting times, according to the daylight, half-past seven and eight. The breakfast time was always getting changed. We found that worked very badly. It was fixed with the best of intentions at the time, but it did not work well, and customers were continually complaining, and some employers, especially those not associated, made rules of their own to start at any time they liked. Now we let the men have breakfast before they come and start at eight and go on. That has given every satisfaction. It came in on the 1st May. Every employer seems to be well satisfied, and the workpeople too whom I have asked. There is no dissatisfaction.

The witness withdrew.

## THIRTY-FIFTH DAY.

Wednesday, 5th June 1912.

PRESENT:

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| <p>Mr. W. G. SUTHERLAND.<br/>Mr. A. GARDNER.</p> | <p>Mr. E. L. COLLIS, M.B. (<i>in the Chair</i>).<br/>Mr. J. PARSONAGE.<br/>E. A. R. WERNER (<i>Acting Secretary</i>).</p> |
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Mr. DAVID MCKILLOP examined.

20,713. (*Dr. Collis*.) What practical experience have you had in connection with the house-painting trade?—Twenty-two years.

20,714. Is that as a house-painter?—Yes.

20,715. Are you connected with the Edinburgh branch of the Scottish Painters' Society?—Yes.

20,716. How many members are there in your branch?—At the present time 549.

20,717. Are you prepared to give particulars of a number of cases of lead poisoning which have occurred among these men?—As far as I know from my own knowledge.

20,718. Will you give first the details with regard to Hugh Blyth?—He was a member of the branch for a while. He was laid up badly, but he was not certified at the time to be suffering from lead poisoning. He was confined in Bangour Asylum with general paralysis.

20,719. In whose employment had Hugh Blyth been?—He was for many years with Messrs. Dobie. He was a decorator and sign-writer there.

20,720. Did he have an attack of lead poisoning some years ago?—Yes; his wife told me that he had been off badly through lead a number of years ago; she did not state how long.

20,721. (*Mr. Sutherland*.) You do not know how long?—No, I do not know how long.

20,722. (*Dr. Collis*.) He was taken to Bangour Asylum, and certified to be suffering from general paralysis?—Yes; he is now dead.

20,723. Did the doctor of the asylum mention to Mrs. Blyth that her husband was suffering from the effects of lead poisoning?—Yes.

20,724. When he had his previous attack, before he went to the asylum, was he certified as having lead poisoning?—He was not a member of our branch then. I only know what Mrs. Blyth told me.

20,725. You do not know whether he had compensation; or was it before the Compensation Act was passed?—Before the Compensation Act was passed.

20,726. How long is it since he died?—October 1909.

20,727. Did he have any compensation at all, do you know?—No.

20,728. Have you anything to say regarding the shopman at your own place of employment?—He is not there now, but he had two or three definite slight attacks, three weeks, a fortnight, and so on, occasionally.

20,729. (*Mr. Sutherland*.) What was his name?—William Crawford.

20,730. Employed with whom?—Thomson, 66, Newington road.

20,731. Leith?—Edinburgh. He was at that time employed there.

20,732. (*Dr. Collis*.) Was his case notified?—No; he was treated at the infirmary.

20,733. Do you know whether he made any claim for compensation?—No, he made no claim.

20,734. Are these names to go down in the printed evidence, or do you want them left out?—It is immaterial to me.

20,735. Very well. Can you refer to other cases among members of your branch?—There is one of

them here, James Watson. Two years ago, in March, he was affected with lead poisoning in the left arm.

20,736. Did the doctor see him and say that it was lead poisoning?—He was certified for that, and got compensation. He was off for eight weeks.

20,737. Have you known any other cases?—Another one was treated for nephritis, a member of the branch.

20,738. That is Bright's disease?—He only worked five weeks during the year before last. He had no compensation, although the doctor said that there was lead in his system.

20,739. Had he been employed for many years as a house-painter?—Yes. I think he had been a good few years employed.

20,740. (*Mr. Sutherland*.) Was he a regular painter?—Yes.

20,741. (*Dr. Collis*.) Have you met with a case while you were temporarily employed at the Science and Art Museum?—Yes. He has had several attacks, and last winter he had a very severe attack.

20,742. Did he make any claim for compensation?—No.

20,743. (*Mr. Sutherland*.) Who was this?—The permanent painter at the Science and Art Museum at Edinburgh.

20,744. What was his name?—William Walsh. They got the sick allowance. It is a Government institute. He was allowed sick pay for so many weeks.

20,745. (*Dr. Collis*.) What Government institute is it?—It is the Royal Scottish Museum of Science and Art. He got sick pay.

20,746. Therefore, he would get his sick pay and not bother to claim for lead poisoning?—No, there was no need for compensation.

20,747. That was not so with the other man you mentioned just now who was ill for three weeks?—The one with nephritis was off for nearly twelve months.

20,748. But he made no claim?—No.

20,749. (*Mr. Sutherland*.) Was that the man with Thomsons'?—No, the one previous.

20,750. Hugh Blyth?—No, the one after Hugh Blyth, the shop man.

20,751. What was his name?—William Crawford.

20,752. (*Dr. Collis*.) Can you account in any way for the fact that the people in the North do not claim compensation always?—Yes; some of them are afraid that if they do they will lose their job. They have, perhaps, been for some time in the shop. The insurance companies press employers to get rid of men. That is only a suspicion.

20,753. (*Mr. Sutherland*.) You have no knowledge of that?—No.

20,754. (*Mr. Gardner*.) Your knowledge is that these men find difficulty in getting employment afterwards?—Yes. They would rather try to keep it quiet.

20,755. (*Dr. Collis*.) The men do definitely find difficulty in getting employment afterwards if they claim, and consequently they do not claim?—They do not claim.

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[Continued.]

20,756. Do you think that this might in any way account for the fact that we do not hear much of lead poisoning in Scotland?—Yes; that is my opinion.

20,757. Can you also give us particulars regarding a chronic case of which you have knowledge?—Yes. That refers to a man working alongside me for many years.

20,758. Will you tell us about it?—He was off badly for 13 weeks in 1899, and confined in the infirmary for a while.

20,759. (Mr. Sutherland.) What was his name?—Robert Johnson.

20,760. Of where?—The same employment—Thomson, Newington Road, Edinburgh. In 1901 he had 15 weeks off. He seemed to take it every alternate year. And then he had 11 weeks off in 1903, with slight attacks betwixt times for perhaps a day or two. Two years ago he claimed compensation from his employer at that time, who was Hall, in George's Street. Then Hall's insurance people went to Thomson's insurance people, and the two of them had to divide at the finish. It never went to the court, although it was going there. He got somewhere about 16 or 18 weeks' compensation between the two firms.

20,761. (Mr. Sutherland.) Is he still alive?—No, he died a fortnight ago.

20,762. (Dr. Collis.) Do you know what he was certified to have died of?—Yes, an ulcer; nothing to do with lead. I made inquiries.

20,763. Lead does not appear on the death certificate?—No, it does not appear on the death certificate. It was hemorrhage and an ulcer. There was a peculiar name attached to it, which I cannot remember.

20,764. Duodenal ulcer?—Yes, something like that, I dare say.

20,765. Do you consider that there is great danger from inhaling dust containing lead?—Yes. In the case that I referred to of Johnson it was always after sandpapering work that he seemed to be affected. He seemed to inhale the dust after sandpapering work.

20,766. Is it possible to avoid breathing particles of lead when you are rubbing down with sandpaper?—No; unless there is some invention for protecting the mouth and nostrils.

20,767. How could that be done?—They could have muslin, gauze, or something of the sort put over the mouth and nose.

20,768. Do you think that if such an apparatus was supplied it would be possible to get the men to wear it?—Some men would; I do not say they all would unless you made it compulsory.

20,769. But if it were made compulsory, how would you compel the men?—The chargineman would have to be responsible to the employer to see that it was carried out.

20,770. If it was not carried out, what could happen?—I do not know what the result would be.

20,771. You speak of the chargineman. On a piece of work which is being carried out in a private house, the chargineman is not always present, is he?—He must always be on the job.

20,772. But sometimes from one's own acquaintance with painting, certainly in the South, where the piece of work is, to use a colloquial expression, kept warm by a single man only, perhaps four or five men start the first day and look as if they were going to do the work fast, and they all disappear, and one man only comes. There is no chargineman on the spot at all?—He will be the chargineman himself.

20,773. How is he going to compel himself? In these cases you could not bring any influence to bear on the man?—No.

20,774. And that is not an unusual condition, is it?—It is very frequent at this time of the year.

20,775. Have you ever seen a respirator which you would regard as comfortable, and which you would have been pleased to wear yourself?—No, I never did.

20,776. How long do you do dry rubbing down for? What is the percentage of the whole work which is dry-rubbed down?—It depends on the quality of the job. Some jobs are never rubbed down at all.

20,777. But take the average piece of work?—I could not give any stated time. Sometimes it is about half the time of putting on the paint, and sometimes more.

20,778. (Mr. Gardner.) And other times just a few minutes?—Yes.

20,779. (Dr. Collis.) Do you think it possible to dispense with dry rubbing down?—It is a difficult question. It could not always be done away with.

20,780. It could not?—Owing to the way in which the work is done, it could not be done with water and felt, because it does not get time to stand long enough. It has to stand a few days before you start using felt and pumice.

20,781. How long?—When in a hurry you can give it a scuff with sandpaper and go on.

20,782. (Mr. Sutherland.) A scuff with sandpaper does not do it any harm, does it?—It does not break very far into the skin.

20,783. (Dr. Collis.) Do you think that that gives off dust?—Yes, especially if it is sharp colour flat.

20,784. Rubbing down with pumice stone and water is not so much used now, is it, as dry sandpapering work?—It is almost all sandpapering.

20,785. Does there appear to be any tendency to introduce pumice stone and water?—No; it is a thing of the past.

20,786. It is going out rather than coming in?—Yes.

20,787. Do you consider that the wet process is suitable for rubbing down old paint?—That is preparation work. You use hard pumice and water. But between the coats of paint you use sandpaper, and that is where the dust comes from. Very seldom, in preparing a job thoroughly, do they use sandpaper. It is after it gets a coat of paint on that you start sandpapering.

20,788. Not till after you put on a first coat?—No.

20,789. (Mr. Gardner.) Cheap work you sometimes rub down with sandpaper before painting, as a preparation?—If it comes so cheap as that, you do not do anything at all.

20,790. (Dr. Collis.) The wet process of hard pumice and water is used, is it not, for rubbing down old paint?—Yes.

20,791. Why can it be used for that purpose?—To cut the surface, because the old paint is hard; sometimes it is enamelled and varnished, as the case might be.

20,792. In your opinion the wet process cannot be applied to new paint-work between successive coats of paint?—It does not get the chance, unless there are many days between each coat.

20,793. How many days would you have to let the paint stand?—A week at the very least.

20,794. In Scotland do you usually apply three coats of paint?—Yes.

20,795. That is a matter of three weeks, then?—Yes, between coats.

20,796. That is prohibitive from the length of time?—Yes.

20,797. Does the rubbing down of the successive coats of new paint cause much dust in the air?—Yes, especially when it is a sharp colour flat.

20,798. Is a quantity of dust visible on surrounding objects?—Yes; you can see it on a polished table in the middle of a floor.

20,799. (Mr. Sutherland.) You cover those with the dust sheets?—I mean, if there is a little polished table you can see the dust on it.

20,800. (Mr. Gardner.) Can you see it on the floor?—If it was heavy sandpapering you would see it lying on the floor at the margin underneath wherever you were working.

20,801. (Dr. Collis.) Do you hold that in the case of new paint work this dusty process cannot be generally replaced by a wet process?—Yes.

20,802. Would you be prepared to adhere to that answer even if you knew that several witnesses had stated that dry rubbing down could be dispensed with entirely?—They must give the time stated between.

20,803. How is the filling made which is used in preparing rough work for painting?—The usual thing



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[Continued.]

is to use a dry powder. Alabastine is most commonly used now.

20,804. That is plaster-of-Paris, practically?—Yes.

20,805. You use that for filling?—Yes.

20,806. How is this filling applied?—It is made into a paste with water, and applied with a knife, and sometimes put on with a brush and sandpapered off.

20,807. Is there any danger connected with the use of this filling?—I do not think there is any with that.

20,808. Have you noticed much splashing when ceilings with moulded or raised designs are being painted?—Yes. It depends on the man and the brush he is using.

20,809. Is there any fine spray generated?—Yes, especially with rubbing down cornice and ornamental work. You cannot see it at first, but you feel it on your hands, and afterwards you will see it.

20,810. Can you suggest any way of removing the risk attendant on such splashing?—No.

20,811. Do you consider that stippling gives rise to similar dangers?—Yes, quite the same.

20,812. Could a man possibly wear a respirator when he was doing such work?—I think so, unless it was too warm for him.

20,813. It might get too warm for him?—It might get too warm for him.

20,814. We have been told by witnesses that it would be impossible to apply exhaust fans to remove the dust or the spray. Do you agree with this?—Yes, I think it is impossible.

20,815. Do you consider that there is danger in connection with the burning off of paint?—No, I think there is not.

20,816. Have you anything to say as to turpentine substitutes?—The smell is the worst. It will give you a headache, perhaps, and sore eyes, if closely confined.

20,817. (Mr. Sutherland.) That is turpentine substitutes?—Yes. Turpentine affects you too, but you soon get rid of it, I think. The others seem to hang about you much longer.

20,818. That is with the substitutes?—Yes.

20,819. (Dr. Collis.) How and where are the colours usually mixed?—We get them in a pulp. We do not know much about the manufacture.

20,820. Then what do you do?—They are beaten up with turps, and so on.

20,821. Where?—In a pot.

20,822. But where?—In the shop or on the job. There is no fixed rule. If it is a big job, it is done on the job. Some firms supply the lead made up ready as paint; others send the lead, oil, and turps to be made up into paint.

20,823. Do you ever get any of the materials dry?—No.

20,824. So that you do not think there is much danger of dust being inhaled at this operation?—No.

20,825. Can you name any other processes in which there is great danger of the painter inhaling dust or fumes?—No, I cannot think of any just now.

20,826. Have you any experience of painting with paints which do not contain lead?—Very little. There was a substitute in a shop a few years ago called Laroline.

20,827. Did you notice any difference in the use of that preparation?—The more thinners you put into it, the thicker it got; that is the fact. It seemed to curdle the more thinners you put into it. Whether it was a substitute for turps, or not, I do not know, but it did not agree with the thinner that was in the shop at the time.

20,828. Have you applied zinc paints?—Dry.

20,829. What do you mean by dry?—Made up into size colours and used as water paints.

20,830. (Mr. Sutherland.) As zinc distemper?—Yes.

20,831. (Dr. Collis.) You have not used zinc paints with oil?—Not in oil.

20,832. There are, no doubt, many processes in which the painter cannot avoid getting his hands soiled with the paint or stopping material?—He does not require to handle the stopper. He has putty boards for the white-lead putty.

20,833. Will it not get on to his knife?—Yes, but not on his hands.

20,834. Will the handle of the knife always be quite clean?—Yes.

20,835. When he is painting, is there any probability of his getting his hands soiled with paint?—Yes, every probability, especially in painting cornices or ornamental work.

20,836. Do you think that the provision and use of washing conveniences is important?—Yes, very important.

20,837. Do you consider that time should be allowed for washing before each meal and before leaving work?—Yes.

20,838. And that there should be a proper supply of soap, towels, nail brushes, and clean water?—Yes, there ought to be.

20,839. Including hot water?—No.

20,840. But do you not think that there should be hot water?—I do not believe in the hot water.

20,841. You do not believe in it?—No.

20,842. Do you find that you can wash equally well in cold?—It is my belief that hot water opens the pores of the skin, and it is dangerous because of that.

20,843. But which can you keep your hands clean with the easier?—By rubbing with oil before you use water and soap.

20,844. What oil do you mean—turpentine?—Linseed oil.

20,845. Is that always available?—It should be on all jobs where there is paint.

20,846. But frequently paint is sent out ready mixed?—You have the thinners—oil and turpentine.

20,847. Is it always practicable to have a supply of soap, towels, nail brushes, and water?—Sometimes you cannot get water, but you should be able to.

20,848. How is it you cannot get it sometimes?—It may be a new house, where there is no water.

20,849. Is that fairly frequent?—Yes, tenement work and new property.

20,850. (Mr. Sutherland.) No water at all?—Yes, on new property before the water is laid on.

20,851. (Dr. Collis.) Then you cannot get water at all?—Not unless you go a distance for it. It is not on the premises.

20,852. When it is on the premises can you always get soap, towels, and nail brushes?—No.

20,853. How is that?—Sometimes the work is in a house where you are confined to the one room. Some people restrict you to going to that room and doing your work and going out again. You are not allowed to travel through the house.

20,854. You cannot always get water even there?—No, unless it is for washing the woodwork—preparing—and you cannot do without it. You are allowed to go to the kitchen then sometimes.

20,855. You cannot get it for washing purposes?—Some people are very strict. You are confined to that room. You must not go travelling about the house. You may have the water, but not the soap.

20,856. Do you take soap and towels and nail brushes with you to the work?—No, not at present.

20,857. Is not that the custom in Scotland?—No.

20,858. Do painters usually wear overalls whilst at work?—Yes.

20,859. What do these overalls consist of?—A jacket and an apron, and some wear overall trousers. The general thing in Edinburgh is a jacket and apron.

20,860. How often are the overalls washed?—The general rule is every fortnight. Some do it every week, but it is every fortnight mostly.

20,861. Where do you keep the overalls?—Generally in the paint shop, or wherever we can. If we are only working in one room, they must lie in the same place, but in a big job a small room will be set aside as a paint shop, and the overalls will hang there usually.

20,862. When you are going to a new place to work, what do you do with your overalls on leaving the piece of work you have been doing? You take them with you, I suppose?—When you leave one job to go to another you take them with you.

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[Continued.]

- 20,863. How do you take them?—Roll them up in paper or put them in a bag. Most of the men have small bags.
- 20,864. How do you take your meals to the work?—In various ways. As I said before, you are sometimes confined to one room.
- 20,865. What do you carry your food in?—In paper, usually in the pocket.
- 20,866. Do you put it in the bag?—No.
- 20,867. Where are the overalls washed?—Generally at the usual washtub at home.
- 20,868. Are they ever washed in anything else besides the washtub?—I do not know of anything else.
- 20,869. Who does the washing; the wife, I suppose?—Yes, the wife in the case of a married man, and perhaps the washerwoman in the case of a single man—or a laundry woman.
- 20,870. (Mr. Gardner.) Where are they boiled?—In the usual washing pot.
- 20,871. (Dr. Collis.) Do they never boil them in the kyle pot?—No. Most people have a washing pot, and a kyle pot separate.
- 20,872. (Mr. Gardner.) In all cases?—It should be so.
- 20,873. (Mr. Sutherland.) All decent cases?—Yes.
- 20,874. (Dr. Collis.) Have you ever known the kyle pot used?—No, I cannot say that I have.
- 20,875. Is there any danger of dust arising from a dry overall that has been worn on the previous day?—Yes.
- 20,876. Would you advocate a periodical medical examination by a doctor, with power to suspend those whom he found to be affected by lead?—Yes. I believe that all apprentices ought to be examined before they become indentured; that is, before they go into the trade.
- 20,877. It would be more frequent than that. It would be continued during the work: every month, say, a man would have to be examined by a doctor to see if he was affected by lead?—I do not know what the results may be.
- 20,877a. If they got compensation when they were suspended, would you welcome it any more?—I would not object to being examined, but I do not know how other men might take it.
- 20,878. Do you know of much compensation for lead poisoning being claimed under the Workmen's Compensation Act?—No, not any further than I have said.
- 20,879. Have you known men to be affected with other diseases intensified by the fact of lead in their system, even if they could not actually claim to be affected by lead poisoning, which diseases might be thought by the doctor to have originated with lead poisoning?—The one that suffered from nephritis is one case.
- 20,880. Do any others occur to you?—Not at the moment.
- 20,881. To sum up, then, do you consider that it is impossible to stamp out the evil of lead poisoning in your trade without replacing the lead by some non-poisonous substance?—That is the only way to stamp it out. I do not want to abolish the use of lead myself. I do not like the idea of other things; zincs, for instance.
- 20,882. Why do not you like them?—Experience shows that these substitutes are not good.
- 20,883. You have only had one very short experience of something which is very little known?—Without lead they do not stand so long.
- 20,884. That would not matter to you, would it?—It would make more work, you think?
- 20,885. (Mr. Sutherland.) Perhaps less?—I am not accustomed to the use of these other things.
- 20,886. (Dr. Collis.) You have no practical experience of them?—No.
- 20,887. But apart from that natural prejudice against being called upon to use something which you have never used before; do you see any other way of stamping out the evil of lead poisoning?—No.
- 20,888. (Mr. Gardner.) You spoke about respirators—that the only way of keeping dust away was by the use of respirators. Have you ever known men wear respirators?—No.
- 20,889. You have never known them in your trade?—No.
- 20,890. Do you think that the men would take kindly to them at all?—It depends on how the men take it themselves. It was only an idea.
- 20,891. You know that a respirator has been used for keeping people from breathing dust, but you have no experience of using them?—No.
- 20,892. Do firms in Edinburgh use white-lead filling for filling up?—Not now; they have done in the past.
- 20,893. But have they all given it up for the use of alabastine?—Yes, they have all given it up for the use of alabastine. There may be cases now and again, but very few.
- 20,894. You do not like hot water for washing purposes?—No.
- 20,895. Why? Do you think that you can absorb paint through the skin?—Yes, I think so.
- 20,896. You have a definite opinion that you can absorb paint through the skin?—Hot water makes it liable to get through the skin.
- 20,897. But, quite apart from hot water, you think it possible that paint can be absorbed through the pores of the skin? Your objection to hot water is that you think it open the pores and drives it in?—Yes.
- 20,898. You do not like turpentine substitutes, because they are more volatile?—I object to substitutes.
- 20,899. But although they are more volatile, would that tend to lead poisoning?—I could not say whether it would tend to it or not.
- 20,900. It is a case to a certain extent of prejudice?—That is all. The smell is most objectionable, and some of these substitutes alter the colour.
- 20,901. The same thing applies to your prejudice with regard to zinc?—Yes.
- 20,902. The ordinary painter's prejudice?—Yes, I have never used it.
- 20,903. He has never used it, and he has never made any attempt to use it?—He has never had the opportunity.
- 20,904. The painter in the past has never tried to find an effective substitute for white lead. Both the operative and the master. The operative has not much chance. The employer has more. Do many shops provide washing facilities on the jobs now?—No. It depends on the men on the job themselves, and the circumstances of the house in which they are working.
- 20,905. The employer makes no provision?—No, the employer makes no provision.
- 20,906. With regard to working at a small house, you could never get your overalls and your clothes hung up anywhere else than in the paint shop?—They must just be in the room in which you are working. In an empty house, for instance, you may take the lavatory or elsewhere.
- 20,907. You never carry your food in your bass?—No.
- 20,908. Do you know men who do that?—I have seen it sometimes.
- 20,909. The first time they go to a job, when they take the bag with them?—No. They would put a piece in during the day.
- 20,910. The food is kept in the bag now and again, if not always. With regard to inspection, do you think if white lead was allowed to be retained in use that the trade is a trade which could be subject to inspection?—You would have to get every man to a certain place, say in the shop.
- 20,911. I am not dealing with medical inspection just now; but if white lead were to be allowed and regulations were made for the use of that poisonous substance, there would have to be some system of inspection to see that the regulations were carried out. Do you think that the trade is a trade which would lend itself to that inspection?—No.
- 20,912. It could not, you think?—I do not think so. You would have to have an inspector for every job.

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[Continued

20,913. (Mr. Parsonage.) You do not see any danger in burning off?—No.

20,914. You do not think that there is any danger from the fumes?—I do not think it. It depends on what they use for burning off.

20,915. I mean ordinary burning off with a spirit lamp?—I do not think that there is any danger with a spirit lamp.

20,916. Is there no danger when you have to rub it down after you have burnt off?—No.

20,917. You rub down the old stuff to smooth it down?—Yes.

20,918. Do you think that there is no danger in the stuff that comes off then?—No; it is wet.

20,919. Not always?—Yes. In most cases you polish it down with pumice stone and water.

20,920. Even then you get the stuff into the water?—Yes.

20,921. You get it on your hands; it gets on the floor, and it dries. Do you think that there is no danger in that?—Well, I have never thought that there was any danger in that.

20,922. What are the usual hours of work in Edinburgh?—The general hours are from 6 in the morning to 5 at night during the summer, with an hour off for breakfast and an hour for dinner.

20,923. Divided into three periods of three hours each?—Yes.

20,924. Do you work three hours before breakfast?—Yes. Some shops only work 2½ hours before breakfast; some firms start at 6, have 1½ hours for breakfast and half hour for dinner.

20,925. (Mr. Sutherland.) Where is that?—Dobie's; that is the only shop, to my knowledge.

20,926. (Mr. Parsonage.) That is breakfast, not dinner. Why do they allow 1½ hours?—For men who come from a distance.

20,927. Sometimes men take food with them for the week in Scotland, when they are going away for a week?—Yes, I have heard of it.

20,928. How do they carry it; they cannot carry it in their pockets?—In hampers; but I have never experienced that.

20,929. (Mr. Parsonage.) You have not had experience of zinc white, or any of the substitutes for lead that are on the market at the present time?—None, except Lumlino.

20,930. I have never heard of the material which you mention. You could not say from practical knowledge that there is no substitute that can take the place of lead?—No.

20,931. You have only used lead and nothing else?—Yes.

20,932. (Mr. Sutherland.) Was Hugh Blyth certified as suffering from lead poisoning?—No, general paralysis.

20,933. Was that brought on by lead poisoning?—Mrs. Blyth said that the doctor at the Bangour Asylum informed her that Mr. Blyth had lead in his system.

20,934. It was not certified as such?—No.

20,935. When did he break down and have to go to the asylum?—He had about 26 weeks' sick benefit a twelve-month before he went into the asylum.

20,936. What year?—It would be 1907 or 1908; I am not quite sure. He was in the asylum for close on a twelve-month.

20,937. And he died when?—In 1909.

20,938. (Mr. Gardner.) What was his age?—About 50.

20,939. (Mr. Sutherland.) He really would come within the scope of the Act of 1907?—Yes, but he was not certified.

20,940. So there was every ground for them to make a claim for lead poisoning upon if they had thought that they could have succeeded?—They did not know at that time. He was not being treated for lead poisoning.

20,941. But does not your society take an interest in its members in that way?—Yes; but then, if the medical certificate does not state anything about lead and there are no signs of lead, we do not take any action.

20,942. But the doctor at the asylum told the wife that it was lead poisoning?—But we only deal with the certificate.

20,943. Are you the secretary for the Edinburgh Society?—Yes.

20,944. It would come through you?—Yes.

20,945. Do you not inquire if a case is a case of lead poisoning?—We did not trouble.

20,946. Do you pay the benefit without making inquiry?—We get a medical certificate, and have to pay the benefit under the rule.

20,947. We may take it that this was not lead poisoning?—You may take that, if you like; but the doctor told Mrs. Blyth that there was lead in his system, but he would not certify it on the death certificate.

20,948. That the death was due to lead poisoning?—He would not certify that.

20,949. If general paralysis had been brought about by lead poisoning, he would have had a substantial claim against the insurance company?—That was not stated in the certificate.

20,950. The doctor could not certify that?—He would not state it.

20,951. He would have stated it if he had felt justified in doing so, would he not?—He only remarked to Mrs. Blyth that there was lead in his system.

20,952. We may take it that that was not a case of lead poisoning?—He had suffered from lead a number of years previously before I was acquainted with him in any way.

20,953. We have had Mr. Dobie here, and he disclaimed any knowledge of lead poisoning?—There is one in his shop at the present time who treats himself occasionally with sulphuric acid because of the lead.

20,954. Are you in Mr. Thomson's employ?—Yes.

20,955. Did not this shopman of whom you spoke get compensation for lead poisoning last year?—No.

20,956. Why?—He never claimed it, I think.

20,957. You are not as keen on claims in Scotland?—But the shopman is not a painter; he is only a labourer; he has nothing to do with our society.

20,958. It does not matter?—We do not recognise them.

20,959. But the shopman has a claim. The law does not discriminate between a man being a labourer or not?—But we do not recognise him.

20,960. Why do you think that men refrain from claiming compensation? The insurance companies, you say, press the employers. Have you ever known of your own knowledge any insurance company pressing employers not to take on a man in such a case?—You cannot get it definitely proved.

20,961. It is only an idea of yours; it is not a fact?—A lot of men do not know that they are entitled to compensation for lead poisoning.

20,962. Then they have not so much intelligence in Scotland as we have been giving them credit for. We have been looking upon the Scotch working painter as the model of all that is sound in his trade, and everything, and now you come and tell us that they do not know that they can claim?—They have been a while with an employer and do not want to be removed.

20,963. Really, I cannot take seriously what you say. It is only hearsay evidence of your own, is it not?—Only just general conversation.

20,964. Your members get sick pay when off work?—Yes.

20,965. Is the cause of the sickness generally stated?—Yes, it must always be.

20,966. Have you had any claims under the head of lead sickness?—James Watson was lead-poisoned.

20,967. Did he make any claim?—I do not mean on your society, but on his employer?—For compensation?

20,968. Yes?—Yes; he had eight weeks' compensation.

20,969. In any case, if there was lead poisoning it would be reported in your returns for sick payment, would it not?—Yes.

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[Continued.]

- 20,970. Is James Watson the only man that you know as suffering from lead poisoning?—The only man to my knowledge during my time.
- 20,971. For what period have you been secretary?—Ten years.
- 20,972. Is that the only one case in ten years?—Yes. The other cases were not members of the society.
- 20,973. In your society, 549 or 550, you have only had one case of lead poisoning in ten years?—They have not always all been in the society.
- 20,974. (Mr. Gardner.) Only a section of these men get sick benefit. They do not all get sick benefit?—No.
- 20,975. (Mr. Sutherland.) Still, you have only had one case before you in ten years?—Yes.
- 20,976. With regard to dry rubbing down, there is a tremendous lot of work that is quite innocent of dry rubbing down, is there not?—You do not do dry rubbing down in cheap work?—No.
- 20,977. And in moderate work you do not do much of it?—It depends on the quality of the job.
- 20,978. But in moderate work?—You sandpaper up to the level of the eye. In good work you are more particular.
- 20,979. Do they do that in Scotland?—I thought that they only did that in England?—In some places.
- 20,980. It is only in really good work that there is what you would call a lot of sandpapering?—A good class of work has good sandpapering applied to it.
- 20,981. I understand that you fill up with alabastine?—The most popular way of filling up is with alabastine.
- 20,982. And that is not lead?—No.
- 20,983. If you got a mouthful of that it would not poison you with lead?—No. You could spit it out easily.
- 20,984. Do you rub that down with sandpaper?—Yes.
- 20,985. And then what do you do—coat it?—Prime it and just paint it.
- 20,986. Coat it?—Yes.
- 20,987. What do you do after that?—Paint it with three or four coats till you stop the suction.
- 20,988. With regard to the coats on the top of alabastine, you do not cut down the first coat much, do you?—Not much.
- 20,989. The first coat is to stop the suction?—Yes.
- 20,990. The second coat would not have a great deal of rubbing down, would it?—No; you cannot rub very much.
- 20,991. You rub the alabastine down smooth, and the subsequent rubbing down is to take the fine nibs off the paint?—Yes.
- 20,992. And the better the quality of the painting, the less rubbing down of that kind you have to do?—Yes.
- 20,993. When you speak of sharp colour, what do you mean by that?—Flat colour.
- 20,994. Yes, but at what stage does that come—just before you enamel, or is it only a filler up?—Some firms believe in sharp colours.
- 20,995. For filling?—No, for painting purposes.
- 20,996. (Mr. Gardner.) For bringing up?—Yes. They have sharp colours as a preventive of blistering. There is very little oil in it.
- 20,997. (Mr. Sutherland.) I am speaking of inside work now?—Yes, for inside work.
- 20,998. It is not every firm that uses sharp colour, is it?—No.
- 20,999. Most of the Scottish masters who have come here—I do not know whether it is your experience—have said that they use a great deal more oil and less turpentine in their paint?—For bringing up purposes?
- 21,000. Generally—more than we do in England. Is that confirmed by your experience?—I have never had any experience in England; but most firms believe in oil for the first coat, and sharper colour for the next coat. Some firms use very little oil. Every coat is sharp colour.
- 21,001. But they do not cut down every coat?—Yes.
- 21,002. There comes a time when the coat is practically the finish, before you varnish?—You use sandpaper.
- 21,003. You would spoil your surface with sandpaper?—You make a surface for enamel or varnish.
- 21,004. You said it would take three weeks to get three coats of paint on and rub down by the wet process?—Yes.
- 21,005. Suppose you put a coat on to-day, would it take a week before you could touch it with the wet process?—It would require that, I fancy, to do it justice.
- 21,006. If you did it well with the wet process, ground pumice and felt and water, you would not want to cut down much after that, would you?—Between each coat?
- 21,007. If you really made the first coat the basis with good rubbing down, you would not want to cut down very much after that?—No.
- 21,008. So that at the end of the week you could put another coat on, and that could be very lightly done in two or three days with water?—You cannot rub it down and paint it at the same time.
- 21,009. But you do not want to rub it down much when you have rubbed the first coat down well?—You have to do the same again. The brush marks are there—the reeds.
- 21,010. It should not be so with proper painting?—It may be rougher in some places than in others. It depends on the work.
- 21,011. Taking your own time, a fortnight would do, allowing an interval between the first and the second, and finishing the third?—Yes.
- 21,012. So that that takes off 33 per cent. of your time?—But if you started rubbing down on a Saturday, you could not paint it the same day.
- 21,013. Yes, you could. For ceiling work the old flattening is being superseded by Duresco and water paints?—Yes.
- 21,014. There is not as much flattening as there was 12 years ago for ceiling work?—Water paints are taking its place.
- 21,015. There is no dust from mixing paint?—No.
- 21,016. And there is no dust in what is called the paint shop, if it is outside the room where you are working—no lead dust?—No.
- 21,017. You do not think that the Scotch housewife boils her clothes in the pan she makes the family soup in?—No.
- 21,018. If that is stated, it is a libel on Scots-women?—Yes.
- 21,019. You say that water is not always available, but you always get water for your distemper work on a job; you are bound to, are you not?—You have to go for it.
- 21,020. But if it is available for one thing, it is available for the other, is it not?—For washing hands, do you mean?
- 21,021. Yes. If you can get it for your distemper, you can get it also for your washing?—Suppose you do not use distemper?
- 21,022. There are not many houses you go in where you use all paint?—No.
- 21,023. There are very few jobs where there is not some distemping done?—That is true.
- 21,024. So if you can get the water for distemper, you can get it also for washing?—Yes.
- 21,025. Do not the masters supply towels?—No.
- 21,026. But there is usually soap sent on a job?—Not always.
- 21,027. Do you speak for other shops besides your own, or only for your own?—Just what I have been in.
- 21,028. Shops you have been in in Edinburgh?—I have been for 14 years in the present shop. I have been with Messrs. Dobie and Messrs. Hall and Moxon.
- 21,029. Do not Messrs. Hall and Moxon and Messrs. Dobie supply soap on a job?—I do not think there is always soap. There may be soap if it is a washing job.
- 21,030. (Mr. Parsonage.) Soap is not sent out specially for painters to wash their hands?—No.

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[Continued.]

21,031. (*Mr. Sutherland.*) I did not say that it was sent out specially for painters to wash their hands, but there is soap on most jobs for stipplers, for washing brushes?—There ought to be.

21,032. And there is, as a rule, is there not?—If it is a day job there will not be any soap, because it is returned to the shop.

21,033. You do not think it a hardship on the men that they should provide their own overalls, do you?—No, they are used to doing that.

21,034. They do it without any grumbling?—Yes.

21,035. They do not regard it as a hardship to keep them clean, do they?—No.

21,036. So that in any regulations that are passed, it would not be cruel to the men to ask them to do

what they have done from time immemorial, would it?—No.

21,037. (*Mr. Parsonage.*) Do you say that there is no lead dust in the paint shop?—I am not aware of it.

21,038. Does the man at the bench never scrape out his pots when he is going to put colour in, occasionally?—That is done away from the paint shop.

21,039. Sometimes he scrapes a pot. I do not mean burns it out, but just scrapes it round when he wants to put colour in?—Even then there is no dust. It would be a skin that he would scrape off.

21,040. The dust comes from that. It is not always a skin that comes off when you scrape a kettle. There is not sufficient on to be a skin. In sweeping up the paint shop I do not see how you can avoid lead dust.

The witness withdrew.

Mr. ARTHUR SMITH (Aberdeen) examined.

21,041. (*Dr. Collis.*) What practical experience have you had in connection with the house-painting trade?—I have had 18 years' practical experience now as a house-painter.

21,042. Are you connected with the Aberdeen branch of the Scottish Painters' Society?—Yes; I am an official of that branch.

21,043. What is your official position?—In the meantime I am auditor.

21,044. How many members are there in your branch?—They average about 350.

21,045. Have you practical acquaintance with all branches of the painting trade?—Yes, every branch of the trade in Scotland, and especially in the north of Scotland. There is no speciality; it is general work, including all branches of the trade.

21,046. Have you yourself known cases of lead poisoning?—Yes; I have experienced the preliminary symptoms myself in the shape of colic.

21,047. Let us take them in order. I think you wish to mention six cases?—Six cases.

21,048. Will you give us details of the case of James Murray, senior?—James Murray, senior, is a very old man now, and it is several years, I believe, since he contracted lead poisoning. He was an inmate of the hospital in Aberdeen for some considerable time.

21,049. Was his illness attributed to lead poisoning?—His illness was attributed to lead poisoning.

21,050. Was it notified as such, and did he claim compensation for it?—No, I do not believe that he did claim compensation for it.

21,051. How about James Thomson?—James Thomson was in America, and while preparing some work which had been filled with a white-lead filler, he rather disagreed with the dust that he was inhaling, and the following day he felt rather badly. He immediately, or within a day or two, was taken badly and was confined to bed, and was very ill for a few days.

21,052. That sickness occurred in America?—That sickness occurred in America.

21,053. Is he now at home?—He is now in Aberdeen. He was only in America for 12 months.

21,054. Has he suffered at all while he has been in Aberdeen with lead symptoms?—Subsequently to that?

21,055. Or before?—Not subsequently, I understand; and up to that time he had never suffered from lead poisoning.

21,056. How about Lynas Peacock?—He is an Englishman working now in Aberdeen. He belongs to Hartlepool. He was working as a bench man. He was taking charge of the paint shop, mixing up the paints.

21,057. Dry, or paste?—I should think it would be paste. It is only on very rare occasions that it is mixed dry.

21,058. (*Mr. Sutherland.*) Was this when he was in Aberdeen?—This occurred in Hartlepool. He is in Aberdeen now.

21,059. (*Dr. Collis.*) Where was the paint mixed?—The shop wherein the paint was mixed had a corrugated

iron roof, which was very warm, owing to the sun striking on the roof, and the smell was very disagreeable. The doctor stated decidedly that it was a case of lead poisoning. The fact of the matter is that he has not yet recovered from it. He still feels the effect. At that time the doctor attributed the disease to inhalation of the fumes.

21,060. Is he one of the members of the Aberdeen branch?—He is one of the members of the Aberdeen branch.

21,061. Is he on your sick club?—No.

21,062. Did he make any claim for compensation?—The disease was contracted in Hartlepool, not in Aberdeen. I am not aware whether he made any claim for compensation.

21,063. You do not know whether the doctor gave a certificate saying that it was lead poisoning?—I am not aware of it.

21,064. With regard to James Smith, have you anything to say?—James Smith was in London. He suffered from Bright's disease. His doctor stated that it was due to the presence of lead. He attributed it to the dry polishing down which is so prevalent in London on many jobs, and the inhalation of the dust.

21,065. Did he make any claim at all for compensation for lead poisoning?—I am not aware that he made any claim.

21,066. How about John Tennant, senior?—John Tennant suffered from wrist drop a good number of years ago. The details of the case I got from his son. He suffered from wrist drop as the result of lead poisoning. He was ill for a number of months, in fact, from it.

21,067. Had he any other symptoms—pain, colic, or anything of the sort?—Yes, he was very ill for some time.

21,068. Was this before the Compensation Act came in?—Yes.

21,069. So that he would not be making any claim?—No, that was not a case of a claim.

21,070. Then, as regards yourself, what is your experience as to illness from lead poisoning?—I never experienced colic until I came to London.

21,071. (*Mr. Sutherland.*) Are you working in London now?—No; I only worked in London for two years.

21,072. How were you affected?—With spasmodic pains, and they occurred two or three times. I went to a medical man here, and he told me that it was lead colic, and he treated me. It never really went any further, although I had some slight symptoms of colic. When I left London it disappeared entirely. I have never suffered since from it.

21,073. Did you make any claim for compensation?—No, I never made any claim for compensation.

21,074. How long were you on the sick list?—It was only a matter of two or three days.

21,075. Did you have any constipation?—Yes.

21,076. Did you have difficulty in getting the bowels open?—Yes.

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MR. ARTHUR SMITH,

[Continued.]

- 21,077. What measures did you have to take for that purpose?—I received some aperient from the doctor.
- 21,078. That was sufficient?—That was sufficient at the time. The doctor told me at the time that he was quite able to treat it then, but I ought not to let it go any further.
- 21,079. I notice in regard to these cases that you have mentioned that most of them appear to have contracted their illness while out of Scotland?—Yes, mostly.
- 21,080. Can you in any way account for that?—The one point which is striking, I think, is the fact that, in London especially, there is an immensity of white work which does not occur at all in Scotland.
- 21,081. There is not much white work in Scotland?—No. not a fraction of what there is in England, and London especially. And the work in London is done with sharp colour, whereas in Scotland it is done more with oil or varnish colour, the result being that in applying glass paper to the surface of London paint or London-painted work the dust is more easily detached than it is with the oil or varnish paint. In polishing down the surface, dust is more readily thrown off with the London colour than with the oil or varnish colour, which is more prevalent in the provinces, and in Scotland in particular.
- 21,082. Your experience from working in London and working in Aberdeen is that when working in London you are more exposed to dust than when carrying out work in Aberdeen?—Very much more. The preparatory work in London is very much more elaborate than it is in Scotland or even in the provinces of England.
- 21,083. Have you known men in Scotland complaining, perhaps, of colic and pain, even although they have not been off for any length of time from sickness or illness?—Yes, it is not at all uncommon.
- 21,084. Contracted in Scotland?—Contracted in Scotland.
- 21,085. Do you know Mr. Robert Miller, of Seton Place, Old Aberdeen, a coach-painter?—No, we have nothing to do with coach-painters in Aberdeen. They are entirely different. We deal with general house and ship work.
- 21,086. He is blind as a result of lead absorption?—I am not aware of the case. Was he a master-painter?
- 21,087. No, an ordinary painter. He lives in a cottage down there. I corresponded with him, and went to see him. Have you anything you wish to add?—There is one point with reference to the question of colic; when any of the painters experience these spasmodic pains, they resort, of course, to spirits, whisky or brandy, in very many cases. The spasmodic pains cease in a short time. They never go any further, because they consider that the cause is removed, and they never go in for any further treatment. They are absolutely in ignorance of the real cause.
- 21,088. In your opinion, is it possible to dispense with dry rubbing down?—Quite possible.
- 21,089. Could you do without it entirely?—Entirely without it.
- 21,090. Which is most commonly done to-day, dry rubbing down with sandpaper or wet rubbing down with pumice stone and water?—Dry rubbing down is more prevalent in London and the provinces of England by a very long way.
- 21,091. Have you worked in the provinces of England as well as London?—I have worked in Newcastle.
- 21,092. What percentage of the whole work is rubbed down dry on an average?—In Scotland I should say at least 90 per cent. was rubbed down dry.
- 21,093. To come to a job, how much time, while at work on that job, is occupied in rubbing down? That is what I want to know?—It is a rather a difficult question to answer, because many of the jobs are done almost entirely without any rubbing down at all, without any preparatory work.
- 21,094. But you dry-rub down between the coats, do you not?—With decent work; but much of the work does not receive polishing down between coats. I should say that on an ordinary job a matter of possibly 5 per cent of the time would be absorbed; I should not think it would be any more.
- 21,095. When you have been working in London and in the provinces, has that percentage been higher?—Very much higher.
- 21,096. How much would it rise to?—Nearer 50 per cent. It is very much more elaborate in London than it is in any other part that I know of.
- 21,097. The work is more elaborate?—More elaborate; the preparatory work especially.
- 21,098. Is that to produce a finer effect?—To produce a finer effect.
- 21,099. And it costs more?—Undoubtedly it costs more.
- 21,100. Is rubbing down with hard pumice stone and water suitable for rubbing down old paint?—It is entirely suitable.
- 21,101. Why is it suitable for old paint?—It produces a more level surface.
- 21,102. Is the old paint harder, and easier to rub down?—Yes.
- 21,103. That is the reason why it is suitable?—Yes, it cuts down better.
- 21,104. What would you say with regard to new paint?—It is too soft.
- 21,105. Can the wet process with hard pumice and water be applied to new paint-work?—Yes, provided the under surface is hardened. It depends entirely on the length of time that the work has stood. A matter of three or four days possibly would harden the under surface in most cases.
- 21,106. If you were rubbing down with pumice powder and a cloth and water, that would be more suitable, I presume, for new paint?—It would be more suitable because it would not disturb the under surface so much.
- 21,107. How long would it take a coat to harden after you had put on the first coat before you could rub down with the pumice powder and water?—It depends entirely on the nature of the material that is applied. If it is a flat colour, the surface will harden very much more rapidly than if it is oil colour.
- 21,108. How quickly would flat colour dry quite hard underneath?—In 24 hours.
- 21,109. So that you could rub down after that?—It would be quite ready for rubbing down after that.
- 21,110. And the other process?—The other process is determined by the amount of oil or driers incorporated in the material.
- 21,111. (Mr. Sutherland.) You are speaking of the wet process now?—I am speaking now of the distinction between the rapidity of the flat and the oil paint in regard to hardening.
- 21,112. (Dr. Collis.) Take a good piece of sharp work; what length of time would that take? What is the longest length of time with an oil coat before you could rub down with pumice powder and water?—If it is not thickly coated, but coated in a practical manner, a matter of four or five days would be quite sufficient.
- 21,113. Does this rubbing down of the successive coats of new paint, by the dry method, cause much dust in the air?—It causes a good deal of dust in most cases.
- 21,114. Is there a quantity of this dust visible on the surrounding objects?—It is mostly visible on the floor; but on a job where there is much dry rubbing down, the whole of the furniture in the room; if there be any, window ledges, mantelpieces and so on, usually show traces of the dust.
- 21,115. If you were dry rubbing down a door, would there be enough to leave the impress of your foot on the floor if you moved away?—Yes. If you left an article on the mantelpiece during the time the rubbing down was going on, and then removed the article, you would see traces of rubbing down all round.
- 21,116. Do you think that in the case of new paint-work this dusty process can be generally replaced by a wet process?—Yes, generally it can.
- 21,117. If you wait for the coat to set?—Four or five days at the outside is all that is necessary, even for oil paint, before the wet process is used.

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21,118. If you were using the wet process on an oil paint, would you put on three coats of paint altogether?—That must be determined by the state of the woodwork or the wall where it is applied.

21,119. What is usual—two or three coats?—On an old wall, if the wall is broken or dirty, it is necessary to give at least two coats. If the wall is in very good condition, one coat is sometimes sufficient.

21,120. Have you ever had to give three?—If it was very bad, three would be necessary.

21,121. If you are giving it one coat, is any rubbing down necessary at all?—It certainly would be slightly necessary. It depends a great deal on the condition of the wall.

21,122. But if you are going to put on one coat, and finish with that one coat, the condition of the wall must be pretty good?—Yes, quite so.

21,123. Would you have to do much rubbing down?—Much rubbing down would not be required on a one-coat job.

21,124. You do not rub down unless you are going to put another coat on?—No.

21,125. (Mr. Gardner.) You would prepare the wall by rubbing down with pumice stone and water before putting on the coat?—Yes.

21,126. (Dr. Collis.) For single-coat work dry rubbing down could be dispensed with?—Yes.

21,127. For two-coat work you have to dry-rub down the first coat at present?—Yes, between the coats at present you would dry-rub down.

21,128. If you put the paint on to-day, and you were going to dry-rub down the coat, how soon could you dry-rub down?—If it was an oil colour it would dry-rub down in two days without disturbing the under surface at all.

21,129. If you had to wait and do it by the wet rubbing process you would have to give four or five days?—Not necessarily four or five; three days would do. It depends almost entirely on the application of the material.

21,130. But how much extra time on a certain definite job would be required if dry rubbing down was abolished?—I should say that three-days would be sufficient for rubbing down by the wet process.

21,131. You would require to wait three days till it was dry?—Two or three days. The shortest time with the dry process would be one day.

21,132. But take the same piece of work. You have said that in some cases it would take four or five days for the oil paint to dry?—Yes.

21,133. In such a case as that how soon would it be sufficiently dry or hard for you to dry-rub down? Would it be as long?—It would be quite ready to rub down dry on the second day.

21,134. But with wet rubbing down four to five days?—Four to five days would be a reasonable time.

21,135. Now take a piece of work which you could dry-rub down the next day. There are some pieces like that?—Yes.

21,136. How soon would the paint be sufficiently set for you to wet-rub down?—Possibly two days longer.

21,137. That is three days?—Yes.

21,138. So that if you are applying two coats of paint, it would take two days longer to finish your work, because the last coat is not rubbed down?—Not necessarily. It may be rubbed down between coats.

21,139. Take two coats; you dry-rub down coat No. 1 and you put on the last coat, and you do not rub that down?—No.

21,140. The wet process has taken you two days longer?—Yes.

21,141. Now let us take three coats. You put on a coat, and then you wait two days extra before putting on a second coat. Is that right?—Yes.

21,142. Would you have to wait an extra two days before you could put on your third coat?—I should say that a matter of two days further would allow it to be rubbed down.

21,143. If you are putting on three coats of paint, one, two, and three, it would be four days longer before you could finish your work?—A matter of three or four days longer.

21,144. Putting on one coat, no extra time; two coats, two days; three coats, four days?—Yes.

21,145. Roughly, that is right?—Yes, roughly.

21,146. How is the filling made which is used in preparing rough work for painting?—Generally white-lead filling is mixed by the painter with japanners' gold size, varnish, and turpentine.

21,147. Do you ever use any filling which is not made of white lead?—The other fillings that are used, as far as I am aware from personal experience, are distempers, which are coming into use now in the north of Scotland.

21,148. Do you ever use alabastine?—Yes.

21,149. Have you ever used any other fillings of that character which do not contain white lead?—Hall's distemper.

21,150. As a filling?—Yes.

21,151. How is the filling applied?—With the brush or knife, according to the depth of filling required.

21,152. Do you ever rub down the surface?—Yes.

21,153. Dry or wet?—Necessarily dry.

21,154. It must be dry?—It must be dry.

21,155. Does that process give off dust?—It creates a great amount of dust.

21,156. Could you get rid entirely of white lead for filling?—Yes. I think there is no doubt but what a substitute can be found for white-lead filling.

21,157. What is your experience, for instance, of alabastine? Is it as good a filling as the white lead filling?—As a filling it seems to be quite as good.

21,158. Have you noticed much splashing when ceilings with moulded or raised designs are being painted?—It is inevitable; there must be splashing.

21,159. Do you use lead paint much for that purpose in Scotland?—Yes. It is certainly being replaced with washable distempers now.

21,160. You use it still?—Yes.

21,161. Which is used more? In the north of Scotland embossed relief ceilings are first painted with white lead, and then finished with Duresco or Hall's distemper.

21,162. (Mr. Sutherland.) Painted with a coat of oil paint first?—Yes.

21,163. Not much lead. It is thin just to make a surface?—Yes.

21,164. (Dr. Collis.) But it is lead paint?—It is lead paint.

21,165. There is splashing?—That is inevitable from the nature of the colour itself.

21,166. Can you suggest any way of removing the risk attendant on such splashing?—It is really impossible to remove the risk of splashing.

21,167. Do you consider that stippling gives rise to a similar danger?—It must do. The very nature of the material itself causes spots of paint to be thrown off.

21,168. Could a man possibly wear a respirator in doing such work?—I do not think it at all practicable. In any case there would be great difficulty in acclimatizing the men to wear them.

21,169. Witnesses have told us that it would be impossible to apply exhaust fans to remove dust and spray generated in the processes we have just mentioned. Do you agree with this?—I should certainly think it is impracticable.

21,170. Do you consider that there is danger in connection with the fumes generated in burning off paint?—Personally I do not think that there is very much danger in the fumes from burning off paint. I believe that the danger arises not from fumes, but from the dust that arises, after the burning off is completed, in polishing down the door.

21,171. How do you polish down the door after burning off the paint?—As a general rule pumice stone is used on the work which is burnt off.

21,172. The wet process?—The wet process.

21,173. Is there any dust from that?—Very little. There is practically no dust unless the debris is allowed to dry.

21,174. It falls on the floor and dries?—Yes.

21,175. And generates dust?—Yes.

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21,176. Have you anything to say with regard to turpentine substitutes for removing paint instead of burning off?—Not turpentine, but solvents.

21,177. What is your experience of solvents?—There are some very fine solvents in the market. There are two or three which I personally use, and they are superior in many cases to the burning off process.

21,178. Do they give off any disagreeable odours or smell or fumes?—Some of them do, but there is really nothing very disagreeable with the new solvents. They smell mostly of petrol.

21,179. Have you ever suffered yourself from headache or anything when using them?—No.

21,180. How and where are paints and colours generally mixed?—As a general rule, in the provinces in Scotland, they are mixed in the shop, and sent out to the job when in large quantities. Small quantities are mixed on the job.

21,181. Do you ever have to mix dry colour?—Red lead; never white lead dry.

21,182. White lead always comes as paste?—White lead always comes as paste.

21,183. To what extent do you use red lead?—Only to a very slight extent, in the case of priming ironwork, and it has to be mixed dry.

21,184. Is ironwork always treated with red lead paint?—Not always, but usually.

21,185. What do you use for putting on the ironwork besides red lead?—In many cases they do not coat the ironwork with lead preparation at all, but with some oxide.

21,186. Have you yourself painted any special ironwork with non-poisonous oxide?—Yes; on many occasions I have used oxide on the ironwork.

21,187. Is there much danger of dust being inhaled in mixing paints?—Not if the paint is in paste.

21,188. We have been over several processes. Can you name any other process in which you think that there is danger to the painter of inhaling dust or fumes?—I do not think so.

21,189. There are many processes apparently in which the painter cannot avoid getting his hands soiled with paint or stopping material. Is that so?—That is quite correct.

21,190. Do you think that the provision and use of washing conveniences is important?—It is most important.

21,191. Do you consider that time should be allowed for washing before each meal and before leaving work?—If it is to be done, time must necessarily be allowed.

21,192. Is it allowed to-day?—It is not, so far as I am aware.

21,193. In no place where you have worked, either in England or Scotland?—In no place, and as a general rule the men are afraid to take the time.

21,194. Why?—In case of victimisation. If one man suggested to the others that they ought to stop prior to the meal hour if they are working on dirty work, there is the danger that his employer might turn him out. That is the feeling amongst some of the men.

21,195. Should there be a proper supply of soap, nail brushes, and clean water?—Yes, I should say so.

21,196. Are soap, towels, and nail brushes supplied to-day?—Not so far as I am aware.

21,197. Not at any of the shops at which you have worked?—At none of the shops at which I have worked other than the shop I am at present engaged in. That is merely for the warehouse staff.

21,198. Do you think that hot water is necessary?—It is certainly better. Paint can be removed very much more easily with hot water than with cold.

21,199. Is it always practicable to obtain hot water on the premises?—It is very difficult sometimes to get either hot or cold water in some new houses, where the buildings are isolated.

21,200. But you require water, do you not, in certain of the processes, for instance, if you are using water paint?—Yes.

21,201. How do you manage to get it?—There is some difficulty in getting it. It must be got.

21,202. But if you have to get it for water paint, you get it?—Yes, but with difficulty.

21,203. When it comes to the question of washing, which is not necessary to the process, it is a bother to get it, and so you do not get it. Is that what you mean?—Yes, in some cases. In new properties, where the water is not turned on, you may have to go some distance for water.

21,204. You go some distance for the water if you want it for the paint; but if you want it to wash in, you do not?—You would not be so willing to go then.

21,205. Do painters usually wear overalls whilst at work?—Yes, but in Scotland mainly—or I will not say mainly, but in very many cases—it is the apron that is worn, and no overall trousers.

21,206. How about the coat?—They wear the short jackets and aprons, but no overall trousers.

21,207. How often are these overall garments washed?—In some cases it is almost necessary to wash them at the expiration of one week, and in other cases they will probably ruin a month before they are cleaned.

21,208. (Mr. Gardner.) The painter here wears a long blouse. In Scotland he wears a short white jacket?—Yes.

21,209. I wanted to note that point of difference?—Exactly.

21,210. (Dr. Collis.) How do they take them to the work and from the work?—They are just thrown into a basket amongst the tools, as a general rule.

21,211. How do they take their food to the work?—Usually in their pockets.

21,212. Do they ever take it in the basket?—No, I should not think so. It is not customary at any rate.

21,213. Do the men have their own overalls washed?—They have them washed.

21,214. Where are they washed?—In many cases they are sent to the laundry by the man's wife, and the laundry cleans them.

21,215. They go to a general laundry?—Not a general laundry; any private laundry.

21,216. My things might go to the same laundry?—Yes.

21,217. My handkerchiefs might be boiled in the same cauldron as your overalls?—Exactly.

21,218. And the next time I go to blow my nose, I may have the advantage of getting some of your lead dust?—It is quite probable.

21,219. (Mr. Gardner.) Is it customary for painters in Aberdeen to send their overalls to a laundry?—Quite customary.

21,220. (Mr. Parsonage.) Does not his wife wash them?—In many cases they are so dirty that the wife will not wash them, and they are sent to a laundry.

21,221. (Dr. Collis.) Really, then, they are too dirty to treat at home?—In very many cases.

21,222. The public laundry has to take them?—Yes, the public laundry has to take them, and they use strong caustic soda. They make them white.

21,223. When they are washed at home, as I suppose they are sometimes, where are they boiled?—As a general rule in Aberdeen they are just put in the wash-house boiler—in the general wash-house.

21,224. Are they ever boiled anywhere else than in the wash-house boiler?—They may boil them in an iron pot in their own kitchen.

21,225. When they have finished boiling them in the iron pot, what will go into the iron pot the next day?—That is problematical.

21,226. Is there any possibility of what is boiled out of the overalls getting into the iron pot?—I should not say that it is altogether out of the question. They may use it to boil the clothes without any knowledge of the danger, and think nothing about it.

21,227. And put the cabbage in the next day?—It is commonly termed a broth pot. They will sometimes use that.

21,228. There is, I suppose, some danger of dust arising from the dry overall which has been worn on a previous day, which might rise and be breathed?—There is a danger, no doubt.

21,229. Would you advocate periodical medical examination by a doctor, with power to suspend from



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work those whom he found to be affected by lead?—I should think it would be a necessary precaution.

21,230. Do you think that the men would object?—There is no doubt that at first they might resent what they might think was an interference; but if they were educated up to the point of knowing the danger which they incurred by neglecting it, I have no doubt that they would accept it.

21,231. Do you think that it would be easy to get the men together for such medical examinations if they were a distance away in the country?—I do not know that it would be possible to get them all together at one time; in fact it never would be possible to get them all together at one time.

21,232. They would have to be examined as they could be?—Just as they came back to the town.

21,233. Do you know whether much compensation for lead poisoning is claimed under the Workmen's Compensation Act in Scotland by painters?—I have really no information on the subject.

21,234. Have you found the men in any way reluctant to claim compensation?—I know that in the case of accident there is a reluctance on the part of some of the men to claim compensation.

21,235. But you do not know whether that is so as regards lead illness?—I do not know the position with regard to lead illness.

21,236. Have you ever known men affected with other diseases than those definitely called lead poisoning, which have been intensified by the fact of lead being in their systems?—No such cases have come to my notice.

21,237. Do you consider that it is impossible to stamp out the evil of lead poisoning entirely, without replacing the lead by some non-poisonous substance?—I do not know that it is possible absolutely to stamp it out without abolishing the use of lead, but the dangers can be minimised greatly by statutory regulations.

21,238. What is your opinion concerning care and cleanliness of individual men in guarding them against lead poisoning?—The question of cleanliness is one which, in many cases, never appeals to the painter. He is absolutely ignorant of the danger of the lead, and, therefore, he does not have any due regard to the cleansing of his hands.

21,239. Do not you think that attention to the question of cleanliness and care is sufficient to enable him to escape any possible danger?—No; I do not think that personal cleanliness would ever remove the causes.

21,240. Why do you think that?—Because personally I contend that it is the inhalation that is the main source of contraction.

21,241. You think that some men have some idiosyncrasy, possibly, which renders them more liable to the influence of lead?—They do not really understand the danger of it.

21,242. No; but one man will get lead poisoning and another will not, though both are subjected to the same exposure?—Yes.

21,243. Whether he is careful, or whether he is not?—Yes. It has been a matter of note to myself that on many occasions I have seen men who have had their hands and their faces spotted with paint, sit down and take their food out of a paper, which has been lying exposed to paint fumes all the time, and take their lunch in the room where they were working.

21,244. They have escaped?—They have escaped.

21,245. Others more careful and cleanly have not escaped?—In four of the cases which I have quoted the men were very careful, and scrupulously clean men.

21,246. And yet they went down?—And yet they all contracted the disease.

21,247. Have you had any experience of the use of paint which did not contain lead, zinc oxide for instance?—I have experience but it is a limited experience, owing to the fact that there is not much of it done.

21,248. Do you think that zinc oxide could be used as a substitute for white lead?—I believe that it is quite possible.

21,249. On what grounds—as regard colour, for instance?—The colour is very much superior to that of white lead.

21,250. How about durability?—The durability, so far as I am aware, except under very exceptional circumstances, is quite equal to that of lead.

21,251. In what circumstances do you consider that that zinc has greater durability than white lead?—In cases of sulphuretted atmosphere.

21,252. Does it keep its colour better?—It keeps its colour better.

21,253. Does it last better?—The question of durability under these conditions is one which I cannot exactly speak upon.

21,254. What is the chief objection put forward to the use of zinc oxide in paint?—The common fallacy, and it is a fallacy, is that it does not cover as well, and that possibly you would require about four or five coats of oxide of zinc to equal two coats of white lead.

21,255. Do you yourself consider that zinc oxide is wanting in the capacity of masking or hiding the surface to which it is applied?—In the case of one or two-coat work it is inferior, possibly, to lead. It is inferior, undoubtedly, in the case of one coat. In the case of two-coat work it is only very slightly inferior. In the case of three-coat work I should say that it is quite equal in masking capacity.

21,256. Can you quote any authority on this point?—Yes, the records of practical experiments published in Cassell's House Decoration, edited by Paul Hasluck, 1911.

21,257. What were the experiments?—Two wooden panels of known size were prepared in exactly the same manner. On these panels were applied a definite sample of white lead paint and a definite sample of oxide of zinc paint, and the weight of paint required to cover the panels for each coat was carefully determined.

21,258. Can you give the weight of paint per square foot in each coat?—The quantities are as follows:—

| Weight of Paint per Square Foot. | First Coat. | Second Coat. | Third Coat. | Total.    |
|----------------------------------|-------------|--------------|-------------|-----------|
| White lead paint                 | Lb. .0452   | Lb. .0309    | Lb. .0300   | Lb. .1061 |
| Oxide of zinc paint              | .0265       | .0221        | .0220       | .0706     |

21,259. What was the comparison as regards opacities?—As regards the opacities of the two materials after each coat, the following results were found: After the first coat the white lead was distinctly the better; after the second coat the white lead slightly better; after the third coat there was no difference, but the important point to note is that, whereas the three coats of white lead paint had absorbed .1061 lb. of paint per square foot, the three coats of oxide of zinc paint had only absorbed .0706 lb. per square foot.

21,260. What conclusions may be drawn from these experiments?—The obvious deduction is that under the actual conditions of painters' use, it is possible to produce an oxide of zinc paint whose opacity is equal to that of white lead paint, without prejudice to the saving of more than 25 per cent. of material by reason of the superior spreading power of the oxide of zinc paint.

21,261. (Mr. Sutherland.) This is from Hasluck?—From Hasluck.

21,262. We are really getting Hasluck's opinion?—Yes.

21,263. There are other factors to be taken into account besides spreading power in estimating the relative costs, are there not?—The other factors are the numbers of renewals necessary and the prime cost of material.

21,264. Is this still Hasluck?—I am not exactly sure but what it is Hurst.

21,265. They are very different?—I am not sure but what Hasluck quotes from Hurst.

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21,266. (Dr. Collis.) You put in a table in which all these factors are taken into account?—Yes.

|   | White Lead. | Oxide of Zinc. |
|---|-------------|----------------|
| Covering capacity in square yards per cwt.          | 806         | 1,411          |
| Price per cwt. in shillings - -                     | 32          | 36             |
| Cost (in shillings) per 100 sq. feet                | 0.44        | 0.28           |
| Times painted in 20 years - -                       | 5           | 5              |
| Cost in shillings per 100 sq. feet for 20 years.    | 2.20        | 1.40           |
| Relative economic value—highest represented by 100. | 64          | 100            |

21,267. These latter figures that you put in are not from your own personal experience, but are quotations from the book that you named?—Yes.

21,268. (Mr. Parsonage.) With regard to the wet rubbing process, when you say that work can be rubbed down by the wet rubbing process in two days, what wet rubbing process do you mean?—Ground pumice and felt.

21,269. You do not mean pumice stone and water?—No, not the hard pumice and water.

21,270. You mean nothing else but ground pumice stone and felt?—Yes.

21,271. That would take a considerably longer time than dry rubbing?—The paint would not be sufficiently hard in two or three days. The lump pumice stone could only be used on old work.

21,272. A witness here at the last meeting said that it would take twelve months before it was hard enough to rub down with pumice stone and water. The process of rubbing down, or felting down with ground pumice and felt, would take a longer time than the dry rubbing?—It would take a longer time.

21,273. A great deal longer time. Would it be practicable to introduce that to take the place of dry rubbing between coats, looking at the time it would take?—I think that it would be quite practicable.

21,274. It would add very considerably to the cost of the work?—It would undoubtedly add very considerably to the cost of the work, but only in certain cases. There are cases where it would be quite as economical to do it with the pumice and felt as it would by dry rubbing.

21,275. Why?—On certain classes of work where the work does not require any real levelling down, but merely wants surfacing.

21,276. You said that there was much more preparation of the work in London than elsewhere?—Very much more.

21,277. You mean that work is done better in London?—It is much more elaborate.

21,278. (Mr. Sutherland.) Not better necessarily?—Much better. The preparatory work is far more elaborate. And necessarily the finished work reflects the preparatory work.

21,279. (Mr. Parsonage.) You would not waste a lot of time on preparatory work if you did not want a good finish?—No.

21,280. Did you work in the West End of London?—Yes.

21,281. Would you say what firm?—I was mostly with a small firm in Portsea Place. It has now gone from there. It is 11 years ago.

21,282. (Mr. Gardner.) What do you consider the chief causes of lead poisoning amongst painters?—Inhalation of dust, I suggest, is the most prolific cause.

21,283. If we are not doing so much rubbing down, which causes the dust, what is the reason of the increase of lead poisoning? How do you account for it?—I have really no definite opinion on the question of fumes, as to whether the fumes really cause lead poisoning or otherwise, but I certainly know that the smell of white lead paint is distinctive, and I would suggest that the smell, even in itself, very often does harm.

21,284. That is, you think that white lead paint has a distinctive smell which zinc paint has not?—Undoubtedly.

21,285. You said that you thought that dry rubbing down could be done away with. Did you mean between coats, or for preparatory work?—For all preparatory work.

21,286. But not between coats?—Between coats too. The difference would be that on newly painted work, between coats, it would only be done with pumice powder—felted down.

21,287. But you replied to Dr. Collis that dry rubbing down could be done away with entirely?—It could be done away with almost entirely. I would not say absolutely entirely.

21,288. Would it not be at the expense of the finished work?—No, I should not say so. Polishing with pumice gives a far superior finish compared to the glasspapering—the dry rubbing process.

21,289. When you say that dry rubbing down could be done away with, you mean that wet rubbing down should be substituted?—Yes, I would suggest that.

21,290. I think you agree that so far as burning off paint is concerned, solvents could be quite well substituted for the lamp?—In most cases they are quite efficient.

21,291. Without doing any harm to the woodwork?—Absolutely without doing any harm.

21,292. You have had no great personal experience of the use of zinc?—Very little, not on any large jobs.

21,293. Is it much used in the North?—To a very small extent.

21,294. Can you give any reason why the master painters in Aberdeen have not taken up the use of zinc?—Well, they are just going on in the same old rut. They have used lead for a number of years, and they possibly think that they can manage better with the lead than they can with zinc. They have greater experience of lead, and therefore they have greater faith in it.

21,295. If this Committee, recognising that white lead was the cause of a good deal of trouble among the men, were to institute a set of regulations for using white lead, it would require inspection to see that they were carried out. Do you think that any system of inspection could be carried out in the trade?—I think it quite impracticable for any real system covering the whole area to be introduced. I do not think that it is possible to cover the whole area with any system of inspection.

21,296. The trade does not lend itself to inspection?—No; that is certainly the case. Some of the jobs are of so short duration that before notification could be sent the job would be finished and the men out of the way.

21,297. (Mr. Sutherland.) The master painters of Aberdeen are most of them very practical men, are they not?—I would not like to commit myself.

21,298. They are, most of them, men who have gone through the trade?—They all are, I believe, with one exception.

21,299. So we may say that they are practical men?—They are really practical men.

21,300. And their use of white lead covers a life experience of the trade?—Yes.

21,301. So that there is a sound reason for their preference for it against zinc oxide. They know the value of white lead?—Yes; but on the other hand, they have never thoroughly tested oxide of zinc.

21,302. I do not know about that?—The necessity has never arisen.

21,303. There is a large amount of water paint used?—Yes, an increasing amount.

21,304. For ceiling work and that kind of thing?—Yes.

21,305. The process of flattening ceilings and stippling, which is an objectionable one perhaps, is reduced very considerably thereby, is it not?—Yes.

21,306. You quoted James Murray, senior, as a case of lead poisoning. Is he still alive?—He is still alive.

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[Continued.]

- 21,307. Is he working?—Very seldom.
- 21,308. What age is he?—I should say that he is about 73. He is certainly over 70.
- 21,309. Did you know him when he contracted lead poisoning?—I did not know him at that time. I became acquainted with him after.
- 21,310. James Thomson, when he contracted lead poisoning, was in America?—He was in America.
- 21,311. Was it lead poisoning?—It was undoubtedly lead poisoning.
- 21,312. Did he get a doctor's certificate?—I understand so. I was personally acquainted with the painter in question prior to his going to America, and subsequent to his return. I am still acquainted with him.
- 21,313. Is he working at the trade to-day?—Yes.
- 21,314. How long has he been back from America?—I should think about 6 years.
- 21,315. Has he had any recurrence of lead poisoning?—I do not think that he has had any recurrence. He has never left off working.
- 21,316. And Lynas Peacock—do you know for whom he worked at West Hartlepool? Was he in one of the shipyards?—I understand that he was in one of the shipyards, and in an outhouse used as a paint shop.
- 21,317. For one of the shipbuilders?—I understand that it was for one of the shipping firms.
- 21,318. Did the doctor give a certificate of lead poisoning?—Yes, I understand so, and he advised him at that time to frequently take a little beer.
- 21,319. I have known painters take it without doctor's advice?—Yes; but the point that I mention that for is that he was a teetotaler up to the time when the doctor advised him to resort to beer on certain occasions.
- 21,320. Has he had any recurrence since?—He has never been really fit since, although he has never been invalided altogether. He has always been working, but his health has never returned to normal.
- 21,321. I understand that the doctor attributed it to the heat of the shed?—Yes. It was in the summer time. The outhouse where he was working had a corrugated iron roof. Peacock himself stated that the heat was very great while the sun was striking on the roof, and the smell became really obnoxious.
- 21,322. Is James Smith still at work?—He is still at work in Aberdeen.
- 21,323. Was it in Aberdeen that he had this attack of Bright's disease?—It was in London, or subsequent to his return from London.
- 21,324. Did you know him personally at the time?—Yes. I know him now.
- 21,325. Were you with him?—I was not working with him.
- 21,326. No, but you were in contact with him during the time?—Yes.
- 21,327. John Tennant—is he working at the business still?—Yes. He is in much the same category as Murray. He is a very old man now—over 70, but he is quite able to do a little job now and again.
- 21,328. How long is it since he had wrist drop?—About 20 years ago. I would not be positive as to the time.
- 21,329. Is his wrist normal now?—Yes. He is not robust by any means, but he is quite able to do small jobs.
- 21,330. You yourself have experienced colic?—I experienced colic in London.
- 21,331. Did the doctor certify that it was lead poisoning?—He told me that it was due to lead poisoning.
- 21,332. From the use of lead?—Yes.
- 21,333. That was an ordinary doctor?—Yes.
- 21,334. Not a Home Office doctor?—No.
- 21,335. How long did it last with you?—So far as I can remember I had about three days' illness at that time.
- 21,336. Is that the only illness you have had?—That is the only illness I have had through lead.
- 21,337. You know that you can have colic from paint which is not lead?—The constipation in my case was very marked.
- (Dr. Collis.) Colic from a non-lead paint would not be associated with constipation. That is why I asked the question in my examination-in-chief. The colic produced by the oil, turpentine, and driers would be associated with diarrhoea rather than constipation.
- 21,338. (Mr. Sutherland.) (To the witness.) You suggested in your reply to a question that 50 per cent. of the time of the painter in London was taken up with dry rubbing down?—Not necessarily—preparatory work.
- 21,339. I understood that, in reply to Dr. Collis, you said 5 per cent. in normal work in Scotland, and 50 per cent. in London?—Yes, but that is preparatory work. The 50 per cent. that I suggest is absorbed in London work is on preparatory work.
- 21,340. Washing off ceilings, stripping walls, and rubbing down?—No, more on woodwork, or painted work.
- 21,341. Fifty per cent. of the time spent on painted work would be taken up with preparatory work?—Yes.
- 21,342. Rubbing down, stopping, and sandpapering?—Yes.
- 21,343. A painter's time is not all spent in painting, is it?—Not by any means.
- 21,344. So that 50 per cent. would probably be 50 per cent. of 50 per cent. of his time, or 25 per cent. of all his time?—I should say that on a really good job—
- 21,345. We are speaking of average employment and average work, and average jobs?—25 per cent. of the job would no doubt be a reasonable average for preparatory work.
- 21,346. A little of that would be dry rubbing down?—There would be a little, but very little dry rubbing down.
- 21,347. So that even in London the time actually devoted to dry rubbing down would be very small in proportion to the whole of the time the man is at work?—Very small.
- 21,348. So that your 50 per cent. might mislead if people read it that in London 50 per cent. of the painter's time was given to dry rubbing down?—Yes. It was not my intention to suggest that.
- 21,349. Sandpapering is not used for levelling, is it? You do not use dry rubbing down for levelling, except when you are filling up with fillers, either distemper fillers or leadless fillers?—It is used for levelling where the brush marks are showing. Sandpaper is used for levelling—really polishing.
- 21,350. If you have levelled up a door with alabastine, or any of those fillings, or lead filling, which can be cut down with pumice stone and water, you do not do very much levelling after that?—There is practically no levelling after the filling up.
- 21,351. The other is to take off the nibs?—Yes, and any other marks that may be occasioned.
- 21,352. You are of opinion that dry rubbing down could be dispensed with by the use of felt and ground pumice?—On practically all jobs.
- 21,353. Mr. Parsonage asked you if it would not add much to the cost of the work. If it is slightly rubbing down, it should be no more expensive than sandpapering; should it?—Quite so, not for work that is in really good condition.
- 21,354. For work which you have previously filled up with distemper fillings?—It would add very little, if any, to the cost.
- 21,355. What hours do you work in Aberdeen?—The hours range from nine hours for six months in the spring and summer time to seven hours during the winter.
- 21,356. About 50 hours. You take an hour for dinner and an hour for breakfast?—Yes, an hour for

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[Continued.]

breakfast and an hour for dinner during the summer time, when working nine hours; and only one break during the winter time.

21,357. You have had very little experience of zinc oxide paint?—Practically very little experience.

21,358. So that we cannot attach much weight to your opinion that it could replace white lead?—No. The experiments that I have conducted personally have been such that I would not submit them as really authoritative.

The witness withdrew.

## THIRTY-SIXTH DAY.

Thursday, 6th June 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Sir GODFREY BARING, BART., M.P.

Mr. E. L. COLLIS, M.B.

Mr. W. G. SUTHERLAND.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

E. A. R. WERNER (*Acting Secretary*).

Dr. COLLIS in the Chair.

Mr. H. G. CHANCELLOR, M.P., and Mr. S. P. PENWARDEN examined.

21,359. (*Dr. Collis*.) Do you attend to-day as the representatives of Messrs. C. Chancellor & Co., paint merchants?—(*Mr. Chancellor*.) Yes.

21,360. Do you manufacture leadless paints?—Yes.

21,361. Is your paint intended to be used as a substitute for white lead in paints?—It can be used for any purpose for which white lead paint is used.

21,362. What is the composition of your non-poisonous paints?—They vary with the colour. All the colours have their own pigments, but the bulk of the trade is in white—tinted white, ivory white, and cream and so on—and the pigment in that case is zinc oxide. That is the main pigment.

21,363. Do you obtain your zinc oxide at home or from abroad?—Partly at home, and partly from abroad.

21,364. Do you make any special stipulation as to the method of manufacture of your zinc oxide—whether it is the direct or the indirect method?—No; we generally buy it on the market.

21,365. Are there any lead compounds in your paints?—Not in the article that you are asking about. We do supply ordinary white-lead paints as well, but the article you ask about, "Velure," has no lead whatsoever, except in the case of lead chromes. Some of the colour pigments and vermilion would contain poison.

21,366. Would they contain red lead?—No.

21,367. Would the vermilion contain a mercury salt?—Yes. What I am saying applies to white, and those that are made mainly of white. Where you have to use colour pigments you have to use colours which may or may not be poisonous.

21,368. (*Mr. Gardner*.) The tinting pigments are chromates?—Yes, some of them.

21,369. (*Dr. Collis*.) And, in the case of vermilion, it contains a mercury salt?—Yes.

21,370. What vehicle do you use?—We use a special medium.

21,371. Are lead driers added?—No.

21,372. Do you use turpentine for thinning the paint?—No; we use a special thinner, which is practically the medium slightly modified.

21,373. Do you get a sufficient covering power without the use of either red or white lead?—Yes. We claim that a coat of Velure will cover quite as well as two coats of white-lead paint.

21,374. How does the cost of your paint compare with that of lead paints?—Compared with common paint and varnish, one, and often two coats, less are required, so that the saving in quantity of material used and in labour more than equalises the cost per gallon of material. Three-coat work, ordinary house decoration,

with a coat of varnish on it, is charged by ordinary painters 1s. 2d. a yard on an average in London, whereas three-coat work, two under-coats, and finishing coat of Velure, which gives a better result and requires no varnish, is charged quite commonly by painters at a shilling a yard. With Velure you get a better finish and better cover with one coat less at the prices at which I am willing to supply the Government. I supply the Admiralty at that price in some of their departments. A few Government departments buy, but not very many. I find very great difficulty in doing business with the Government. The cost of the material would work out at about 2d. per yard. That is the cost of white for material without labour. Black is 1½d. Then I can also give the cost of colours. In the one case I am giving the comparison with ordinary work carried out with common paint and varnish.

21,375. That is 1s. 2d. per yard?—Yes.

21,376. (*Mr. Sutherland*.) That includes labour?—That includes labour. It is 1s. as against 1s. 2d. The other quotations are for the material without the labour. It covers 90 yards to the gallon. At that it will work out for material 2d. a yard for the finishing coat, 1½d. a yard for the black, 2½d. for most colours. The under-coats may be got up in common paint, if you like. We supply under-coats, but we do not make that a condition. You use this as a finish.

21,377. As a finishing coat?—This can be used from a motor car down to a common piece of decoration.

21,378. (*Dr. Collis*.) Are the prices which you quote here on the basis of the Government quotations rather than quotations to the trade?—No. The prices which I have given you are charged by ordinary painters buying at 20s. a gallon, buying the ordinary materials at the ordinary prices on the market.

21,379. And on that it works out at 1s. against 1s. 2d.?—For the ordinary common work of any small decorator, not for the Government carrying out large contracts. Would you look at exhibit A? You will see that the experience of many large contractors is that they can get a great deal more than I claim for the paint.

21,380. Do you put this in?—Yes. I thought it would be interesting.

21,381. I will read it: "Dears Sirs, We have yours of the 6th inst., for which we are much obliged. In 1904 we obtained from your agents in Liverpool, Messrs. Brown, Kay & Co., 44 gallons of poppy red, and 26 gallons of white Velure paint to be put on some steel work for the North Eastern Railway Company at Hull. We have 13½ gallons of poppy red left in tins and bottles, none of which have had the seals broken. We shall be glad to know if you

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" will take this back, carriage paid, at the price we paid for it. It appears that we have had the same experience as other people, viz., that it has gone much further than we anticipated. At present we have nothing on which we can use Velure, but we will bear you in mind when there is any work on which it can be used. Can you supply small quantities, say about a quart each, of black, green and yellow?—Yours faithfully, for the Cleveland Bridge and Engineering Company, Limited, James E. Reed, Secretary." I put that in to show you that when I claim 90 square yards per gallon I am not claiming anything excessive.

21,382. (Mr. Sutherland.) Who is the contractor?—The Cleveland Bridge and Engineering Company. Others of the biggest engineers in the country have had precisely the same experience. One is Head, Wrightson, and Company; Sir Thomas Wrightson was in the House. Then Rudd and Son, Grantham. Also F. and H. F. Higgs, a large firm of London contractors, and Andrew Handyside and Company. That is simply a statement of fact. Head, Wrightson and Company are amongst the largest in the trade.

21,383. Do your customers tell you that it is no more costly to paint with your leadless paint than to use lead paints?—Some of them say that they can get the same result at a cheaper rate. There is a great amount of prejudice against special articles. Ordinary decorators like to make up their own stuff, and they will not adopt specialities if they can help it, but our experience is that where contractors have carried out a contract with our materials they not only find that they can get the work through as cheaply or more cheaply, but they recommend them elsewhere. The best evidence of that is this: Here is a circular showing what architects said in 1911, and what was said in 1911 by decorators and others. I get out one of these every year, and I could easily multiply the examples ten times over. I differ a good deal from a great many business people in that I absolutely refuse to publish any testimonial which has behind it even the suggestion of a request. They are absolutely spontaneous, written when remitting cheques or when giving orders and so forth. You will find evidence of that kind repeated over and over again, and especially on the question of durability.

21,384. Over what period have your paints been used?—Since 1899.

21,385. Has your paint been found durable? You say "since 1899"; that gives us 13 years?—I put in a list including several cases of paints not requiring renewal for seven or eight years. There is a paragraph under "Buildings, &c. where used." May I put that in as evidence? Velure was used first on the Royal yacht "Victoria and Albert" in 1902. Since then they have tested a lot of other similar things, but have rejected them all and come back to Velure. I believe it is exclusively used for finish.

21,386. (Dr. Collis.) Was it used to decorate the yacht for the Coronation review last year?—I do not know. I have had an order within the last week. I get orders about twice a year.

21,387. (Mr. Sutherland.) Is that through the Office of Works?—There is a special department, I think. My firm is on the Admiralty list for special purposes only. I cannot get adopted for general purposes: therefore, I am restricted to certain special things—the Royal yachts, and the buildings of the Admiralty, but not ships.

21,388. You said "the 'Victoria and Albert.'" I was thinking of the museum?—No, the yacht; they buy the paint and apply it themselves.

21,389. (Dr. Collis.) We inspected the Royal yacht "Victoria and Albert" when it was decorated before the Coronation review. That is why I asked about it?—The finish has always been done with Velure since 1902, and I believe that they paint it much less frequently than they used to.

21,390. Is it used at Windsor Castle?—We do not get the orders direct, but the estate agent there purchases through one of our customers. It was used at Sandringham in 1902. On sending round circulars to architects in 1903, I got a postcard from the architect, Mr. Beck, who specified it for Sandringham. I did not

know of his connection with Sandringham at the time. He has ceased to be the architect since then, so I do not know whether it is being used there or not. That was quite unsolicited. I did not know Mr. Beck. I did not know anything about him. With regard to durability, if you have occasion to visit Osborne House you will see the condition. When it was first transferred to the nation by the King, it was decorated throughout the inside with Velure matt. I am not sure whether it was outside or not. I do not believe that it has been re-painted since. I believe that that paint is still on the walls.

21,391. That is a matter of six years at least, is it not?—More than that. It was 1903—eight or nine years. Since then Velure has been used in the Victoria Hall, which is an addition. I have not been down myself, but there is a hall in connection with the Cadet College.

21,392. (Sir Godfrey Baring.) I live close by, and I know all about it?—Yes, you know all about it. It was put on by Watts, of Cowes. They used large quantities.

21,393. (Dr. Collis.) Will you name some other places where your leadless paints are used?—The Home Office keep on buying small quantities, nearly the whole of which, I believe, are used on baths in prisons. We are asked to send down half a gallon, or something of the sort, to these various prisons. It has been repeated again and again. There is Mountjoy, Dublin, for instance. I cannot remember all. I only know of it having been used for other than baths in prisons at Maidstone and at Lewes. It is only occasionally that we get to know what it is used for.

21,394. There it was used for external doors, was it not?—It was for external doors in the one case and brick walls in the other.

21,395. How long ago was it put on to the external doors?—(Mr. Penwarden.) Four years, I saw the surveyor here about it.

21,396. Was that the doors or the walls?—The doors at Maidstone. (Mr. Chancellor.) That is a very severe test.

21,397. How have the doors stood?—I do not know. At Lewes it was used on brick walls. If you want to see places close at hand which you can visit by a short walk, you will find a very good example in the Infants' Hospital at Vincent Square. That has been painted twice. I forget when it was painted originally. They have expressed very great satisfaction with it.

21,398. (Mr. Sutherland.) When was it painted last?—Last year. Plaistow Fever Hospital is a kind of show-place to which medical officers come from all over the world. It is a poor law institution. It is a kind of model. They use nothing but our stuff.

21,399. (Dr. Collis.) Is it used there for both outside and inside?—Yes. (Mr. Penwarden.) On a zinc-oxide undercoat. That may interest you. (Mr. Chancellor.) We recommend that lead paint should not be used immediately under this.

21,400. Particularly we want examples of its use for external purposes and its durability?—The best example would be ironwork at a seaside place.

21,401. I think that what would stand on ironwork would probably stand on woodwork?—Velure has been used exclusively on the Soudan Government Railways for about nine years. They tested a variety of paints and found that ours was the only thing that would stand the combined effect of the equatorial sun and the sand. For about 150 miles, I understand, the railway runs through sandy desert. Nothing would stand there until they adopted Velure. We made some special shades to harmonise with the sand. Since then the external parts of the carriages have been painted exclusively with our material. We had to send the stuff down to Loughborough. The Gloucester Wagon Works are making 100 carriages for them now. We send whenever they have new carriages made. In the Nigeria Coast Protectorate it has been used exclusively on the "Ivy," which is the Governor's official yacht, and on the Nigerian Railway as well. Where the test is especially severe, a test of exposure to sun or to cold, we claim, and I am interested

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in claiming, as you quite realise, that this will last very much longer than anything else.

21,402. You quote the Nigerian Railway and the Soudan Railways as particularly severe tests of your paints being applied for external purposes. Could you give examples from India as well?—On the South Indian Railway, and on the tramcars in Rio de Janeiro, and on the Buenos Aires and Pacific Railway, they have used it and sent us testimonials. We have supplied some to the Royal Indian Marine—for ships, I suppose—I do not know.

21,403. Have you examples of a similar kind on home railways?—In England it is very difficult to get business from railways unless you are prepared to adopt the same methods as your competitors, and those are methods which I will not adopt. Only here and there can I get it used by the larger railway companies, but the smaller companies have used it for many years, especially the Belfast and Northern Counties Railway, who now buy through the Midland Railway Company.

21,404. Do you supply the Midland Company? Have they been bought by the Midland lately?—They have for years used our paint, and continue to use it. The Midland Company have used it on their Heysham boats.

21,405. They do not use lead paints for carriage-work generally?—They have not bought them for carriage-work. They buy them in small quantities and for special purposes. Questions of price and other things have prevented our getting their business up to the present. The Great Eastern Railway have painted their Hook of Holland to Harwich boats—or Earle's Shipbuilding Yards have painted them for them—for many years with our paints. If you are ever crossing that way you will see. Lots of yachtsmen who used to have their yachts painted in the spring, and again in the autumn, now only have them painted once a year since using Velure.

21,406. Have you ever had any complaints at all on the score of durability?—Only very occasionally, and then, when I am able to investigate, I generally find that something has been added to the paint. It works a little stiff, something like varnish with pigment in it; consequently, it is a very strong temptation to the workmen to put linseed oil in, or something of the sort. Where we have been able to investigate and get the facts, in a number of cases of complaint we have found that something of the kind is at the bottom of it. We have not had many complaints.

21,407. (Mr. Sutherland.) That is the experience with regard to most proprietary paints, is it not?—Yes, that is the experience with regard to most proprietary paints. May I say one other thing, that all these garden suburbs and cities which are run on the co-partnership principle have adopted Velure from the very start. Ealing began in 1901; Hampstead and all the others one after the other have done it. If you make inquiry from the Co-partnership Tenants, who are a kind of wholesale society supplying them, you will find that that is so. The manager, who has had probably as big a building experience as any living man, will tell you what he thinks of it. He is Mr. Ramsbottom, of 6, Bloomsbury Square.

21,408. (Dr. Collis.) Do they use it for external purposes as well as for internal purposes?—Yes, Mr. Raymond Unwin experimented with it when Letchworth began. He is very well known in the Garden City Movement especially. Generally the houses on the Co-partnership Estates are finished in two coats, instead of three or four. After the priming they put one coat, and finish with a coat of Velure. You will find that all over Letchworth and Hampstead.

21,409. (Mr. Parsonage.) Is the second coat lead?—We have asked them not to use lead, because zinc is so much better.

21,410. (Mr. Sutherland.) Does that affect its durability?—Lead is against the durability, because of the chemical action that is set up. Then Whiteley's new premises were finished in Velure—the enamel work. There is very little enamel work about it. Wills' Tobacco Factory buy regularly. Huntley and Palmers have been regular buyers for years. Then there are flour

mills (I attach importance to them because they are up to date), Hovis, and Vernon's, and so on. They have adopted them. I put in a list with a cross against those who constantly send orders. They appear to be specially well satisfied with it. Then Smedley's Hydro have done their decorations for years with Velure. The Express Dairy Company and Williamson's tea shops use it for outside as well as inside.

21,411. We are specially interested in the question of its use for outside purposes?—Then schools of all kinds, including such well-known schools as Rugby and the Royal Naval College at Osborne, and Balliol College, Oxford. I have an unsolicited testimonial from Mr. Nagel, of the Chemical Laboratory there. I do not know him. The Chertsey Union Workhouse painted their exteriors eight years ago with it, and the Post office pillar-boxes in a number of towns, where the local postmaster has the right to do it, are being painted with our paint. In London only the General Post Office has a right to do it. They have used it for bicycles for some considerable time, but not on the pillar-boxes. One postmaster tells another about it, and it is spread from one to the other. They find that they do not have to paint so often. It has been put on no end of public buildings such as libraries, baths, and places of that kind. Then there is the Office of Woods and Forests, next to the War Office; that was painted with it.

21,412. (Mr. Sutherland.) Inside and out?—External painting on the wood sashes, for instance. Nearly all the internal painting was done with it, and I believe the external. Mowlem's did the work.

21,413. (Dr. Collis.) Was that at the time that it was built?—Yes.

21,414. It has not had long to stand?—Three years.

21,415. (Mr. Sutherland.) The sashes are coloured; they are not white, are they?—(Mr. Penwarden.) They would be stone colour, speaking from memory.

21,416. (Mr. Gardner.) Velure can be supplied in any colour?—(Mr. Chancellor.) We stock about 150 colours and make fresh ones every day.

21,417. You have colour for pillar-boxes?—We have a colour, vermilion, which we number 167.

21,418. (Dr. Collis.) Am I right in considering that you would suggest that the garden cities would be a good example to take of the standing power of your paint for exterior work, because it has had years of test and there has been time for re-painting?—Yes. If you went to Ealing, Mr. Ramsbottom would tell you anything about it. I have not seen them myself. He has had the organising, under Mr. Vivian, of practically all of the Co-partnership estates. There is a kind of co-operative society, which helps to finance and which buys on a big scale, and supplies at cheap rates all the subsidiary companies.

21,419. You do not advise that your paints should be put on former coats or priming coats of white lead?—We advise that the coat immediately under Velure should be zinc-oxide paint, because there is no chemical action set up then. In the case of white lead our experience is that after some time the white lead has the effect of creaming the Velure, and it is best to prevent that, if possible, if you want it to remain white.

21,420. To sum up, then; so far as your experience goes you have found your paints to be efficient substitutes for ordinary lead paints?—Yes, and far more durable because less liable to atmospheric and chemical action.

21,421. Have you any difficulty in obtaining your supply of zinc oxide?—No. There is difficulty just now with strikes and so forth.

21,422. But apart from that?—There is no difficulty.

21,423. Do you anticipate that, if there was a largely increased demand for zinc-oxide paints, there would be any difficulty in the future?—Probably the price would go up and a corner would be formed, as they are trying to form a corner in white lead just now.

21,424. (Mr. Sutherland.) They have formed a corner?—Yes. I do not know if it is going to last.

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Mr. H. G. CHANCELLOR, M.P., and Mr. S. P. PENWARDEN.

[Continued.]

Ordinary economic forces are set in operation directly you create a demand, especially an unexpected demand, for an article.

21,425. (*Dr. Collis.*) If this Committee made a recommendation limiting the use of lead in paints, it would probably increase the demand for zinc?—It would no doubt increase the demand for zinc, but under conditions of free trade, where you can draw your supplies from anywhere, the difficulty is minimised.

21,426. (*Mr. Sutherland.*) But can you do that with regard to zinc oxide?—Yes. It is produced here and it is produced in Belgium. It is produced in large quantities.

21,427. Zinc oxide is already in a ring?—There is a ring, but its operations are not very severe at present.

21,428. It controls prices, I think?—There may be other pigments which can be used unless you insisted on zinc being used. If you rule white lead out, probably other pigments may be found.

21,429. (*Dr. Collis.*) Have you any idea what others?—I cannot say. Lithopone would keep down the price. As an outside finish it is not good, because sun makes it grey.

21,430. We want to know whether you think that such a limitation, if made, would detrimentally affect the public purse in having their property protected?—If it were merely a prohibition of white lead, I do not think it would materially. If it were a question of something special, I do think that the effect would be material.

Sir ERNEST HATCH in the Chair.

21,431. (*Sir Godfrey Baring.*) You have not found any special difficulty in very smoky towns with your paint; I mean places like Manchester, for instance, and Sheffield?—It is rather the other way. It is not chemically affected so easily as the ordinary paint. It is not destroyed so quickly.

21,432. (*Mr. Sutherland.*) The colour is not?—No. People have washed it down for re-painting, and found it in such a condition that they have said, "We shall not paint until next year." We have had that experience again and again.

21,433. (*Sir Godfrey Baring.*) You think it specially suitable for smoky towns?—Yes. This is rather important. It has been used inside the acid chambers, I think they are called, in electrical works in generating chambers, where the fumes settle and run down the wall.

21,434. (*Mr. Sutherland.*) Sulphuric acid?—Yes. If you put strong sulphuric acid on it it will eat it away, but the condensation of the sulphuric acid on the wall appears not to affect it much. Brewers have adopted it repeatedly in their yeast rooms because they find that they can flush them down and remove the settlement of the yeast germs.

21,435. (*Mr. Sutherland.*) Do you suggest that Velure and articles like Velure (not as good, but of the same character) could replace white lead for all the purposes for which white lead is used?—I do not know of any purpose for which they cannot.

21,436. I mean for general painting. I am thinking of the question of cost?—You quite understand that it would become costly if used other than as a finish—if you painted wood from the bottom with it without any under-coat at all. If you use a zinc under-coat and finish in Velure there is no decorative or protective purpose that I know of for which it is not suitable. Indeed, as a protection against the oxidation of metal in seaside places or places of that kind it is very much better than white lead. There is no purpose for which white lead can be used for which a thing of this kind in conjunction with a cheaper material as an under-coat cannot be used with greater economy and with more durable results. I am absolutely certain of that, and I have had plenty of experience to go upon.

21,437. There are many, many hundreds and thousands of properties where two coats of paint are sufficient and will last for three or four years?—Yes, put on over old paint, but, put on *de novo*, you very seldom find two coats sufficient except on metal work.

21,438. But there is an enormous amount of such property all over the country, so if we abolished white

lead and were confined to things of this nature it would enormously add to the cost of the work, would it not?—Where you are covering an old coat of paint with the same colour you need never use more than one coat of this. You can dispense with the intervening coat, and numbers of people do.

21,439. Your material is slow-drying, is it not?—It is slower-drying than common paints.

21,440. And slower than most of the enamels?—Rather slower. It can be quickened, but we do not recommend that for outdoor use.

21,441. You claim that slow-drying contributes to its durability and lustre and body?—Yes, the slower the more durable. In frosty weather, of course, it takes twice or three times as long.

21,442. That applies to all paints, more or less?—Under ordinary conditions it is slightly tacky the next morning.

21,443. A friend of mine painted a place outside at Newcastle with Velure; he was perfectly satisfied with the Velure, but the weather was not happy for it, and a dust got up, and the last state was worse than the first?—Yes, I know.

21,444. (*Chairman.*) Would that have applied to ordinary lead paint?—No, not to the same extent. White lead is in itself a drier.

21,445. So to that extent white lead would be preferable in such an instance?—Yes; but may I say that, where you are using two or three coats of paint, the under-coats would be quicker drying. It only applies to the very last coat.

21,446. (*Mr. Sutherland.*) You do not use lithopone for your under-coat, do you?—Sometimes a little, but I use more zinc oxide. The medium is cheaper and it is a quicker drying thing. It dries flat and quickly.

21,447. You use no lead drier?—No. We use a special liquid drier.

21,448. Is there no lead in that?—None whatever.

21,449. (*Sir Godfrey Baring.*) You are sure that there is no lead in it?—Yes, I am practically certain.

21,450. (*Chairman.*) I do not like the word "practically"?—I feel absolutely certain that there is no lead in it.

21,451. (*Mr. Sutherland.*) Most driers have a measure of lead in them, even liquid driers?—I do not know much about driers. I buy of the manufacturer. I am quite certain that there is no lead in ours. If there is doubt about that, I will find out.

21,452. Medical evidence shows that there is very great danger from manganese driers, and turpentine and oil, not of lead poisoning, but discomfort to the workers?—I think that our preparation is oxide of manganese. I will ask if there is any lead in it.

21,453. The proportion of the proprietary paints, like your own and Ripolin, put together, would be a very small proportion compared with the bulk of white-lead paint, would it not?—Yes. All these paints are used as a finish. The bulk is an undercoating.

21,454. There would be difficulty if the Government substituted proprietary paints for white lead, would they not?—Yes, if they were substituted for all white lead purposes there would be difficulty, but you would substitute a coat of this paint for the last coat and the coat of varnish on it.

21,455. We all recognise that inside we could dispense with lead, but outside the great bulk of the work is done just with the lead, oil, and turps, and driers?—If you want to protect it you varnish it.

21,456. Not necessarily to protect it, but if you want an extra finish?—In cottage painting and ordinary house decoration you put on a coat of varnish.

21,457. No?—Not on doors.

21,458. If the doors are grained, yes, but the ordinary house door in 80 per cent. of cases is not varnished?—(*Mr. Penwarden.*) That would only apply to cottage property, would it not? (*Mr. Chancellor.*) I personally do not get about very much, so I cannot say, but I think that I am correct.

21,459. The front door might be varnished?—You would never see a front door not varnished, I should think.

21,460. (*Chairman.*) I was detained on another Committee, and did not hear the whole of your evidence.

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[Continued.]

Did you come here to speak as an expert?—I am the principal of a firm of paint manufacturers.

21,461. I did not know whether you were chairman or were actively engaged in the business?—I founded the business.

21,462. Then we may take it that you are an expert?—Yes.

21,463. The whole of the inquiry by this Committee is centered on one point, and that is whether any harm would ensue to the trade generally if the Committee decided to prohibit the use of white lead. In your opinion no harm would ensue in any direction, I understand?—Not to anybody except the white lead manufacturers.

21,464. Do you think that the public would suffer in any sense first in regard to extra cost, or secondly in regard to want of durability, if white lead was prohibited?—I believe that other materials are more durable than white lead. I have given reasons for that in the evidence which I have given already. With regard to cost, any fresh rule disarranges matters for a time, but I do not believe that it would make any material difference after things had settled down.

21,465. I suppose we may take it that, in a sense, you are prejudiced in favour of your own paint?—Not at all. We supply lead paint as well. Of course, naturally, if you have a speciality on which you pledge your credit, you are prejudiced in a sense.

Mr. CHANCELLOR withdrew.

21,466. (Chairman.) (To Mr. Penwarden.) What is your position?—I am a director of Messrs. Chancellor's Company.

21,467. (Mr. Parsonage.) Has the sale of Velure materially increased each year?—Yes.

21,468. Among house decorators?—I cannot quote you figures, but the tendency is a distinctly upward one over the whole bulk of our trade.

21,469. A gradually upward tendency?—A gradually upward tendency. I do not know that offhand I could tell you where the output goes.

21,470. This is enamel?—We do not call it enamel.

21,471. But it is always glossy?—Yes.

21,472. (Mr. Sutherland.) It is an enamel in essence?—It is a question of trade terms. It may be supplied to give a dull finish or glossy.

21,473. (Mr. Parsonage.) I want to know whether it is supplied to finish flat work?—Yes.

21,474. I have never seen that. It is difficult to use, is it not?—I do not think so.

21,475. There is rather hard work for the wrist in using it?—No, I should say not.

21,476. I want to know the effect of using it for outside work?—It is very similar to using varnish.

21,477. Does it work stiffly relatively to ordinary lead paint?—Relatively to ordinary flatting.

21,478. Would the ordinary painter, working in the ordinary way on ordinary painting work, be able to use Velure?—Certainly.

21,479. (Mr. Gardner.) No special training is required?—No.

21,480. (Chairman.) Would there be any inducement to the master house-decorators to use your paint in preference to lead paint?—There would be several inducements. He would turn out, I should say, better work at a lower cost. That is a material inducement, I should think.

The witness withdrew.

Mr. PETER JOHNSTONE HUNTER examined.

21,497. (Chairman.) You are employed by the Forth Bridge Railway Company as inspector, are you not?—Yes.

21,498. Are you in charge of the painting operations on the Forth Bridge?—Yes.

21,499. Have you been instructed to attend before the Committee for the purpose of giving evidence re-

21,481. But taking it that he has a fixed idea that lead paint is the best, is there any specific reason why he should give your paint a trial?—It would be very difficult to deal with a man who has already a fixed prejudice in his mind. You cannot convince a man like that.

21,482. What kind of customers are they who buy your paint?—The decorators are our largest customers.

21,483. People who have an open mind on the question?—Certainly.

21,484. Is it because they have an open mind on the question, or because they think yours a better paint?—I think that it often begins in this way: in many cases an architect specifies it, and the decorator has to use it against his prejudice. He finds his prejudice mistaken, and goes on using it because he likes it.

21,485. Does the cost differ much from that of lead paint?—The cost per bulk would be more. The cost per bulk plus labour would be very little more proportionately.

21,486. Is the covering power greater?—We consider so.

21,487. Supposing that I was a master house-painter and I did work for my customer very satisfactorily with lead paint, would there be any special reason, owing to the particular merits of your paint, why I should change?—I should suggest to you, if I were a traveller and I approached you, that if you used Velure instead of lead paint in the ordinary way you would get one of two results: either an equally good result at a lower cost, or a better result at the same cost.

21,488. Is not that the gospel as it is preached by a large number of other firms?—I am not responsible for other people.

21,489. Mr. Chancellor has handed in a list of a large number of places where this paint has been used satisfactorily?—Yes.

21,490. Do you know from your own knowledge that this paint has had a pretty good trial, say four or five years?—Yes.

21,491. With quite satisfactory results?—Quite.

21,492. Do you know if your customers have ever returned to lead after using this paint?—Yes, I have found that, but I should certainly not consider that as a reversal to lead, implying that they had dropped Velure, but that it was a reversal to type because we have not created a sufficiently deep impression upon them. A man is using a great many different things, and he loses the impression caused by our particular stuff.

21,493. Have you ever had a case where a master house-painter or decorator has told you or your firm that he proposed to abandon the use of your paint because he had not found it as efficacious as he had found lead?—Yes.

21,494. He has told you that?—Not when lead has been used as a comparison, but on general grounds he has not been satisfied. I have had cases of that kind.

21,495. Many?—Not many; a very small proportion.

21,496. Would that be a very small percentage in comparison with those who have greatly approved of your paint?—It would be a negligible percentage.

(Mr. Sutherland.) It is only fair to say that Velure is recognised as a valuable article in the trade, but it is used mostly for finishing, and used as you would use a high-class varnish.

(Mr. Parsonage.) I think that it has more covering power than any other enamel that I have seen, if I may call it an enamel.

garding the materials that are used for painting that bridge?—Yes, I have.

21,500. Are non-lead materials principally used in the painting of the Forth Bridge?—Yes, non-lead materials principally.

21,501. What paints do you use?—Oxide of iron.

21,502. Oxide of iron is what you principally use?—Oxide of iron principally.



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Mr. PETER JOHNSTONE HUNTER.

[Continued.]

21,503. Do you use any red lead or white lead?—Both red and white.

21,504. How much do you use of each on the Forth Bridge?—The quantity of red lead last year was 1 ton 16 cwt., and white lead 18 cwt.

21,505. And oxide of iron?—9 tons of paste. That is not mixed paint.

21,506. Were the other two mixed paint or paste?—The white lead is paste. The red lead is powder.

21,507. What proportion of non-lead paint do you use in comparison with paints containing lead?—75 per cent.

21,508. Why do you use 25 per cent. of lead paint?—The lead makes the better priming coat on bare steel work.

21,509. (Mr. Gardner.) Red lead?—We use a mixture of red and white lead as a priming coat on the naked steel where we have to chip and scrape. We give it two coats of lead before we put the oxide on.

21,510. (Chairman.) How often is it necessary to repaint the parts which are painted with oxide of iron?—It varies. We paint the bridge every three years, but last year I commenced painting the lower parts every year, because they are subject to the action of the sea spray. The paint does not last so long on the lower parts of the bridge. It is really only absolutely necessary to paint it every two years, but I have commenced to do it every year.

21,511. When did you decide to use oxide of iron instead of lead paint?—That was decided during the building of the bridge.

21,512. You have always used oxide of iron?—I have always used oxide of iron with lead always as a priming coat.

21,513. You have no comparison between oxide of iron and lead paint?—Do you mean with regard to the time it would stand without repainting?

21,514. Yes?—Only with regard to inside work.

21,515. Are the directors of the Forth Bridge Railway quite positive that oxide of iron produces as good a covering as lead paint?—Lead paint is not so good unless you put some covering paint over it. It absorbs the oxygen from the atmosphere, and there is a tendency then for corrosion to begin.

21,516. Then oxide of iron was used because it was preferable to lead paint?—You had better state it in this way: The whole of the steelwork was primed with red lead, with a proportion of white in it. If you mix red lead powder and oil, the lead settles to the bottom of the pot, and you have to continually stir it. By putting in a proportion of white lead you float the red. You get a better mixture. The whole of the steel work received a coat of this red and white mixture first. We do not use red lead alone. It is always covered with oxide.

21,517. Why did you cover the priming coats of lead paint with oxide of iron paint instead of lead paint?—The priming coats are lead paint. Lead absorbs the oxygen from the atmosphere, and it is necessary to cover it with some other paint to prevent that.

21,518. (Mr. Sutherland.) You think that oxide of iron resists the weather better?—Yes.

21,519. I expect you find that it is necessary to protect the lead paint from the weather?—Yes.

21,520. (Chairman.) Do you consider the oxide of iron better than lead as a paint as a last or covering coat?—Yes.

21,521. Can you say anything as to the relative costs of non-lead and lead paints?—Lead paint is more expensive than oxide of iron. Our contract prices for oxide paste last year was 12s. per cwt., red lead 16s., and white lead 19s. 9d.

21,522. Have you ever tried to find a substitute for lead as a priming coat?—No, we have never tried to find a substitute.

21,523. Supposing that this Committee were to prohibit the use of lead for all outside work, do you think it would be possible to find a substitute for the lead priming coat that is used now?—I do not know of any at present, but I know from experience that, if it is prohibited, a substitute will be found. That is always so.

21,524. But otherwise, you tell us that the non-lead paints used on the Forth Bridge have proved satisfactory in every respect?—Yes.

21,525. (Dr. Collis.) Have you ever had any illness among the men who put on the paint?—No, there has been no illness amongst them that you could trace to the use of paint. From 20 to 22 years ago, when painting the inside of the tubes first of all, there were a number of cases of what was called painter's colic. There was a large quantity of dust in the tubes. I think that the dust had as much to do with it as anything. Since then there have been no complaints.

21,525a. They were inside the tubes?—They were inside the tubes.

21,526. Were they cleaning lead paint off the tubes, or applying the first priming coat?—In some cases they would have some lead paint to clean off.

21,527. Would that be the paint that was put on before the steel was delivered to you?—No; that would be put on after erection.

21,528. They would be cleaning off the primary coat you yourself had put on, and which you know contained lead?—Yes.

21,529. On that occasion there was a certain amount of sickness?—Yes.

21,530. Do you now have to chip the inside of the tubes at all to apply fresh priming coats?—Generally speaking, no. We may have a very small surface to chip once a year, but, generally speaking, there is no chipping to do. It means a scrape, and a rub with the wire brush.

21,531. And re-application of the oxide?—We only use lead inside.

21,532. Do you use the wire brush much?—Yes. After the steel is scraped it is always brushed with a wire brush.

21,533. Does not that create dust?—Yes, it creates dust.

21,534. Do not the men have any sickness at all?—No.

21,535. All the inside of the tube is painted with lead?—Yes.

21,536. The men have no sickness?—No. We only touch up a little corner here and there where there might be a leakage. There is no general painting in the inside of the tubes.

21,537. So that they would be only dealing with an inch or two?—Yes; it might not exceed a square foot.

21,538. Then the men would move away to another part?—Yes.

21,539. That makes a difference?—Yes.

21,540. Is there a good current of air through the tubes?—Yes, there is a good current of air through the tubes.

21,541. An up or down current as the case might be?—Yes.

21,542. That would carry the dust away?—Yes. The air in the tubes is quite pure. There is a current going through the tubes all the time.

21,543. In outside work, do you often have to scrape down to the surface?—Yes, on the lower part of the bridge.

21,544. Do you scrape down to the surface over large areas?—On the lowest points we practically scrape bare.

21,545. For how far up would that be?—To the level of about 90 feet above high water. We do the steel work nearest the water.

21,546. Do you have any of the paint under the water mark?—No; the lowest point is about 30 feet above high water.

21,547. For 30 feet you bare the steel entirely every year?—We do not bare the steel work for a distance of 30 feet every year; it is the steel work at the level of 30 feet above the high water, i.e., the steel work nearest the water, that is bared every year. (See Question 21545.)

21,548. And you have to chip all the old paint off, and you get dust?—Yes.

21,549. My experience of that part of the world is that there is usually some air blowing about?—Yes, it is generally blowing there.

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Mr. PETER JOHNSTONE HUNTER.

[Continued.]

- 21,550. That probably carries away the dust as it is made?—It carries it away. It does not hang around in the air.
- 21,551. The men employed on that work have never complained?—We have had no complaint at all from them.
- 21,552. The only complaints of illness that you have had have been when employed on the inside of the tubes?—On the general painting of the inside of the tubes over twenty years ago.
- 21,553. (Mr. Sutherland.) You do not think that you could dispense with the lead for priming on your present knowledge?—At the present moment I am experimenting with a paint, and applying it to the bare metal. It is not a lead paint; it is a bituminous paint. It was tried four years ago on a small section, and last year I repainted that section with the same paint, and it appears to be satisfactory.
- 21,554. Is it a black?—Yes, it is a black.
- 21,555. (Mr. Gardner.) Have you never tried any portion of the outside work finished entirely with red lead paint?—Yes; I tried it just with the red alone, but it deteriorates very soon.
- 21,556. How many coats did you give it?—Two coats.
- 21,557. It did not stand?—It did not stand.
- 21,558. On what ground do you say that you must have red or white lead as a priming coat on the bare steel?—That is the result of general experience—that it is better to prime the steel with red lead before applying any other paint.
- 21,559. Have you ever tried any portion of your priming from the beginning with oxide?—I tried a portion last year with a mixed oxide paint. That was done in August last and it has failed.
- 21,560. You put oxide direct on the steel?—Yes, three coats of oxide direct on the steel. We had to chip and scrape into the bare metal.
- 21,561. The water does not get at that?—It is from 30 feet to nearly 40 feet above the water. The sea spray does get up to it.
- 21,562. (Chairman.) You would not mind very much if white lead were prohibited altogether, would you?—No, provided I find an efficient substitute.
- 21,563. And that you expect you would do fairly easily if you had to?—Oh, yes, if I had to.
- 21,564. (Mr. Gardner.) You use red lead on the bridge? There is only sufficient white lead put in to carry the red?—Yes. Some of the tubes were painted red at the beginning and we finished with white because of the lightness.
- 21,565. You have not tried zinc paint inside, because it is not exposed to the weather?—I do not see why zinc should not do equally well.
- 21,566. You might try a section just for experimental purposes?—Yes, I will.
- 21,567. Use a good oxide zinc?—Yes.

The witness withdrew.

Mr. WALTER SIMPSON examined.

- 21,568. (Chairman.) Are you at present foreman painter at Messrs. Brown & Co.'s Engineering and Shipbuilding Works, Clydebank?—I am.
- 21,569. What practical experience have you had in connection with the painting trade?—I have been all my days at the painting trade, and have been 30 years a foreman.
- 21,570. How many painters are employed at these works under you?—In the month of November about 410.
- 21,571. Have you yourself known cases of lead-poisoning among painters?—Very few; and in all my experience I do not think that I have had half-a-dozen cases altogether. I would attribute those to pure carelessness.
- 21,572. How do you know that there were only half-a-dozen cases amongst all these men you employed during all these years?—As far as we know, these cases are always reported to the firm.
- 21,573. Do they always come to you if they are ill, and tell you what is the matter with them?—If it is lead-poisoning they will do that.
- 21,574. How do they know that it is lead-poisoning?—They go to the doctor, and he pronounces it to be lead-poisoning.
- 21,575. Supposing they do not go to the doctor, but go away ill, how do you know then?—I am speaking of cases reported to us.
- 21,576. You have only had these few cases reported, but there have been a great many more?—There may have been unknown to me.
- 21,577. Do you regard the breathing of dust arising from dry rubbing down as one of the most serious dangers involved in the use of lead paints?—To a certain extent, but there is not the same amount of rubbing down now as there used to be.
- 21,578. I am not speaking about that, but when it does take place?—You may inhale a little of the dust in rubbing down.
- 21,579. Do you come here to tell us that there is no danger in using lead paint?—There is a certain amount of danger.
- 21,580. But you seem to minimise what the Committee have had in evidence as one of the most serious sources of danger—the rubbing down?—I do not see that there is a great deal of danger in the rubbing down.
- 21,581. You do not know?—Really I do not.
- 21,582. With all your experience, you do not think there is much danger in rubbing down?—Not a great deal.
- 21,583. Then you have come here to minimise the danger of contracting lead-poisoning from paints with lead in them, during dry rubbing down for instance?—The cases I know of are purely carelessness on the men's own part.
- 21,584. (Dr. Collis.) Have you had any experience at all of the use of paints other than those containing lead?—Oil paints?
- 21,585. Yes?—Yes, I use oil paints all the time.
- 21,586. Which do not contain lead?—All kinds of paints.
- 21,587. What is your experience as regards the lasting properties of paints which do not contain lead?—I think that it would be a hard thing to substitute white lead by anything else.
- 21,588. That is not what I asked you. I asked you what experience you had had as regards the durability of paints which do not contain lead; zinc oxide, for instance, or oxide of iron paint and graphite paints?—I do not think that anything stands better than white lead. That is my opinion.
- 21,589. I did not ask you that. I said: "What experience have you had of the lasting properties of paints which do not contain lead?" What you keep on telling me is that you think that nothing will stand like lead. I want to know your experience?—As far as my experience goes I have found that other paints such as zinc oxide and so on stand very well.
- 21,590. Have you used them much? That is what I want to get at?—Yes, I have used them very largely.
- 21,591. For what purposes?—For inside work.
- 21,592. On what?—Confined places, with oxide paint, in Admiralty work.
- 21,593. Are you doing much Admiralty work?—We have four vessels in hand just now.
- 21,594. And the inside confined places are done with oxide of iron?—Entirely.
- 21,595. Do you use non-lead paints for any other parts of the vessels for the Admiralty besides the confined places?—No.
- 21,596. What do you do the top decks with?—First with red lead, and finish them off with zinc and white lead mixed.

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Mr. WALTER SIMPSON.

[Continued.]

21,597. How much white lead do you put into the zinc?—The Admiralty mixture of white paint is two-thirds zinc white and one-third of white lead. We must use that.

21,598. You use those for decks and for cabins?—For all finished work.

21,599. Then with regard to confined places, you have some experience of oxide of iron. What is your experience of the use of zinc oxide paint alone?—Do you mean in any particular colour?

21,600. White, or colour if you like, as long as you do not put lead into the colour?—I find that zinc works very well.

21,601. What knowledge have you of its use? For what parts of vessels, and in your work generally, have you experience of its use?—As a rule, I finish most with zinc white. The finishing coat, such as flattening, is always done with zinc.

21,602. Have you had any experience of the use of zinc brought up from the base?—It is very seldom that we do that, but I have done it. I prefer white lead as a base.

21,603. I do not want your preference, but what your experience is based on?—I have put it on bare iron and bare wood.

21,604. For what purposes—what part of the vessel?—All over—the whole of the inside entirely with zinc white, the first coat.

21,605. And the hull, too?—Yes, entirely.

21,606. Right on to the bare metal?—Right on to the bare iron or bare steel.

21,607. And brought the whole thing up with that?—Yes, brought the whole thing up with that.

21,608. Could you name a vessel that has been so treated?—Yes, I believe I could. I cannot remember the name at the moment.

21,609. You have a vessel in mind?—Yes.

21,610. Was the vessel when it was finished good in appearance?—It looked perfectly well.

21,611. Has that vessel come back into your hands for repainting?—No.

21,612. Do you know how the paint stood?—I have had no report back of any fault being found with anything.

21,613. That experience seems to be good?—Yes.

21,614. Do you get vessels sent back to you for repainting ordinarily?—No. As a rule when we finish a vessel we are done with it.

21,615. You have no knowledge then of the durability of the paint you put on?—We have had several of the Cunard vessels back for repair.

21,616. Have any of those been brought up with zinc from the base?—No.

21,617. Then you have had no experience in regard to durability?—No.

21,618. The only test of paint is time?—Yes. I have not seen a vessel back that has been coated throughout with zinc.

21,619. You say that you can make a vessel look perfectly nice with zinc, but we want to know how it will last. On that point you have no experience?—Not with regard to a vessel coming back. I have seen many jobs finished with zinc.

21,620. We all understand about the finish, but how will the zinc last?—It is not as durable as white lead.

21,621. But on what do you base that? Can you give us a single case?—I have so many through my hands that I cannot remember any single case at the moment.

21,622. You mentioned the Cunard?—I finished some 250 ton cranes with zinc, and it did not stand as well with zinc. I am painting them at the present time with white lead.

21,623. (Mr. Parsonage.) How long have they stood?—Five years. They had a coat of oxide of iron. Sir William Arrol built the cranes. They came in under a coat of brown or red oxide. I finished a couple of coats with zinc white. They are pretty bare now.

21,624. (Dr. Collis.) Can you tell us of any similar crane painted in a similar way with lead?—Those are all the big cranes we have in the yard.

21,625. We must have a comparison to see whether, if the paint had been lead, it would have lasted better?—I have some jobs in the yard which have been done with white lead. They are perfectly good although they are dirty.

21,626. How long ago?—About the same time.

21,627. What are they?—One a crane, or big machine, which is there was done entirely with that.

21,628. What kind of machine was it?—A machine for rolling plates. That was done ten years ago, and it is good.

21,629. The wear and tear on that is as much?—The wear and tear on that is as much as on the cranes. It is used every day of the week.

21,630. (Mr. Gardner.) From the first time you paint a hull inside till the ship leaves the yard, what is about the average time that would elapse?—Five or six months.

21,631. If you give one vessel a coat of red lead and another a coat of zinc, a long time elapses between the two coats?—Yes.

21,632. What sort of appearance has a vessel painted with zinc as compared with an ordinary vessel coated with lead during that time? You know how the first coat acts on the steel?—The zinc or even the white lead will turn quite yellow; the red lead will not. The rust will come right through.

21,633. Did the rust come through the zinc just as much as through the lead?—More so. It does not come through the red at all. It will show through the white lead a little. There is not the same body in the zinc.

21,634. That would go to show that even the zinc is as good a protection against corrosion as white lead?—I would not say that.

21,635. The rust was there?—The rust was there, but there is not the same body in the zinc, and it came through sooner.

21,636. Sooner than with the white lead?—Yes.

21,637. That is what I wanted to know. And how about the red lead?—You will scarcely get it to come through the red lead.

21,638. It is an effective protection against corrosion?—It is as near perfection as we can get it.

21,639. What is the best protection for the outside of a hull? Which paint is going to stand subject to the action of the water? Have you had experience of that?—Do you mean red or white?

21,639a. Take them all?—The best thing I get for a ship's bottom is red and white lead mixed. Nothing stands better.

21,640. Have you ever tried zinc for outside in the water?—Yes.

21,641. How did it stand?—It got quite soft and fuzzy in the water.

21,642. You would take the vessels to the graving dock, and that is how you would find it?—Yes, that is how you would find it. That is where you would see it.

21,643. Why did you use the oxide of iron in the confined places instead of red lead, if red lead is so much better as a protector?—The Admiralty Orders specify it. We are obliged to do it.

21,644. Then they will have some reason for specifying it?—The reason is that a ship which was done with red lead was being cleaned up some years ago, and the sailor men complained of lead poisoning. It was supposed to be that. They got it into their heads that it was that. A good many knocked off through it, and so the Admiralty said: "Do away with red lead entirely in all confined places."

21,645. The men would be scraping off red lead and creating dust?—Yes.

21,646. You think that the Admiralty have stopped it because of the danger of lead poisoning, and have specified oxide of iron?—Yes; that is the reason.

21,647. Have you tried bituminous paints in these confined places?—Bituminous paints in double bottoms.

21,648. Do men work in the double bottoms with red lead as they did for many years? You do not know of any evil effects on the men?—No.

21,649. Except through the fumes?—If you wait in too long it will affect you.

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MR. WALTER SIMPSON.

[Continued.]

21,650. You put that down to the fumes from the medium—the oil and turpentine?—Yes.

21,651. Has it any different effect on the men now that they are coating with oxide of iron?—The smell of the paint is there at all times. You cannot wait in a confined place too long. You must get fresh air. With double bottoms I have an electric fan, and a hose leading into them.

21,652. Is there any difference between the period of time that a man can wait in with lead paint, and the period of time with oxide of iron?—As far as the smell is concerned it is about the same.

21,653. And with bituminous paints?—It is much worse. I have taken men out of the double bottoms in all states, shouting and fairly stupid. I have had to put them below ventilators to bring them round.

21,654. Then, in your opinion, bituminous paint has a very much worse effect on the men than other paints?—I hope that I shall never be required to do double bottoms with them again.

21,655. I suppose that you have had to lift men out?—Yes, lift them through the manhole.

21,656. They could not come out themselves?—They could not come out themselves.

21,657. (Mr. Parsonage.) Does it stupefy them?—I have been down myself for a time, and after a little time I felt that my head was swimming.

21,658. (Mr. Gardner.) You only remember starting one vessel from the foundation with zinc in all the work that you have done?—I believe that I have done more. It is a long while to look back at all the vessels I have done; I have done so many.

21,659. At the time she left the yard she would be just as good as any other vessel?—Yes, at the time she left the yard.

21,660. If anything had gone wrong with the vessel the owners would have complained?—In a case like that the owners specify that it shall be done with zinc; otherwise it would not be done.

21,661. So that they could not make a complaint if anything went wrong?—No.

21,662. The first vessel was done for these owners on that specification. Do you know whether they repeated the specification?—Really, I could not say. If you had let me know the questions you were going to ask I should have been prepared with an answer, but I cannot answer from memory.

21,663. So far as the durability of paint goes, you think that there is nothing to replace white and red lead for painting on board ship for preparatory coats?—I prefer it myself for preparatory coats.

21,664. It is the case that we have a good deal of lead poisoning in the trade, although it may not have been your experience. If rubbing down and the inhalation of dust does not cause that poisoning, what do you think causes it?—I think that there is a good deal of carelessness on the part of the workmen themselves. They are not clean, and they are careless as well. I have seen them sitting down for meals with their hands covered with paint, and although I have hot and cold water, a nail brush and everything else and every accommodation in my shop, they will not take advantage of the accommodation. They really are eating paint.

21,665. What accommodation have you for washing purposes?—I have two large sinks 4 feet 6 inches, hot and cold water, soft soap, a nail brush and a towel.

21,666. Two taps?—Yes.

21,667. For 400 men?—We have not always 400 men.

21,668. Supposing that you had only 100, would that be adequate provision?—I have 200 now.

21,669. (Chairman.) How many towels have you for 200 men?—Most of them are local men.

21,670. Have you one towel for 200 men?—Yes, one big towel.

21,671. I call it disgraceful for you to come here and tell this Home Office Committee that the men are careless, when you supply them with one towel to wash these dirty hands which you have described to us?—You may not understand the towel I mean. It is a large one.

21,672. I do not care how large it is?—It is several yards of canvas.

21,673. (Dr. Collis.) How long would it take these 200 men to get washed? It would take three-quarters of an hour at least if they were even to wipe their hands on the towel?—Two-thirds of the men live locally.

21,674. That does not matter. They ought to wash before they leave the premises?—They are not allowed to leave the ship to go into the shop before the time.

21,675. There is no time allowed for washing?—They should do it in their meal time.

21,676. (Mr. Parsonage.) If they were caught a minute before, they would have to go out?—Yes.

21,677. (Dr. Collis.) Are you helping to make them clean?—Ours is the finest shop in the river.

21,678. It does not say much for the others. The standard is one washing basin for every five men; you have one for 200, and you say that the men are dirty?—So they are.

21,679. (Mr. Gardner.) When the horn blows there is not much chance for a man to wash. If he had to wait for a turn at the tap, he would have no time to take his food?—I see that.

21,680. So that that points to the necessity of more washing facilities being provided in the yard?—That is what is wanted.

21,681. (Mr. Parsonage.) Is there anything to prevent you from providing them, and allowing five minutes for washing?—That is not in my power. Our order is that no man shall leave the ship before the horn blows.

21,682. (Chairman.) My point is that you complain of the men being dirty, and yet you tell us that they have no opportunity of making themselves clean. That is the point. I may tell you this: that if lead were allowed to be used in the future, one of the first conditions would be that you provided proper washing arrangements, and a towel for every five people. Instead of having one or two taps for 200 men, you would have to have 40?—But as soon as the horn blows the men are on the way home.

21,683. Before they left the factory you would have to provide one towel for every five people, and soap, and proper washing accommodation?—What I have spoken of is there if the men want it, but they do not come into the shop.

21,684. But my point is that you have come here and made a complaint against the men of being dirty, but, by your answer to Mr. Gardner, we find that you provide no accommodation?—I have seen them coming in and not even taking advantage of the water that is there.

21,685. Of the ample supply you give?—Yes.

21,686. (Mr. Parsonage.) Do your firm give you instructions to put the towel there?—I do the whole thing myself.

21,687. Have you no instructions to provide washing accommodation for the men?—None whatever.

21,688. So that what you have you have provided entirely on your own account?—Yes.

21,689. You give them canvas to wipe their hands on?—Yes.

21,690. You know that they cannot wipe their hands on canvas?—It is not hard canvas.

21,691. Supposing it is ordinary scrim canvas, you cannot wipe your hands properly on it?—I have done so many times.

21,692. (Chairman.) When you go back you might see if you cannot give them a little more accommodation, and help them to be clean?—That is all very good, but if a man is not allowed to leave a ship before time, what are you to do?

(Chairman.) You might tell them what you have heard here.

21,693. (Mr. Parsonage.) You say that it is the best shop on the Clyde? It does not say much for the others?—Mr. Gardner can tell you what the other shops on the Clyde are like.

The witness withdrew

## THIRTY-SEVENTH DAY.

Tuesday, 9th July 1912.

PRESENT:

SIR ERNEST, F. G. HATCH, BART. (*Chairman*).

Mr. E. L. COLLIS, M.B.

Mr. W. G. SUTHERLAND.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

E. A. R. WERNER (*Acting-Secretary*).

M. GIRAUD and M. PETIT examined.

21,694. (*Chairman*). Do you, M. Petit, attend to-day as representing the French firm of Carlier Frères, manufacturers of hydrated zinc oxide?—Yes.

21,695. And do you attend to-day as the English representative of the same firm trading as Giraud & Co., London?—(*M. Giraud*.) Yes.

21,696. Do you manufacture leadless paints?—We are not paint manufacturers. We manufacture Zinox, which is a stiff paste composed of pure zinc oxide (hydrated) ground in pure linseed oil. The painter prepares paint from this paste by the addition, according to need, of oil, turpentine, driers, and colour. We guarantee Zinox free from white lead.

21,697. Is your paint intended to be used as a substitute for white lead in paints?—Yes.

21,698. What is the composition of your non-poisonous paint?—The composition of the Zinox is hydrated zinc oxide and pure linseed oil. The chemical analysis of this product gives zinc oxide (ZnO), water (H<sub>2</sub>O), and linseed oil only.

21,699. What vehicle is used?—Pure linseed oil.

21,700. Are there any lead compounds in your paint?—No.

21,701. Are lead driers added?—No.

21,702. Do you use turpentine for thinning?—Zinox contains no turpentine. The painter can thin with turpentine or any substitute.

21,703. What substitutes are used if turpentine is not used?—They use white spirit. They can use any kind of turpentine substitute.

21,704. Do you get sufficient covering power without the use of lead?—Paints made from Zinox have greater covering power than those made from white lead.

21,705. Will you give us exact particulars of the comparative covering power of Zinox and white lead?—If one makes two normal paints, one with white lead and the other with Zinox, their covering power will be identical, that is to say, that the obliteration will be exactly the same. For instance, the usual formula for paints with white lead and Zinox are: white lead 2½ lbs., oil 4½ ozs., turpentine 2 ozs.; Zinox 2½ lbs., oil 1 lb., turpentine 2 ozs. For the drier, the usual proportion for the above amount of oil. These two paints will obliterate quite equally, but white lead paint, according to the above formula, will only cover 11 square metres, when Zinox will cover 15 square metres. Therefore, Zinox goes further, because it covers 15 square metres with the same obliteration as white lead for 11 square metres.

21,706. What do you mean precisely by "the same obliteration"?—By "obliteration" I mean that if you take a board with a black line drawn on it, and put one layer of white lead and one layer of Zinox on the board, you will get exactly the same obliteration with the white lead as with the Zinox.

21,707. How does the cost of your paint compare with that of lead paints?—Paints made from Zinox are cheaper than those made from white lead.

21,708. Can you tell us how much cheaper?—Well, it comes to about 1s. 10d. per cwt. It is cheaper in use—not by weight.

21,709. Do you sell much of this Zinox in France?—We have sold for this year already between 700 and 800 tons.

21,710. Do your customers tell you that it is no more costly to paint with the leadless paint than to use lead paints?—All our customers say that paints made from Zinox are cheaper to use than paints made from white lead.

21,711. Over what period have your paints been in use?—Zinox has been in use in France for seven years.

21,712. Has the Zinox paint been found to be durable?—Yes.

21,713. Do I understand that you have had no complaints in that respect?—None of our customers have complained of the durability of paint made from Zinox for exterior work, or interior work. They have not complained at all.

21,714. (*Mr. Sutherland*.) For neither?—For neither.

21,715. (*Chairman*.) Can you give us particulars of a test of the durability of this zinc paint?—At St. Denis, near Paris, 22, Avenue de la Plaine, stands a five-storey corner house. The first and second storeys have been painted with Zinox, and the third, fourth, and fifth storeys with white lead. To-day, the Zinox is in a better condition than the white lead. This house, which was painted in October or November 1906, is still to be seen. We saw it two weeks ago, and it had not been repainted. But if a member of the Committee was desirous to see it, we should like to know beforehand so as to preserve it as it is. On this subject I have a letter from the proprietor of the house, and he says himself how the house stands now.

21,716. Will you please read it?—"With regard to your asking about your Zinox which has been employed six years ago for the exterior painting of our house, situated at 22, Avenue de la Plaine, St. Denis, we are happy to say that the results obtained have been far superior to those obtained with the white lead, because the two storeys painted with the Zinox are still in a very good state, while the three storeys painted with white lead have a very black aspect. The paint of the white lead is falling into dust, and" (they put a French expression, which I must translate literally into English) "'swears with the Zinox.' That is to say, that it looks very bad beside the Zinox, which is still in a very good state. We do not regret to have made the trial, and we recommend your Zinox as being superior to white lead."

21,717. Is the gentleman who wrote that the proprietor of the house?—Yes, he is the proprietor of the house.

21,718. Is he a quite disinterested person?—Yes. He is himself a manufacturer of paints. He is a manufacturer of English varnish. He is not the painter. The house belongs to him.

21,719. Would you give his name?—Certainly

21,720. Will you put the letter in?—Yes.

21,721. You tell us that this house has been exposed to atmospheric conditions for six years?—For six years. There are no other houses round it, and the house I must say is situated in a very bad place in St. Denis. Therefore, the rain or sun or any bad weather is going against it all the time.

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M. GIRAUD and M. PETIT.

[Continued.]

21,722. I suppose that in Paris the atmosphere is purer than in some of our manufacturing towns?—I dare say that it would be, but we have tried Zinox in Lille, which is a manufacturing town with a lot of smoke all over, and the buildings are very black. We found that Zinox will stand much better in Lille than white lead.

21,723. Have you any evidence similar to that which you have given us with regard to Paris, from which the Committee could see quite clearly that the trials of Zinox in manufacturing towns have been satisfactory?—We have some letters. The only evidence that we have of that kind are the houses which have been painted with Zinox in Lille.

21,724. How many houses did you paint with Zinox in Lille?—M. Petit says between 200 and 300, but he does not know very well, because they supply the wholesale paint merchants, and are not in direct contact with the builders. But we have some letters from people in Lille who have been using it and who say that they have had no complaints whatever about the Zinox.

21,725. Can you name a few of the most important customers who have expressed their satisfaction with your Zinox paint, and have given repeat orders for it?—Among our buyers are Messrs. Boyer Frères, Rue St. Honoré, No. 392, Paris; Messrs. Durand, Giroux, Froment & Co., Rue St. Meri, No. 5, Paris; Messrs. Cadot Frères, Quai de la Guillotière, No. 9, Lyons; Messrs. Les Fils de V. Faur, Rue St. Remi, 32, Bordeaux; Messrs. de Kouninck et de Decken, Antwerp, Belgium. These firms use between them 500 tons of Zinox a year.

21,726. (Mr. Sutherland.) Are they paint manufacturers or dealers?—They are wholesale people like a paint merchant would be here.

21,726a. Not decorators?—Not decorators. Wholesale paint merchants.

21,727. (Chairman.) Have you any English customers?—No, we have no English customers. I have submitted it to different firms. So far the firms to whom I have submitted it have said that it is a very suitable product.

21,728. I want to know whether the paint has been tried in England in any way?—No, it has not been tried in England.

21,729. Has Zinox been used on ships?—Zinox has been used to paint yachts, and the result has been very good, as one owner has recommended the use of Zinox to all his friends possessing yachts. On this subject I have some letters, if you would like to see them, from people possessing yachts; and there is a letter from a boat builder in France who is using Zinox for all his work.

21,730. Would you give a little explanation of each letter, and then put the letters in?—Certainly. I have a letter here from a gentleman of the name of Monchablon, a yacht owner, and he says that he is very pleased with the Zinox. His yacht, of which the name is "Yvonne," is 40 tons. He says, "My boat has been painted with Zinox." Only the top parts are painted with Zinox; that is to say, the parts which are above the water. The keel and bottom of his boat are copper, and he could not paint them with Zinox. He said that in a small boat like this the sea water is going over practically all the time, and Zinox has never been affected by it. He says that last summer he was in a place in the Riviera, and he remarked about another yacht much larger than his which had been painted with white lead just at the time, and it looked much worse than the paint on his yacht.

21,731. Was it painted at the same time?—That he does not say. He said that in the other boat the paint was yellow in places.

21,732. Then the comparison is not worth very much, is it?—No. He says that he thinks it was done quite recently; because the boat was a very elegant one (if I may put it that way), and the owner of the boat generally had it repainted every year. It is one of the smartest yachts in the Riviera.

21,733. Just quote the other letters?—Here is a letter from Messrs. Abel, Le Marchand, Vincent & Cie. They say: "Dear Sir—I have used Zinox for seven years on all the boats I am speaking of, and

" which I have navigated. I have always been very satisfied with this paint, which adheres to the wood and preserves it perfectly. The paint also remains white, and is very economical in use, which is the reason why I am continuing to employ it with great satisfaction to my customers. I shall always be very pleased to recommend the qualities of Zinox because I have always been satisfied that it is a good product." Here is a letter from a gentleman who possesses a yacht also, and he is ordering only 10 kilos to repaint it. He says: "I have been very satisfied last year with the Zinox you have supplied me with. Will you kindly send me as quickly as possible two barrels of 5 kilos each to the following address," which is given. That is from M. Bar. Those are all the letters I have about yachts.

21,734. Can Zinox be used on iron?—Zinox has been used with the same success on iron, steel, and wood.

21,735. Can you give us any particulars of where it has been used on iron?—M. Petit says that in Lille there are some works of spinners where they make thread. They are obliged to use vapour of water; and the top of their works is covered with iron. Until lately they have been using all sorts of paints, which could not stand the moisture. Last year they used Zinox and it has stood it very well. We have a letter from that firm.

21,736. Are the works that you speak of large ones?—Yes, very large works.

21,737. For how long have they used Zinox with such success?—For four years. There is another firm of the name of D'Alciel which used it six years ago.

21,738. Have they repeated the order?—M. Petit does not know. He says they will use Zinox, but the orders would not be put through to them direct, because they are buying from someone else.

21,739. Do they still use Zinox?—They still use Zinox. They do not use anything else.

21,740. How often do they paint these iron roofs?—Not more than once a year.

21,741. (Mr. Sutherland.) Have they only just started with your stuff?—No. Some was started six years ago, and one started four years ago.

21,742. (Chairman.) Supposing that the demand for zinc paints were to be greatly increased, would there be any difficulty in getting sufficient zinc ore at present prices?—As far as we are aware, we will always have sufficient zinc oxide to meet even a very strong demand.

21,743. What is your knowledge with respect to this?—The knowledge of my firm—what my firm have told me. M. Petit says they have no fear of being short of zinc oxide, because they are engaged with such large firms, who will be only too pleased to make contracts with them, and they already have contracts with them, because they can make it as well from the metal as from the ore.

21,744. Do you know anything about the capacity of the world for producing zinc ore?—M. Petit says that he cannot give a very definite answer.

21,745. Now, will you kindly translate the letter about the cotton mill?—The name of the firm is Delannoy et Fils: "In answer to your letter of the 21st June we must say that we are very satisfied with the Zinox. For a great number of years we have tried a great number of different colours in paints in our spinning room, where we do work thread with artificial humidity, and we have never before been able to obtain a result to be compared with the one obtained with Zinox. We are happy to assure you of this."

21,746. Does moisture not affect Zinox paints?—Salt and water does not affect Zinox. Re the complaints made about ordinary zinc oxide being affected by water remaining in the sashes, such complaint has never been made about Zinox. Moisture would not affect it, as it has been used in that spinning factory.

21,747. Can Zinox be used on glass?—Zinox can be used on glass like any other paint.

21,748. Do you know if your Zinox paints are used by the railway companies?—We know that the French Northern Railway and the French Eastern Railway

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[Continued.]

use Zinox, but we do not know for what purposes exactly.

21,749. Have you tried to ascertain for what purposes it is used?—No, we have not tried to ascertain, but we think it is for all their buildings and stations. We have a letter from the contractor of the Northern Railway, who is contracting for the supply of all the paints of the Northern Railway.

21,750. Please read it?—The name of the contractor is Mr. F. Grandi. They wrote on the 15th June 1912 to Messrs. Carlier, and they said: "Following your demand, I have pleasure to inform you that all the zinc oxide hydrated, which you call 'Zinox,' has given me full satisfaction in the many applications I have made with it." This firm are contractors to the Great Northern Railway Company, and I must say that the Great Northern Railway Company made a trial of Zinox six years ago. They painted a board partly with Zinox, partly with white lead, and partly with other kinds of paint, and they put it against their works, so that the smoke or any kind of bad weather could go against it. At the end of six years they looked at it, and found that Zinox was the best of the lot, and it was after that result that they forced their contractor to only use Zinox for all the works.

21,751. When did you first bring Zinox under the notice of the railway companies?—Six years ago.

21,752. What quantity of Zinox have they used since that time?—I could not tell you. It goes direct to the contractor, so we do not know.

21,753. Have you any idea whether it has been used continuously?—M. Petit says that he knows that for one special work they took 6 tons, and the French Eastern at one time, for one work only, took 7 tons. But as it goes through the contractor it is difficult to answer.

21,754. Could you tell us how many tons of paint they use in the whole of their system in the year? I want to know what percentage this bears to the paint that is used generally?—M. Petit says that it is rather difficult to answer, because of the difference from year to year and the difference of the structures to be painted.

21,755. Could you apply to any of the railway companies to ascertain exactly what use is made of Zinox paint in any of their departments?—I could apply to those two companies to know the quantity of paint they use in a year.

21,756. It would be very satisfactory to this Committee if they could hear authoritatively that one of the great railway companies in France used this paint for a variety of different purposes, and that it had been satisfactory in all respects. That would be very good evidence. Could you find out, for instance, whether it is used for railway carriages, whether it is used for iron bridges, whether it is used for railway stations, where smoke plays such a serious part?—I think that that is where they generally use it at the present moment—on the stations. M. Petit asked me to tell you about the President of the *Chambre Syndicale* of the Master Painters in Paris. If you would write to the president (M. Manché) officially he would tell you anything you would require about Zinox.

21,757. (Mr. Sutherland.) I know him. He visited us at Leeds?—We asked him for a letter. He said: "I cannot give a letter, but if I have an official letter from the Home Office I will reply."

21,758. (Chairman.) That is very satisfactory. Now, do you supply users direct or only through paint merchants?—Only through paint merchants.

21,759. Then you do not always know for what purpose Zinox is used?—No.

21,760. But you judge of its efficiency as a paint by the fact that the demand for it has increased considerably since it was put on the market?—Yes. The demand has practically doubled each year. If it might interest you I have a letter here from the vice-president of the same *Chambre Syndicale*.

21,761. Will you translate it?—This gentleman is also a builder and contractor and master painter. He says: "You know that I have followed Zinox very attentively since its appearance on the market, and that from last year I have adopted Zinox exclusively for all my works, as well for the interior as for the

exterior. I estimate that it is the best of the products which we possess actually to replace white lead as to the point of view of covering power, and the facility of having it employed by our workmen. I must add that of the numerous works which I have executed with Zinox it gives the greatest satisfaction to all my customers and also to their architects."

21,762. (Dr. Collis.) In 1915 in France the use of lead in paints for buildings will be prohibited, will it not?—Yes, it will be, if there is no other law coming on the top of it which might alter it.

21,763. As the law stands at present, that is so?—Yes.

21,764. Are the building contractors and decorators taking steps in France to find out what they will use when that law becomes operative?—M. Petit says that in France the contractors are looking for a substitute for white lead, because of the law.

21,765. Does that, do you think, in any way account for the prosperity of the Zinox firm just at present?—M. Petit says he does not think that that is what makes the good sale of Zinox at present, because there are many substitutes for white lead on the market, which have been tried by many firms, and in none of them have they found the qualities which they find in Zinox. They have found also that Zinox is better than white lead, and even if there was not a law in France the people would prefer to use Zinox instead of white lead.

21,766. And even without the law which is to come into force in 1915, do you consider that the sales of Zinox would be equal to what they are now?—It is not the fear of the law which makes people buy Zinox. It will be bought because people see that it is better than white lead, and they will certainly use it in place of white lead.

21,767. Yes, but you understand the point that I am upon?—I know quite well what you mean.

21,768. Is there really here a true comparison with white lead, or is it because white lead has got to go in 1914 that they are picking out the best of what remains?—I quite follow your question. He says that that does not make any difference. It does not affect it in any way.

21,769. I wanted to get that point clear?—If there was no law, people seeing the Zinox would buy it just the same.

21,770. (Mr. Sutherland.) On its merits?—On its merits.

21,771. (Dr. Collis.) With regard to hydrated oxide of zinc, which is sold under the name of Zinox, is the method of preparation a secret in any way? I do not want to ask the method if it is secret?—Yes.

21,772. Might I go so far as to ask whether it is made from the ore by the direct process at all?—M. Petit says that he can use zinc oxide made by the direct process or the indirect process. It does not matter to him.

21,773. Does he buy the zinc oxide made or does he make the zinc oxide?—No, he does not make the zinc oxide.

21,774. He buys it and then hydrates it?—He buys it and then hydrates it by special process, which is a secret.

21,775. So that his process of manufacture depends, not on the amount of zinc ore which there is in the world but on the amount of zinc oxide produced from the ore?—Yes, that is right. He can make his stuff from zinc oxide coming from the ore or coming from the metal.

21,776. Yes, but he has to get the zinc oxide first. He does not produce it straight from the ore?—No; he buys the zinc oxide to make this.

21,777. He is in fact a paint manufacturer, the same as in England a person is who buys white lead from the lead corroder and makes white lead paint?—Yes, exactly the same.

21,778. So that the supply of zinc oxide which he can get affects his output; in the same way that, if the lead corroders could not get enough lead to make white lead, the paint manufacturer could not make his white lead paint?—Yes, that is right. That is why we put the answer as we did. We know that the firms would

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be only too pleased to supply us with large quantities, and my firm already have large contracts placed with different firms.

21,779. Is the zinc oxide that he uses chiefly made in France?—He has many firms who are supplying him with samples of zinc oxide, and he takes the one that he likes best for his purpose. He is not bound to anybody.

21,780. No, but as a matter of fact does he buy usually in France or from Belgium or Germany?—He buys practically everywhere. France, Belgium, Holland, and America. He takes those which are found best for his purpose.

21,781. Does it affect his product if the zinc oxide contains any appreciable amount of lead?—He does not use any zinc oxide with lead in it. He always analyses it and tests it, and if there is any lead in it he does not use the zinc oxide.

21,782. What amount of lead does he allow in the zinc oxide? Does he allow himself a limit of one per cent. or what?—No percentage at all. I know the French Code would give three per cent. of lead.

21,783. But he works with none?—He works with none.

21,784. To the best of your knowledge, does it stand sulphur fumes?—M. Petit says that they have no effect upon it at all.

21,785. (Mr. Sutherland.) They do not affect it?—They do not affect it.

21,786. Not sulphurous gases?—No.

21,787. (Dr. Collis.) Has it been used at all in gas works?—He says that it has been used in places where people have sulphurous baths. They always use Zinox there.

21,788. Has it been used at all in gas works?—No. That is the only answer he can give to your question.

21,789. (Mr. Sutherland.) Is M. Petit the gentleman who published a book on zinc oxide?—Yes.

21,790. Published by Scott, Greenwood, & Co.?—I do not know.

21,791. It was translated?—Yes.

21,792. There is an English edition. Is Zinox nothing but pure zinc oxide?—Yes; pure zinc oxide guaranteed.

21,793. How does it differ from the ordinary zinc oxide paint?—He says that the difference between the ordinary zinc oxide and Zinox is that the Zinox is much thinner and the Zinox forms a combination.

21,794. Thinner?—The molecules are much thinner.

21,795. Finer?—Finer. By his process there is a true chemical compound which does not exist with ordinary zinc oxide.

21,796. But what constitutes the difference in application between Zinox and zinc oxide?—Do you mean in the working?

21,797. Yes, in the working?—It is exactly the same.

21,798. M. Petit in his little book speaks of a thin coat of white lead paint as one of the great advantages in painting, and as a means of getting good work. He admits in his book that a thin coat is very much better than a thick coat for the life of the paint. He also admits in the book that zinc cannot strain as thin and give the same covering or obliterating capacity that lead can. Now, how does Zinox get that covering capacity?—Zinox gets that covering capacity by the method of making it. That is the only answer I can give. It does obliterate as well as white lead; and it will therefore obliterate better than ordinary zinc oxide will.

21,799. Will it spread thin like white lead?—It will, because the thinner you use it the better it is.

21,800. And still keep the covering power?—And still keep the covering power.

21,801. (Chairman.) I do not think that you have answered Mr. Sutherland's point quite. What is the difference between this paint of yours and ordinary zinc oxide?—If you use ordinary zinc oxide for outside work, for instance, after a certain time the molecules of the zinc will go down in the oil. It will be only zinc oxide in transparent oil if I may say so. With Zinox it will be a true chemical compound, and therefore the zinc oxide cannot be separated either from the

oil or from the water. They do not separate; they form a homogeneous film exactly like white lead does.

21,802. (Mr. Sutherland.) Does Zinox saponify like white lead?—It does.

21,803. Is it a secret thing?—It is a secret thing.

21,804. Is it covered by the process of hydration?—Yes; it is covered by the process of hydration and operation of the oil.

21,805. I understand that there is nothing added in the way of thinner to the zinc oxide?—No; there is only pure hydrated zinc oxide and pure linseed oil.

21,806. The best linseed oil?—The best linseed oil.

21,807. You do not require any special preparation for the linseed oil?—That I do not know. I think that he makes special preparations, too. He says that they always buy the best, the purest linseed oil, analyse it and see that it is very pure, and then he makes his own preparation after.

21,808. But he does not change the nature of the oil, does he?—That I cannot say.

21,809. And when you supply it to a painter, does he just mix it with ordinary linseed oil and turpentine?—Yes.

21,810. And does it require as much oil as zinc oxide does?—Yes, he says that we use more oil with Zinox than we do with ordinary zinc oxide. This paper will show you perhaps:—

#### Directions for Use.

All the paints in current use can be made with Zinox M or B.

The best results are obtained in using Zinox M or B in the form of very liquid paints.

#### ZINOX "M" (Flat).

The following is, for example, an excellent liquid paint for application on plaster:—

For outdoor work—

By Weight. By Measure.

|            |   |                     |
|------------|---|---------------------|
| Zinox M    | : 100 lbs.                                      | 4 gallons.          |
| Oil        | - 50 "  | 5½ "                |
| Turpentine | 5 "   | ½ " (slightly over) |
| Drier      | : Usual proportion for the above amount of oil. |                     |

This liquid paint, though very fluid, covers perfectly, is very durable, and highly economical.

For indoor work, decrease the amount of oil and increase that of the turps, viz.:—

By Weight. By Measure.

|            |   |            |
|------------|---|------------|
| Zinox M    | - 100 lbs.                                      | 4 gallons. |
| Oil        | - 35 "  | 3¾ "       |
| Turpentine | 15 "  | 1¾ "       |
| Drier      | - Usual proportion for the above amount of oil. |            |

For dead flat:—

|            |                     |
|------------|---------------------|
| Zinox M    | - - - 100 lbs.      |
| Oil        | - - - 5 "           |
| Turpentine | - - - 30 to 35 lbs. |

or better with turpentine alone, viz., 30 to 35 lbs.

#### ZINOX "B" (Glossy).

Contains and requires no varnish.

Same formula as for Zinox M.

Zinox B yields liquid paints which dry to a highly elastic film with a brilliant enamel lustre.

The method already given for dead flat with Zinox M, if applied to Zinox B, will give a waxy polish.

These paints smooth themselves, and can be washed repeatedly without losing their brilliancy.

#### Important Notice.

Zinox M or B applied on hard wood (oak) out of doors ought always to be used in the form of oily paints, i.e., liquid paints in which oil predominates, even when used on places exposed to the sun.

It neither wrinkles nor cracks; its elasticity is remarkable.



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[Continued.]

To preserve Zinox M or B, cover it with a layer of water.

21,811. But you do not give here the proportion that is used for zinc oxide?—No, but he says that they use more with Zinox than they do with the ordinary zinc oxide.

21,812. Could you send the Committee a specimen of Zinox to test?—Yes.

21,813. What quantity?—A 7-lb. tin. I have two small samples here.

21,814. (Chairman.) A 7-lb. tin is something that can be used practically. Mr. Sutherland might like to use it?—There are two qualities, one which is flat and one which is glossy. Both of them contain only pure linseed oil and pure hydrated zinc oxide.

21,815. Can you make this Zinox paint in any colour?—We always make it white ourselves, but the painters can tint it any colour.

(Mr. Sutherland.) If the material is good it can easily be tinted. You could not get dark colours like greens and so on with this, but you could get light shades.

21,816. (Chairman.) Then this Zinox paint could not be used for dark colours?—No, not for very dark ones. It can be used exactly in the same way as you would use white lead. For the colours which you can do with lead you can use Zinox.

21,817. (Mr. Parsonage.) Is this the consistency that it is always supplied in?—Yes.

21,818. (Mr. Sutherland.) Does it deteriorate by being kept?—No, it does not. To keep it you have only to cover it with a layer of water, and you can keep it indefinitely, exactly like white lead.

21,819. (Mr. Gardner.) It does not cake?—No, it does not cake. It covers itself with a skin exactly like white lead, which the ordinary zinc oxide will not do.

The witnesses withdrew.

## THIRTY-EIGHTH DAY.

Thursday, 17th October 1912.

PRESENT:

SIR ERNEST, F. G. HATCH, BART. (Chairman).

Lord HENRY BENTINCK, M.P.

Mr. E. L. COLLIS, M.B.

Mr. W. G. SUTHERLAND.

Mr. F. C. RICE.

Mr. A. GARDNER.

Mr. J. PARSONAGE.

Mr. A. L. O. FELL.

Mr. C. L. MASON.

Mr. W. ROBINS.

E. A. R. WEINER (Acting Secretary).

Mr. F. PISART re-called and further examined.

21,820. (Chairman.) Do you attend to-day principally in order to give us further information regarding the Belgian State Railway?—Yes.

21,821. A question was put to you when you attended in May last which implied that the Belgian State Railways were at present using lead paints. Have you taken steps to ascertain whether this is so?—Yes, I have.

21,822. What steps have you taken?—I applied through Monsieur Beernaert to the Minister for Railways, who is also Prime Minister of Belgium.

21,823. What was the result of your inquiries?—Monsieur Beernaert received an official letter. I produce here a letter of Monsieur de Broqueville stating that white lead has been prohibited since 1908.

The letter was handed in and is as follows:—  
(Translation.)

“Brussels, 21st July 1912.

“I have the honour to transmit to you the enclosed note setting forth the particulars asked for by Mr. F. Pisart, Mining Engineer of Liege, concerning the use of white lead and zinc white in the works carried out by the State Railway Department.

“(Signed) de Broqueville,  
Minister of Railways.”

“To Monsieur Beernaert,  
Minister of State at Brussels.”

“Note.

“The Belgian State Railway Department no longer uses white lead, this material having been prohibited alike for works of maintenance as for those of construction, by a Ministerial Decree passed in the course of the year 1908.

“From the close of that year no further purchases of white lead have been made.

“The quantities of zinc white supplied to the services using it are as follows:—

|      | Locomotives and Rolling Stock. | Permanent Way and Works. |
|------|--------------------------------|--------------------------|
| 1909 | 38,400 kilos.                  | 118,150 kilos.           |
| 1910 | 59,500 „                       | 75,000 „                 |
| 1911 | 61,000 „                       | 75,006 „                 |
| 1912 | 60,000 „                       | 96,000 „                 |

“The figures given for the Permanent Way and Works Service are those of the quantities of zinc white supplied for requirements of maintenance by public tenders; they do not include the supplies used by the contractors for constructional works which are carried out by way of contract.”

21,824-34. Does that prohibition apply to all painting work done for the State Railway?—Yes, both for work done by the railway administration and that done by contractors.

21,835. Does it apply to locomotives and rolling stock as well as to buildings?—It applies to everything—locomotives, carriages, waggons, station buildings, bridges, signals. I must add something to that reply: The Belgian Government has only two departments, and in no department have they used white lead since 1908.

21,836. What paint is being used at present instead of white lead?—Zinc white.

21,837. Is it absolutely pure zinc white?—No. I will not say that pure zinc white is not good, but the Government contracts in Belgium allow zinc oxide containing not more than 4 per cent. of lead salts.

21,838. In what way is pure zinc oxide not satisfactory?—Absolutely pure zinc oxide hardens and peels off. In the same way, absolutely pure white lead chalks off; for outside work only I mean.

21,839. What do you consider the best proportion for a white paint?—Where absolutely pure white is

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[Continued.]

required zinc oxide with 4 per cent. of basic sulphate of lead, combined in the course of manufacture—not added—is sufficient for good results. Where a pure white colour is not so important and the greatest possible covering power is required for external work, a little more lead should be allowed.

21,840. How much P—I should say 8 per cent. of combined lead in the form of lead sulphate as the maximum.

21,841. How much soluble lead calculated as lead monoxide would that represent?—That depends on the nature of the basic sulphate of lead. You have many basic sulphates of lead. You have mono-basic, di-basic; tri-basic. I have made experiments on this subject, and I must say that when you have a small percentage of basic sulphate of lead in zinc oxide, all the basic sulphate of lead is soluble in a solution of hydrochloric acid of  $\frac{1}{4}$  per cent. strength. When you have 2, 3; or 4 per cent. of basic sulphate of lead it is soluble in hydrochloric acid, but when you have more than that, i.e., 7 or 8, you arrive progressively at basic sulphate of lead which is not dissolved.

21,842. When you say "is not dissolved," you mean cannot be dissolved by hydrochloric acid?—Yes, by acid. When you have 8 per cent. of lead, 60 per cent. of the lead only is dissolved in the acid solution.

21,843. Would you say that there would not be more than 5 per cent. of soluble lead P—I have a note: If you have a zinc oxide containing 8 per cent. of lead, 63 per cent. of this lead is soluble in a solution of hydrochloric acid  $\frac{1}{4}$  per cent. strength. That is what we have found.

21,844. (Mr. Sutherland.) That is roughly 5 per cent. P—Yes. I have had only one or two days to make these experiments.

21,845. (Chairman.) Then you maintain that perfect paints for all purposes can be produced under a restriction of not more than 5 per cent. of soluble lead P—Till the day before yesterday we did not pay very much attention to the quantity of lead which was soluble, because generally we make zinc containing 3, 4, or 5 per cent. maximum, and as we have never had any trouble with lead poisoning with this proportion, we did not pay attention to this question. We are making both pure and leaded zinc; we saw a difference, a sensible difference in the way in which they are standing, for outside paint, so far as we have tried.

21,846. When you made inquiries regarding the Belgian State Railways, did you ascertain whether the use of red lead had been discontinued?—Yes, but not formally, because the question was not put to me when I was before the Commission. But I know that red oxide of iron is being used now in place of red lead.

21,847. How do you know that?—From a member of the Belgian State Railways, the General Manager of the Malines Works, and he told me that red lead had been suppressed at the same time as white lead.

21,848. With regard to your statement that the State Railways have ceased to use white lead, I understand you produce a letter from the Prime Minister of Belgium to that effect, but with regard to your statement that red oxide of iron is being now used instead of red lead, you have no such letter?—No official information.

21,849. You have very large works for making zinc oxide have you not?—Yes. We make about 10,000 tons annually.

21,850. How long have the works been in operation?—Since 1870.

21,851. How many men are employed at your works?—We are making also lithopone. We have several works, and we are employing on the whole 500 men.

21,852. Have you had any cases of lead poisoning among your workers?—None since the beginning of the works, that is in the last 42 years.

21,853. Do you take any precautions to prevent them from breathing the dust of the material you manufacture P—No; we have no special ventilation.

21,854. Are a number of the men considerably exposed to dust?—Yes. There are 20 or 30 men who do the packing. They get covered with zinc white

dust just like a miller. They have to hammer down the material into the casks.

21,855. If they do not suffer from lead poisoning, do they suffer from phthisis or bronchitis?—No. In lithopone we had a man suffer from a chest complaint on account of the mechanical effect of the dust. Lithopone does not contain lead at all.

21,856. Do you then pack the zinc oxide absolutely dry?—Yes. We guarantee that it shall not contain more than a quarter per cent. of water.

21,857. Does all your zinc oxide contain a small percentage of lead?—Most. We are also making the purest zinc oxide in the world.

21,858. Notwithstanding that much of it contains lead, you have had no cases of lead poisoning from the breathing of dust by the packers?—Never.

21,859. Do the men have to exercise care in handling this zinc oxide with a small percentage of lead if they have cuts or scratches on their hands?—In fact it is a regular practice to rub the material into any scratch or cut for the purpose of healing.

21,860. (Dr. Collis.) Do you have any medical examination of your men at all?—Yes. We have physicians who are attending for everything in the works, and, as you know, in the Netherlands the medical inspection of factories is very careful.

21,861. Do you mean that you have a doctor at the works who sees any man who is ill?—He sees only men who complain of anything.

21,862. Have you ever known that doctor or any of the doctors say that the men suffer from any effect of inhaling zinc dust, except the mechanical effect?—No.

21,863. You have never heard of any illness ascribed to zinc?—No. A doctor of the Dutch Government, an official doctor, asked us last year to have some ventilators, only on account of the dust, in the lithopone department, where there is no lead at all, because the ceilings were too low. It is an old building, and the ceiling of the packing room is too low. We are considering how best to deal with the matter.

21,864. But as a matter of fact your own medical man, your own doctor, has never suggested to you that zinc ever causes any illness among the men?—No.

21,865. Not during the whole 42 years that you have been engaged in this?—No. We can show you statistics of our works showing that the number of days of illness of our workmen are less than in the towns. During 40 years the amount of illness per year has been less than the amount of illness in the district. The books are open to anyone and we can show the attendance of the men. There are many workers who have been employed by us for more than 20 or 30 years as packers, and in every department.

21,866. Concerning the chest trouble in the manufacture of lithopone, could you tell me what form that chest trouble took?—The man was not very strong in the chest. It was only one case. He suffered from inflammation.

21,867. Pneumonia or bronchitis?—No, irritation. We had to put him in another department.

21,868. He used to get irritation?—Irritation.

21,868a. He could not continue the work and went to another department?—We put him in another department where there was no dust.

21,869. Did the doctor say that he had bronchitis or consumption or anything definite, or did he only say that it was irritation?—Merely that.

21,870. (Mr. Sutherland.) Is there any law in Belgium corresponding to our Workmen's Compensation Act?—I am afraid that I do not know the Workmen's Compensation Act. I do not know if it is the case in Belgium, because we have only very small works in Belgium, but in Holland there is a Compensation Act.

21,871. Your works are in Holland?—Yes.

21,872. Now with regard to the evidence that you gave us last time. I asked you this question (18,892), "May I put it in this way? Do you think that pure zinc oxide without any addition is a suitable pigment for a climate such as that of England." You answer "But it depends on the physical properties of the pure

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[Continued.]

"zinc. It is impossible to say 'Yes' or 'No' without making experiments." Then you go on to say, "You can have very pure zinc obtained by the wet process—that is no pigment at all." Is that the process that is called the hydrated process?—No, not at all. It is zinc oxide obtained by precipitation and this zinc oxide is in a crystalline form. The hydrating as it is done by one or two French firms is a mixing of ordinary zinc oxide with an emulsion of oil and water, but it has no relation to this process.

21,873. Does that hydrating process confer on the zinc any special qualities of stability or ease of working?—Ease of working perhaps, but at present I must say that personally I have no special experience of it, because the quantity of such material sold up to the present is a few hundred tons, and we do not pay much attention to it.

21,874. The experience to be gathered from that is not very important, because the quantity made is so small?—The quantity is only a thing of a few hundred tons a year.

21,875. So that it is what might be called in the experimental stage?—No. I think that people are using it regularly, but we are not using it, and we have not made experiments ourselves with it.

21,876. (Mr. Rice.) This letter from the Minister of Railways says that the Belgian State Railways Department no longer uses white lead, and it gives figures as to the amount used by the Department?—Yes.

21,877. Do they prohibit the use of white lead by contractors?—Yes. In the beginning of the note they say that white lead is prohibited for all maintenance works and for new construction.

21,878. I want to know if white lead is prohibited in connection with the work done by contractors?—Yes, it is.

21,879. At the Brussels Exhibition I noticed several carriages and locomotives that had a label on them, "Purchased by the Belgian State Railways." Would the State Railway Department ascertain if those engines and carriages were painted with white lead or zinc white before they purchased them?—I do not know—not when the Belgian Railway buys an engine after it is painted.

21,880. (Chairman.) Do they prohibit the use of lead even on purchases they make in other countries?—I cannot say.

21,881. (Mr. Sutherland.) Do you know whether the Railway Department had a heavy stock of lead before they prohibited it?—No.

21,882. They might have had?—The Belgian Railway Department is always short of money, and I do not believe that they have a big stock. Perhaps they have stocks for three months or something like that. As they are making several tenders a year, I do not see the interest they would have in having more than that amount of stock.

21,883. (Mr. Fell.) The fact that they have now ceased to purchase does not prove that they have yet had any experience with zinc white?—They have had only zinc oxide since 1908, and it was after experiment that they took up zinc oxide. They did not suppress white lead at once. At first they suppressed

white lead in 1902, and they used zinc oxide solely in 1902, but they came back to white lead in 1903, and then they made new experiments in 1908, and they suppressed white lead entirely from that time till the present in 1912. Everybody thought that white lead was suppressed for ever, but they came back to white lead a year later, and they used white lead during the five years from 1903 to 1908. Then they came back to zinc oxide, but admitting 4 per cent. of lead compounds in it, and never came back to white lead again.

21,884. (Mr. Fell.) Would it be possible to get a statement as to why they changed?—I do not think that they will give any information of that kind. It is an internal matter. They will not say anything about the reason why they abandoned white lead or why they came back, and then abandoned it.

21,885. (Chairman.) Would you say from the fact of their having used zinc white during the last four years that that is in itself proof that it is satisfactory?—It is our opinion. I am absolutely sure that for the next years it will be zinc oxide that they will use.

21,886. (Mr. Mason.) I notice that the figure for permanent way and works for 1909 is quite a large one. It dropped suddenly in 1910, which looks as if they found that zinc white was not so successful as they thought, and used something else in place of it. Can you suggest any reason?—No. It was exactly the contrary. They found that they had got too much zinc oxide. They purchase their zinc oxide on the basis of the quantity of lead used. They found that zinc oxide was more economical to use, and so they had a surplus stock.

21,887. How do you suggest that they made a mistake in that way with regard to permanent way and works when, on the other hand, the locomotive and rolling stock department made an under-estimate by roughly 50 per cent. of their requirements in 1909. Did not they order in the same manner?—There was a shortage of carriages and waggons, and the rolling stock was very much increased in 1907, and they were obliged to buy many cars, and I presume that they had come up for repainting in 1910. Before 1909 they were always buying about 30 tons a year of zinc oxide for the Rolling Stock Department. It would vary to the extent of a few tons. For the last few years it was always something like 30 tons. In 1909 they increased their purchases on account of the increase of the rolling stock.

21,888. (Mr. Mason.) What is the comparison between a kilo. of zinc and a kilo. of lead?—You will find it in the book of Monsieur Souris, Chief of the painting department in the Belgian State Railways. Up to the year before 1908, they always bought about 150 tons of white lead. It varied between 120 and 150, and at present they have a larger system. It is always increasing, but the quantity is not.

21,889. Would you say that if they had 120,000 kilos. of white lead, they would only want 75,000 kilos. of zinc?—You will find in the book of Monsieur Souris the relation between one kilo. of white lead and one kilo. of zinc oxide, and you will find that one kilo. of zinc oxide in the Belgian State Railways is doing much more work than one kilo. of white lead. That is the reason why the quantities are smaller.

The witness withdrew.

Mr. A. CONNELL examined.

21,890. (Chairman.) Do you attend to-day to give evidence as the representative of Messrs. Meister, Lucius, and Bruning?—Yes.

21,891. What materials do this firm manufacture?—Aniline and alizarin dyes.

21,892. Do you manufacture pigments and paint materials?—No, just the dye stuff merely for colouring the paints.

21,893. Do any of the materials which you supply contain lead?—None of them, and they are absolutely non-poisonous.

21,894. What colours do you manufacture?—All colours sold under various technical names—"Hansa" yellows, "Hansa" greens, and various other names.

21,895. Do you manufacture reds and greens?—Yes, practically every colour.

21,896. Are they intended as substitutes for colouring materials which have a lead base?—They can be used for that purpose, and they are used for that purpose. Much of the lead colouring material at present used is in the form of chrome.

21,897. Why is so much lead used in the form of chrome?—Because for many years nothing was known except chrome which was fast to light.

21,898. Please explain what you mean by "fast to light"?—I mean a colouring material which does not fade or change its tint when exposed to bright light.

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[Continued.]

21,899. Has your firm succeeded in producing aniline colours which are fast to light?—Yes; the "Hansa" yellow is faster to light than lead chrome.

21,900. Is it fast when used direct on woodwork, metal work, plaster and the like?—Yes. Chromes are not fast when applied directly on lime, but "Hansa" yellow is always fast to lime.

21,901. Can the "Hansa" yellow be used for all purposes for which chrome yellow is used to-day?—Yes, and with advantage.

21,902. What is the special advantage?—Fastness to light and fastness to lime and its non-poisonous properties.

21,903. You have told us that the materials you manufacture are dyes?—Yes.

21,904. Does that mean that another material must be used with them to give the requisite body of paint?—Yes, and we recommend generally its use with heavy spar lithopone and other basic materials as a body. The "Hansa" yellow is merely a dye.

21,905. Is your firm directly interested in the manufacture or sale of lithopone?—We are not, but we recommend it because we have never heard any complaint regarding its use.

21,906. Can the "Hansa" colours be used also with zinc white?—Yes, and they are even better with zinc white than with lithopone.

21,907. In what respect do you mean they are better with zinc white?—"Hansa" yellow is slightly less fast when used with lithopone. This is not the case when it is used with zinc white. But even with lithopone, "Hansa" yellow is faster to light than lead chrome.

21,908. How does the price of leadless yellow or green paint made with "Hansa" yellow compare with a similar lead paint made with chrome?—The "Hansa" yellow paint is somewhat more expensive at present.

21,909. What would the additional cost of using "Hansa" yellow mean?—The actual colouring material, of which of course a very small proportion is used, has been variously estimated as from 10 per cent. to 50 per cent. more expensive than lead chrome. The resulting paint when mixed ready for use would therefore be, in the case of a paint containing 10 per cent. of yellow colouring material, from 1 to 5 per cent. more expensive.

21,910. How long have these new colours been on the market?—Since May 1910.

21,911. Is two years a sufficiently long trial to enable you to judge of the quality of your colours?—Yes; if the colouring material were not fast it would fade in much less than two years.

21,912. But we have been told by many witnesses that a longer time than that is needed to test the durability of a paint?—Yes, but our material is not a paint; it is a colouring material which can be added to any paint base, and the durability of the paint would depend on the basic material used. A lead paint coloured with "Hansa" yellow would last the same time as a lead paint coloured with any other dye. A zinc paint coloured with "Hansa" yellow would last as long as a zinc paint coloured with any other dye. But in both cases the "Hansa" paint would be faster.

21,913. (Mr. Sutherland.) The colour?—Yes.

21,914. (Chairman.) Has your sale of these colouring materials been considerable since the middle of 1910?—Yes.

21,915. Is the demand for them increasing?—Yes, it is.

21,916. To what extent has there been an increase?—It has been a continual increase. It was in 1910 when we first put them on the market, and the increase has been continual since then.

21,917. Can you give us any idea what that increase means?—In May 1910 the sale was nothing.

21,918. What was the quantity in 1911?—I am afraid I cannot tell you.

21,919. You say that the demand is increasing. Can you give us any indication as to who use them?—The majority of the large distemper and paint manufacturers.

21,920. (Mr. Sutherland.) Do you mean water paint manufacturers?—Not necessarily.

21,921. (Chairman.) Do you find that these paint manufacturers and decorators are using them in ever increasing quantities?—Yes.

21,922. Are they suitable both for interiors and exteriors?—Yes. The advantage of "Hansa" yellow is particularly marked when used on exteriors in cities, because, in addition to being faster to light, it is unaffected by sulphuretted hydrogen, whereas chrome colours have a tendency to turn black.

21,923. You sell your colours to large manufacturers of distempers and paints?—Yes.

21,924. You have told us that for these purposes the demand is increasing, notwithstanding the fact that "Hansa" yellow is more expensive than chrome?—Yes; for the best class of work a large amount of "Hansa" yellow is now being used.

21,925. You have dealt mainly with the "Hansa" yellows; are we to take it that your remarks apply equally to the greens which are derived from those yellows in the same way as chrome greens are derived from chrome yellow by mixture with blues?—Yes.

21,926. So far you have told us regarding leadless substitutes for lead chrome colours. Do you also supply leadless reds which will take the place of all those colours which are commonly made with orange lead?—Yes; we can supply dyes for any tint of red which can be struck on a barium base alone.

21,927. You have sample cards showing various red tints produced without the use of lead?—Yes.

(Some cards were handed to the Committee.)

21,928. Would these be more expensive than those made with an orange lead base?—I am afraid I am unable to say; it is doubtful.

21,929. Why are you doubtful about that?—Because I do not know the cost of manufacturing paints exactly as paints.

21,930. Would you say that if lead materials were to be prohibited the additional cost of these leadless yellows, greens, and reds would be sufficient to increase very materially the cost of painting operations?—No; the increase in cost would be a very slight one owing to the relatively small quantities of actual colouring matter used in any painting job.

21,931. (Mr. Rice.) You said that you recommended the use of lithopone with your paints because you had had no complaints of lithopone. Do you recommend also the use of white lead with your paints?—No, we do not recommend it. What I intended to indicate was that we have been asked by a good many people for a substitute for white lead, and in that case we have recommended lithopone.

21,932. When you have been asked for a substitute for white lead you have recommended lithopone?—Yes.

21,933. But you have not ceased to recommend white lead for any reason?—It is no interest to us to either recommend it or the opposite. We simply sell the dyes.

21,934. (Mr. Mason.) When you speak of aniline or alizarin colours being in use since May 1910, I take it that you mean your particular brand of aniline colours?—I was referring particularly to that one colour, "Hansa" yellow, not aniline colours generally.

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[Continued.]

21,935. Can you tell me why the Midland Railway Company gave up using alizarin?—I am afraid I must hesitate to enter into any discussion as to the reasons for that sort of thing, because the people who have supplied them are very big customers of ours, and what you tell me is absolutely news to me. I was not aware of it, and I can hardly credit it.

21,936. (*Mr. Sutherland.*) With regard to your colours, are they bleeding colours? Do you know what I mean by bleeding colours?—Bleeding in oil.

21,937. Yes?—Some of them are, and some are not.

21,938. (*Mr. Mason.*) I take it that most of these colours are not substitutes for lead paints, but substitutes for such things as cochineal?—Yes, substitutes for colouring matter; that is so.

21,939. They only take the place of lead in the case of the yellows and greens, perhaps?—No; do not misunderstand me. "Hansa" yellow does not take the place of lead chrome. It takes the place of chrome. It is the colouring matter. What we say is, that we have a colour by which a substitute for lead chrome can be made. We provide the colouring matter.

The witness withdrew.

Mr. KENNETH W. GOADBY, D.P.H., M.R.C.S.

Evidence to 21,981 handed in and taken as read; witness then called in and examined.

21,947. In the course of evidence given before the Committee in December last, certain questions as to the effect of both lead and zinc compounds on bacteria were asked, and as at that time I had made no special experiments in this direction I was unable to answer such queries from first-hand knowledge.

21,948. It appears that both M. Trillat and M. Marie had made certain observations on the effect of zinc and lead salts on bacteria. Various cultures, in the one case of two of the higher fungi, *aspergillus niger* and *penicillium glaucum*, were used, and in the other case the typhoid bacillus.

21,949. M. Trillat, in experimenting with *penicillium glaucum* and *aspergillus niger*, found that there was very little effect on the *penicillium glaucum*, but a definite effect on the *aspergillus niger*. In these experiments cultures which were to be tested were placed in petri dishes, and the whole series of cultures placed under a bell-jar of 10-litre capacity. The dishes were placed at different heights in the bell-jar, and both at the bottom and the top were placed open dishes of the compound which was to be tested.

21,950. Inhibition was only noticed in the case of white lead and oil and not with zinc oxide. Development was not entirely inhibited, and the observer only speaks of a "retardation" of the growth, and not of a "direct" inhibition.

21,951. These experiments were all performed with fluid media.

21,952. M. Marie's experiments were made by taking various portions of oil, &c., white lead and white zinc, and placing these materials over the surface of gelatin plates upon which the bacillus typhoid had been previously inoculated. As, however, the observer states that at the end of five days these plates were covered with a number of colonies of bacillus prodigiosus, staphylococci, and a large number of other organisms, the experiments can hardly be regarded as coming within the denomination of a bacteriological test, interesting though they may be.

21,953. It is suggested, however, on reviewing the experiments, that there may be inhibition produced by the action of vapours given off by compounds of lead with oil, or zinc with oil, and I have accordingly proceeded to experiment with certain bacteria.

21,954. Two varieties of experiments were undertaken:—

(1) To test if any action could be produced by the vapours given off from white lead paste and

21,940. (*Mr. Gardner.*) Your firm provides stains which are entirely free from lead and lead salts?—Yes.

21,941. (*Mr. Sutherland.*) Do those yellows bleed?—No.

21,942. Only the reds?—Not all reds. Very few of the reds do. It is the fault of the manufacturer; wrong precipitation or wrong methods of working. It may not be entirely the precipitation. What I mean is that if asked for non-bleeding paints, a manufacturer can supply them. For some purposes, bleeding in oil is no disadvantage.

21,943. (*Mr. Mason.*) Your colours are non-poisonous paints, and can be used as substitutes for poisonous paints?—All our colours are non-poisonous. Our dyes can be used as a preparation. We are not supplying paints in any form. We are not even supplying dry lakes. I want that to be clear.

21,944. They are stains?—Yes.

21,945. (*Mr. Sutherland.*) Do they use your stains to produce what is called lead chrome, or a substitute for it?—A substitute for it.

21,946. On a lead base?—No.

zinc oxide paste and oil when these compounds were heated in the manner described in my previous evidence.

(2) To determine whether any inhibitory action on bacterial growth could be determined at room temperature.

#### First Series of Experiments.

21,955. I pointed out in my previous evidence that if white lead paste be exposed to a temperature of 50° C. in an electrically-heated tube, and air drawn over, certain compounds, amongst which aldehyde and formic acid were recognisable, came over, but no lead, and no trace of that metal could be discovered. Formic aldehyde is a well-known bactericidal agent, and I thought, therefore, that if any inhibition was produced in the cultures, such an action might be easily attributable to the formic aldehyde, and not to any recondite volatile action of the metal lead.

21,956. An apparatus was set up consisting of—

(a) A tube, round which was wound a resistance in asbestos, through which a measured electric current could be passed, and so maintained that it would give a steady heat of any desired degree.

(b) A long glass tube, which fitted tightly inside the heating tube, and which contained the white lead and oil or zinc white and oil to experiment with.

(c) An exhaust pump, connected up with a series of wash bottles in such a way that a constant stream of air could be drawn through the heated tube and over the surface of the contained compound at a steady rate.

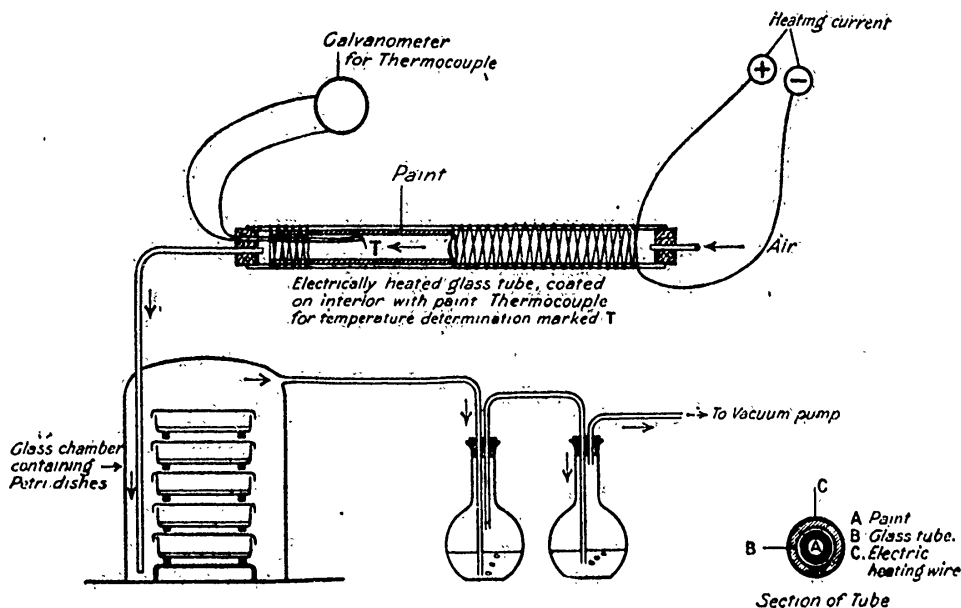
(d) Interposed between the tube containing the lead or other compound to be tested, and the series of wash bottles, was placed Bulloch's anaerobic apparatus, connected up in such a manner that the air drawn over the surface of the warmed compound passed first of all through this glass vessel, which was hermetically sealed, then through a series of wash bottles, so that the air passing over could be examined for the content of lead, aldehyde, carbonic acid, &c. In the Bulloch's apparatus were placed a series of petri dishes containing the cultures to be tested.

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[Continued.]

## 21,957. TESTS FOR INHIBITION OF BACTERIAL GROWTH.—A.



21,958. The cultures used were:—

*Bacillus Gärtner*, an organism of the typhoid group, and the common cause of ptomaine poisoning. It is closely allied to the bacillus tyhous, differing from it only in certain carbohydrate fermentations.

*Bacillus coli communis*, an organism commonly found in the intestine of man and animals.

*Staphylococcus pyogenes aureus*, one of the organisms commonly causing boils, blood poisoning, &c.

21,959. The lids of the petri dishes were raised, so that the whole of the surface was open to the action of the vapours. The cultures used were grown for twenty-four hours previously on agar at blood heat, an emulsion was then made in sterile normal saline, and sufficient of the culture added by means of a platinum loop to 10 c.c. of melted gelatine or agar, the melted medium being then poured into the petri dishes under aseptic precautions, allowed to cool, and placed in the glass container of the apparatus.

21,960. The whole of the apparatus having been set up, the electric current was turned on, and the heat, as indicated by a delicately-reading thermo-couple attached to a galvanometer, maintained at 50° C., from which point it did not vary more than 2° during the whole of the experiment. Air was drawn over at a slow rate for three days continuously, at the end of which time the experiment was stopped, the plates removed, and inspected.

21,961. Three plates in every respect similar to those used in the apparatus were placed in a glass jar alongside the apparatus under exactly similar conditions, with the exception that no vapour was drawn over, to act as controls.

21,962. Distinct inhibition of growth was produced in all the plates in the apparatus, when white lead paste free from acetate, or containing 0.1 per cent. of acetate, was used. Slight growth took place in the depths, but no surface growth was obtained, showing that the gases given off from the heated white lead and oil were a vapour inimical to the growth of the three organisms tested.

21,963. This experiment was performed with lead containing 0.1 per cent. of free acetate. A similar experiment was performed with lead when washed free from all traces of acetate, with an exactly similar result.

21,964. With zinc oxide in oil slight inhibition also took place.

21,965. Heavy growth took place on all three control plates.

21,966. Examination of the contents of the condensing flasks through which the air passed after passing through the bacterial chamber showed that both aldehyde and formic acid were present, but in the case of white lead no trace of lead could be discovered.

21,967. There is, therefore, little doubt that the inhibition of the growth was to be referred to the presence of the aldehyde and formic acid.

## Second Series of Experiments.

21,968. The method of experiment was as follows:—

Gelatin plates were poured, as previously described, and the plates placed in bell-jars, as in the method described by M. Trillat, the jar being cemented to a glass plate by means of resin ointment.

A series of controls inoculated were placed in a similar bell jar in the same position, and under the same conditions.

In the experimental jars, in addition to the petri dishes containing the cultures, a large dish was placed containing:—

- White lead paste, free of lead acetate.
- White lead paste, containing 0.1 per cent. lead acetate.
- Dry white lead, powder.
- Zinc oxide paste in oil.
- Pure linseed oil.
- Pure lead acetate.
- Zinc oxide, powder.

21,969. The plates were exposed for three days, at the end of which time the covers were removed, and the plates inspected for the purpose of comparison. Wherever possible the colonies on the plates were enumerated. In the case, however, of both the staphylococcus aureus and the bacillus coli communis, the colonies were so numerous as to be innumerable. In the bacillus Gärtner plates, the colonies varied between 300 and 350 per plate, the lowest number being present on the control, the highest number on the dry white lead plate. (See Table A.)

21,970. The amount of culture added to each of the petri dishes for the purpose of the experiments was the same, a standard loop containing 1 milligramme being used in each case for inoculation.

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[Continued.]

21,971. TESTS FOR INHIBITION OF BACTERIAL GROWTH—A.  
AT ORDINARY TEMPERATURE, 18-20° C.

CULTURES—24 hours agar emulsified in normal saline, 2 standard 1 mg. loopsfuls added to gelatin plates and poured into petri dishes. Petri dishes placed in bell-jars with compound to be tested.

## Compounds Tested.

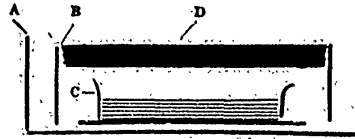
| Micro-organism.                         | White Lead Paste<br>Acetate Free. |                                 | White Lead Paste<br>0.1 per cent. Acetate. |                                 | Dry White Lead<br>Powder.   |                                 | Zinc Oxide<br>Paste.        |                                 | Zinc Oxide<br>Powder.       |                                 | Pure Linseed<br>Oil.        |                                 | Pure Lead<br>Acetate.       |                                 | Control no Substance<br>in Bell Jar. |                                 |
|---|-----------------------------------|---------------------------------|--|---------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------------|--------------------------------------|---------------------------------|
|   | 24 hrs.<br>Heavy<br>growth.       | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth.                | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth. | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth. | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth. | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth. | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth. | 3 days.<br>Liquefac.<br>growth. | 24 hrs.<br>Heavy<br>growth.          | 3 days.<br>Liquefac.<br>growth. |
| <i>Staphylococcus<br/>genes aureus.</i> |                                   |                                 |  |                                 |                             |                                 |                             |                                 |                             |                                 |                             |                                 |                             |                                 |                                      |                                 |
| <i>Bacillus<br/>Gärtner.</i>            |                                   |                                 |  |                                 |                             |                                 |                             |                                 |                             |                                 |                             |                                 |                             |                                 |                                      |                                 |
| <i>Bacillus coli communis</i>           |                                   |                                 |  |                                 |                             |                                 |                             |                                 |                             |                                 |                             |                                 |                             |                                 |                                      |                                 |

21,972. There was therefore no evidence that any vapour was given off from the surface of the above compounds that produces inhibition of bacterial growth at the ordinary room temperature, which varied from 18° to 20° C.

## Third Series of Experiments.

21,973. A third series of experiments was undertaken, and in this case the conditions were made much more rigorous.

21,974. Instead of exposing 50 grammes of the substance in a bell-jar\* containing 10 litres of air, as in M. Trillat's experiments, that is, 5 grammes per litre, a dish containing 20 grammes of the substance to be tested was placed inside the petri dish of 50 c.c. capacity, which was inverted (see sketch).



Outer cover of petri dish.

A—Outer cover of petri dish.

B—Inner cover.

C—Capsule with substance tested.

D—Layer of gelatin containing bacteria.

21,975. The organisms tested were as before:—

- Bacillus Gärtner.*
- Bacillus coli communis.*
- Staphylococcus pyogenes aureus.*

21,976. The cultures were poured in a similar way, using a standard loop, the emulsion having been made on 24 hours culture grown at 22° C., and the plates placed in the cold incubator. In each case the experiment was so arranged that the substance tested in no way touched the surface of the media upon which the organisms were grown, and in no case, either in these experiments or those previously described, did any air-borne contamination, nor any other organisms than those actually placed in the media, show upon the cultures after prolonged incubation. The experiments therefore satisfy ordinary routine bacteriological conditions, in that no organisms other than those tested were found at the conclusion of the experiment. These inhibition experiments were performed with the following substances:—

1. Zinc oxide.
2. Zinc oxide and oil.
3. Basic lead sulphate.
4. Basic lead sulphate and oil.
5. Lithopone.
6. Lithopone and oil.
7. Manganese borate.
8. Manganese borate and oil.
9. Linseed oil.
10. White lead, acetate free.
11. White lead, acetate free, plus linseed oil.
12. White lead, with 0.1 per cent. acetate.
13. White lead, with 0.1 per cent. acetate, plus oil.
14. Zinc oxide, plus oil, plus manganese borate.
15. Basic lead sulphate, plus oil, plus manganese borate.
16. Lithopone, plus oil, plus manganese borate.
17. White lead (acetate free), plus oil, plus manganese borate.
18. White lead (containing 0.1 per cent. acetate) plus manganese borate, plus oil.
19. And the usual controls.

21,977. It will be seen from the annexed table that the basic lead sulphate (purex), the zinc oxide, linseed oil and manganese borate, the acetate free white lead, manganese borate and oil, showed a clear ring in the

\* 20 grammes in a jar of 50 c.c. capacity is equal to 4,000 grammes in a 10-litre jar.

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[Continued.]

centre exactly opposite to the dish containing the substance. Very little growth took place on these plates, whereas on all the other plates the colonies were so numerous as to defy enumeration. With the bacillus

coli communis, the colonies were enumerated. It will be seen that a slight amount of difference exists in the number of colonies present, but that this difference is well within experimental error. (See Table B.)

## 21,978. TESTS FOR INHIBITION OF BACTERIAL GROWTH.—B.

METHOD.—24 hours cultivation of B. Coli. Communis, B. Gärtner, Staphylococcus Pyogenes Aureus, emulsified with normal saline—2 standard 1 mg. loops to 10 c.c. melted gelatin at 39° C., poured into petri dishes. Inverted when cold and capsule of substance placed in lower half.

| Organism.                          | Substance.  | Quantities.    | Capacity Dish. | Result, 48 hours.                                      | Result, 4 days.            | Notes.                 |
|------------------------------------|---|----------------|----------------|--|----------------------------|------------------------|
| 1. Staphylococcus pyogenes aureus. | Zinc oxide and linseed oil.                                       | 20 grammes     | 50 c.c.        | Colonies innumerable.                                  | Liquefied.                 |                        |
| 2. Ditto                           | Zinc oxide powder.  | Ditto          | Ditto          | Ditto  | Ditto.                     |                        |
| 3. Ditto                           | Zinc oxide, linseed oil, manganese borate.                        | Ditto          | Ditto          | Centre of plate opposite the dish clear, few colonies. | Outer ring only liquefied. | Retardation of growth. |
| 4. Ditto                           | White lead, acetate free.   | Ditto          | Ditto          | Innumerable colonies.                                  | Liquefied.                 |                        |
| 5. Ditto                           | White lead, 0.1 per cent. acetate.                                | Ditto          | Ditto          | Colonies innumerable.                                  | Ditto.                     |                        |
| 6. Ditto                           | White lead, 0.1 per cent. acetate, linseed oil.                   | Ditto          | Ditto          | Colonies innumerable.                                  |                            |                        |
| 7. Ditto                           | White lead, 0.1 per cent. acetate, linseed oil, manganese borate. | Ditto          | Ditto          | Clear ring in centre of media.                         | Outer edge liquefied.      | Retardation of growth. |
| 8. Ditto                           | White lead, acetate free, linseed oil.                            | Ditto          | Ditto          | Innumerable  | Liquefied.                 |                        |
| 9. Ditto                           | White lead, acetate free, linseed oil, manganese borate.          | Ditto          | Ditto          | Clear ring in centre.                                  | Outer ring liquefied.      | Retardation of growth. |
| 10. Ditto                          | Basic lead sulphate (purex)                                       | Ditto          | Ditto          | Clear central ring, edge growth.                       | Not liquefied              |                        |
| 11. Ditto                          | Basic lead sulphate (purex), linseed oil.                         | Ditto          | Ditto          | Innumerable colonies.                                  | Liquefied.                 |                        |
| 12. Ditto                          | Basic lead sulphate (purex), linseed oil, manganese borate.       | Ditto          | Ditto          | Clear central ring, colonies at edge.                  | Edge only liquefied.       | Retardation of growth. |
| 13. Ditto                          | Lithopone   | Ditto          | Ditto          | Colonies innumerable.                                  | Liquefied.                 |                        |
| 14. Ditto                          | Lithopone and linseed oil.  | Ditto          | Ditto          | Colonies innumerable.                                  | Ditto.                     |                        |
| 15. Ditto                          | Lithopone, oil, manganese borate.                                 | 20 grammes     | 50 c.c.        | Innumerable colonies.                                  | No liquefaction.           | Retardation of growth. |
| 16. Ditto                          | Linseed oil   | Ditto          | Ditto          | Innumerable colonies.                                  | Liquefaction.              |                        |
| 17. Ditto                          | Manganese borate.   | Ditto          | Ditto          | Innumerable colonies.                                  | Liquefied.                 |                        |
| 18. Ditto                          | Manganese borate and oil.   | Ditto          | Ditto          | Clear ring   | Not liquefied              | Retardation of growth. |
| 19. Ditto                          | Control   | Nothing added. | Ditto          | Innumerable colonies.                                  | Liquefied.                 |                        |

NOTE.—The chief factor in the production of inhibition appears to be the manganese borate, which apparently combines with the oil.



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[Continued.]

21,979.

## B. 2.—COLONIES ENUMERATED.

| Organism.  | Substance.  | Quantity.  | Capacity Dish. | Result, 48 hours. | Result, 4 days.  |
|--|---|------------|----------------|-------------------|--|
| 1. Bacillus coli communis, 2 mg. loops in 10 c.c. gelatin. | Zinc oxide and linseed oil.                                       | 20 grammes | 50 c.c. -      | 1,600             | No liquefaction and no colonies of organisms other than those of bacillus coli communis present on any of the plates. Sub-cultures made from each of the plates gave an active growth of bacillus coli communis. |
| 2. Ditto   | Zinc oxide powder   | Ditto      | Ditto          | 1,952             |  |
| 3. Ditto   | Zinc oxide, linseed oil, manganese borate.                        | Ditto      | Ditto          | 1,440             |  |
| 4. Ditto   | White lead acetate free   | Ditto      | Ditto          | 2,016             |  |
| 5. Ditto   | White lead, 0.1 per cent. acetate.                                | Ditto      | Ditto          | 2,720             |  |
| 6. Ditto   | White lead, 0.1 per cent. acetate, linseed oil.                   | Ditto      | Ditto          | 1,700             |  |
| 7. Ditto   | White lead, 0.1 per cent. acetate, linseed oil, manganese borate. | Ditto      | Ditto          | 1,600             |  |
| 8. Ditto   | White lead, acetate free, linseed oil.                            | Ditto      | Ditto          | 1,600             |  |
| 9. Ditto   | White lead, acetate free, linseed oil, manganese borate.          | Ditto      | Ditto          | 1,710             |  |
| 10. Ditto  | Lead sulphate or purex  | Ditto      | Ditto          | 1,920             |  |
| 11. Ditto  | Lead sulphate or purex, linseed oil.                              | Ditto      | Ditto          | 2,240             |  |
| 12. Ditto  | Lead sulphate or purex, linseed oil, manganese borate.            | Ditto      | Ditto          | 1,900             |  |
| 13. Ditto  | Lithopone   | Ditto      | Ditto          | 2,240             |  |
| 14. Ditto  | Lithopone, linseed oil  | Ditto      | Ditto          | 2,400             |  |
| 15. Ditto  | Lithopone, linseed oil, manganese borate.                         | Ditto      | Ditto          | 2,020             |  |
| 16. Ditto  | Linseed oil   | Ditto      | Ditto          | 2,112             |  |
| 17. Ditto  | Manganese borate  | Ditto      | Ditto          | 1,120             |  |
| 18. Ditto  | Manganese borate, linseed oil.                                    | Ditto      | Ditto          | 2,400             |  |
| 19. Ditto  | Control   | Ditto      | Ditto          | 1,920             |  |

21,980. It will be seen, therefore, that whatever evidence exists for inhibition of bacteria from paint, must be referred to some substance other than the lead itself, and that this substance is one of the aldehydes, probably formic aldehyde, is rendered highly probable.

21,981. It may be pointed out that this formation of an aldehyde or other substance inhibiting bacterial growth is of undoubted importance with regard to painting. The hygienic effect and disinfecting action of freshly painting rooms has been recognised by hygienists for many years; a room is always freshly papered and painted after an infectious disease has been present therein. There is no doubt that the most efficacious paint in such circumstances is one which produces some form of vapour inhibiting bacterial growth.

21,982. (Chairman.) Have you come to-day to lay before the Committee some additional investigations you have carried out on the effect of lead and zinc compounds on bacteria?—Yes.

21,983. Generally speaking, you found a distinct inhibition of growth due to the gases given off from heated white lead and oil and a slight inhibition from the gases given off by heated zinc oxide and oil?—Yes.

21,984. You satisfied yourself that this is due in each case to aldehyde and formic acid?—Yes. As far as one could say from the experiments, those were the substances passed through, and knowing that these bodies have a distinct inhibitory action on bacteria, there is nothing else to ascribe the action to. On this point, I might show these dishes, because they actually illustrate the things that were used. That is a petri-dish, and you see they are illustrated roughly in my

printed statement. The method of experimenting is as follows: The medium containing a certain number of microbes is poured into this part of the dish. The whole is previously sterilized and the cover put on. In the case of vapours, these dishes were placed in this way, and the covers raised so (*describing*), so that the vapour could pass directly into the chamber and so diffuse over here, covering the surface. When they were used in the second series of experiments, the substance to be tested was placed in a small watch glass in *this* way; the medium was poured into *this* part of the dish in the same way, forming a thickish layer. *This* dish contained a substance to be tested. It was placed in, under antiseptic precautions, and the top put on like that. When I refer in one place to a clear ring, it applies to the portion of the dish exactly opposite to where this little watch glass of the tested substance was, showing that the action was more intense exactly over the watch glass, but radiating, and less intense round the sides. There was no direct contact with the substance tested and the medium containing the bacteria, but it is quite close, and any vapours given off would easily get to the substance containing the bacteria. When inhibition of bacterial growth took place, a clear ring remained in the centre of the mass of small bacterial colonies covering the rest of the surface, there were some colonies round the edge, but none in the centre.

21,985. Why was the inhibition of growth much less with zinc oxide and oil than with white lead and oil?—Well, I suppose there would be more formic acid and aldehyde given off from a substance like white lead which has a strong affinity for oil than there would be from zinc white which does not chemically combine with oil.

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21,986. Your general conclusion from the whole series of experiments is that all pigments when mixed with oil and driers give off a vapour which kills bacteria?—All those pigments I have tested at ordinary temperatures have done so, with certain exceptions.

21,987. What are the exceptions?—They are in this Table. It is largely a question of the driers as far as I can make out. With regard to all these pigments, it did not appear to have anything to do with the pigment at all. If you compare the two series of experiments, paragraphs 21,978 and 21,979, when I used manganese borate and oil, which you could scarcely call a pigment, because it is only a drier that is put in the paint to accelerate its drying, it produced retardation of growth. The oil did not. May I explain these Tables a little more fully?

21,988. In my question I asked for your general conclusion, you will notice?—But then you say pigment; that is difficult. The pigment does not seem to make any difference. If the pigment was varied it would make no difference, but if the drier was it would. I have not considered other driers. I can only speak with regard to this particular class of drier. It did not make any difference with regard to what is dealt with in paragraph 21,978.

21,989. I will put the question in that form. Your general conclusion from the whole series of experiments in paragraph 21,978 is that pigments when mixed with oil and driers give off a vapour which kills bacteria?—Yes, certainly; that I agree with. That is the point. It seemed to be the action of the drier with those pigments that was responsible for the bacterial inhibition rather than the pigment's action on the oil. It is a compounded pigment.

21,990. (Mr. Sutherland.) Would not white lead have a greater action owing to the absorption of oil and saponification?—No; that I did not find. You see here white lead and linseed oil acetate free. The colonies were innumerable, and in other cases no action had taken place at all.

21,991. Would not that account for the difference between the white lead and the zinc oxide that you referred to earlier?—That is an absolutely negative result. There was no inhibition in those two cases.

21,992. "With zinc oxide in oil slight inhibition also took place"—paragraph 21,964?—That is heat. That is a different type of experiment entirely. This is at normal temperature (15°-20° C.), as you will see. The others were with the vapour passed over from the heated substance. It is quite a different type of experiment, one in which vapour given off from mixed paint at room temperature, the other from zinc or lead mixed with oil and heated to 50° C. in an electrically heated tube.

21,993. (Chairman.) Do you say that this vapour which kills bacteria would have a hygienic effect and a disinfecting action?—Yes, evidently.

21,994. It would not produce ill-effects?—Possibly not. It would be in very small quantities, and the amount given off would be local. Where you have a large quantity of it (and in the experiments I have tested with animals), particularly where you have turpentine, then, as I said before in my previous evidence, the animal definitely suffers from turpentine poisoning. There is no question of that, but on the question of the deleterious effects of these bacterial inhibitory substances, aldehyde, formaldehyde, and formic acid and substances of this description, would have to be in fairly large quantities to do any harm to man. I do not know what the concentration is necessary to produce effect on man; that is a point on which I could not offer an opinion.

21,995. Lead poisoning which occurs amongst painters must be due to the absorption of lead in some other form than vapour?—Yes, I think that is definitely so. That is the conclusion I come to.

21,996. This means, then, that we get back to the breathing of lead dust as the most serious cause of lead poisoning?—Yes.

21,997. This Committee then must concentrate their attention on the removal of the danger of lead poisoning arising from the breathing of dust containing lead?—Yes, I am quite in accord with that.

21,998. (Dr. Collins.) One minor point: in paragraph 21,978 the results obtained from experiments numbers 10 and 11 seem a little bit unexpected. When you were using basic lead sulphate alone, at the end of 48 hours there was a clear central ring, while when you had basic lead sulphate and linseed oil on the other hand there were innumerable colonies, as if there was retardation with the sulphate alone?—I do not understand that at all.

21,999. It seems to be slightly supported by the second series of experiments in paragraphs 21,978-9: There again you have rather fewer colonies, with lead sulphate alone than with lead sulphate and linseed oil?—Yes.

22,000. They seem to support one another as far as they go?—As far as they go they do, certainly.

22,001. You have no explanation to offer?—No. In looking through the results I noticed what you point out. I could not see any particular reason. I have not carried out any further experiments. One naturally puts the result of the experiment as it is. I am not engaged in any partisan investigation.

22,002. Would you consider that I am right in saying that all paints containing driers and oil have some definite hygienic beneficial effect?—I think so. I should imagine that that is one of the great reasons for painting out a room which has housed an infectious case. I have stated that, I think.

22,003. You have stated it in paragraph 21, 81 of your printed evidence?—One always paints a room out after infectious disease if one can, and the inhibition of bacterial growth cited above is probably an explanation of the advantage of so doing.

22,004. The two elements in paint which conduce to sickness and illness are turpentine and lead dust?—I think so, undoubtedly.

22,005. So that the less lead dust you get, having regard to the special reference to our Committee, the better. And the second consideration, not actually referred to us, is less turpentine?—Yes. As you know, I have always been interested in lead dust, and one felt that if there was anything important in the vapour question, it was necessary to settle it, and I have been over the ground exceedingly carefully and I cannot satisfy myself that there is the least trace of lead vapour.

22,006. (Mr. Sutherland.) If you eliminated the lead dust in the painting trade by the prohibition of dry rubbing down, would not that be a solution of the question, because that is the main source of lead dust?—Personally, I think it is the main source of lead dust. From my own experience, and experience in dusty atmospheres, experiments and so forth, I think that you have there got the kernel of the whole question—the question of dry rubbing down.

22,007. The prohibition of that would be a very simple administrative thing to do, would it not?—That is for you to say, not for me. I only express an opinion on the scientific aspect of the case.

22,008. Perhaps you would not care to answer this question: Do you think that the medical information on the subject is sufficiently precise to determine the prohibition of white lead?—As it exists, no; I do not think so. My personal view from what I have seen is that there is not sufficient evidence. I have not been able to satisfy myself by what I have been doing. That is all; if you ask me a direct question, whether there is or is not sufficient evidence to warrant the total prohibition of white lead, I consider there is not sufficient evidence.

22,009. (Chairman.) On what evidence do you base that statement?—I am alluding to my own experimental work. The point is this; I hold that lead poisoning as taking place amongst painters exactly as amongst white lead workers is a dust question rather than anything else, and therefore, if it is a dust question it seems to be a matter of removing that dust rather than of stopping the material that is used.

22,010. But supposing you cannot remove the dust?—The question was "if you could remove the dust," and I say, yes.

22,011. But if you cannot remove the dust?—If you cannot remove the dust, then you still have operating the cause of the poisoning. That is obvious,

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22,012. (*Mr. Sutherland.*) If that could be easily attained, it would be a big step towards solution?—Yes; I think it would be the biggest step of all.

22,013. Are you of opinion that even with the prohibition of the use of lead there would remain a large incidence of paint sickness?—Unless some regulations are brought into force. If you only touch the question of dry rubbing down and leave every other condition operating as it is, you will get all sorts of queer symptoms and disease, like nephritis and so on, due to the paint itself.

22,014. (*Mr. Rice.*) To the turpentine in the paint?—To the turpentine. You cannot, I suppose, eliminate turpentine. If you could cut out turpentine and cut out dust—

22,015. Then you could leave lead?—I think you could leave lead.

22,016. (*Mr. Parsonage.*) Then you would get these cases certified as being lead poisoning by the certifying surgeon?—That depends on the way in which you go to work. If somebody says a thing is black when it is white, do you think that that is an argument—if I may be allowed so far to contradict on that point. If you have a definite disease of which we are beginning to recognise definite symptoms, and you get those symptoms from another cause and say it is lead colic, you are making a wrong diagnosis.

22,017. I am dealing with a peculiar case at the present time, the case of a man who has been working at painting for five years. He was working with a company dealing with the lining of boxes inside with lead. He finished up with his painting and worked as a labourer with the joiners in the shop for two years. He was put on to painting, and he was only at it two days, and he was ill with lead poisoning. There was no question of any dust arising from the paint at all. There was no rubbing down of any kind. He had been certified by the certifying surgeon as suffering from lead poisoning. The firm have appealed to the medical referee, and his decision is that the man is suffering from lead poisoning?—But I am going to ask a question. You say he was engaged in lining boxes with lead?

22,018. This is the work, I understand, of the company he was employed by. He was painting the boxes?—Did he never line the boxes afterwards?

22,019. No. He had finished that work for two years?—That does not matter. You can have lead remaining in the body for two years. He might have stored up in his body an amount of lead dust from the lining of boxes in painting, turning them over and so on, and shaking them, and then, when he began the painting, he would inhale a large amount of turpentine vapour, and that would act as a liberating cause, and he would develop an acute attack of lead poisoning. I have seen a case of lead poisoning come on acutely four years after the man had left the painting trade; due to a long period of alcoholic excess. There was no doubt he had lead poisoning, but he had had no exposure to lead in the meantime. One finds that in animals and in men large quantities of lead are stored up and remain latent in the body, and if some sudden intercurrent disease occurs the lead is liberated. I have seen a case of a man who had left lead works for some time—five or six years. He suffered from lead poisoning to some extent during the time he was working. He had a bad attack of bronchitis with influenza, and he got definite wrist drop. The poison of the influenza bacillus is known to attack the nerves. Various heart symptoms and so on are common—what we call toxic neuritis following from the action of poisons on nerves which are somewhat damaged and in which hæmorrhage had taken place before, and where the recovery had been only slight, and the nervous mechanism was working perhaps at only half its normal rate. The poisoning took place immediately, and he developed wrist drop. You may call it wrist drop or secondary toxic influenza poisoning.

22,020. I understand the doctors to say that the lead material works out of the system?—I wish it did.

22,021. (*Mr. Parsonage.*) Is not that so?—I think Dr. Collis will support me in that.

(*Dr. Collis.*) I entirely agree with what Mr. Goadby says.

22,022. (*Mr. Sutherland, to the witness.*) When you were here last, you pointed out to us important results obtained in recognising lead poisoning by basophilic bodies in blood. Have there not been experiments made in Germany on these lines?—Yes. The Leipzig experiments are most interesting, and most convincing. I have not the absolute details at my fingers' ends at the moment. You will find them in the book by Goadby and Legge on Lead Poisoning; when it comes out in about a month's time. There we have quoted the experiments that have been carried on at Leipzig. They have examined the blood; they have established a routine examination once a month for painters, and they claim to have absolutely stopped lead poisoning. The early appearance of basophilic granules allows time to prevent a man becoming any further infected, and the process there adopted, I believe, is this; when a man is found to have more than 100 basophilic corpuscles per million (it is an easy estimation), he is certified, not as suffering from lead poisoning, but as being in a pre-saturine condition, and his work is altered. The men are going voluntarily for blood examination.

22,023. (*Chairman.*) You say that the work is altered. What do you mean?—If a man was engaged in lead work, and was affected by dry rubbing down, or if he had been in white lead work where he was working in removing the corrosions from the beds, he would be given other work. Many persons can absorb lead dust and not suffer appreciably.

22,024. Applying that to the painting trade, you mean that painters if they had these symptoms would have to be given other work?—I believe that what is done in Leipzig is that they are put on their club, or that there is some special arrangement. They are certified as sick. There is some arrangement by which they are either paid or have some other sort of work quite different.

22,025. Do you mean that they have compensation?—I think so. I believe it is worked through the Guilds. I did not anticipate the question, and have not the exact details here.

22,026. The long and short of it is that they must abandon their work for a certain time, or be given other work in which they do not come into contact with lead?—In the worst cases. The ordinary medicinal treatment might be quite enough in other cases.

22,027. You said that the system in Leipzig was that they were given other work?—Given other work without exposure to lead dust. I am quoting from memory; I have not the exact figures. You must not pin me down to that as a fact please, otherwise I must withdraw it altogether. I can give you the exact facts later.

22,028. As you are not quite certain as to the facts in respect of the evidence you have given about the Leipzig experiments, you suggest to us that you will send in a paper dealing with the whole question?—Yes. The medical side of the question I can give you fully, but you asked me about the administrative side, which I am not so familiar with.

22,029. In giving these further particulars you will bear in mind the remark you made in connection with men being given other work, because I want that cleared up?—Yes, certainly I will clear that up. I will give you the particulars of the method of dealing with lead poisoning in Leipzig. The method of estimating whether a man is or is not suffering from lead poisoning is by the basophilic granules. It has been found successful. What is done with that man between the time he shows basophilic granules in his red blood cells and is certified free of them and goes back to his original work, I cannot say at the present moment.

22,030. (*Mr. Sutherland.*) Do you think that the advent of the new Insurance Act does not give an opportunity to the Government to collate a very valuable mass of evidence before they eventually decide to adopt any prohibitive course through the insurance records of the sickness claims?—I do not understand the question.

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22,031. After a course of three or four years, if all the cases of sickness amongst painters were recorded, as they will be for the purposes of benefit, and collated and tabulated, and the sickness analysed, we shall get at definite data?—Certainly, and I think you will get very different data from that which you have now, but unfortunately sickness from lead poisoning does not come under this category. It is dealt with under the Workmen's Compensation Act.

22,032. (*Chairman.*) So that those cases will not be recorded?—Not more than at present. I had forgotten that for the moment.

22,033. But even supposing that all the cases were recorded, it would mean a prolongation of the present state of affairs for three or four years?—Yes, unless you made some definite recommendation for the present; for instance, with the evidence you have before you, you could not postpone dealing with dry rubbing down. That, I think, is obvious.

22,034. (*Mr. Mason.*) Do I understand that there is no danger in a freshly painted room?—No, I did not say that.

22,035. Your answer to Mr. Sutherland was that provided there was no dry rubbing down, or provided there was no dust, there would be no danger from lead poisoning?—Yes, if you put lead poisoning in. Then I think all the other factors may be considered negligible.

22,036. (*Chairman.*) What other factors?—The splashing from painting and so on that were discussed in my last evidence. I think the sprays negligible, as compared with the dust produced.

22,037. (*Mr. Mason.*) May we consider that what we know as lead colic is due to these aldehydes?—I am afraid I must ask you what you mean by lead colic, to see whether we agree upon what is lead colic.

22,038. I am asking you. I have known men who suffered from lead colic, and I cannot find out how they get it. I want to find out from you how they get it?—We must start with meaning the same thing when we discuss colic. If you mean pain in the stomach and leave out the word "lead," I think it is exceedingly probable. That you get lead colic now with painters I do not deny, but you get other colic. You get colic with turpentine. That is my position. I hope you have understood it.

22,039. Put in an Irish way, many of the lead colics are not lead colics at all?—Absolutely.

22,040. (*Mr. Rice.*) Do I understand you to say that the only danger of lead poisoning arises from the dust from dry rubbing down?—Yes, as far as I can see.

22,041. And if regulations were enacted preventing the use of dry rubbing down and thus having no lead dust, the whole danger that is suggested is obviated?—As far as I can see from my own experience and from my experimental work, that is my feeling.

22,042. (*Chairman.*) But what is your experience about this particular thing?—My experience has been with regard to white lead industries, generally.

22,043. But have you had any experience in house painting and general work?—Only in the fact that in consultation I have seen a number of cases of house painters who have suffered from lead poisoning and who were suffering from lead poisoning, and in every case which I have seen I have undoubtedly found that the cause of their illness was concerned with dust.

22,044. Yes, dust, but not necessarily rubbing down dust?—In every case it has been associated with that. I may be unfortunate in my experience.

22,045. Might not that be a coincidence?—It might. I have not seen all the painters that have suffered from colic.

22,046. But have you seen painters at work, and have you noticed specifically the amount of dust that might arise from other operations?—Yes, certainly. You put in dry rubbing down. It would be only fair in answer to your question to say dust of which dry rubbing down is the chief cause. Would that meet with your approval?

22,047. Yes?—That is what I mean.

22,048. Have you any knowledge of the amount of dust that is on an overall of an ordinary painter?—Yes,

there is an enormous amount when they are not washed, and the same in white lead works.

22,049. Would you attribute that mainly to dry rubbing down dust?—No. I suppose that the painters' overalls get a certain amount of splashing, as in the white lead works, and the overalls have to be dealt with. It would not get on to the overall as dust. It might get on as a splash, and then dry and create dust. It would not be dust that was made at the time.

22,050. It is not then a question of only dry rubbing down?—Mainly.

22,051. (*Mr. Rice.*) In your opinion, should there be a regulation dealing with dust?—Yes, dealing with any possible source of dust.

22,052. Dust only? What do you say with regard to emanations?—I do not regard emanations. There is no evidence whatever of emanations except with regard to turpentine.

22,053. (*Dr. Collis.*) Or absorption through the skin?—Or absorption through the skin.

22,054. (*Mr. Rice.*) You place very little importance on the washing of the hands?—Very little. It would be a small extra dose. That is a subsidiary cause. One wants to put one's finger on the main cause. There are contributory causes.

22,055. Would you attach importance to washing hands in warm water?—I should attach distinct importance for general hygienic reasons to a man washing his hands.

22,056. Apart from the hygienic question of cleanliness to prevent the danger from the use of lead, would you attach importance to the washing of hands?—Very little trouble is brought about by not washing hands.

22,057. Overalls. What do you say with regard to those?—I have seen washerwomen get lead poisoning from overalls because they were not damped when they came to them. I consider it is one of my duties as appointed surgeon to several large lead works to occasionally examine overalls when they come down to be washed, to see that they are properly damped. No absorption takes place through the skin unless you rub in a soluble lead salt or ointment on delicate skin such, for instance, as inside the thigh or the axilla. You can in this way produce lead poisoning from inunction; it is possible. Men handling lead as in lead rolling mills, whose hands are covered with a lead oleate all day long, and who are very careless at the washing, do not suffer appreciably from colic or from other forms of lead poisoning. A few susceptible ones may ultimately show wrist drop, just as the file cutters do, but this is probably due to fine metallic dust inhaled, but they do not suffer to the same extent as the white lead workers do, who wash their hands every meal time, and also wash their mouths, but inhale lead dust during their work. The persons engaged in washing the corrosion off the plates, and whose hands are all day long in a solution of lead acetate very rarely develop lead poisoning. There is often much splashing; and although precautions are taken to prevent this, splashing a good deal is occasioned when throwing the grids about and beating them with a fork to remove the adhering white lead. The workman who is not shovelling and making splashes, but attending the rollers and the man who lifts the corrosion from the bed and so distributes dust are always the most probable persons to develop lead poisoning. It is therefore the inhalation of dust rather than contact and absorption by the hands that determine the incidence of poisoning. One would not be so foolish as to say it does not matter about your hands, but there is not a risk of absorption through the skin of the hands. Operators should not eat their meals without washing their hands, of course, otherwise there would be a subsidiary cause of lead poisoning. Workmen, painters or white lead workers, ought to wash their hands most decidedly, but they are not liable to absorption of lead through the skin.

22,058. (*Mr. Rice.*) But they would be when eating food, unless the hands are properly cleansed?—Yes.

22,059. So in that respect you do attach great importance to washing the hands before meals?—Certainly, in regulations, in white lead regulations, I

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should say that no meals should be taken without washing.

22,060. And the same with regard to smoking?—Yes.

22,061. Does it matter whether it is hot or cold water?—No.

22,062. But in cold weather?—Probably they would not wash their hands if they had cold water. Absorption *via* the alimentary canal is very small indeed compared with the dust danger.

22,063. Many witnesses have regarded it as highly important that there should be always hot water for washing the hands before meals?—Personally I should not attach any importance to that.

22,064. In cold or hot weather it is immaterial?—Yes. As I told this Committee, and I think the Potteries Committee, I fed animals for three years with as much as a gramme of white lead a day, but they exhibited no symptoms of lead poisoning. The same class of animal exposed to white lead dust go down in six weeks when exposed to from one-tenth to one-hundredth of the above quantity, as fine dust in the air breathed.

22,065. (*Chairman.*) Is that because it is through the lungs?—Yes. In the other case it goes through the alimentary canal. I have given details of artificial digestions. It is difficult to find the lead. It becomes precipitated as an almost insoluble compound by the ordinary digestive processes.

22,066. (*Mr. Robins.*) You lay great stress on the fact that the chief cause of lead poisoning amongst painters is from the dust?—I do.

22,067. As a practical painter for nearly 40 years I can tell you that in my own craft where we use lead you cannot escape from dust. With your personal experience and mine and that of the generality of our trade, would you not consider it better to abolish it altogether, knowing as we do that other things can be used with equal advantage?—You are making two statements together and asking me to agree. You say as a practical painter, that there are plenty of other things.

22,068. I am a coach painter?—I am not a practical painter, but I have always understood that it is most difficult to find any efficient substitute, and I am not prepared to express any opinion on that point. All I can say is that I regard dust for practical purposes as the only source of lead poisoning. I have been fighting that question now for the last ten years, and by fighting it in that way I have succeeded in reducing lead poisoning in certain big factories from an incidence of something like 50 cases a year down to one occasionally, and that very mild—solely by the methods of dust elimination.

22,069. Would it be your opinion that dust can be done away with altogether where lead is used?—That again is a practical question. It is not one to ask me. It is a practical question how you have dust produced, and what are your processes. It is very difficult. If you are going to eliminate the dust, then you can eliminate the poisoning. I can answer that.

22,070. From my point of view it never can be done away with?—You perhaps possess special knowledge that I am not prepared to express an opinion upon. I would if I were acquainted with the exact conditions.

22,071. (*Dr. Collie.*) You have been quoted, I believe, on the strength of the experiment you made of injecting zinc oxide, I think it was, under the skin of a cat?—Yes.

22,072. Zinc has certain toxic properties?—Yes, I have found that.

22,073. Do you consider the toxic property of zinc in any way comparable with the toxic property of lead, if zinc or lead is absorbed in the form of dust?—You mean as to the relative poisonousness of the two substances?

22,074. Yes?—I have come to the conclusion that all heavy metals of every sort, of which zinc is one and lead another, affect the kidneys.

22,075. If there is sufficient of it, whatever the metal?—If there is sufficient of it, whatever the metal.

22,076. Do you consider that there is any reasonable comparison from the health point of view between the

dust of zinc and the dust of lead?—I can give you details of experiments dealing with that point if I may. I have been giving animals zinc by inhalation. Going back to the inoculation, one animal was done with zinc oxide, another one was done with Purex, another was done with white lead, all at the same time, and another one was done with lithopone. They all died. They all had the same amount, 0.5 grammes of lead, 0.5 grammes of zinc oxide, 0.5 grammes of lithopone, and 0.5 grammes of white lead. As to the relative rates of death, two months for the Purex. That animal died with encephalopathy; the zinc oxide cat six weeks, encephalopathy; the lithopone cat two months. That died in the night. I do not know what happened. It had no loss of its jumping muscles, but it died. In the case of the white lead cat it was a month—call it three weeks and a half.

22,077. That is subcutaneous injection?—Subcutaneous injection.

22,078. The inhalation is an important point for us to consider?—Zinc and white lead dust inhalation—

22,079. The two together?—The two together—zinc and red lead dust and zinc alone.

22,080. What were the proportions of zinc and lead—half and half?—Half and half. The date is 5th December 1911. This is zinc and white lead. That is the date of the commencement of the experiment. The red lead is the same, and the same with the zinc. They were equal parts, and 54 grammes were used in four days. It was blown over.

22,081. (*Chairman.*) Blown over the cage?—Blown into the cage. This is the cage that I explained to you when I gave evidence last time. The amount in the cage is very small blown in with the apparatus that we used. The next date is 14th March 1912. There were symptoms of poisoning there. Zinc and red lead, 10th March 1912. I have not the finish in this book. The cat did not die. It is alive now.

22,082. Did you find symptoms?—Very slight symptoms just before I went for my holidays.

22,083. When did you go for your holidays?—About the last week in July. That animal I have not killed and examined at present, so there is no post-mortem of it, and there is in the others.

22,084. As far as the experiments go they do not show much toxicity with regard to zinc?—Not with the same doses—with that blast. Taking the amount of dust in the three experiments, if anything rather more zinc dust goes over. It is a little lighter.

22,085. What do you say to this?—"But in view of Dr. Goadby's experiments, one may assume that zinc is a poisonous metal, even if it contains little or no lead capable of producing pathological changes and in particular inflammation of the kidneys"?—I have found that in inoculation experiments, undoubtedly. You could do it with iron. A good deal depends on the dust. I do not know absolutely what quantity of the zinc dust inhaled will produce toxic symptoms. The difficulty of dealing with zinc is this—that although paralysis, and hamorrhage do not occur to the same extent that they do with lead, a chronic condition of inanition is set up. The zinc cat whose record unfortunately I have not got here, lost weight like the lead cat. It got emaciation and metallic poisoning, but it did not develop anything like the acute symptoms that the lead animals developed.

22,086. You will get a poisonous effect also with iron?—Yes.

22,087. Is the poisonous effect of zinc closer to the poisonous effect of iron than it is to lead?—I do not know what the definite amount is, but putting them in relation I should put lead, zinc, iron, and I should not bracket zinc and iron together.

22,088. Would you put a greater space between zinc and lead, than between zinc and iron, if you were arranging a series?—Zinc and lead undoubtedly are closer.

22,089. Whereabouts would you put copper in the series?—I have not tested copper. I could not say.

22,090. Do you think it is probable that in the house painter's occupation the dust from zinc that the painter is exposed to would ever be sufficient to cause sickness, unless a person was specially predisposed?—

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I have no statistics, but I should think that on a surface being rubbed down dry with clouds of dust, the zinc would be present in toxic doses. Zinc does not produce the same definite symptoms, that is to say, the gross hæmorrhage, that lead does, so that paralysis is unlikely to occur, but I should think there would be sufficient zinc to cause some effect on the health, especially when associated with turpentine.

22,091. The point rather is that among house painters, with their present exposure to lead dust, the incidence of sickness is lower than it is with people exposed to dust in white lead works. If you reduce the toxicity of the dust by a quarter, is the probability of ever reaching a very toxic dose in the trade in using zinc serious?—It is very difficult to say. I have not made sufficient experiments with zinc to answer the question; but I know that it is possible to increase the toxic effects of both lead and zinc, by exposure first of all to turpentine. Emaciation follows. I have been trying to immunise animals to turpentine vapour, and I cannot do it. An animal exposed to zinc dust decreases in weight at a much greater rate if it is exposed to turpentine vapour before it is allowed to inhale zinc dust, than if it be exposed to the inhalation of zinc dust alone.

22,092. We have to-day the house painter exposed to turpentine and lead, and taking into consideration the lower toxicity of zinc, is it not possible that we should get below the toxic dose?—It is probable, but I could not answer that without further experiment.

22,093. It is because you are quoted here that I have asked the question?—It is reading more into my experiments than I should care myself to read into them. One point that did not arise just now, and which I did not mention, is this: in regard to the investigation by certain French observers, there was a question raised when I gave evidence previously whether guinea-pigs might not give a better answer to the question, Does paint give off deleterious vapours? It was said that the French observers had got effects on animals exposed to paint fumes. I have made experiments on that which might interest the Committee.

22,094. (Mr. Sutherland.) In what way do your experiments on guinea-pigs differ in results from the French experiments?—It was difficult at first to understand why they did. You are familiar with the experiments of M. Breton. As I had found the bacteriological experiments cited previously gave entirely different results when repeated in my laboratory with proper controls, I determined to repeat the guinea-pig experiments. I found that the method in which M. Breton had ventilated the chamber in which the guinea-pig was exposed was insufficient, and that animals exposed in a similar manner died of CO<sub>2</sub> poisoning from expired air, when exposed to either zinc or lead paints. I therefore repeated the experiment, giving the animal sufficient fresh air, and using a white lead paint acetate free, and a white lead paint with acetate, and a sample of zinc paint that Mr. Werner kindly got for me, and the latter is the only one that killed the guinea-pig. Apparently there was more turpentine in the zinc paint, and, although the animals showed signs of poisoning (it was definite turpentine poisoning, although M. Breton says that

he took great care to eliminate turpentine), I found that where animals were exposed in his way, it made no difference at all what the compound was, but that, when the animal died of asphyxia, sufficient air was allowed to enter, the zinc paint—which obviously had more turpentine than the white-lead paint—caused death. I will describe the experiments.

22,095. (Chairman.) What was the amount?—I put 150 to 200 c.c. of paint in a dish, and over the dish I placed a wire gauze and a bell-jar round (describing). M. Breton had a chamber, and had air passed over very slowly. The animal was living in a pond of CO<sub>2</sub>.

22,096. What happened to the others?—They were very ill. When you took them out of the cage they were all right for the first 15 to 30 minutes, and then developed definite signs of poisoning. The guinea-pigs exposed were all the same weight. The one exposed to zinc oxide died. The others recovered.

22,097. What deduction did you make?—Simply that there was more turpentine in the zinc paint.

22,098. Do you attribute the death of the guinea-pig to the additional turpentine?—Yes.

22,099. Not to the zinc?—No; please do not think I am suggesting that it is due to the zinc. It is a well-known fact that you want more turpentine in zinc paint than in others.

22,100. Is that so?—I believe it is so, especially in flitting paints.

22,101. We want to know what deduction you draw?—My deduction is that there was more toxic vapour in the sample of ready-made zinc paint than there was in the sample of ready-made lead paint, or in the lead paint made up with a compound.

22,102. I want to know why there was more vapour in the one case than the other?—I have asked one or two painters, and they have said: "If you want to use zinc you have to put in extra turpentine."

22,103. Could you tell that from your experiments?—Not without careful analysis of the paints themselves.

22,104. Do you not think that that is rather important?—Breton's experiments are quoted as showing that zinc has no toxic effect, or rather, he attributed the toxic effect to lead emanations. It was obviously not the emanation of the lead; it was the turpentine vapour that was given off, and in this particular instance it was the zinc paint that contained more. If one had mixed a larger quantity of turpentine with the lead paint, then that animal would have suffered. The point is that the variation is not due to the pigment itself.

22,105. It seems to me that you are rather speculating on the fact of the turpentine being there in abundance?—Nothing is further from my intention than to speculate.

22,106. Are you sure that turpentine was present?—The animal showed signs of turpentine poisoning when I dissected it, and it smelt of turpentine.

22,107. Then you are sure that it was turpentine?—I am sure it was turpentine that killed it. The others did not die, so the deduction that I make, I think, is the obvious deduction, and fair.

The witness withdrew.\*

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Evidence to 22,150 handed in and taken as read; witness then called in and examined.

22,108. As requested by the Committee, I have conducted further experiments with a view of controlling those described in M. Breton's Report to the French Chamber of Deputies, and beg to submit the result as follows:—

22,109. First, with reference to M. Trillat's experiments, page 344, I may be allowed again to point out that no evidence whatever is afforded by Trillat's experiments that vapours containing lead are ever given off from paint materials.

22,110. The effects produced upon micro-organisms, studied by Trillat, are such as would be produced

necessarily if any volatile organic vapour were given off when oil is oxidised by air in presence of lead oxide.

22,111. It is doubtful whether the slight retardation of growth noticed by Trillat in presence of white lead alone was more than accidental. I believe Dr. Goadby has not been able to verify Trillat's observation. In any case, if real, the difference he observed was slight and the effect transient, and there is nothing to show that it was due to lead.

22,112. The experiment referred to at page 336 of M. Breton's report, to which Dr. Collis attached special importance (Q. 15,045 in my evidence given before the

\* For further details of experimental work by Mr. K. W. Goadby, see Appendix XXI.

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Departmental Committee on 14th December, 1911), is the only one that I can discover in the Report which deserves attention as an indication that lead may be volatilised by passing air through lead paint. But the experiment does not necessarily afford proof of volatilisation. In such an experiment the lead may easily have been carried forward in the form of spray.

22,113. I have, therefore, specially directed my attention to this experiment and have repeated it in various ways. It is not quite easy to pass air through a thick mixture such as lead paint. Bubbles tend to form, and these often burst suddenly, giving rise to fine spray. I have found that, when precautions are taken to avoid any spray being carried forward, no evidence whatever can be obtained by means of sulphuretted hydrogen that lead has been carried forward.

22,114. In my opinion there is not a shred of real evidence in M. Breton's report that lead is ever volatilised in appreciable quantity under the conditions which obtain in practice.

22,115. The same may be said of the reports of MM. Heim and Hébert. It is noteworthy that these observers admit that they were unable to detect lead by means of sulphuretted hydrogen—the recognised distinctive test; they relied on Trillat's agent, which is not a distinctive test for lead.

22,116. It is also noteworthy that the amounts of lead which they supposed they had detected were very minute and practically the smallest quantities that can be indicated by the test.

22,117. Further, it is noteworthy that the amount that the test appeared to show was volatilised when lead was heated to fusion in a current of air was very much the same as they inferred was volatilised when the air current was passed over lead at the air temperature.

22,118. I have altogether failed in obtaining evidence of volatilisation under the conditions they describe—using sulphuretted hydrogen as the test.

22,119. Trillat's agent, in my experience, not only suffers from the disadvantage that it is not a specific test for lead; but it is also uncertain and not more delicate, when lead is present, than the sulphuretted hydrogen test. It is very difficult to avoid the production of a blue colour, owing to the readiness with which the agent undergoes oxidation.

22,120. The following is a detailed criticism of the French experiments:—

#### OPINION ON THE FRENCH EXPERIMENTS REFERRED TO IN M. JULES-LOUIS BRETON'S REPORT.

M. Trillat's experiments, page 344. These experiments involved watching the development of certain micro-organisms (*Penicillium glaucum* and *Aspergillus niger*) in presence of dry white lead powder and of a paste of white lead and oil.

22,121. Dishes containing an appropriate culture fluid infected with the organism were placed under bell jars containing—

- (a) Nothing else;
- (b) Dry white lead powder;
- (c) White lead made into a paste with oil.

22,122. Using *penicillium*, contrasting the development of the organism in jar (a) with that in jar (b), a slight retardation was obvious in jar (b). In jar (c) the growth was manifestly retarded. In the case of the more sensitive organism, *aspergillus*, it is stated that after five days, colonies were a little less numerous and less compact in jar (b) than in jar (a). Even after 15 days, no growth had set in in jar (c), though the cultures in jar (a) and in jar (c) were then fully developed.

22,123. It is implied in the Report that the results afford proof that plumbiferous emanations which affect the growth of the organism were given off.

22,124. Taking into account my previous observations, I am satisfied that this was not the case, and that the explanation I have already put forward may be equally applied to Trillat's experiments.

22,125. The retardation of the growth of *penicillium* and the prevention of growth in the case of *aspergillus* by exposure to the mixture of white lead and oil is without question to be ascribed to the organic but not plumbiferous vapours which our earlier observations have shown to be given off from such a mixture, as proved by the effects produced on certain leaves, such vapours being formed in consequence of the oil undergoing oxidation.

22,126. As reference is made to the fact that exposure in presence of oil alone had no effect on the organisms and it is implied that the white lead is contributory to the effect, it should be pointed out that oil alone undergoes oxidation very slowly and that the oxidation process is much hastened by mixing it with white lead. In fact, it is on this account, that a mixture of white lead and oil is so specially valuable as paint. The result that Trillat obtained is that which was to be expected therefore.

22,127. The very slight retardation of growth observed by Trillat in presence of white lead alone may well have been a mere coincidence. It is necessary that such experiments should be repeated many times to carry conviction, and no weight can be attached to the result of one or two. If white lead alone could produce a specific lead effect, it is to be expected that the effect would be cumulative, whereas M. Trillat states that after 15 days the *aspergillus* cultures were "*en plein développement*" both in jar (a) where nothing else was present, and in jar (b) containing the white lead powder.

22,128. It is noticeable that moist white lead was without effect according to Trillat. Many micro-organisms are very sensitive to acid, and it is conceivable that the effect observed by Trillat may have been due to traces of acetic acid liberated from acetate present in the white lead by the action of atmospheric carbonic acid; such escape of acetic acid would be less likely to take place in presence of water.

#### M. ARMAND GAUTIER'S OPINION—P. 334.

22,129. An opinion given by M. Gautier in the following terms is cited at p. 334:—

"Une autre pratique fort dangereuse, aussi par ses poussières, etc. . . . Il est presque impossible de faire disparaître les vieilles peintures à l'huile par simple raclage; pour les enlever, on les fait fondre au moyen de ces lampes à gros chalumeau que vous avez certainement vu employer quelquefois à Paris. A une température de 200 à 250 degrés, la peinture plombique se ramollit et on peut dès lors la gratter avec des raclettes spéciales. Les ouvriers chargés de ce travail sont bien plus exposés que les peintres eux-mêmes à l'empoisonnement saturnin, parce qu'ils ne peuvent pas se soustraire aux poussières plombées ainsi produites. Elles sont absorbées par les pores de leur peau et par leurs poumons et produisent rapidement de dangereuses intoxications."

22,130. I have given most careful attention to the burning process, and in my opinion there is far less likelihood of dust arising in the operation of burning off paint than in dry rubbing down.

22,131. There is absolutely no reason to suppose that volatile lead compounds are produced in the operation of burning. It is conceivable, however, that the volatile organic products given off from the burnt oil may in some cases have produced effects which have been wrongfully attributed to lead poisoning.

22,132. M. Marie's observations (Report p. 346) are subject to the same criticism as M. Trillat's. They prove nothing more than that vapours are given off from a mixture of white lead and linseed oil, but not from this oil alone or from a mixture of the oil and zinc white, which inhibit the growth of organisms. No one knowing anything of the subject will wish to dispute the point. But as organic vapours generally—at all events all those of the *Hormone* class—have this effect, such results are valueless as proof that lead was in any direct way the cause of the effects observed.

22,133. The same argument applies to the experiments referred to on page 348 with a guinea pig which was exposed to the vapour of ordinary lead paint, i.e.,

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a mixture of white lead, linseed oil, and turpentine. The implication that the lethal effects of the mixture were due to emanations containing lead is absolutely unjustifiable, and it is difficult to understand how serious scientific workers can have been led to put forward such a view, and to leave out of account other possible explanations.

#### TRILLAT'S AGENT.

22,134. Great importance is attached in M. Breton's report to experiments in which lead is said to have been detected by means of Trillat's agent.

22,135. I have therefore paid special attention to this test. In the first place, it is not a specific test for lead and it is not justifiable to base the conclusion that lead is present on the evidence afforded by this test alone.

22,136. Trillat's agent is affected by almost any, if not by every oxidising agent. Lead peroxide being an oxidised agent, if lead be present and be converted into peroxide, the agent indirectly affords proof of the presence of lead—provided always that every trace of any other oxidising agent be got rid of.

22,137. In applying the test, it is necessary to convert the lead presumed to be present into peroxide by means of an oxidising agent and unless every trace of this be removed before the test is applied the test is useless.

22,138. My observations go to show that it is doubtful whether Trillat's test is in reality superior to the recognised specific test for lead. In any case, I hold that it is not legitimate to assert that lead is present unless the specific test for lead be successfully applied.

22,139. M. Breton quotes an experiment (p. 336) in which lead was detected by means of sulphuretted hydrogen, but this is one in which a current of air was passed through lead paint. I do not doubt that lead was detected, but I have no doubt whatever that the lead was not volatilised but carried over mechanically as spray. I find that, just as in my previous experiments on distillation, unless care be taken, minute particles are carried forward in the form of spray.

#### MM. HEIM AND HÉBERT'S EXPERIMENTS.

22,140. The experiments made by MM. Heim and Hébert are also subject to the above criticisms. Their conclusions are based largely on the use of Trillat's agent.

22,141. In passing large volumes of air through tubes containing finely divided solid matter it is difficult to prevent particles from being carried forward mechanically, and these are not held back even by cotton wool unless the plugs of this material are packed very closely in the tubes.

22,142. In all cases, hitherto, I have failed in obtaining evidence that lead is ever volatilised from white lead under conditions such as obtain in practice. I have little doubt that in the cases in which volatilisation is supposed to have been observed the lead was really carried forward in the form of dust, and that in the case of paint the deleterious effects attributed to lead when not due to dust were those arising from organic vapours.

22,143. In the paper he communicated to the Liverpool section of the Society of Chemical Industry on March 13th, 1912, on the *Toxicity of Paints*, Professor Baly makes no reference to his previous paper in which he had implied that a *volatile lead compound* was formed; but he now speaks of a poisonous volatile organic substance—unsaturated aldehydes—as a product of the action of white or red lead on oil. He further states the opinion that, "the causes of poisoning which have been noted amongst people inhabiting rooms freshly painted with white lead would seem therefore to be due to these unsaturated aldehydes and not to be true lead poisoning."

22,144. Professor Baly should have withdrawn in specific terms the statement he made in his previous communication that volatile lead compounds were formed.

22,145. It is satisfactory, however, that he has himself shown that he was in error in speaking of

volatile lead compounds, and that he has adopted the explanation put forward by me at a much earlier date; but in giving this explanation he overlooks the possible influence of turpentine.

22,146. He also exaggerates the properties of the volatile organic compounds speaking of the vapours as singularly nauseating. But this was in the case of experiments in which he had heated the oil and white lead mixtures. The familiar smell of lead paint (without turpentine) is scarcely to be termed nauseating.

22,147. Apart from his tendency to exaggerate the "toxicity" of the products of the oxidation of oil we may claim Professor Baly's statement as entirely corroborative of mine. He even shows that basic lead sulphate acts on oil though more slowly than white lead.

22,148. In fine, I am of opinion that all the evidence we have obtained shows that the dangers attending the use of lead compounds are only the well-known mechanical dangers—that dust or incautious handling are the causes of poisoning whenever it arises. Our inquiry appears also to show that in many cases effects have been regarded as due to lead poisoning which are attributable to other causes.

22,149. The protective effect of paint is due to the production of a tough skin formed by oxidation of the paint. Whatever substance be incorporated with the oil sooner or later the oil must undergo oxidation. White lead is the most effective toughening agent; other metallic compounds are less effective and are therefore often used together with driers. Whatever objection may apply to lead paint, applies to other paints in greater or less degree—the oil is the primary cause of difficulty and there will be little difference presumably in the "toxic" effect of the vapour of two paints which dry equally rapid whether or no lead be present in both.

22,150. I believe Dr. Goadby has expressed the opinion that the vapour given off by paint in drying may be of distinct hygienic value in bringing about disinfection of rooms, &c. I am in entire agreement with him on this point.

22,151. (*Chairman*.) Do you attend to-day to give further evidence on the question of emanation of vapours containing lead?—Yes; more particularly in reference to the questions that were put to me at the end of my previous examination.

22,152. I notice in your fresh proof you criticise very carefully the experiments referred to in the report of the French Chamber of Deputies?—Yes.

22,153. You do not refer to any experiments which you have yourself made as a check on the French experimental work?—I have made experiments, particularly with reference to the point that was raised in connection with M. Breton's experiments, I think it was.

22,154. Have you made any repeat experiments yourself?—Yes; I have repeated the experiments which he describes.

22,155. You do not say so in your proof of evidence?—I intended to imply that.

22,156. What experiments did you make?—I took exception to the test that was used—Trillat's test—as not being a test for lead. Then my attention was called to an experiment by M. Breton, in which he passed air through lead paint, and found lead in the receiver. I have repeated that experiment, and I have come to the conclusion that, as in other cases, the lead was merely carried over mechanically. Lead paint is a thick material, and it is necessary, so to speak, push the air rather hard to get it through, and you are very liable, if you are not particularly careful, to get spray produced, and in that way lead has been carried forward. I have made a number of experiments in which I took care, and in which I introduced plugs of cotton wool to prevent solids being carried forward, and in those cases I got no lead. That is the only case in the French report in which the specific test for lead was used. I cannot find, when I repeat the experiment, any indication that lead really is volatilised.

22,157. Could you give us any particulars of the experiment you made?—The experiment is simple. It involves merely having a flask with paint in it, and a



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tube dipping into that paint. The flask is closed in the well-known way with cork and clips; then you pass the air on into a receiver into water so as to scrub it.

22,158. You also criticise the use of M. Trillat's reagent. Have you made an exhaustive series of tests with that reagent?—I have made a great many tests with Trillat's reagent, and I have come to the conclusion, as I said before, that it is not a test for lead; it is only a test for oxygen in lead peroxide. Many other oxides produce the same effect. That is point No. 1. My second point with regard to that test is that it is very uncertain. You can never be sure that it is working properly. Since that report was sent in, I have been working on it from another point of view, and I am more and more convinced of the uncertainty of the test, especially when it is carried out in the way that is described, I think, by MM. Heim and Hébert.

22,159. In the last paragraph of your proof you state that you are in entire accord with Mr. Goadby with regard to the hygienic value of the vapour given off by paint in drying?—The vapour given off might have effect in killing organisms and so on attached to the wall.

22,160. Have you made any experiments on this subject?—Not direct experiments, but I know a great deal about the influence of that type of vapour.

22,161. Have you made any experiments yourself?—Yes, with leaves, and so on. I brought those under your notice before, and I am arguing from that kind of evidence.

22,162. You say that you are in entire agreement with Mr. Goadby with regard to the hygienic value of the vapour given off by paint in drying. Those are your own words?—Yes.

22,163. I want to know whether you made any experiments yourself, or whether you are quoting from other experiments?—I made experiments with living things, leaves for instance.

22,164. If the vapour given off is hygienic it could not produce ill effects, and therefore the excessive illness amongst painters must be due to the use of lead?—But you have to bear in mind the sense in which that expression is used. That expression is used with reference to the killing of organisms, not as showing that it is health-giving. It is hygienic in the sense that it acts against something which is harmful.

22,165. But it would not produce anything tantamount to lead poisoning?—It might produce headache effects, and effects of that kind, certainly. I think that it does produce many of the effects that painters complain of, and more particularly that people complain of who go into freshly-painted rooms.

22,166. (Dr. Collis.) Do I understand that you consider the oil is a primary cause of anything of this sort which arises?—Oil and turpentine.

22,167. The oil primarily?—No, not primarily.

22,168. I am reading from your proof. I may have mistaken your meaning?—When I am speaking there I am speaking of the effect of whatever solid material you have plus oil. The oil is the primary cause, and not the solid material. It is the medium.

22,169. You mean it is the medium rather than the oil?—The oil is the medium.

22,170. What do you say upon the question of turpentine?—That is put into the paint to thin it. The original mixture is a mixture of oil plus lead. The assertion was that you get volatile vapours from lead. We say that you get volatile vapours not from

the lead, but from the inter-action of the lead and the oil, and the vapour arises not from the lead.

22,171. I was wondering whether you were eliminating turpentine?—No, the amount of vapour given off in the early stages is mainly turpentine. As the drying sets in, the drying of the oil proper, you get the vapour given from the oil, but that is a slower gradual process. It takes days, and the other takes hours probably.

22,172. I suppose you look on turpentine as the more toxic of the two?—If it were diminished to the same quantity, I do not think weight for weight, it would be. If you condensed the vapours from the oil and contrasted those with the others, I think probably you would find that the vapours from the oil were more toxic.

22,173. (Mr. Sutherland.) There is nothing in this last statement of yours, where you quote Dr. Goadby as to disinfection of rooms, etc., that conflicts with the known fact that newly-painted rooms give off emanations of those working in them which are not lead emanations?—It is in accordance with that. If the vapours act as disinfectants, as I have said, then they will have their influence also on people exposed to them.

22,174. You are of opinion that lead cannot volatilise under the conditions of painting?—I have studied the matter very carefully, and cannot see a scrap or particle of evidence anywhere to prove that lead is ever volatilised from paint under any conditions which occur in painting.

22,175. And dust produced by dry rubbing is the great source of danger?—I think that dust is the source of danger. Temporary effects may be produced by turpentine which have been thought to be lead poisoning effects in the past, but those are not effects that matter.

22,176. If we could eliminate the dry rubbing down which is the great source of dust, we could go a long way to reduce the evils of lead poisoning, could we not?—I think you would reduce practically all the evils that come. May I make one remark with reference to what has been said in the course of this Inquiry with regard to oils. I think that Mr. Baly, in his paper read in Liverpool, has given an altogether wrong impression with regard to the effects produced from the oil. He speaks always of poisonous effects. There is no evidence of any poisonous effects being produced. We ought to be very careful in using the word; for instance, smelling salts are poisonous, but you do not speak of their poisonous effects.

22,177. (Mr. Fell.) Do you say that the volatile products given off from turpentine in paint in some cases produce effects which have been wrongly attributed to lead poisoning?—Yes, I do not think the Committee ought to go away with the idea that these are really poisonous. You may get temporary effects. It is not right to speak of turpentine which is used by painters as a poisonous substance. However you use oil, if you use it in paint you will produce this effect, whether you associate it with lead or anything else.

22,178. (Chairman.) In your opinion is turpentine innocuous?—No, it is not innocuous. If it were used as a beverage it would be poisonous, but not in paint.

22,179. Do you consider that it has ill effects if mixed with paint?—It has an effect just as smelling salts have an effect.

22,180. Would it be injurious to a workman in his daily occupation?—No, I think not. He would soon get accustomed to it. Smelling salts, of course, would be dangerous if taken in quantity.

The witness withdrew.

Mr. EDWARD M. JOHNSON.

Evidence to 22,272 handed in and taken as read; witness then called in and examined.

22,181. I am a director of Locke, Lancaster, and W. W. and R. Johnson, Ltd., lead de-silverisers and white lead corrodors, and I have been acting as chairman of the committee of the white lead corrodors' section of the Chamber of Commerce, which has had

the preparation of the evidence placed before the Committee by the Chamber, and, so far as possible, I have carefully followed all the available evidence, although the rule which precludes any other than the witness being present has made it difficult for me to do so. On

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behalf of the corrodors, I wish to assure the Committee that, if there is any point on which further evidence is required which we may be favourably placed to obtain, we shall be pleased to assist.

22,182. I am personally of opinion that a public inquiry; as, I believe, was held in the case of phosphorus poisoning, would have been the proper method of getting at the root of the matter. I am not here to plead specially for the continuance of the white lead industry, if it can be proved to be contrary to public policy. I have little doubt that the corrodors are as public spirited as other manufacturers, and are prepared to suffer for the public good. But any interference with the use of lead in paint is more than an interference with the trade of the white and red lead makers, it involves the interference with the use of 20 or 25 per cent. of the output of the raw material, pig lead, the substitution of a mainly foreign product like zinc white, for a mainly British product like white lead, and a change that may be described as a costly revolution affecting the amenities of every home. The *onus probandi* is emphatically imposed on those who propose a drastic change, and it is, I submit, for your Committee to be satisfied of the necessity and justice of prohibition before recommending that step. I am grateful that I have been allowed an opportunity, not indeed to place before you anything particularly new, but to indicate some of the deductions to be drawn from the evidence placed before you.

22,183. My submissions are briefly:—

- (i) *That there is no statistical or other evidence that prohibition is more necessary in the case of red and white lead than in the case of other articles.*
- (ii) *That prohibition has not been possible elsewhere, and is not possible in the United Kingdom.*
- (iii) *That education and regulations have been successful elsewhere, and if tried here would be successful.*

22,184. I.—*That there is no statistical or other evidence that prohibition is more necessary in the case of red and white lead than in the case of other articles.*

A. So far as I know, there are no public statistics other than the Blue Book figures reproduced in Mr. Holt Schooling's Table A.

22,185. I would like to call particular attention to this table. Your Committee are no doubt aware that for a considerable period an energetic press campaign has been inspired by the manufacturers of one at least of the suggested substitutes. I am sure, however, the average reader of these *ex parte* and interested statements in the press as to the prevalence of lead poisoning and deaths from the same, will be astonished to learn that the mean annual death-rate per 1,000 living of occupied plumbers, painters, and glaziers is less at every age than the mean annual death-rate of all occupied males in industrial districts, and that there are only six occupations in England and Wales out of the great number examined where the death-rate in all age-groups is lower than the death rate in occupation G4.

22,186. Table O shows that the death-rate from plumbism in occupation G4 (painters, plumbers, and glaziers) is much smaller than the special death risks that attach to various other occupations.

22,187. Tables D and E show that the decrease in death-rates in occupation G4 has kept pace with the decrease in the death-rates of the whole population. These tables are particularly encouraging to those who, like the lead manufacturers, have by the help of the Home Office Regulations and their own unstinted efforts improved the hygienic conditions in the factories, and who, through me, ask that the users of their products should have the same advantages.

22,188. Tables F and G, again, show conclusively that there is no excessive mortality in occupation G4; and table H shows that that mortality is at all ages lower than the mortality in all occupied males (industrial districts).

22,189. Table J is equally interesting and shows that during 1900-2 there were only 20 actual deaths in occupation G4 for every 100 deaths statistically expected to occur.

22,190. Any unprejudiced person must agree with Mr. Schooling that the mortality in occupational group G4 is in no way excessive or abnormal, on the contrary there are a very large number of most varied occupations in which the mortality exceeds that of the plumber, painter, and glazier.

22,191. It must be admitted that the statistics of mortality are not such as offer a *prima facie* reason for so extreme a measure as "prohibition."

22,192. As to occupational sickness, it is admitted that the statistics are of the slenderest character, but there is no reason why the Home Office should not set on foot the machinery to ascertain the rates of sickness among house painters, with the rates of sickness that occur in all occupations, with the age distribution of the men exposed to risk of sickness, the age distribution of the cases, and the age distribution of the weeks of sickness.

22,193. It is impolitic and unjust to recommend prohibition until these data are received, as indeed has been emphasised by several of the foreign witnesses. Dr. Kaup has said that "no industrial disease can be properly studied and checked unless there be sufficient material in the way of statistics."

22,194. In the absence of data—perhaps on that ground alone—there is no reason for prohibition. The data available do, however, show a large reduction in the number of cases of lead poisoning, 1900-10, and there is presumptive evidence to be deduced from the mortality statistics that the sickness from all causes among house painters is not in excess of the sickness from all causes among the general population.

22,195. However, I gather that you asked Mr. Schooling to prepare other tables similar to his Table J, and this he did, and I have studied also Tables K, L, M, N. I still consider Table J the fair standard, referring as it does to 7½ millions of males in the Occupied Males Groups, Industrial districts of England and Wales.

22,196. Table K relates to 29½ millions of lives of occupied males in England and Wales, including the professional and commercial classes that are exposed to no industrial risk. It certainly indicates excessive mortality in occupation G4. But if the test of Table K is considered fair and suitable, then Table L must not be ignored; which permits of exactly the opposite conclusion.

22,197. Table M in the same way indicates an excessive mortality in occupation G4, as compared with the abnormally healthy occupation of a paper-hanger. It would be interesting to know why this industry is so healthy in view of the fact that the paper-hanger is not infrequently exposed to paint emanations. The conditions might be secured in other branches of the building trade.

22,198. Table N is equally conclusive in the opposite direction.

22,199. I know of no reason why the wood turner and cooper should have a higher death-rate than the painter. It would be unfair and statistically unsound to use only Tables K and M without due regard to the other table, including Tables L and N.

22,200. Mr. Schooling's summarisation stands unshaken, and no reliable statistics have been adduced to show that prohibition is more necessary in the case of red and white lead than in the case of other articles.

22,201. B. But is there any other evidence? Medical or scientific, for instance?

22,202. I cannot find that any one of the English or foreign scientific witnesses whose evidence I have been able to read has admitted the necessity for prohibition.

22,203. If after perusal of the statistics available it is still held that the occupation of painter is

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abnormally dangerous, would it not be well to consider why—whether it is quite certain—that lead is the sole cause, and if satisfied that it is, after most careful and exhaustive examination, then whether it cannot be rendered harmless by regulation of its use, education of the user, extension of the principle of medical inspection, and possibly a more general diffusion of knowledge of the preventive and curative remedies among the medical profession—the members of which have not all the complete knowledge of this industrial disease that several have. As regards education of the user and extension of principle of medical inspection I have just heard that much has been done in this direction in Leipsic in Germany, where the routine examination of the blood is carried on systematically with all painters, with the result that a great diminution in repeated cases of lead poisoning has taken place.

22,204. I understand that evidence has been placed before you that the sallow and unhealthy appearance of the faces of some painters is attributable to the inhalation of turpentine vapour. This effect is just as marked where pigments other than lead are used. Turpentine at least temporarily lowers the vitality of the user, and may well be an important factor affecting the ill-health of painters which is frequently attributed solely to lead.

22,205. The substitution of zinc white for white lead would increase the percentage of turpentine used in the paint when mixed for use.

22,206. Dr. Goadby's interesting experiments on animals, which showed similar symptoms whether exposed to emanations of zinc oxide, lithopone, or white lead paint, prove that the turpentine is the chief, if not the sole, cause of the malaise, nausea, and ill-defined colic felt by him and the animals experimented upon. The turpentine vapour clearly caused the presence of basophil granules in the blood and also kidney disease. By the use of white lead the use of turpentine is decreased as compared with zinc white, as also is the use of driers.

22,207. One of the reasons advanced for the prohibition of the use of lead is that the emanations given off a freshly lead-painted surface contain a volatile lead compound. I am aware that Professor Baly has withdrawn his lecture as to its conclusions, and now agrees that at ordinary temperatures aldehydes and not volatile lead compounds were the cause of the ill effects he experienced.

22,208. Professor Armstrong's interesting experiments show clearly that the volatile substances are free from lead, and are nothing more than the products of oil and turpentine in the drying process. He and, I understand, Dr. Goadby have proved, once and for all, that this idea of volatile lead compound emanation is based on a complete misconception, that the French experiments of Trillat, Breton, Heim, and Hébert, largely relied upon by the French Government, were not only unreliable, but would not bear any scientific examination. The later experiments of Dr. Goadby prove in particular that retardation of bacterial growth only occurred when manganese borate was present, whether the paint be lead or zinc or lithopone. Mr. Klein has arrived at the same result as Professor Armstrong by different means.

22,209. I submit that there is no scientific evidence here in favour of prohibition.

22,210. But if there were, would it not be our duty, before prohibiting the use of white lead, to be quite certain that the substituted pigment was itself harmless? Supposing it were possible to eliminate the harmful action of turpentine and driers, has it been proved that the only two serious substitutes for white lead are above suspicion—namely, sulphate of lead and oxide of zinc?

22,211-21. Dr. Goadby has conclusively proved before a previous Committee (Potteries Committee Report, page 483) that sulphate of lead is soluble in gastric juice, and the ridiculous claims of non-toxicity made for this pigment have been sufficiently dissipated by the Home Office in recent prosecutions.

22,222. He has also proved that zinc oxide is soluble in gastric juice, and I understand the result of inoculation of an animal with zinc oxide was exceptional inflammation and hemorrhage of the kidney. Zinc oxide, even pure, cannot be described as completely innocuous. Zinc oxide containing from 2 to 7 per cent. of lead is largely on the market, and would combine what disadvantages there may be in lead and zinc. I believe Dr. Goadby demonstrated before the Royal Physiological Society some of the toxic effects of turpentine, and I presume they have been brought to the notice of your Committee.

22,223. No doubt zinc white (pure) is less poisonous than white lead, but Dr. Delbastée, the deputy who initiated a prohibition movement in Belgium, never claimed it as harmless. It is doubtful if any of the heavy metals are quite harmless.

22,224. A fact of importance when it is remembered that lead effects are more severe in the presence of alcohol is to be found in the fact that zinc also produces considerably more effect under the same circumstances. Belgian official regulations (1901)\* forbid the employment of zinc, galvanised iron, lead, antimony, and arsenic in the manufacture of beer engines and other appliances for alcoholic liquors. A small quantity of lead is nearly always to be found in zinc white and the newer "direct" process of manufacture contains up to 5 or 6 per cent. of lead. A pure zinc oxide is too costly for ordinary use. The Belgian Government has recently raised the limit of lead permissible in zinc white from 1 to 5 per cent. But in view of Dr. Goadby's experiments, one may assume that zinc is a poisonous metal even if it contains little or no lead, capable of producing pathological changes and in particular inflammation of the kidneys. I note that the French "Moniteur Officiel du Commerce" for July 4th, 1912, contains new regulations under the law of 1905 (which deals with the sale, &c., of foodstuffs), and Article 2 of the "Arrêté," referring to packing, states expressly (with one or two special and unimportant exceptions) that "it is forbidden to place any beverages or foodstuffs in direct contact with copper, zinc, or galvanized iron." Article 3 restricts the lead in any receptacles, &c., used for beverages and foodstuffs to 10 per cent.

22,225. The presence of lead in zinc white is important, in that the mass of house painters, if the use of lead were prohibited, would certainly never suspect poisonous qualities in the pigment approved by the Government. Prohibition, then, would lead to a lack of precaution with zinc white and other harmful compounds, the results of which might be severe. In a publication of the French Ministry of Commerce† the author calls attention to the "purely mechanical action" of zinc dust and its frequent contamination "with antimony, lead, &c." The same publication cites cases of poisoning in a zinc white factory near Marseilles, ultimately proved to be due to arsenic present in the zinc. In fact, I submit that the evidence of Professor Armstrong, Dr. Goadby, and others, points strongly to the desirability of regulations being introduced for

\* The reference to Belgian Official Regulations emanates from Mr. Van Ierberghe (Courtrai) who states that the regulations forbidding the employment of zinc, &c., for certain purposes appear in the Ministerial Circulars of April 3rd, June 16th, September 17th, and December 12th, 1891.

† The publication of the French Ministry of Commerce referred to is entitled "Poisons Industriels." It was issued in 1901. The words quoted occur on page 70.

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all painting—not because of the lead which is present in most good paints, but because of the dust and turpentine, which is common to all, good and bad alike.

22,226. My submission is that there is no statistical or scientific evidence that would justify you in recommending prohibition of lead, and the substitution of any other known metallic pigment.

22,227. II.—But I go further and say that the evidence points to the fact that prohibition has not been possible elsewhere and will not be possible here, on two grounds, though there may be others:

- A. The absolute necessity of the use of red and white lead, and absence of an efficient substitute.
- B. The failure of the repressive legislation.

22,228. *Austria*.—An examination of the evidence shows how one or both of these causes continually crop up, notably in the evidence of Dr. Ignaz Kaup and Dr. Josef Rambousek, who recounts the failure of all the substitutes and the non-observance of the prohibition of the use of lead in inside painting in Austria, and indicates how the prevention of lead poisoning can best be secured by regulations. From Austria, too, you have had the evidence of a very large master painter, Herr Meissl, that white lead is indispensable for outside use and for damp places inside, and that red lead is indispensable for painting ironwork. All agree that the greatest source of danger is the dry rubbing down and that its prohibition is the chief obvious remedy.

22,229. *Belgium*.—Again, M. Ricker-Devigne from Belgium in his interesting historical account of the Belgian Prohibition Movement, which only ended in regulation, points out that there is no efficient substitute for white lead for outside painting, and even for inside painting in the vicinity of water.

22,230. *Germany*.—Again, from the German evidence of Herr Leyendecker. "No satisfactory substitute for white lead can be found in non-poisonous pigments." The railway department, after two years' practical test, found that white lead gave the only satisfactory results. Herr Dullen's: "Regulations are amply sufficient, and there is no necessity to prohibit the use of white lead." Herr Niederhauser: "There is no efficient substitute for white lead where durability is important." Again, I note the principal danger is shown to be the use of dry white lead and the practice of dry rubbing down.

22,231. *Holland*.—Again, Professor H. Wefers-Bettink, of Holland, gives exhaustive reasons for his opinion that "white lead cannot be replaced by zinc oxide," and "that experience has shown it is not possible to substitute white lead by a less injurious (zinc oxide) or better still by a purely harmless pigment." Again, that "the great majority of practical men are convinced that paint of zinc oxide as to durability is very inferior to paint of white lead." All this was confirmed by Mr. Nooijen, a practical master painter from the same country. I note again that these witnesses limit the serious danger to dry rubbing down.

22,232. *Switzerland*.—Again, M. de Morsier, of Geneva, has given you the whole history of the prohibition movement there, and how it was finally abandoned because *inter alia* "for outside work white lead is indispensable, for railway stock and iron work leadless materials give unsatisfactory results—red lead, especially cannot be prohibited—and there is no effective substitute for lead."

22,233. Dr. Roch instances the case of the Belgian Government, who reversed the decision to cease using carbonate of lead for the railways, as white lead was found to be indispensable, and recommends, before all else, the prohibition of dry rubbing down.\*

22,234. *France*.—It is a striking fact that in only one country (France) is prohibition contemplated; and, concerning France, you have already had the evidence of M. Expert-Bezançon that the proposed prohibition does not come into force until 1st January, 1915, and that, as was the case on the previous nine occasions mentioned in Mr. Miller's evidence there is little probability of any permanent effect being given to any such prohibition.

22,235. I read as lately as August, 1912, in the report of the British Consul at Lille\*.—

"White Lead.—There was no sensible modification in the white lead industry. The law prohibiting its use for outdoor painting purposes, which comes into operation three years hence, does not appear to be in favour with the public. For the use thereof has not been decreased, whereas substitutes such as lithopone, &c., are being gradually left aside as consumers begin to discover their inferiority to white lead, and it is doubtful whether the law will ever come into force. Prices of white lead and colouring matters rose with those of lead and oils."

22,236. When one reads the significant evidence of Dr. Roch and M. de Morsier of how this prohibition was secured, and how preposterous will be the effect of attempting to enforce it, one can only conclude that they have made a mistake in France—and there is no reason for England to do likewise.

22,237. While, therefore, it is evident that prohibition is by no means certain in France, there does not appear to be any known instance of white lead being successfully abolished in any other European country where the experiment has been tried—in Prussia and Belgium,† on the State railways; in Switzerland, for all Government work (after a four years' trial); in Holland, the Marine Department and Justice Department; everywhere the reintroduction of white lead has resulted, owing to the failure of the proposed substitute.

22,238. *Great Britain and Ireland*.—I cannot unduly emphasise the evidence of our English and Irish witnesses.

22,239. Out of 123 leading decorators in the country selected impartially by disinterested public bodies and personally unknown to me or any white lead maker, 111 said there was no substitute for white lead, and of the 110 who had used white zinc for inside work, no less than 93 recommended the use of undercoats of white lead. The vast majority recommend the issue of regulations to prevent lead poisoning.

22,240. The onus is upon your Committee to disprove in no uncertain way the conclusion of the Report of the Home Office Departmental Committee of 1893, that "there is at present no substitute than can take the place of carbonate of lead." You have had scientific witnesses like Messrs. Klein and Armstrong to explain wherein lies the superiority of white lead over other pigments; these explanations were corroborated by disinterested and impartial grinders of all pigments, whether lead, zinc, or lithopone, like Mr. Rivet, of Messrs. Farmiloe, and were confirmed by practical painters and users like Messrs. Sibthorpe and Plumb. We could have produced hundreds of witnesses to assert and re-assert this, but we attached more importance to the evidence of the foreign disinterested experts, most of whom have been long engaged, and are still engaged, in trying to find a really effective substitute for white lead.

22,241. The experience, limited to a few years, of one Government department not engaged in competitive work cannot be set against that of practically the whole of the painters and paint manufacturers in this and every other country,

\* The extract quoted in the proof from the report of the British Consul at Lille occurs on page 44 of Cd. 6005-02.

† See \* note to previous column.

\* See note on 22,317; 22,318; 22,319.

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to shy nothing of the fact that an increasing quantity of white lead is purchased annually by the Admiralty and the War Office.

22,242. III.—Education and regulations have been successful elsewhere, and if tried here would be successful.

I firmly believe that by regulations you can devise a protection for the user of lead and other pigments without injustice to the makers of lead and its pigments, and at less cost to the community or consumer than if you prohibited the use of leads.

22,243. So far as coachbuilders are concerned, since the workmen work under the eye of their employers, the enforcement of regulations which would obviate all danger is a relatively simple matter, seeing that in lead works, where the conditions are more severe such good results have followed the special rules. The special rules could be extended to carriage works in the same way as they have been applied to colour grinding works.

22,244. Investigations in this and other countries have conclusively demonstrated which lead processes are the most dangerous. On reviewing the foreign inquiries it is clear that the most thorough investigation which has ever been given to this question is that of the recent Austrian Commission. That Commission was composed of the most representative elements, the official element predominating. They considered exhaustively the whole subject of lead, from the mining and smelting of it to its commercial uses, and their report comprises seven volumes full of the most painstaking statistics. You have had the advantage of hearing the evidence of two of those who took a leading part in connection with that Commission, Dr. Kaup and Dr. Rambousek, men of European reputation as hygienists, who spend their lives in dealing with precisely this class of problem, one of them the author of the Report of the Austrian Commission on this branch of their enquiry. They have told you that the conclusive finding of the Austrian Commission, which they emphasised with their own opinion, was that the cause of lead paint poisoning, which is overwhelmingly the most important, is the process of dry rubbing down. It cannot be reasonably contended that Austrian conditions of painting are fundamentally different from ours. Nor, indeed, does this Austrian view stand alone. In every country where the use of lead paints has been the subject of official or semi-official inquiry it is agreed that lead dust gives rise to the most harmful effect, and that dry rubbing down is the most fruitful sort of dust.

22,245. You have been told not only by men of the vast experience of Herr Meissl, but also by men so entirely acquainted with our own circumstances as Mr. Plumb and Mr. Sibthorpe, that there is no practical difficulty in dispensing with dry rubbing down.

22,246. To a plain man of business the common-sense line of action would appear to be to follow the Austrian and German example and abolish dry rubbing down, striking at the root of the danger, rather than adopt the drastic principle of prohibition.

22,247. There is also practical unanimity as to the ignorance of the majority of those employed in painting of the poisonous qualities of the materials in use. This, of course, is by no means confined to white lead. The percentage of painters actually attacked by lead being small, the workmen rarely come into direct contact with it, and not unnaturally, therefore, are disinclined to attach much credence to the so-called dangers of paint, particularly as obvious exaggeration characterises most of what they do hear on the subject. This phase of the question is perhaps the most difficult with which to deal, but I have not such a poor opinion of my countrymen generally, and of British painters in particular, as to suppose that they are less capable than foreigners of profiting by a little education in the hygiene of industry.

22,248. In the light of experience abroad, there can be no question that the abolition of dry rubbing down and the publication of information whereby workmen are made aware of the dangers of lead and the first symptoms of lead poisoning, by routine blood examination, for instance, together with the best

methods of counteracting the same, would very considerably diminish the number of cases, and these precautions would probably be more effective still if all receptacles containing lead or other dangerous compound were clearly marked with the percentage of that compound.

22,249. Looking to the fact that almost every Continental country has recently considered this question and that no single country has yet established a system of prohibition, but that wherever regulations have been enforced with any degree of thoroughness they have caused a speedy decrease of lead poisoning, it does appear the merest commonsense that a system of regulations should be first tried rather than prohibition, with its obvious economic advantages, and, as I submit, its doubtful possibility and effectiveness. That governmental interference with an industry is to be avoided if possible is a truism which needs no argument. The rationale of this has been put before you very pointedly by Dr. Rambousek. Other things being equal you will avoid crushing out an industry which, with its ancillary occupations and ramifications, occupies a not inconsiderable position in the economic framework of the country.

22,250. I may be met with the objection that any system of regulation to be effective would be so vexatious to the painting trade, and would require so expensive a machinery of inspection and administration, as to counterbalance the disadvantage to the community of the use of a more costly and less efficient substitute for white lead which would be necessitated by prohibition.

22,251. The answer to this is threefold. In the first place, the regulations need not be vexatious to the painting trade. For the most part they would only enforce upon the trade, as a whole, ordinary rules of cleanliness which are already observed by all the better class of painters, and the extra cost of any particular rules would be common to the trade. In any case the painter has a way of escape from the irksomeness of regulation of white lead by having recourse to other less regulated paints to which he would be forced by prohibition. Further (though I confess my present knowledge of all details is a negligible quantity), I am assured by Dr. Goadby, whom I regard as one of the highest living authorities, that there should be little difficulty in arranging a satisfactory extension of the principle of self-inspection to the painting industry, as such would entail little or no departmental expense and might be devised in a manner applicable to all branches of the trade.

22,252. Secondly, there is no necessity for an effective system of regulation to be costly. There is obviously no need to visit every painting job once a day. Surprise visits and a few punishments would effect a speedy knowledge and general observance of the law. It is possible also that the workmen themselves might assist through the trade unions in the enforcement of the regulations, as happens in Germany and Austria. Again, the work of inspection is not of great technical difficulty, and could be performed by men of far less education and standing than His Majesty's factory inspectors, always provided that the inspectors were under the direct supervision and control of the factory inspectors, and were not subject to the disadvantages of local appointment. I have further considered this point and should like to put in a more extended statement of my views.

22,253. Thirdly, it must be pointed out that prohibition, just as much as regulation, would necessitate a machinery of inspection, so long as there continues to be no substitute of the same all-round efficiency and cheapness as white lead; and the cost of the two systems of inspection would be the same. As a case in point, I may state that in the course of the last few days one of our staff was handed a so-called substitute for white lead, which, on analysis, proved to contain 11 per cent. of white lead.

22,254. I would point out that no prohibition of the use of white lead can have any beneficial effect for, say, 10 to 20 years of the continuance of the practice of dry rubbing down is to be permitted.

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22,255. I would further point out that it is not reasonable to prohibit the use of the lead compounds and allow the unrestricted use of the far more deadly arsenate of copper, oxide of mercury, ferro-cyanide of potassium, and the various mercurial colours, zinc greens, &c.

22,256. I have made a careful study of the regulations in force in various countries, and have consulted some of the leading house painters and experts in this country. I desire to suggest for the consideration of this Committee the formation of a joint committee to draft and consider regulations which would, if enforced in this country, materially decrease the risk to which the house and coach painter is exposed. This Committee should consist primarily and necessarily of Home Office experts who are accustomed to the work; secondly, of master painters and users of white lead paints; and, lastly, of a white lead corroder and/or a white lead grinder. I may repeat that, in my judgment, which is founded upon long experience of the conditions in white lead factories, the principal danger to be feared is that of lead dust, and provided that that danger can be eliminated by the enforcement of regulations among the actual users of paint similar to those which are in operation in white lead factories, I feel sure that if the figures are extracted after five years' working under these regulations a very considerable improvement will be shown. I appeal to the Committee not to recommend so childish simple a remedy as prohibition, which would involve an enormous loss of capital to those engaged in the white lead and kindred industries as well as materially add to the problem of unemployment among the working classes, until after a full trial has been given to all other reasonable remedies which are proposed, and in particular until some more definite knowledge is obtained as to the real source of danger to which the painter is exposed.

22,257. I do not put forward a set of regulations, because I feel that the drafting of such should be left to a Committee, but I have tabulated the points which I think should be dealt with by the Committee.

22,258-64. I.—APPLICABLE GENERALLY, *i.e.*, IN CARRIAGE PAINTING IN WORKSHOPS AND INSIDE AND OUTSIDE HOUSE PAINTING.

(a) Employers must affix in some prominent position in their workplaces and pay offices the text of these regulations, and the attention of each workman must be drawn to the dangers of dust, zinc, lead, and turpentine poisoning, to which carelessness may expose him, and to the rules of hygiene which should be followed to avoid the absorption of poisonous matter and dust by the respiratory and digestive organs (in particular the danger of smoking and eating during and after work without having first ensured cleanliness, and the danger of sweeping up the remains of paint without having first moistened them), and especially the danger of inebriety.

Each employer to be responsible that every workman has a copy of such regulations and instructions before engaging.

(b) Prohibit mixing and use of colours dry except in existing white lead or grinding works, where, of course, the special Home Office Rules for dangerous trades are in force.

(c) Prohibit dry pumice stoning and dry scraping off of all paints.

(d) All ingredients containing lead must be in vessels upon which the lead contents are clearly stated.

(e) Aprons and/or overalls and headgear to be provided and washed weekly. Washing facilities to be offered in all cases. Hot water, if convenient, but not necessary when special soap provided for use with cold water and nail brushes. Ten minutes to be allowed for washing before meals and on leaving work.

(f) Quarterly or half-yearly inspection by a doctor. Proper register. System of self blood examination.

(g) Workmen are to submit themselves to the prescribed medical examinations, and whenever called upon by the employer or inspector produce their card showing the date of their last medical inspection.

(h) Doctor to have power to suspend for prophylactic reasons.

(i) Master to have power to dismiss and not re-engage for the same reasons.

(j) If medical inspector certifies a man to be alcoholic, he is not to be employed where he comes into contact with lead or other metallic poisons.

(k) No workman shall be engaged or continued in employment of any employer unless he shall have received a certificate of good health from an approved doctor, within three months from the date of such engagement or continuance of employment. Substantial penalty for any breach of this rule.

(l) Workmen engaged in the handling of white lead, ground and mixed in paste, shall work in such a way as to avoid the contact of the substance with the hands, as also the producing of splashes.

(m) Workmen so engaged shall wear clothing and headgear exclusively reserved for the work. They shall keep them in a good state of cleanliness and shall take them off before leaving the workshops or workplaces.

(n) Before taking food or drink, and before leaving the workshops or workplaces, workmen shall rinse their mouths, and shall also wash their hands and faces with special soap. Food brought into the workshops or carried to the workplaces shall be enclosed in boxes or coverings kept well shut until the mealtime.

(o) Workmen shall keep the material and the tools under their charge in a good state of cleanliness.

(p) Workmen are forbidden to bring spirits or tobacco, or consume tobacco or spirits, in the workshops or workplaces.

(q) Breaches of any of these regulations shall be punished by a fine.

(r) In case of a repeated offence within twelve months after a conviction under these regulations the fine to be increased.

22,265. II.—FOR INSIDE HOUSE-PAINTING ONLY.

(a) Rubbing off and pumice-stoning off old paint—whether supposed to be leadless or not—must only be done after previous and complete moistening. Everything rubbed off must be removed before it becomes dry, or must be kept moistened until removed.

(b) Foremen to be responsible for above; also for seeing that a copy of the regulations and instructions is displayed on every job.

22,266. III.—APPLICABLE FOR CARRIAGE-PAINTING ONLY.

Regulations similar to those in white lead factories could easily be framed, *i.e.*, fans, floor moistening—in fact, any good anti-dust regulations—quite irrespective of the dust being leadless or leady.

22,267. In addition to regulations I hope that your committee will follow the German, Belgian, Austrian, and Swiss examples in issuing full and simple instructions and warnings to painters. It is a matter of great regret to me and others that the old guild and apprentice system has no vogue in England—that there are no painter guilds with whom to communicate and co-operate, as mentioned by Herr Leyendecker, and suggested by Mr. Sibthorpe, who also raised the interesting points of registration and licensing of painters. I would welcome a revival of such, by which we should get a well trained and intelligent class of men, keen on using the best material and turning out good work. A guild or union could exercise a wise selection in admitting to its guild, and should have the sense to see that it was not to the interest of its members to admit all or any, temperate or intemperate,

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clean or dirty, into such a skilled trade as that of painting. The Home Office and/or the Insurance Act Commissioners should assist and encourage the formation of such guilds, and I should have thought master-painters would have welcomed them also. In particular, they should be warned of the dangers of alcoholic excess, and the masters warned to engage only abstemious or temperate men. You have been told by Herr Leyendecker that the most effective protection is cleanliness and temperance—brandy and spirits to be particularly avoided—and have doubtless considered the striking testimony of Dr. Roch, of the Cantonal Hospital of Geneva, of the relative insignificance of lead poisoning as compared with alcohol poisoning. Similar evidence was given before the Pottery Commission. The predisposing or aggravating influence of alcoholism might be pointed out to the moderate and immoderate drinker alike, and the thirsty man be encouraged to drink milk. You will have noticed, too, Dr. Roch's allusion to insanitary dwellings as a predisposing cause of lead poisoning. Everything they have said has for years been accepted by English lead manufacturers as a truism, founded on actual experience. Is it too much to hope that your Committee can do much to educate the men as well as their masters on these essentials?

22,268. I have serious hopes that the provision of unemployment benefit by the recent Insurance Act will reduce the liability of the painter to occupational sickness.

22,269. In conclusion, I must explain that I have ventured to draw your attention to what appears to me to be the outstanding points of the evidence called before you, because it was quite impossible for the witnesses to come before you in logical sequence. All the foreign witnesses but one were unknown to me, and it was difficult to make their convenience and yours coincide. We insisted, as indeed they themselves insisted, that all our technical witnesses, whether statistical or scientific, should get at the facts, whatever they might prove to be, to the best of their ability. With regard to the foreign witnesses in particular, they will bear us out that we acted simply as collecting evidence on behalf of the Committee. All alike, whether British or foreign, have acted as if your Committee had called them. Though a corroder I have endeavoured to make an impartial survey.

22,270. As an industry we have been abused and prejudiced by outside criticism for years. We have hitherto been content, if only we could satisfy the Home Office of our *bona fides* and solicitude for the safety of the workpeople. There has not been a word of complaint from the Home Office. The letter and spirit of the regulations have been loyally kept. We do not believe that the Home Office will further any crippling of an industry without, at any rate, very careful consideration of what we have placed before you.

22,271. I do feel that we have a distinct grievance, that we are kept in ignorance of evidence that may have been tendered to you in favour of the prohibition of lead—and I can understand the sulphate, zinc, and lithopone makers may feel the same of us. I venture to ask even now that a transcript of all the evidence should be handed to us at once so that we can have a chance of bringing rebutting evidence, and I have no objection to a transcript of all our evidence being handed to anyone who wants it.

22,272. I can well understand the attractive simplicity of prohibition at first sight. Here is an article the use (or the careless use) of which, it is admitted, causes a large amount of human suffering and a certain number of deaths in a particular trade, whether above or below the average. There are other articles which can more or less take its place. What is wealth compared with human suffering? What is the cost to the community beside the annual loss of life? Let us strike out white lead and all will be well! It is surely unnecessary for me to point out such methods defeat their own ends. If, upon such arguments, the use of articles infinitely more dangerous than white lead were prohibited, the whole national well-being would be brought to an end. It is not by such slap-dash

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methods that the improvement of the State is effected. The method of a scientific age is not to throw aside a useful material but patiently to seek out and eliminate the true causes of the evil.

22,273. (Chairman.) You are Chairman of the Committee of the White Lead Corroders' Section of the London Chamber of Commerce?—Yes.

22,274. In paragraph 22,182 of your proof you refer to the public inquiry in regard to the prohibition of yellow phosphorus?—Yes.

22,275. In this you are mistaken?—Am I?

22,276. There was no public inquiry, but the prohibition law was passed by Parliament just as any house painting law would have to be.—I said "I believe"; I was not sure.

22,277. Such a long and patient hearing on all sides, extending in the case of this Committee over more than two years, is only possible under the system of Departmental Committees and Royal Commissions whose procedure can hardly be discussed here?—I understand that.

22,278. You have prepared a somewhat lengthy proof in support of the arguments which have been put forward against any prohibition of the use of lead in paints?—Yes.

22,279. You desire no doubt to have this proof put in and taken as read?—Yes, with any corrections that I may be allowed to make.

22,280. In paragraph 22,182 of your proof you refer to pig lead as a mainly British product?—No, I mean that "white lead" is mainly a British product.

22,281. Are you aware that 92 per cent. of the metallic lead used in this country is imported?—Yes. I thought there would be some misunderstanding about that. In addition to lead imported in the form of ore, about half of the metallic lead imported into this country is in the form of argentiferous and auriferous lead. It is not pig lead at all in that state. We get out the copper from it, the gold and the silver, and all that sort of thing. It does not follow that it does not come from a British possession. It comes in in an absolutely unusable form. The remaining half is pig lead, *i.e.*, the finished article.

22,282. The metallic lead produced from British ore is 17,990 tons, and the metallic lead imported is 213,707?—But a lot of the lead imported is in the raw material state, and we make it into pig lead in England. It is imported largely from British Colonies.

22,283. Are you aware that 92 per cent. of the metallic lead used in this country is imported?—It is not imported in a form in which it can be used. There is a large de-silverising interest in the country. I am a de-silveriser. What we make is pig lead. Some of the bullion and the ore comes from foreign countries, and some from the British Empire. What we make is used by white lead manufacturers very largely because we make it in a specially pure form. The ore imported is full of gold and silver. But with regard to the Welsh mines there is hardly any silver at all. They have a rather precarious existence, depending on the price of lead.

22,284. I find in the official figures of the Board of Trade that metallic lead from British ore is, 17,990 tons, and the metallic lead imported from abroad is 213,707 tons. Approximately, a third of that 213,707 comes from British possessions. Now, do you still maintain that the raw material used for white lead making is mainly a British product?—I state that white lead is mainly a British product, but I think that the pig lead that is used in this country for white lead making is mainly, if not entirely, a British product. Whether it is foreign or English, you are going to interfere with the consumption in this country of some 25 per cent. The point is quite good with regard to what is consumed in this country.

22,285. You admit that my figures are correct?—Yes, I think they agree with the figures that I have.

22,286. In Part 1 of your detailed proof, you deal with the statistical evidence regarding lead poisoning?—Yes.

22,287. You do not dispute the official figures showing a deplorable number of deaths from lead poisoning among painters, do you?—I do not dispute

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Table A. of the Registrar-General's report, nor the figures published by the Board of Trade last night. That one reads every month. I have been reading the figures this afternoon in Mr. Werner's room, as a matter of fact, in the *Labour Gazette*.

22,288. Table C. of Mr. Schooling's report, which you refer to, shows that the death rate from plumbism among plumbers, painters and glaziers, is one fifty fourth part of the death rate from all causes? Yes, at all ages.

22,289. This means, does it not, that of every 54 plumbers, painters and glaziers who die, only 53 would die if there were no exposure to risk of lead poisoning?—I think you had better ask him that.

22,290. But it means that, does it not? Is not that the deduction you make from it?—I am not an expert on these matters.

22,291. Would you not as a humane man say that everything should be done to save that one man in 54?—If the deduction is correct, I should say by all means give him a good chance under regulations.

22,292. I did not ask about regulations, but ought he not to be saved?—A very good effort should be made.

22,293. Not a very good effort; but ought he not to be saved?—Certainly. I am a humane human being. Everything possible and reasonable should be done.

22,294. These figures refer to deaths from lead poisoning alone, and take no account of the increased mortality from Bright's disease, and nervous and other diseases due to exposure to lead?—You beg the question. How can you say that it is due to exposure to lead entirely after all this evidence? I might have said so if I had not gone into it, but I think it is possible that other things, besides lead, cause kidney disease, for instance.

22,295. I say these figures refer to deaths from lead poisoning alone, and take no account of the increased mortality from Bright's disease and nervous and other diseases due to exposure to lead?—I do not like the words "due to exposure to lead." It seems to me to beg the question. I cannot admit it. We will agree to differ upon that point. My point is that other things besides lead predispose one to Bright's disease and kidney disease, obviously turpentine does.

22,296. Do you tell us that the mortality figures showing an increase of Bright's disease, and nervous diseases, and other diseases, are not correct?—I would not like to say that they are not correct, but it was that little addition with regard to lead that I did not like.

22,297. (*Dr. Collis.*) Among plumbers, painters and glaziers, the mortality from diseases of the urinary system, which include Bright's disease, is 94. Among file makers, who have no exposure to turpentine or any oil vapours, it is 160. In white lead manufacture and among those engaged in lead goods making, with whom you are particularly associated (and you know there is no exposure to vapour of turpentine, or of oil), it is 160; so I think we are justified in considering that the 94 among the plumbers and painters has relation to the lead to which they are exposed?—It is a fair argument. As a matter of fact, our workpeople are largely exposed to turpentine and oil.

22,298. The point is that urinary diseases are always found associated with exposure to lead, and we therefore feel ourselves justified in considering that the urinary diseases of the painter are due to the same cause. When we do not find the urinary diseases of the painter in excess of other people exposed to lead, we find that they have a liability to gout which the others have not, and we are perfectly prepared to place the gout to the credit of the turpentine?—This seems to be worth following up. We shall have another go at it.

22,299. (*Chairman.*) Now there seem to be only two possible means of dealing with the evil: (1) to issue a code of regulations; (2) to prohibit the use of lead, or rather to restrict its use within narrow limits, as for example, by forbidding the use of paints containing more than 5 per cent of soluble lead compounds. Do you agree that these are the only two alternatives, regulation or prohibition?—I do not agree

that you are any better off with prohibition. You may prohibit. Is it strictly logical to say that there are only two alternatives to anything? A thing is either black or not black. It does not follow that it is black or white. But I admit that those are the only two alternatives that I have heard seriously discussed.

22,300. I may say that practically all the witnesses whom we have examined have admitted that something must be done to remove the evil of lead poisoning?—Yes; we should like it very much.

22,301. The question which confronts this Committee is not whether anything should be done, but how it can best be done?—I quite agree.

22,302. You next go on to quote authorities for attributing much of the painter's ill-health to turpentine and oil?—Yes. There seems to be very grave ground of suspicion against turpentine. I do not know so much about oil. Professor Armstrong, who was here this afternoon, uses the word "oil," but it rather looks as if it was a mixture of the two.

22,303. Do you suggest that a mixture of turpentine and oil produces lead poisoning?—No, but it predisposes. A great many things have been put on to lead that are not lead. It is like hanging a dog with a bad name. I do not know that anybody is quite satisfied yet that the diagnosis of lead poisoning is quite complete. If Dr. Collis, for instance, were to diagnose a case as lead poisoning, I would not be so foolish as to say that he was wrong, but there is evidence from these scientific gentlemen—so they have told us, and I imagine they have told you—that turpentine is under grave suspicion. It was raised at the Geneva Inquiry. It is not a new point.

22,304. You do not suggest that it causes lead poisoning?—No. I would not suggest such a thing as that.

22,305. You next say, in paragraph 22,205 of your proof, that the substitution of zinc white for white lead would increase the percentage of turpentine used in paints?—Yes.

22,306. What proof do you offer of this statement?—Take genuine ground white zinc. I have put it into percentages. I think that is the proper way to do it. We sell white zinc in considerable quantities. When mixed for use it would consist of 61½ parts of dry zinc oxide, 14 parts of refined linseed oil, 14 parts of boiled oil, 8 of turpentine, and 2½ of some manganese borate driers. That is 100 per cent. White lead mixed for use would be 78 parts of dry carbonate of lead, about 15·5 of fine linseed oil, 3·5 of turpentine, and 3 of driers. That is 100 per cent. Those are working mixtures, gentlemen, I think. I will put it in this way: 72½ parts of genuine ground white zinc, 3 added parts of refined linseed oil, 14 of boiled oil, which contains a lot of driers, 8 parts of turpentine, and 2½ of manganese borate driers; the lead to consist of 85 parts of ground white lead, 8·5 per cent. of refined linseed oil, 3·5 per cent. of turpentine, and 3 per cent. of driers, which would be regular patent driers. If you went into a room and painted it, you would find that your zinc would start to dry, but would not dry so quickly as the other. It would get sticky. Possibly the smell would not be much worse, but you could not put on the other coat so soon as you could with white lead. Consequently your painters would have to keep about on the job very much longer. In the second place they would certainly, from all the evidence, have to put on three coats of zinc mixture as against two of the other. Thirdly, from all the evidence we have had, you would have all these gentlemen in again with their zinc paints putting it on again sooner than would be the case with lead, whereas lead would be standing all right. My point is that I do not want to have too much turpentine in the house. It is a very big question whether zinc will stand outside.

22,307. Supposing it were proved that the substitution of zinc for lead would lead to an increased use of turpentine, have you any proof that even that increased amount of turpentine would be sufficient to produce serious ill effects in human beings?—No, but I think that the Home Office authorities might well inquire further into this matter.



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22,308. But you do not know yourself?—No. I am not a bacteriologist, and I would not presume to express an opinion after Dr. Goadby has been here.

22,309. You refer to the evidence offered by a number of witnesses who have been heard by us?—Yes.

22,310. We examined all those witnesses at considerable length, and as you have not listened to their evidence it would be useless to go into all their points again?—I do not want you to.

22,311. In paragraph 22,206 of your proof you refer to the possible poisonousness of zinc oxide. Have you ever heard of a case of poisoning arising from exposure to zinc oxide?—There are several mentioned in the foreign evidence.

22,312. But do you know of any case yourself; have any come to your notice?—No. There was no factory until about six months ago in England manufacturing zinc oxide.

22,313. (Dr. Collis.) But it has been used?—Yes.

22,314. (Chairman.) May we take it that the only evidence you have is the foreign evidence which has been given to this Committee and which you have read?—Yes.

22,315. Would you be surprised to hear that this Committee has had evidence that men who are covered with zinc oxide dust in the course of their work in a zinc oxide manufactory show no signs of poisoning, even when they have worked 20, 30, or 40 years at such a dusty process as packing dry zinc oxide?—Yes; I am very surprised.

22,316. You refer in great detail to the evidence-in-chief of foreign witnesses. Are you aware that it was generally admitted by them to be impracticable to enforce prohibition of dry rubbing down where such a regulation has been introduced?—No; that is not my impression.

22,317. In paragraph 22,233 of your proof you repeat a statement made regarding the Belgian Government and their return to the use of white lead as indispensable?—Yes.\*

22,318. Have you taken any steps to ascertain the truth of that statement?—There was something in a trade paper last week implying that that was not the case. A wire has been sent to-day to Brussels to have it verified.\*

22,319. Would you be surprised to know that documentary evidence of the highest authority has been produced to this Committee showing that no white lead has been used by the Belgian State Railways for the last four years?—Yes. I shall have my answer to-morrow and I may withdraw that. We may have been misinformed.

22,320. In paragraph 22,239, when you come to Great Britain and Ireland, you quote a large proportion of decorators as saying that there was no substitute for white lead. Have you satisfied yourself that each of these gentlemen had made exhaustive and scientific tests of other paints?—No, and I do not think that anybody could have satisfied himself personally upon such a point.

22,321. If they have not made such experiments their statement is not of much value as against the evidence of large users who have tried and succeeded with leadless paints?—If you like to put it in that way I should like to see them called. If I have been foolish enough as chairman of a committee not to take every precaution, and I have half a chance of putting it right, I should like to call them.

22,322. Now, in the third portion of your proof, beginning at paragraph 22,242 you state that education and regulations have been successful elsewhere?—Yes.

22,323. Can you quote any country where statistics have shown that lead poisoning has been stamped out by regulations?—Not stamped out. There has not been time yet. I believe if we honestly tried to do it in this country, in a very short time we should be able to show something almost like that, but we could never stamp out any disease.

\* The result of my inquiry in Brussels is that white lead was not in fact used by the State Railway Department at the date of my evidence, although there was not any official or formal arrêté or decree of prohibition.

22,324. I need not go into great detail with regard to your statements regarding inspection, because they merely repeat the statements of other witnesses called on behalf of the white lead corroders, and those witnesses have already been very fully cross-examined?—Yes; I would like to put in my addition.

22,325. In paragraph 22,256, however, you suggest the formation of a joint committee to draft and consider regulations?—Yes; I thought it would be rather presumptuous on our part to frame them.

22,326. You suggest the composition of this committee, namely, Home Office experts, master painters, workmen and users of white lead paints, and lastly a white lead corroder, and/or a white lead grinder. Do you seriously suggest that a committee representing only one side should be set up. If a white lead corroder, why not a zinc manufacturer? If a white lead grinder, why not a manufacturer of leadless paints?—Quite so (anything you like), but I want it to be absolutely impartial.

22,327. In paragraphs 22,258 to 22,266 of your proof you set forth the points which you think should be dealt with in framing regulations?—Yes.

22,328. This, however, only brings us back to the question of how such regulations can be enforced in the case of painting operations which are scattered all over the country?—Yes.

22,329. In paragraph 22,271 you speak of a grievance of not being allowed to see the evidence tendered in favour of the prohibition of lead, and suggest that all evidence should be published with a view to the calling of rebutting evidence?—I do not make any great point of that. You told me at the beginning the position with regard to phosphorus, but I had an idea that it was a public inquiry. We heard a great deal about phosphorus.

22,330. You do not appear to realise that this is an impartial Committee, containing as it does an equal number of employers' and workers' representatives, together with four members who have absolutely no pecuniary interest whatever in the question, on either one side or the other?—Yes, I realise that it is impartial. If you have read anything else into my evidence, I beg to withdraw it. I certainly did not mean that.

22,331. Do you not think, under these circumstances, that you can rely on our sifting every particle of evidence which is presented to us, and weighing it all fairly?—Yes. It has been going on a long while, and everybody wants to know what is going on.

22,332. You are, of course, aware that all the evidence will be published eventually, and you or any other person interested will then be in a position to approach the Home Office or Parliament if you feel that you are in possession of new and material evidence which this Committee has not heard?—Thank you.

22,333. (Dr. Collis.) There are one or two points in your proof that I would like to ask you a question or two about. In paragraph 22,194 you state, "The data available do, however, show a large reduction in the number of cases of lead poisoning in 1900-1910." Can you tell me where those data are got from?—I understood that the statistics referred to lead poisoning in factories.

22,334. But we are not talking about factories. Your phrase, in the paragraph that we are now speaking of, is dealing entirely apparently with house painting, and it states that "the data available show a large reduction in the number of cases of lead poisoning, 1900-1910." With regard to notifications received by the Home Office, there were in 1901, 169 cases; in 1902, 179; in 1903, 201; in 1904, 227; in 1905, 163; in 1906, 181; in 1907, 174; in 1908, 239; in 1909, 241; in 1910, 232; and in 1911, 263. These are cases, not deaths, so there is no reduction of case incidence; these are voluntarily reported and imperfectly represent the total. With regard to deaths amongst house painters, in 1901 there were 41; in 1902, 32; in 1903, 39; in 1904, 39; in 1905, 28; in 1906, 36; in 1907, 39; in 1908, 44; in 1909, 47; in 1910, 35; and in 1911, 48; so that your statement is hardly correct?—It is very difficult to keep strictly to the terms of

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reference. I would like to know when the Workmen's Compensation Act and other Acts came in.

22,335. The Workmen's Compensation Act came into force on July 1st, 1907? Probably there were more cases in the olden days which were not reported.

22,336. There have been 44, 47, 35, and 48 deaths since?—I quite see myself what has happened. You give your statistics in two forms. Factories and house painters are given separately. I withdraw by all means what I have said. On the other hand, I would like to say that I think that some of the increase is due to the new legislation.

22,337. That may possibly be?—The state of trade varies very much. I suppose when times improve there is a tremendous run, and a great many odd men are taken on who are not regular, and do not quite understand all the tricks of the trade.

22,338. That must always have happened?—I do not want to say that there has been a reduction of lead poisoning. I hope you will not take it in that light, but I think it has been exaggerated. I want to stop what there is.

22,339. In paragraph 22,197 you make an allusion to paint emanation not affecting paper hangers. We have had a great deal of evidence to show that there are no emanations, and therefore the paper hanger cannot be exposed to them?—I do not attach any importance to emanations myself, but I understand that some people do. It is a little sarcasm.

22,340. The paper hanger seems to be particularly happily placed as a workman, compared with a painter, since he carries on his work in the same room, and yet we find him better off?—It is a little curious. One ought to know what the good influence is which makes him so exceptionally healthy. There may be something in the size, or whatever it is he uses on the wall. We might introduce that good influence elsewhere.

22,341. Do you know an old classical quotation: "Art is long and life is brief"?—Yes.

22,342. We cannot sit for ever. We are inquiring as far as we can. Now, do you know of any reason why the wood turner and cooper should have a higher death rate than the painter?—No.

22,343. Ought we not to make a thorough inquiry into the wood turner and cooper too?—It would be very much more interesting perhaps.

22,344. Personally, I have made inquiries, but our inquiry is only into the use of lead in paint?—My point is that ours may be a dangerous trade, but not the most dangerous trade, apparently, judging from statistics alone.

22,345. That is hardly the point?—It is my point.

22,346. The Secretary of State's point of view is that here is a trade with exposure to lead, and that lead is possibly a preventible cause of sickness and illness. Some of these others are not preventible?—Possibly they are.

22,347. Or possibly we do not know anything about the causation to alter it. But here we do know. With regard to other trades, for instance, with regard to accidents in mines, we are constantly making regulations. It seems no argument whatever to say that others are more dangerous, and that therefore this should be left alone?—Please do not think I come here to say that it should be left alone. I say, do you know the definite causation of lead poisoning, and can you prevent it? Do not talk about prohibition until you are quite sure that you have got to the bottom of the cause and are not attributing the cause to the wrong article.

22,348. You have not had the advantage of reading all the evidence which has been placed before us?—No, that is what I wanted to do. You will not let me.

22,349. After all, we are here to consider it and sum it up. The Secretary of State has appointed us for that purpose?—I should have thought that perhaps he would have allowed one to see some of it. We can but ask.

22,350. You mention Dr. Goadby's evidence in paragraph 22,211. While Dr. Goadby was here, I took the opportunity of reading these words to him, without telling him from where I took them: "In view of Dr. Goadby's experiments one may assume that zinc is a

"poisonous metal, even if it contains little or no lead, "capable of producing pathological changes, and in "particular inflammation of the kidneys." I asked him whether that represented fairly his experiments in comparing zinc and lead, and his reply was, as I took it down: "This is reading more into my evidence "than I wished to say"?—I must explain that I have never seen any of Dr. Goadby's evidence. All that we have had to do with Dr. Goadby is that he has been before our Committee, and if he has altered his mind since he spoke to a meeting of the Chamber of Commerce, I withdraw that.

22,351. In paragraph 22,227 you speak of the failure of repressive legislation?—Yes. I have not much evidence on that, but I particularly refer to inside painting. That you have been told about. The fact is that there has been repressive legislation in Holland which has been cancelled. I have the words "Minister of Marine," but I think it is the "Minister "of Justice." This is what he writes to Messrs. White and Leonard: "One of the members of the Commission "appointed some years ago by the Dutch Government "to inform about the white lead question was a certain "Mr. W. C. Metzelaar, Chief Engineer of the Justice "Department (construction and repairs of prisons, " &c.), who proved himself to be a great opponent of "the use of white lead; in the practice he showed this "by modifying in 1910 the general conditions for the "public tenders so that the use of white lead and red "lead was completely prohibited and only the use of "zinc white and oxide of iron was allowed. Now a "short time ago a new tender was given out by "Mr. Metzelaar, and this contains the condition that "the painting work must be done with white lead and "red lead. Not even there is a prescription that the "white lead must be ordered from a manufactory "where it has been prepared as a paste. By the same "mail we send you a copy of the above-mentioned two "tenders, so that, if you think it proper, you can "have a translation made of those parts which interest "you."

22,352. We understood that in Austria they had withdrawn the prohibition on internal painting and regulations with regard to outside painting, and we understood that they could not possibly enforce the regulations?—They could not enforce the prohibition of the use of white lead inside. I know of no evidence that the prohibition of dry rubbing down was unworkable. Did they not find that the painters put a white lead foundation and a coat of zinc white on the top and a very good practice too?

22,353. The evidence was very emphatic on the point of withdrawal. We had a master painter from Austria. It would be difficult to do it here, would it not?—Quite so; it would be difficult, but I have a great opinion of the British nation, and where there is a will there is a way. If the country wishes it, it will be done.

22,354. It is a matter of pounds, shillings, and pence?—Yes, but it is quite another thing to substitute zinc for white lead.

22,355. Monsieur Ricker Dovrède, in a letter put in after discussing the question of regulations, says: "The Corporation of Painters would prefer the "total suppression of white lead in their work"?—That is interesting, but there is other evidence on that point. What does it mean exactly—"Corporation of Painters"? We must do better in England; that is all.

22,356. (Chairman.) Have you, as a body of lead corrodors, considered a set of rules which could be applicable to the evils of this particular trade?—We did set to work, but we thought it was rather presumptuous on our part. After all, we do not paint, and we know that you have a lot of expert gentlemen here. After all, whom can you have better than Dr. Collis and Dr. Legge on the drafting of regulations?

22,357. It would be very interesting if you could send us up a list of rules which you think would combat the whole of the evils and also say how they are to be enforced?—I can show one simple rule, and

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comprehensive of all others—the “prohibition of dry rubbing off.”

22,358. But you come up here to represent the lead corroders, and you say that that regulation will meet the whole case. If you can suggest to us regulations and how they are to be enforced, we will consider them?—I have a suggestion for enforcing them, but I shall be in a much better position three months hence to enlarge on that for a certain reason.

22,359. (*Dr. Collis.*) I hardly followed you in paragraph 22,251. You say, “The regulations need not be vexatious to the painting trade,” and then immediately afterwards you say that the painter can escape from the irksomeness of regulations?—I mean that he can use the other stuff.

22,360. If they are not vexatious, why should he find them irksome?—He may think them so, that is all. We say that there is nothing to take the place of white lead. If there was there would be no necessity for you gentlemen to be sitting here over a year inquiring into all this. If there were something to take its place we should have all shut up long ago in the ordinary course of events. There has always been zinc used: One of my greatest friends, commercially, is the man who sells probably more zinc in England than anybody else. We talk over these things together, and he says, “Let everybody live.” The sales of the two have been going on side by side for years. Zinc is going up. Lead at the present moment is very high in price. It is a most unfortunate time for us, and most unfortunate for the purposes of this inquiry. We are coming before you at a time when we have never had pig lead or other products so high since the Crimean War. I do not consider that we are having a very good year with regard to the painting trade. The cold summer has not been conducive to an inordinate amount of painting, but I find that the imports of foreign white lead at the end of September have increased 9.31 per cent. compared with last year, and the zinc oxide imports have only increased 7.06. Lithopone has gone up 4l. or 5l. a ton while you gentlemen have been sitting here. The increase is not caused by its being used so much in paints. No man on this committee or anywhere else can estimate what the substitute is going to cost.

22,361. With regard to regulations, you base your ideas on the regulations necessary for factories?—Yes, and on the foreign regulations.

22,362. They have broken down in Austria. You have considered probably the difficulty, if not impossibility of carrying out some of these regulations in the house-painting trade?—Yes, some but not all.

22,363. (*Chairman.*) I asked you just now if you could submit to us a list of regulations which you consider would meet the evil with which we have to deal, and also can you tell us how those rules can be enforced?—I put forward these suggestions which I think would form the data for a joint committee. I am a great deal too modest and diffident to come here and dictate to you gentlemen under this roof a list of regulations. I think it would be presumptuous. I want the masters, the makers, the users, and the grinders, Dr. Collis and Dr. Legge, and Mr. Werner to keep them in their minds in dealing with the subject. I think it would be a very good thing.

22,364. This Committee is formed to deal with the question, and when you talk of rules to meet the difficulty I want to know what they are?—Here are two pages, and then I want to put this paper in to explain how they can be carried out. Carrying them out is a difficult matter, and I am an amateur in these matters.

22,365. (*Mr. Rice.*) You have put forward here a suggested list of regulations. Have you any evidence that these regulations would be acceptable to the trade. Have you taken steps to find out whether, if these regulations were in force, the actual users would accept them?—No, but I should be perfectly pleased to ascertain the position with regard to that. I thought it would be presumptuous on my part to come along with a set of regulations. I did not think that the Home Office people would like it.

22,366. But you have put these in without asking whether they would be acceptable to the trade?—I

have put them in without asking whether they would be acceptable to the trade, but I might ask you or Mr. Sutherland whether you think they would be acceptable. Mr. Sibthorpe undoubtedly would say that these are acceptable from his point of view, but I have not ascertained the view of others.

22,367. (*Lord Henry Bentinck.*) The point is what we think of them?—Quite so; everything, of course, depends on that.

22,368. (*Mr. Rice.*) As a corroder of lead, have you taken any steps to find out whether the actual users would support you?—No, not specifically as to these two pages of draft regulations.

22,369. (*Mr. Parsonage.*) In paragraph 22,239, in referring to this matter you state that there have been 123 witnesses called—employers—and the vast majority recommend regulation. I am under the impression that the vast majority have said the contrary?—I do not think I say that. What I mean is that the Chamber of Commerce issued inquiries to the different chambers of commerce throughout the country to 123 different people, and I have their answers.

22,370. (*Mr. Rice.*) In paragraph 22,182 I take it the point is that you wish to make clear that the prohibition of white lead would be the extinguishment of a British industry—converting lead ore into pig lead. What you make into pig lead is from lead ore, I understand—the auriferous and argentiferous ore?—Call it bullion mixed up in an unusable form.

22,371. If white lead was prohibited, would it mean the extinguishment of that particular industry?—If the lead ore or the bullion is rich enough to be worth importing it would not mean the extinction, nor is the sentence meant to mean that, *vide* my answer to the Chairman's 22,280. I say that the smelting and desilverizing industry would be very severely hit by doing away with the use and consumption of 20 to 25 per cent. of pig lead. The lead itself would not be worth dealing with so much. Many poor ores would be affected.

22,372. What trade would suffer?—The people most hardly hit would be the small lead miners in England and Wales. Their lead is found in the ground in such a pure form that it is taken to Newcastle and turned into white lead or electrical lead. We take complex ores from different parts of the world, and we have to do a great deal with them. It is entirely a British industry.

22,373. To what extent will that particular portion of the industry be affected?—The Wales industry will be very largely affected.

22,374. But not the industry of converting the ore?—I hope not.

22,375. Is it possible to adapt the machinery that you now use for making white lead for producing zinc white?—No, and I think that Mr. Lancaster, my partner, has told you that there are very great drawbacks with regard to doing it in this country. We shall always remain a conduit pipe.

22,376. (*Chairman.*) The small mineowners would suffer first, I understand?—Yes.

22,377. What proportion of lead do they produce in comparison with what is used in the whole trade?—I cannot separate the Welshmen yet from the Englishmen.

22,378. On what do you base your statement that they would suffer?—I base my statement of the fact that they would suffer on this—that their stuff is mined for the value of the lead alone. The stuff that we get from Mexico is mined for the value of the gold and silver.

22,379. Why should not the mineowners' ore, as it is so pure, be used?—The price would go down so much that they would have to close.

22,380. (*Lord Henry Bentinck.*) There would be a big demand for lead pipe?—I am afraid that many lead pipes are made from old lead.

22,381. (*Chairman.*) The amount of metallic lead produced from the Welsh mines is 4,500 tons, compared with nearly 18,000 produced in the United Kingdom, so I ask you again, how do you justify your statement that these people who produce so small a

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quantity will be ruined? Do you still maintain that statement?—I am sorry that I cannot make myself clear. What I say is that the Welsh and English lead mines now open (and they are rather more open than usual just now, owing to the high price) produce a form of lead so pure and so free from gold and silver that if you did anything, or the world did anything (because I assume that the world will follow what England does) by which the consumption of pig lead is reduced 20 or 25 per cent., you will infallibly knock down the price of raw material so enormously that the very first people who will have to shut up will be the mines in England and Wales, where only lead is got. That is the point.

22,382. That applies particularly to the Welsh mines? —Yes—to the particular gentlemen who have appeared before you, such as Captain Francis. An impartial witness has been put in by the Chamber of Commerce, who has given chapter and verse for all these things. He has collected information from individuals and given it all to you.

22,383. (Lord Henry Bentinck.) Your convention has a fairly good control over the price of white lead? —I wish we had better control over the price of pig lead, but this is going off the point.

22,384. I do not think it is?—We are talking about pig lead, and now you say that in regard to white lead there is a convention of which I have some control.

22,385. (Chairman.) Now will you read your suggestions?—“As regards the insufficiency of statistical data, I would urge that every National Insurance card should have a space provided for the insertion (compulsory) of the insured person's occupation.”

22,386. (Dr. Collis.) The insured persons' occupations are being, I believe, duly recorded?—I am glad of that. “Secondly, with reference to the suggested difficulty as to the enforcement of any regulations which might be made owing to the very large number of buildings in which the work of painting proceeds simultaneously, in my view there would be no necessity to have a very large number of inspectors, nor need they be men of the mental calibre of H.M. Inspectors of Factories. It appears to me that it would be sufficient if flying visits were paid from time to time to places where painting work was being carried out, as the employer would always be on the *qui vive* for the visit of the inspector, which would, of course, be made without previous notice to him. I should have thought in the ordinary course of events that the sanitary inspectors and surveyors of the various local authorities would have been the officers best fitted to undertake these duties under the supervision of the district medical officer of health, part of whose duties it would be to make the quarterly examination of the men and keep the records. The officers of the local authority are constantly about in each district carrying out various duties of inspection, including the supervision of the erection of new buildings, and under the Housing and Town Planning Act every house in the district has to be surveyed, and I am told that some 108 particulars of

“the size of the rooms and condition and construction have to be taken of each house and filed by the local authority, duplicates being transmitted by the medical officer of health to the Local Government Board. This Act is now being carried into operation in most districts, and the officers delegated by the local authority are becoming more and more familiar with the condition of each house, large or small, in their area. It has occurred to me that, as the Old Age Pension work was delegated to the Excise officials, the Home Office might like to delegate this inspection work to the officials of the local authorities. I understand, however, that the Home Office have an objection to this system on the ground that the sanitary inspectors are appointed by the local authorities, and that it would be impossible for them to exercise an independent judgment. Seeing, however, that these officers hold their appointments subject to the general control of the Local Government, I should have thought this objection not insuperable. Having regard, however, to the fact that it exists, I have caused inquiries to be made as to how far the machinery, which is being set up to carry into effect the provisions of the National Insurance Act might be utilised for the purpose of enforcing white lead regulations. I am not at liberty to make any official use of the information, but I understand that one of the principal officers of the Insurance Commission has informally expressed the opinion that there would be no insuperable difficulty in delegating to the inspectors under that Act the duty of enforcing regulations, especially in view of the fact that, to a considerable extent, the duties of the Insurance Act inspectors would be analogous to those of the white lead inspector.” (I refer you to section 63 of the Act of 1911.) “The Insurance Act inspectors are brought into close contact with employers of labour, and have large powers of inspection of books and interrogation of employees, whilst provision is made for local inquiries in places where excessive sickness prevails. Also the local Insurance committees would render valuable assistance, and probably, as has been the experience in other countries, the trade unions would be efficient safeguarders of the rights of their members, and by officially lodging complaints would relieve the painter from the necessity of lodging them in his own name. A third point is, the medical examination which I have recommended might be done by the Insurance Act doctors, and the payment for it might help to satisfy their demands, which I understand are as yet unsatisfied. My suggestion is that if your Committee are prepared to consider a system of regulation, a general committee might be called with a view to settling the details. Your Committee will do me the justice to admit that as at the moment the full method and routine of the working of the National Insurance Act is unsettled, I am unable to make any definite suggestions.” If you give me till the National Insurance Commissioners have got their arrangements made, we might really talk very much better about it. I honestly believe that if we have a will, we can find our way through.

The witness withdraw.

## THIRTY-NINTH DAY.

Friday, 18th October 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

LORD HENRY BENTINCK, M.P.  
 MR. E. L. COLLIS, M.B.  
 MR. W. G. SUTHERLAND.  
 MR. A. GARDNER.  
 MR. J. PARSONAGE.

MR. A. L. C. FELL.  
 MR. C. L. MASON.  
 MR. W. ROBINS.  
 E. A. R. WERNER (*Acting Secretary*).

Mr. EDWARD M. JOHNSON recalled and further examined.

22,387. (*Chairman*.) When the Committee rose last night you read a few additional paragraphs of your proof. In the first of these (paragraph 22,203) I understand you wish to draw the Committee's attention to the system of blood examinations recently introduced at Leipsic. What do you wish to say on this point?—What I wished to say was that you should ask Dr. Goadby about it. I do not know whether you did. As I explain in the proof, it is an absolutely new thing to me, and one naturally jumps, as I imagine you will jump, at anything that will tend to prevent lead poisoning. I knew that he was going to be here the same day.

22,388. In paragraph 22,249 you refer to the economic disadvantages of the prohibition of lead. Do I understand that you wish to say something more in that connection with regard to comparative prices, statistics of imports, and the like?—I think I tried to make that clear last night. I gave you the mixings, showing what the constituents were, and how I thought that we should have with zinc to have three coats to two, and how it would take longer to dry, and that the job would have to be done again much sooner. I also pointed out last night that there had been an absolutely free market for zinc for years in England, and that the imports up to date this year as against the same date last year were 9 per cent. increase in the case of white lead against 7 per cent. in the case of white zinc.

22,389. In paragraph 22,251 of your proof, do you wish to add a note advocating the application of the principle of self-inspection to the painting industry?—I have no practical experience of that. We do not have that system at present in the white lead factories, but I understand that it is really seriously advocated by people who go into these things, especially in the Home Office, just as the Germans have told us that the trades union people take good care to watch each other on the jobs—not only the masters but each other. If inspection and regulations are introduced at all (I should like to be educated on the point), and the workmen cannot be trusted, they should have the necessary machinery given to them. I think that the Germans are on the right line.

22,390. Workmen or employers?—Both. Self-inspection, I take it, is some system by which the cards and things are put up, and notes are made so that the proper duties are carried out.

22,391. Some system by which it can be insured that the regulations are carried out by the employers and employed and regularly checked?—Yes. You know more about it than I do, of course.

22,392. The lengthy statement which you wish added after paragraph 22,252 was read before the Committee rose yesterday evening. Is there anything you wish to add regarding the subjects touched upon therein: (1) The use of National Health Insurance records. (2) The utilising of the sanitary inspectors and other officers of the local authority. (3) The medical inspectors?—With regard to the use of the National Insurance records and my first point about the card, I understand that a book is kept with these

particulars of the occupations of all the people insured. I imagine that there is an approved society in connection with the Union or Association and that the book has a record.

22,393. (*Mr. Gardner*.) No. Every insured man has a book in addition to his card?—He himself has?

22,394. He himself has?—Whether he is insured in an approved society or by the State?

22,395. The card simply holds the stamps. The book is a record year after year?—Therefore, at the end of one year of the working of the Act you will be able to have a most extraordinary census of occupation. The book, I understand, shows what the employment of the person employed is.

22,396. (*Mr. Sutherland*.) It is the census of invalidity that we want in relation to occupation?—Yes.

22,397. (*Mr. Parsonage*.) The insurance book always remains the property of the man, and it does not go to the Government at the end of the year?

22,398. (*Mr. Sutherland*.) It ultimately goes to the Government; it is bound to?—I hope it does, because we should feel so much more satisfied that every statistical precaution is taken to see if prohibition is justifiable.

22,399. (*Mr. Gardner*.) The application form to become a deposit contributor or member of an approved society and the particulars must all be forwarded to the Commissioners?—Then the blue books will contain statistics?

22,400. I should think so?—That is what I want.

22,401. (*Chairman*.) Now, with regard to the second point: "The utilising of the sanitary inspectors and other officers of the local authority," what do you say?—I have nothing to add to that. Knowing that the Home Office did not approve of that way with regard to local authorities, I naturally rather emphasised the sentence.

22,402. What have you to say with regard to medical inspectors?—I think that the Insurance Act doctors will be fully able to deal with that, especially if the Home Office experts on lead poisoning could let the general practitioner of the country have some sort of up-to-date knowledge of lead poisoning. It has undergone a great transformation in recent years in the remedies applied and so on. It is possible that in some parts of the country the medical practitioner is not really thoroughly acquainted with the method of curing lead poisoning or the means of diagnosing it.

22,403. With regard to medical inspection, you doubtless recognise that the payment for medical inspection would have to be made by the employers of house-painters, just as it is now made by employers in other industries where periodical medical examination is required?—I think that in all these matters, as in my opinion the use of white lead is an enormous advantage to the community, anything which attends its use ought really to be paid for by the consumer. It is worthy of consideration whether the producer might not possibly be called upon to contribute if the employer cannot put it on the consumer, but honestly I think nowadays it is a recognised fact, although

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some recent legislation has not quite recognised it, that ultimately the consumer has to pay. We are told so in tariff matters.

22,404. You have made a lengthy statement without answering my question. With regard to medical inspection, I ask if you recognise that the payment for medical inspection would have to be made by the employers of house-painters, just as it is now made by employers in other industries where periodical medical examination is required?—I think that that is the probable result. It will come on the consumer ultimately, I think.

22,405. In the paragraph marked (N), in Q. 22,264, you call attention to a special soap. Have you brought samples of this?—Two.

22,406. What do you wish to say about them?—I would like you to examine them. I have nothing to do with these people. It is sent by Walkers, Parker, & Co., of Chester. The advantage of the soap is that it is a dry soap that can be used in cold water. It costs about 24s. a hundredweight. It is described as a soap for washing and cleansing the hands of workmen who handle poisonous metals, such as lead, tin, copper, zinc, brass, &c. It prevents lead and blood poisoning by killing the germs and microbes and bacteria, especially in cases of cuts and sores.

22,407. It sounds like an advertisement of a patent medicine. It cures everything. Has it been tried? I believe they are using it at Walker's works and elsewhere. It is good for all washing purposes.

22,408. Is the price moderate?—24s. a hundredweight. I also put in a sample of a soap recommended by our German friends which is used in Germany in white lead factories. I do not know anything about it. The Government analyst, I suppose, would like to look at it. The names of the makers are on it. It is recommended by the German people as a very good preventative of lead poisoning.

22,409. In paragraph 22,267 you refer to the desirability of encouraging trade guilds. Do you wish to call our attention to a guild formed amongst the plumbers?—Yes. Mr. Sibthorpe said a great deal about it.

22,410. Do you want to make any comment on it?—I would like to run through this to show the sort of idea. I do not know whether I may ask a question.

22,411. I do not know that we want a long dissertation on plumbers' guilds. It has nothing to do with our Inquiry. What is the point of it?—The point is that I think it is highly desirable that painters should be registered, and that as far as possible we should work with the unions under the Insurance Act or the approved societies to carry out these regulations. May I ask whether the unions represented here represent a very large percentage of the painters of the country?

22,412. (Mr. Parsonage.) Over 20,000 in my society?—What is the percentage of the whole?

22,413. (Mr. Sutherland.) 12 per cent. — The painters' trade at present is not very largely organised.

22,414. All the trade organisations represent 12 or 15 per cent. — Not more than that?

(Mr. Gardner.) In Scotland they represent a much larger percentage. We represent between 5,000 and 6,000 painters in Scotland.

22,415. (Mr. Sutherland.) That is since the new Act. What is the point regarding plumbers?—The Plumbers' Company is an old City Company, and they have made great efforts to do what they are supposed to do—to look after the plumbing trade, instead of simply schools or dinners and so on. They think they have registered now something like 25 per cent. of all the plumbers in the country. Their objects are all here on these papers. I take it that the object of a trade union is to look after its workmen and their health, get them good wages, and, in order to have a chance of getting good wages and steady employment, it would be a great advantage that there should be a body of registered painters who show by examination or otherwise that they have some real knowledge of their trade. Such men would probably be employed before others. The plumbers seem to have started out with a scheme to protect the public and to protect the

plumber himself. I think that it is most important, and I am perfectly certain, and no doubt you gentlemen have also thought of it, that there will be a great deal more painters' work to be done if prohibition of lead is carried out. When the painters come in I think that they should be skilled men, and should not be accommodating people in domestic or other work more than necessary while they are at their jobs. I would like to put this in bodily, trusting to the Committee to use it—I do not say every word of it. You see the idea? I strongly wish to support Mr. Sibthorpe. In these days there need not necessarily be any competition between labour and capital in a matter like this. There is room for a seriously worked out plan. I cannot say that I have worked the whole thing out myself. These papers are available for your secretary, and I would like to put them in for what they are worth, as showing what is passing through my mind. I will read them if you like.

22,416. As chairman of the White Lead Corroders' Section, have you consulted your colleagues on many of these important matters which you have put before us in your examination in chief?—Yes, we have had several meetings.

22,417. Have you and your colleagues considered this code of rules which you have put before us?—Yes.

22,418. And have they also considered carefully the suggestions you have made with regard to enforcing those rules?—We have not had a meeting on that, but the suggestions have been sent round to them for their approval or otherwise. I have been at meetings, and they have to a large extent left that to me.

22,419. Are they cognisant of the general purport of the suggestions you have made with regard to enforcing the rules?—With regard to National Insurance?

22,420. Yes—what you put in last night?—By now, yes, but when they were sent in to you, not.

22,421. (Dr. Collis.) You suggested that the consumer would finally have to pay. I presume that means that a higher price would be charged to him for work done, and he would have to pay for the system of regulations if established?—What I said was that it was easy to show that the consumer finally paid for regulations, but I am quite prepared to think that as regards medical inspection it would be so trifling that you would not be able to put it on the price.

22,422. If the code is drawn up on the lines you have suggested it would cost a certain amount of money to the trade, would it not?—Yes. I do not mind committing myself to stating, from what I have heard from the National Insurance Commissioners, that it might involve the appointing of about 40 extra commissioners.

22,423. Extra inspectors?—Inspectors under the National Insurance Commissioners. That is an estimate from a layman.

22,424. What is their annual income to be?—I suppose it would cost about 10,000l. a year, would it not? I would like to ask you what you think the substitution of zinc and other things would cost the consumer.

22,425. I want your opinion of the extra cost?—As a layman I would say that if 40 National Insurance Inspectors were required it would cost about 10,000l. I do not say that it is adequate. I do not say that any Government official is adequately paid.

22,426. And then there would be their travelling expenses?—Their real value would be in the moral effect, as they are likely to drop in at any moment. There would not be much travelling. They would be local, would they not?

22,427. (Chairman.) Forty would only be one in each county, so that they would have to travel?—Some counties are very small.

22,428. Do you think that one in a county could inspect all the jobs all over the country?—But the existing inspectors could do it.

22,429. (Dr. Collis.) Forty new inspectors, costing annually about 10,000l. for income, and then there are travelling, office expenses, and upkeep. Would you disagree if I suggested 4,000l. extra to cover extra

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expenses? You are more capable than I am of dealing with that.

22,430. Then we have the medical examination of about 150,000 men. Say they are examined four times a year. That gives 600,000 medical examinations, and if you put it at the low basis of 1s. per examination you get 30,000*l.*? Do you think that examination once a quarter would be necessary?

22,431. Yes. It has been suggested by the Germans that it should be once a month. If you divide 600,000 by 20 you get 30,000, and then there is the question of such extra expenses as would be entailed by the providing and washing of overalls? Which I am informed are provided by most reputable firms already.

22,432. (Mr. Sutherland.) By the men?—Most decent painters provide them. It would not be fair to add that.

22,433. (Dr. Collis.) The suggestion that we have had is that the provision would be put on the employers, and the washing is an important point?—I do not think that the overalls should be added.

22,434. No regulations that we have had recently, calling upon men to wear overalls, have ever been established without calling upon the employer at his expense to provide them and wash them?—I see.

22,435. (Chairman.) You have not totalled up what the approximate cost would be of the regulations which you suggest should be put into force and those which the Home Office would have to put into force?—I have not totalled it up, but it is nothing compared with what the consumer would have to pay.

22,436. Supposing that the cost of that was as high as the extra cost of using oxide of zinc in paint, should not that weigh with us?—Yes, but it will be nothing like as high.

22,437. But supposing that it is?—Then no doubt it will affect your decision.

22,438. (Dr. Collis.) You suggest that the worker engaged in handling white lead, &c., shall work in such a way as to avoid contact with the substance with the hands. Does this mean the wearing of gloves?—No, I should think they need not do that. It refers to splashing of course.

22,439. Take the previous sentence, "shall work in such a way as to avoid contact with the substance with the hands." That surely is impossible unless he is wearing gloves?—I do not think so. When he is stirring up things in a pot is it necessary to splash very much?

(Dr. Collis.) I want to get some idea of your estimate of what even you would suggest as the extra cost to be borne by the public in establishing these regulations. Whether we agree with the estimate or not is another point?

22,440. (Chairman.) You are not in a position to answer that, are you?—Some of the questions I have been asked are awfully hard to answer. I do not profess to know everything when it comes to painting, but I think it would be desirable that the men should be warned not to put their hands into the paint.

22,441. (Dr. Collis.) I thought you were suggesting gloves?—No. Absorption through the hands, provided you wash them, has been largely discounted in recent years. You know as well as I do what white lead works are like.

22,442. For inspection and medical examination, and so on, on your estimate we get to a matter of close on 60,000*l.*?—I do not know what you have reckoned as the cost of having inspectors round, for instance, to see that the 5 per cent. is not exceeded. Everything that I have put down seems to me to be necessary if you are going to allow 5 per cent. of lead in pigments. I have given a case in which I found a substitute containing 11 per cent. In future the chemical people will have a high time of it analysing lead anywhere and everywhere to see that the 5 per cent. is not exceeded. It seems to me to give away the whole case against prohibition. Prohibit it entirely rather than that.

22,443. With regard to the establishment of guilds, you consider that the opinion of these guilds would be very valuable?—If they could be got together and formed.

22,444. We have already what are practically these guilds representing in England 15 per cent., and in Scotland a larger percentage of the people employed. Their opinion will be of value, do you not think, in considering this question?—Yes, if they have sufficient data to give a really considered opinion.

22,445. They have sufficient data. They have many, many years' past experience of illness. We should be considerably assisted, therefore, by obtaining their opinion on the subject, should we not?—I presume so.

22,446. (Mr. Sutherland.) Do you think that the substitution of proprietary paints for a universal basic pigment like white lead, easily mixed by the ordinary painter with ordinary, readily accessible materials, like linseed oil and turpentine, and giving a thoroughly sound paint, would be a solution of the question which any Government should entertain?—What do you mean by "proprietary paints"—free from lead?

22,447. Non-poisonous paints?—I should think that if there were a possible substitute, we should have closed up long ago, considering the amount of money spent on advertising. We do not advertise our white lead to any extent. We have been most careful not to enter the newspapers in any way during the sitting of this Committee.

22,448. A further point involved in that is that one is not a proprietary article (lead is common to anybody) and the others are. The Government or any administrative body could not say, "You shall use Jones'?"—They could not create a monopoly.

22,449. What standard of a paint would be available to the Government departments and the painting trade if white lead were abolished?—I know of none. The only standard that I know of in a Government department (and, as I said yesterday, I supply white zinc) is that in the case of zinc the impurities must not exceed a half per cent. That is required by the India Office. I do not know of any printed formula from the Admiralty.

22,450. Is there any standard for lithopone?—I am told not. I am trying to establish what lithopone is. Judging from samples submitted to my firm for analysis it varies tremendously.

22,451. (Chairman.) If you do not know of your own knowledge do not answer?—I do not.

22,452. (Mr. Sutherland.) The same difficulty would exist with architects, professional men, and municipal departments, if to-day in all their specifications they specify genuine white lead, raw linseed oil, and pure American turpentine. They would be up against the same difficulty in the absence of a standard?—Yes.

22,453. The London Chamber of Commerce can proceed against people for breach if they fail to supply genuine white lead?—Yes. We take samples.

22,454. And prosecute?—And prosecute, and protect the consumer.

22,455. As you are familiar with the sources of supply of lead, zinc oxide, and lithopone, and as you have told us you handle both in large quantities, if lead was prohibited would there be an adequate supply of (a) zinc oxide, and (b) lithopone for some time?—I am afraid not, except at such a cost that you would have to repeal your legislation.

22,456. Is it not the case that many so-called non-poisonous paints are fortified with white lead?—Yes.

22,457. That is common knowledge, is it not?—Yes.

22,458. Can you give the Committee your opinion as to the value of lithopone for outside work?—We have specimens of it, and most of the other white lead makers since the Inquiry was started have put up boards painted with lithopone. It has changed colour. My opinion would not be very favourable at present. We shall see whether it improves with age.

22,459. How do you account for the fact that, notwithstanding the enormously increased supplies of zinc oxide and lithopone in this country, the sales of white lead are well maintained in spite of its high price?—It is very hard. I am agreeably surprised at that fact. I do not know whether the idea that you gentlemen were going to do away with lead has made everybody

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set to work while he can. That is an opinion that is not of much value.

22,460. Is it not the fact that enormous quantities of lithopone are used, not in house painting, but in the manufacture of linoleums and floor cloths?—Yes; that is the largest use of lithopone. There is a great demand for lithopone in rubber factories and linoleum manufactories. I am told by lithopone makers that it is not the paint trade that is causing the rise in lithopone of 5*l.* a ton, but other uses of it.

22,461. The manufacture of zinc oxide is not a protected industry. Anyone can, if he thinks fit, lay down plant and begin to manufacture it in this country to-morrow. Can you tell us the reason why it is not done?—I think that Mr. Lancaster has told you pretty fully about that—the difficulty in getting the material. I do not like to talk about conventions. A gentleman mentioned that yesterday. I should have to go into the whole matter of continental trade and the business connected with the spelter convention, and the different sources of supply of zinc. I can do it if you like, but if you will take it from me if we could get in England a reasonable chance of manufacturing oxide of zinc to compete with the foreign sources of supply, my firm in particular would have done it long ago. All the zinc at present is of foreign origin. What there is in English mines is sent out to the Vieille Montagne or Germany to be manufactured there. We are in the metal trade. If we could have got hold of any source of supply out of which we could make any money we should have done it long ago.

22,462. (*Lord Henry Bentinck.*) Is it difficult to get hold of the raw material?—It is very difficult to get hold of the raw material. The whole of it is controlled. You have heard of the nature of the ore from which the zinc is made. The Dutch zinc now on the market containing 4 or 5 per cent. of lead is said to be got from America. It might be possible under competition for English firms to get hold of their stuff instead of them, but when we have got it we have only got zinc white with a certain amount of lead, and, at present, there is no standard allowing that amount of lead to be left.

22,463. (*Chairman.*) What do you say with regard to Australia?—I would rather refer to Mr. Lancaster's evidence.

22,464. (*Mr. Sutherland.*) You would put that in your reply?—Yes. We have five or six different directors and we have all got our own subjects. It is no good my repeating.

22,465. Do you know that Dr. Leggo, the Home Office authority on the question before this Committee, and Dr. Kenneth Goadby, who is another eminent authority on the subject, both agree that the crux of the question lies in the dust produced by dry rubbing down, and that all other causes are trivial in comparison. Therefore, do you not think that the solution lies in the direction of the prohibition of dry rubbing down—in which as a practical painter I assert there is no insoluble difficulty—instead of prohibiting the use of a valuable material like white lead? It has been proved to the Committee that lead poisoning cannot arise from emanations of wet paint nor from fumes in burning off, nor through the skin, and only slightly through the alimentary canal?—Yes, that is absolutely my opinion. You are a practical painter asking the question; I am not. Anybody who has read my proof will see that that is really what it comes to. Everybody agrees as to what the main source of the danger is. Whether you prohibit the use of white lead in future or not you are face to face with the fact that if you are really honestly wanting to protect the working man from the danger of lead poisoning it is your bounden duty at the earliest possible moment to prohibit dry rubbing down forthwith, otherwise you will have the whole of your lead cases going on for 10 or 20 years, as the witnesses have told you. That is logically, I think, the only conclusion I can draw from what I have been told, and you too.

22,466. You made a suggestion on a point on which the Chairman asked a question. I understand that you do not want to compel the painter to use lead—you could not if you wished to—and you suggest that if the

painter wishes to be free of any regulations he should declare his shop a leadless shop, and get exemption?—Yes, that is what it comes to.

22,467. Then you make the point that, in any case, if the Government allowed a percentage of 5, 6, or 7 of lead in zinc, the necessity for inspection would still exist?—Yes.

22,468. So that in that case there would be no gain to the country either one side or the other?—Quite so.

22,469. If inspection is necessary for regulation, it is also necessary for prohibition, if you want to see that your rules are complied with?—Yes.

22,470. In reference to the records, if the Home Office wished to get an exact record of lead poisoning cases paid for under the Workmen's Compensation Act as distinct from the Insurance Act, it could be done, could it not, by an administrative order making the returns compulsory?—I should think so.

22,471. I understand that the suggested regulations are put in not as an arbitrary code but as a basis of discussion?—Yes.

22,472. You have been asked as to the inclusion of the provision of overalls. Now from time immemorial the operative painters have provided these overalls and provided for the washing of them and they have never grumbled or made it a ground of complaint against the employers. Therefore I take it you do not think that the practice should be interfered with?—That was my idea. I understood that it was the rule already.

(*Mr. Sutherland.*) It is.

22,473. (*Chairman.*) The same thing obtained in the Potteries. From time immemorial the men had provided their own overalls, but a committee sat and decided that the employers should provide them?—That is a matter we leave to the department, of course.

22,474. (*Mr. Gardner.*) Just one point in connection with these rules. You think it would be advisable that men be registered who are using paint. I take it that you mean that there should be a prohibition of men who are not registered from using lead paints?—I suggested that, if your body really contains the great majority of the painters of the country, but of course it does not, and therefore I am afraid it would make a monopoly.

22,475. Our bodies have nothing to do with it in the meantime. There is the question of what you call Trade Union interference with the liberty of the subject. Your suggestion simply means that no one should be allowed to work at a trade or handle lead paints unless he was properly registered?—I think it desirable for them to be registered, but if they do not think so, then it is not for me to force such a thing upon them. My ideas about Trade Unions may be different from yours.

22,476. You speak about guilds of plumbers, and so on. There would be no use in registering a man to work at the painting trade if Tom, Dick, and Harry were also going to be allowed to work at the painting trade. You would require prohibition by law, would you not?—You are taking it rather farther than I am prepared to answer at the moment. I thought it was a matter that the Committee would consider. I have handed in the papers setting forth the plumbers' views. I have not given them out in full, so I cannot very well discuss that paper, but when it is in print I will come back again some other day if you wish.

22,477. These suggestions as to regulations are simply your own? You have not consulted any master painters about them?—We thought we had consulted one or two very good master painters.

22,478. (*Chairman.*) I do not think that we can publish this about the Plumbers' Guild. It has nothing to do with the inquiry. It sets out reasons for members of Parliament why plumbers should be registered?—May I take it back and re-write it entirely from the point of view of painters. It is nothing compared with doing away with white lead.

(*Mr. Sutherland.*) I do not think that it is of much value to publish it.

22,479. (*Mr. Gardner.*) Clause E is a very good regulation, and one which I should very much like to see carried out, but I am just afraid that you have not



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got the feeling of the master painters on that clause. It deals with the provision of overalls, hot water, and time for cleansing. That is paragraph 22,264?—We are accustomed in our works to give time for washing. We have got used to it by the education of the Home Office. For the last 10 or 14 years the Home Office has helped us in our work, and I think we have helped them in regard to regulations. Much has been done to remove the prejudice that there used to be with regard to the Home Office, although I cannot say that we always pull together.

22,480. Now is it not the case that ready mixed paints have not captured the market, simply because the practical painter does not believe in a standardised

paint?—I am advised that the reason why the American habit of selling the paint ready mixed has not come into England is because such an awful lot of rubbish has been sold. The painter has had a sickener of it. He has used the stuff and been blown up by his master, who, in turn, has been found fault with by the householder. They have found it very hard to get these paints on the market, not because of their goodness, but because of their utter uselessness. Many grinders are putting a white lead paint on the market. You want one sort of mixing for some climates, one sort for outside, and one for inside. One wants flat paint and another glossy, and that is one of the difficulties with these proprietary paint people are finding.

The witness withdrew.

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Evidence to 22,500 handed in and taken as read; witness then called in and examined.

22,481. The experiments carried out in the Government Laboratory at the request of the Committee, have been directed mainly to an examination of the conflicting statements which have been put forward with regard to the existence of lead vapours in air which has been in contact with surfaces freshly painted with lead paint. The methods of investigation employed have been exclusively chemical and physical.

22,482. It has been suggested that the discrepancies between the statements on this subject published in the French Report,\* and those made by some of the witnesses who have appeared before the Committee may be due to the employment by the French experimenters of "Trillat's Reagent" by means of which it is claimed that smaller quantities of lead can be detected than by the ordinary tests for this metal. It was thought advisable, therefore, in the first place, to compare this reagent carefully both as regards its delicacy and its reliability with sulphuretted hydrogen, the reagent usually employed in testing for and estimating small quantities of lead.

22,483. The results of this investigation are given in Appendix XXVII. They show that while Trillat's reagent may, under certain conditions, be a more delicate test for lead than sulphuretted hydrogen, it is unreliable on account of the extreme difficulty of ensuring the absence of all traces of peroxides and other oxidising agents which have the power of reacting with it to give a blue colour. As a means of estimating small quantities of lead we found it altogether unsatisfactory.

22,484. While we relied in our subsequent experiments on sulphuretted hydrogen both for the detection and estimation of lead, we nevertheless employed Trillat's reagent systematically, but were never able to obtain any satisfactory indication of lead by means of it when we had not succeeded in detecting the metal with sulphuretted hydrogen. We are unable, therefore, to concur in the suggestion that the failure of some of the witnesses who have appeared before the Committee to confirm the observations of the French experimenters was due to their having neglected to make use of this reagent.

22,485. We next turned our attention to the experiments which are described in Appendix 15 of the French Report. The results obtained in these experiments are of a very remarkable character and, if incapable of any other interpretation than that which MM. Heim and Hébert offer, would leave no room for doubt as to the volatility not only of lead compounds but of metallic lead at the ordinary temperature. We have repeated the experiments, so far as they relate to white lead and metallic lead, carefully observing every detail mentioned by the French experimenters.

22,486. The apparatus and method of experimenting were of the simplest possible description. The sub-

stance to be examined was placed in a long narrow tube having absorbing bulbs filled with sulphuric acid attached at one end. A plug of cotton wool was interposed between the tube and the absorbing bulbs to intercept any solid particles that might be carried over mechanically by the current of air which was drawn slowly through the apparatus. The length of the cotton wool plug employed in the French experiments is not stated, but in the absence of any information on the point it may be assumed that it was not less than 3 inches, the length usually employed in such experiments.

22,487. In experiments with lead filings and granular white lead made by means of this apparatus, traces of lead were always found in the sulphuric acid bulbs, but it was noticed that the cotton wool plug also contained lead and invariably in larger quantity than the sulphuric acid. It was evident, therefore, that solid particles were being carried over in the current of air and it seemed not impossible that these might be getting through the cotton wool plug in sufficient quantity to account for the indications of lead obtained in the sulphuric acid bulbs. An additional plug of cotton wool was, therefore, introduced into the apparatus and further experiments were carried out. It was found that the second plug also contained lead, although in smaller quantity than the first, but no trace of the metal could be detected in the sulphuric acid either by means of Trillat's reagent or sulphuretted hydrogen.\*

22,488. To obviate the possible objection that lead vapours might be condensed in passing through the long plugs of cotton wool which we employed, experiments were made in which the tubes containing the plugs were kept at the temperature of boiling water. These modifications of the conditions had no effect whatever upon the result.

22,489. These experiments seem to point to the conclusion that while a cotton wool plug three inches long is usually sufficient for all practical purposes, a much longer plug is required when it is desired to intercept completely the finest particles of matter that are found in suspension in the air.†

22,490. Our failure to confirm MM. Heim and Hébert's results does not, of course, dispose of the theory of plumbiferous emanations from freshly painted surfaces. Although no vapour is evolved by metallic

\* From the account of the method of experimenting in the presence of lead in the air of workshops described by MM. Heim and Hébert on page 827 of the Report, it would appear that whatever was retained by the cotton wool plug of their apparatus was regarded as lead dust, whatever passed through as lead vapour. Nothing is said as to the length of the cotton wool plug except that it was "suffisamment longue," nor is there any mention of experiments having been made to ascertain whether the whole of the lead might not have been retained by the use of a longer layer of cotton wool.

† In one of the experiments the cotton wool was replaced by asbestos without the result being in any way affected.

\* Rapport fait au nom de la commission de l'Hygiène publique chargée d'examiner le projet de loi, adopté par le Sénat, sur l'emploi des composés du plomb dans les travaux de la peinture en bâtiments, 1907.

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lead or lead oxide alone, it is conceivable that vapours containing lead may be produced as a result of the reactions which go on during the drying of lead paints made up with oil and turpentine. For the investigation of this question a series of experiments was carried out somewhat on the lines of those described by Mr. Klein (Experiment No. 5) in his statement to the Committee.

22,491. Having regard to the exceeding smallness of the quantities of lead alleged to be evolved from lead-painted surfaces, our experiments were planned on a large scale. A box was constructed, containing a large number of readily removable partitions, so arranged that air drawn in at one end must pass between the adjacent partitions in succession before leaving at the other. The partitions were painted on both sides, the total area of the painted surfaces being approximately, 100 square feet.

22,492. In carrying out experiments with this apparatus air was drawn through the box, and then in succession through tubes containing cotton wool and various absorbing agents. The passage of the air was continued until the paint was dry. In most of the experiments a mixture of white lead, linseed oil, and turpentine was used, but in some the turpentine and in others the oil was omitted. Driers were employed in some of the experiments.

22,493. In the experiments in which the cotton wool plug employed was of the usual length, lead could always be detected in the absorption bulbs as well as in the cotton wool. On introducing additional plugs into the arrangement we found, as in our repetition of MM. Heim and Hébert's experiments, that the whole of the lead could be trapped, no traces of the metal being now detectable in the absorption apparatus either by Trillat's reagent or by sulphuretted hydrogen.

22,494. These experiments demonstrate that a current of air which has been passed over a surface freshly painted with lead paint contains traces of lead, which though very minute, can be detected with certainty and even estimated approximately, when the experiment is conducted on a sufficiently large scale. They leave, however, no reasonable doubt that the lead is present not as a vapour, but in the form of minute solid particles.

22,495. But, whatever the source of the lead may be, and whatever the form in which it exists in the air, it is certain that the quantity is so small as to be negligible for all practical purposes. The scale and plan of our experiments enabled us not only to estimate the lead with approximate accuracy, but to determine its quantity in relation to the quantity of paint used. The details of these experiments are given in Appendix XXIX.

22,496. The quantities of lead obtained by the French experimenters were obviously of the same order as those which we obtained, as appears from the following passage in the Report:—"We ought, however, to say that this quantity of lead was so extremely small that the ordinary reactions of lead did not reveal it, and we had to utilise for its detection the new and extremely sensitive reagent discovered by M. Trillat."

22,497. The conclusions arrived at from the chemical experiments already described are supported by the spectroscopic examination of air exposed to freshly-painted surfaces. Lead forms several well-known volatile compounds whose vapours, when present, even in very minute quantity, exercise a powerfully absorptive action on light. We should expect, therefore, if any volatile lead compounds are evolved from freshly-painted surfaces, that their presence would be revealed by a spectroscopic examination. As a matter of fact, a layer of air 4 feet thick, in contact with a surface freshly painted with a mixture of white lead and oil, showed not the least trace of absorption. It is certain, therefore, if emanations of lead take place from painted surfaces that the amount is so small as not to be detectable by this method of examination, or the vapours are those of compounds which differ from the only known volatile compounds of lead in having no absorptive power. It is, of course, conceivable, but highly improbable, that such compounds exist.

22,498. A series of distillation experiments was carried out similar to those described by Mr. Klein, but on a larger scale. Our results entirely confirmed those which he obtained. It has not been deemed necessary in this case to give the details of our experiments.

22,499. In the course of our spectroscopic experiments several observations were made which may be of interest to the Committee, although they do not bear upon the question of lead emanations. At temperatures under 160° F. (70° C.) linseed oil does not evolve any vapour which absorbs light; above this temperature decomposition of the oil sets in, and the absorption becomes very marked. When the oil is mixed with white lead it behaves in exactly the same way. White lead, therefore, has no influence on the decomposition of the oil, at any rate below the temperature of 160° F., that can be detected by this method.

22,500. The poisonous character of the vapours given off by turpentine has been referred to by several of the witnesses who have appeared before the Committee. In the experiments described in Appendix XXIX. we found that traces of acid and aldehyde, as well as considerable quantities of terpin hydrate, were always present in the absorption apparatus. The acid and aldehyde might be derived either from the oil or from the turpentine, or from both. In view, however, of the results obtained in the spectroscopic examination it is doubtful if any considerable amount of decomposition of the oil occurs under 160° F. and we are, therefore, inclined to the view that the turpentine is the source of nearly all the decomposition products observed, especially as Kingzett and Woodcock\* have shown that by the aerial oxidation of turpentine, acetic and formic acids as well as formaldehyde are produced. Experiments, however, which we have just completed, afford definite evidence that boiled oil alone, a mixture of white lead and linseed oil, and a mixture of zinc oxide and linseed oil, give off aldehydic vapours at the ordinary temperature. The amount in each case is very small, and we are unable to say whether it is greater in one case than in the other.

22,501. (Chairman.) You are the principal chemist of the Government laboratory?—Yes.

22,502. In the statement that you have prepared you give an account of an investigation into the evidence for and against the possibility of lead vapours arising from drying paint?—Yes.

22,503. Put briefly, your conclusion regarding Trillat's reagent is that it is not reliable as a means of estimating very small quantities of lead?—Yes, that is the conclusion that I have come to.

22,504. You feel, therefore, that the conclusions based on the use of that reagent ought not to weigh much with the Committee?—Yes, that is my opinion.

22,505. Then, as to the experiments with metallic lead described in Appendix XV. of the French Report,† you consider that all the lead particles found in the collecting vessel must be ascribed to mechanical carrying-over, and not to emanations in the form of vapour?—Yes; that is to say in the repetition of the experiments which we have made, following the directions given by the French experimenters as closely as their accounts would permit of our doing so.

22,506. Have you both by delicate reagents and by spectroscopic methods, satisfied yourself that there are no volatile emanations which contain lead?—Yes. We have made a careful chemical investigation of the subject.‡

22,507. Do you, therefore, conclude that the nauseous vapours of drying paint are due to oil and turpentine, and not to the presence of lead?—Yes, because we have not been able to find any lead in the vapour.

22,508. Lead itself accelerates the oxidation of the oil, does it not?—I am not prepared to give an answer to that question. We have not experimented upon that point.

\* Journal of the Society of Chemical Industry, 1912, pp. 265-267.

† Rapport sur l'emploi des composés du plomb dans les travaux de la peinture en bâtiments, 1907, p. 828.

‡ See Appendix XXX.

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22,509. Would the presence of lead accelerate the emission of nauseous aldehyde and other vapours from the oil?—I am not prepared to answer that question. I have no experimental evidence upon the point.

22,510. Is it possible to obtain that evidence?—Yes, I think so; but I think to get an answer which would be useful to you a somewhat elaborate investigation would be involved. We are quite prepared to undertake that, if you wish it.

22,511. Would it take very long?—It is a little difficult to forecast what you may be letting yourself in for in undertaking an investigation of that kind.

22,512. You might consider it and let us know?—Certainly.

22,513. May the result of your investigation be taken to justify this Committee in disregarding emanations from drying paint as a possible source of lead poisoning?—Yes.

22,514. Then we must concentrate our attention on lead dust as the principal source of plumbism?—I think so. At any rate we have not been able to find any evidence that you have to deal with vapours containing lead.

22,515. (Dr. Collis.) Do you think that the amount of formic acid and formaldehyde produced in the drying of paint would be sufficient to affect the health in any way?—I do not think that I am justified in attempting to answer that question. All I can say upon it is that the quantities at the ordinary temperature appear to be very small.

22,516. Very small?—Yes, very small.

22,517. As to whether that small quantity might or might not affect the health of those exposed, you would not like to say?—No, I am not in a position to say.

22,518. But as far as your knowledge goes, you would expect equal amounts to come off whatever paint had been used, whether the paint was a lead paint or a zinc paint?—All that I would say upon that point is that they come off with the zinc paint as well as with lead paint, but whether in equal quantity or not I cannot say.

22,519. (Mr. Sutherland.) Did you experiment with the fumes of paint arising from burning off?—No, we made no experiments of that kind.

22,520. (Mr. Fell.) In your opinion, if the processes which cause dust in lead painting were prohibited would that do away with lead poisoning?—The processes which give rise to dust?

22,521. Yes, dry rubbing down, for instance?—I think that it would do away with direct lead poisoning, but there still remains the question of the possible indirect influence of the lead on the oil and turpentine with which the lead is mixed; but in so far as direct lead poisoning is concerned it would do away with it.

22,522. The indirect action you have not investigated?—Only to a slight extent.

22,523. (Mr. Mason.) Would you call this indirect action lead poisoning?—That is rather a medical matter than a matter for a chemist, I think. I think that this might interest the Committee: I have mentioned in my statement the amount of lead which we obtained in our experiments from something like  $\frac{1}{2}$  cwt. of lead paint. It might perhaps help to make the conceptions of these quantities a little more definite and concrete if I showed you the actual amount of lead contained (produced).

22,524. (Mr. Sutherland.) Is that from emanations?—The particles of lead that came through when we had painted about  $\frac{1}{2}$  cwt. on our apparatus amounted to about a seventh or eighth part the size of an ordinary pin's head.

22,525. (Chairman.) What deduction do you make from that?—Simply that the amount of lead that is brought mechanically from a painted surface is exceedingly small, so small as to be of no practical consequence.

22,526. (Mr. Sutherland.) Negligible?—Quite negligible.

22,527. (Chairman.) I do not understand. Will you explain?—In regard to the apparatus which I have briefly described in my statement, we painted something like  $\frac{1}{2}$  cwt. of paint on to the apparatus, and drew air over it until it was dry, and we got in

that air, when it was caused to pass through traps of cotton wool, a certain amount of lead mechanically brought over; or it would not have been trapped by the cotton wool.

22,528. (Lord Henry Bantline.) Is that an emanation?—No.

22,529. Why not?—An emanation would be a vapour, and a vapour would not be caught or retained by cotton wool.

22,530. Is an emanation a smell, or what is it?—I am using the word in the sense in which it is used in the French Report, which I have studied for the purpose of this Inquiry. What is really meant is a volatile compound of lead—a compound containing lead which is capable of existing in the state of vapour. That is what it means. What we got over could not be in that state or it would not have been retained by plugs of cotton wool. That is the total quantity of lead that we caught from the amount of paint.

22,531. (Chairman.) What was the size of the apparatus?—A big apparatus about 6 feet long, 2 feet wide, and 2 feet deep, with a large number of partitions in it, over which air was made to pass in succession.

22,532. What made you make this particular experiment?—We made the experiment to answer the question whether, during the drying of paint, there is any volatile compound containing lead given off.

22,533. I am much obliged to you. It is most valuable, but it does not appertain to anything in regard to the painter's work, does it?—I think so. It has been alleged that when a surface is painted, during drying, a vapour containing lead emanates or comes off from the surface, and the object of our experiments was to find out if we could whether or not that was the case.

22,534. (Mr. Parsonage.) Did these particles of lead come off during the process of drying?—Yes, they came off during the process of drying.

(Mr. Sutherland.) They have not come off from emanation, but they have been intercepted mechanically in the cotton wool. They have come off mechanically.

22,535. (Mr. Parsonage.) How have they come off mechanically? No one has touched it?—The current of air passing has taken it off the surface of the paint, no doubt.

22,536. (Mr. Gardner.) Then if that be the case, if that amount of solid matter, no matter how small, came off while nothing was being done to the paint, is there not a great likelihood that a great deal of solid matter comes off during the process of painting itself with the working of the brushes?—Splashing?

22,537. Quite apart from splashing?—No, I think not.

22,538. You say that this solid matter came off purely through the air passing over the painted surface while it was drying. Now, with the agitation of the brush spreading it out and working it all through, would you not get a great deal?—The brush would throw off some, but beyond that you would not have anything more coming off, I think.

22,539. (Mr. Parsonage.) This is a most important point. As I understand it, new paint, when it is drying in an ordinary room gives off certain particles of lead in the process of drying, with no one touching it?—Yes. The air has been passed through the apparatus for something like 40 days, and that is the total amount obtained by the passage of air over the surface for 40 days.

22,540. What would be the difference between the passage of the air in that case and the passage of the air in an ordinary room. Suppose that that door was painted, for example?—You have a steady pull over the surface in this apparatus, and that is more favourable for particles coming off, whereas in the case of a door being painted you have not that.

22,541. But even in the case of a door you would have air passing and something might come off?—Yes, to that extent.

22,542. Would it be poisonous?—No. You have a lot of figures before you dealing with very minute quantities. I thought that it would interest you to see what  $1\frac{1}{2}$  milligrammes really meant. You have had

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hundredths and thousandths of milligrammes mentioned.

22,543. (*Mr. Sutherland.*) Could you make clear the difference between "emanation" and mechanically thrown off lead, because there is great doubt?—I will try again to explain. An emanation is something which comes off from the surface in the form of a vapour or gas. It has been stated by the French experimenters especially, and by one witness before the Committee, that a surface freshly painted with white lead paint evolves or gives off a vapour, and that one of the constituents of the vapour is lead. That is what I understand by "emanation."

22,544. And that you have proved does not arise?—Yes. Suppose that you have a surface painted. The turpentine that comes off from the wet surface is an emanation. Assuming that the oil undergoes decomposition, then the products that come off are emanations. It is alleged that lead comes off in the same way as a vapour. The lead drawn off mechanically from the surface consists of minute, almost infinitesimal, particles of matter set loose in a solid state, not vaporised, and carried over in the current of air into our apparatus.

22,545. (*Mr. Mason.*) Was the scrubbing action of the air in your apparatus greater than would ordinarily obtain with the draft or current of air that would exist under ordinary painting conditions?—Yes, certainly. There was a steady pull of air over the surface all the time.

22,546. (*Chairman.*) This apparatus in the laboratory can be viewed?—Yes. I shall be delighted to show it to any member of the Committee. It is at the laboratory near the Law Courts.

22,547. (*Mr. Sutherland.*) The surface that you dealt with was about 100 square feet?—Yes.

22,548. It is a fairly good surface?—It is a large surface. May I say, with reference to a question asked me, that this amount of lead here is very, very much smaller than a medicinal dose of lead. It is about one thirtieth of a minimum dose that is given medicinally in cases of severe diarrhoea, for instance. I think that it is used for that. Dr. Collis will correct me if I am wrong.

(*Dr. Collis.*) That is correct.

The witness withdrew.

## FORTIETH DAY.

Thursday, 14th November 1912.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman*).

Lord HENRY BENTINCK, M.P.  
Sir GODFREY BARING, Bart., M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.  
Mr. F. G. RICE.  
Mr. A. GARNER.

Mr. J. PARSONAGE.  
Mr. A. L. C. FELL.  
Mr. C. L. MASON.  
Mr. C. KINGGATE.  
Mr. W. ROBINS.  
E. A. R. WEBNER (*Acting Secretary*).

Mr. HEDLEY MILLER recalled and further examined.

22,549. (*Chairman.*) I understand that you wish to offer some supplementary evidence?—Yes.

22,550. Copies of that supplementary evidence have been circulated. You doubtless wish us to take it as read, as we did your written evidence on the previous occasion when you came before us?—Yes.

The following is the supplementary evidence:—

22,551. On the previous occasion on which I gave evidence before the Committee my contention that prohibition of the use of white lead for painting would effectually close the works in this country was questioned, the suggestion being made that there would still remain to the white lead manufacturers:—

- (1) The export trade; and
- (2) Other trades in which white lead is employed, viz., the potteries, linoleum and wallpaper manufacture, &c.

22,552. I have accordingly obtained figures bearing upon this contention. These figures refer to the year 1910, namely, the latest year for which complete figures were obtainable at the time of the compilation of my previous statistics.

|                                      |              |
|--------------------------------------|--------------|
| Total home manufacture of white lead | 57,946 tons. |
| Total imports of white lead          | 14,436 "     |
| Together                             | 72,382 "     |
| Total exports of white lead          | 20,219 "     |

Leaving a balance of 52,163 " being the total home consumption; the difference between this figure and the amount manufactured

in the United Kingdom is only 5,783 tons. The totals given above of home manufacture and imports, however, represent dry white lead, whereas, with the exception of 1,118 tons exported to Canada, the export figure represents ground white lead. The latter contains at least 8 per cent. of oil, and, therefore (allowing for the dry white lead exported to Canada), the export figure should really be placed at 18,690 tons of dry white lead. This reduces the difference between the home consumption and the quantity manufactured in the United Kingdom to 4,254 tons.

22,553. In so far as the home consumption of white lead for purposes other than painting is concerned, the white lead corrodors of the United Kingdom delivered, in 1910, 2,884 tons (dry). Of 125 paint grinders (i.e., all the principal firms in the country) who were asked to give, confidentially, their figures in this connection, 120 replied, of whom 3 declined to give particulars. The remaining 117 delivered, for the purposes above-mentioned, a grand total of less than 11 tons.

22,554. It is, therefore, a reasonable conclusion that at least 50,797 tons are used for the purpose of house and carriage painting in the United Kingdom.

22,555. The effect of prohibition upon the British white lead industry is obvious.

22,556. (*Chairman.*) Now you deal first with the point regarding the export trade in white lead. You take the whole manufacture of white lead in this country in round figures as 58,000 tons?—Yes.

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Mr. HEDLEY MILLER.

[Continued.]

22,557. And add to this imports 14,000 tons, making in all 72,000 tons?—Yes.

22,558. Then you subtract exports 20,000 tons, and get a balance of 52,000 tons?—Yes.

22,559. What conclusion do you wish to draw from this calculation?—I wish simply to get approximately at the quantity of white lead that is actually consumed in this country.

22,560. But do you suggest that roughly, 6,000 tons, or, to be quite precise, 5,783 tons, is all that would be left to the home manufacturers to dispose of if the use of white lead were abandoned for painting?—Yes, with the exceptions that I have made further on; that is to say, the Potteries, and so on.

22,561-2. Now, it appears to me that your deduction is wrong. The Board of Trade figures show that none of the imported white lead is re-exported. To be quite accurate, in 1910 two tons were re-exported out of the importation of 14,436 tons. The import of 14,000 tons is therefore approximately all used by paint and colour firms in the United Kingdom?—I was not intending to draw any conclusion as to what became of the import, as to whether it was used for export or used in this country. For the purpose of my argument it did not matter. But it seems to me that one must also take into consideration the fact that the foreign white lead which comes here to be ground may be then exported, in which case I take it that the Board of Trade or the Customs would have no means whatever of knowing the fact.

22,563-4. In your deductions you assume that if lead is prohibited, 14,000 tons will still be imported from foreign countries?—I think that we are rather at cross-purposes. My figures have simply been brought out in order to get approximately at the quantity, whether manufactured in this country or abroad, which is actually consumed in this country. I did not endeavour or intend to show what became of that particular 14,000 tons.\*

22,565. Excuse me, you do not. Just look at your table. Your argument is this: You say that the home production of white lead is 57,946 tons?—Yes.

22,566. The total import of white lead is 14,436; making in all 72,382. "Total exports of white lead 20,219, leaving a balance of 52,163 tons."?—Yes.

22,567. Which you say is the total home consumption. The difference between this figure and the amount manufactured in the United Kingdom is only therefore 5,783 tons. I am assuming that the import of white lead, *i.e.*, 14,000 tons, would not be purchased from abroad, and the manufacturers would get the benefit to that extent?—I have not tried to follow what becomes of the import of white lead at all.

22,568. Then your figures are fallacious?—No, I cannot agree with you there.

22,569. Then will you kindly explain? I want to ask you what would happen, in the event of the prohibition of lead, to the 14,436 tons now imported from abroad. Would that come in or not?—No; presumably the larger quantity of it would not.

22,570. Then, in that case, would it not be fair to say that the export of 20,000 tons of white lead would come from the home manufacturers entirely?—In the event of, say, a very large reduction in the demand the import and the home manufacture would be reduced in the same ratio.

22,571. I do not follow that?—In the event of a very large reduction in the use, through regulation or through prohibition, for house painting, the import figures of white lead and the home manufacture figures would fall in much the same ratio. If only one-tenth, say, of the quantity was used for purposes other than painting, lead for house painting having been prohibited, it would come to 1,400 tons import and 5,700 tons manufactured in this country.

\* The witness has since forwarded the following note:—

Foreign white lead is imported in the dry state; the negligibly small Board of Trade figures for foreign white lead re-exported refer to dry white lead. Practically all the foreign white lead goes to the various grinders in this country, and it is impossible to trace its ultimate destination; a certain proportion of it is undoubtedly exported after being ground, when it is customarily considered a British product.

22,572. Do you say that if lead were prohibited in the United Kingdom for house painting and coach painting, the vast majority of the imports of lead from foreign countries would cease?—Yes, I take it so; the larger quantity would cease.

22,573-4. What do you consider the English lead corrodors would have as a market if lead were prohibited for painting in this country?—There would be the export of white lead, which is given as 20,000 tons, and of course there are other purposes for which lead is used—roughly, 3,000 tons.

22,575. 23,000 tons in all?—Yes.

22,576. Now how do you arrive at the quantity of 2,884 tons which you say is used for other purposes than house painting?—I circularised the manufacturers.

22,577. What did you ask them?—I asked them how much white lead they had delivered during the year 1910 for purposes other than painting. It is of course all done by the manufacturers. It goes direct to the potteries.

22,578. It is an *ex parte* statement, is it not?—I have told the Committee just how I obtained it.

22,579. Have you any means of having it verified?—I am afraid not. So far as the potteries are concerned the only method of verifying it would be to get into communication with the principal pottery firms.

22,580-1. (Mr. Sutherland.) Could you furnish the Committee with the names of these firms who have replied?—That is quite simple. The names of the manufacturers of white lead I could give. There are not many of them.

22,582. How do the Board of Trade get their figures from the corrodors?—The general figures given in the blue book are the Customs' figures.

22,583. If white lead were prohibited in this country for painting purposes, it would throw that 14,000 tons which are imported on to the open market; and it would curtail the production of white lead at least 50 per cent. That would mean that prices would be very low, and the foreign white lead that had come into this country would go to compete with our producers in the open market; so that the 20,000 tons that we export now would not be a sure market for us, would it?—There is no doubt, of course, that for a certain period the foreign manufacturers who, at the present day, send white lead into this country would compete and cut the prices for the British colonies, and so on.

22,584. That would reduce, would it not, the market of the white lead corrodors?—I think that it depends very much on the period of time which is given for the putting into force of a prohibition order. Obviously at first prices might be anything.

22,585. My point is this: that you destroy the market for the foreign importers who send in here, and that quantity of stuff would be thrown on to the open market. Even if you maintain your foreign figures you cut out 30,000 tons, which is three-fifths of your own production, and it would destroy a very large amount of the lead-corroding industry, would it not?—My whole point is that a very large reduction would destroy the industry in this country entirely.

22,586. And you would have the surplus stuff that does not come in here thrown against you in foreign markets?—That is probable.

22,587. So that you cannot assume that we should export 20,000 tons if white lead were prohibited?—No. We should have, of course, the foreign competition in the British colonies, which at present, I believe, the foreigners do not touch at all.

22,588. (Chairman.) Which country would compete with England in such a case?—The countries from which the 14,000 tons come.

22,589. Which countries are those?—Principally Germany, the U.S.A., Belgium, and Holland. I do not think that any comes from France—very little in any case.

22,590. On what authority do you suggest that these countries would compete with us in our export trade?—Not on any authority at all. I simply say that it stands to reason that as manufacturers they would find some outlet for their product.

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Mr. HEDLEY MILLER.

[Continued.]

22,591. Is it your opinion only?—I should say it is obvious.

22,592. If it is so obvious you must have some reason for it?—My reason is that the manufacturer has to find some market for the goods that he is putting out. Doubtless in time he would curtail his production, but he could not do that at first.

22,593. But you do not quite answer my point. You say that if lead were prohibited in this country the export trade of this country would be in jeopardy because the production of lead in this country would be over 50 per cent. less. That was Mr. Sutherland's statement and you acquiesced?—I acquiesced to this extent—that the foreigners who have their selling agents in London now would endeavour to get in on the trade in the British possessions.

22,594. They try to get in now, do they not?—No, they do not touch them now.

22,595. Why do they not try now?—I could not say.

22,596. But on what authority do you say that the export trade would be in jeopardy, and why should these countries compete with us if lead is prohibited when they do not compete with us now?—I did not say that the export trade would be in jeopardy. I said that the export trade would be affected to a greater or less extent (to what extent we cannot say) by the fact that the foreign manufacturers who now send lead into this country would in their search for a market to get rid of their over-production probably compete and cut prices for the British Colonies.

22,597. It is a pure hypothesis?—Certainly.

22,598. (Mr. Sutherland.) It is a very natural conclusion?—I think it is the only conclusion.

22,599. (Mr. Mason.) If you have 14,000 tons which cannot be imported into England, it is fair to assume that it will cut into the 20,000 tons?—They have their business organisation in London. If it had been possible to get part of the Belgian and German market it would have been done, but it is not done, and it cannot be done because of the tariffs.

22,600. (Dr. Collis.) They would get our Colonial Market if they possibly could, but they would not be able to interfere with the 20,000 tons that we at present export. You cannot have it both ways?—It is the same thing.

22,601. No, excuse me. If we had a large surplus of manufacture which is not used up at home we should be able to hold the market more easily. There will be a greater surplus of our material also to throw on the market?—We have free trade and they have tariffs.

22,602. (Lord Henry Bentinck.) I suppose that it would be quite possible to compete very successfully in the Colonial Market against any possible increase of foreign competition. You could capture the whole Colonial Market if you wished by cutting the price at which you sell?—By cutting down below the actual cost of production, which would be done at first in order to get rid of the stuff at any price.

22,603. There might be slightly increased competition with Germany, but you could eventually capture the market?—Apart from the effect of prohibition and over-production on the part of foreigners there would not be any fear for the Colonial Market.

22,604. You could dump white lead on the Colonial Market with anybody?—Yes. There is the danger that once they have got their foot in the Colonies one never knows how long they will keep it there.

22,605. (Mr. Sutherland.) Germany is a big white lead producing country, is it not?—Yes.

22,606. (Chairman.) You stated that the white lead corrodors deliver 2,884 tons of dry white lead for purposes other than painting?—Yes.

22,607. Have you satisfied yourself that this includes all the white lead delivered direct by manufacturers to pottery, linoleum, and wall paper manufacturers and to others?—No. I cannot express an opinion on the figures one way or the other. I have already said that I put the question to the manufacturers in those words: "for purposes other than painting," and that is their reply. I give the figures for what, under the circumstances, they are worth.

22,608. You cannot suggest any plan by which we can have them verified?—No, except so far as the Potteries are concerned. I imagine that it would not be a very difficult matter to ascertain from some of the larger pottery manufacturers what quantity of lead they use as compared with their output of pottery, so to speak, and make a calculation upon that.

22,609. Would it be possible to estimate the amount used for plumbers' work—jointing of gas and hot-water pipes, and the like?—No, I have tried to do that, but there is no method of doing it. I have a note here to mention jointing.

22,610. Would not a great deal of that be supplied through the same firms who supply white lead for paint purposes?—It would, certainly. White lead is not used pure for jointing. It is used with barytes.

22,611. Might not that affect the accuracy of the figures that you received from painters?—It would to a certain extent.

22,612. So that the figures you have given us cannot be considered as reliable?—The quantity that is used for jointing can only be included in the painting figures. It would be only a small proportion.

22,613. What do you mean by a small proportion?—It is impossible to say, I have put the question to several ordinary builders. They say that quite an insignificant amount is used. It is not used pure for pipe jointing. They use barytes with the white lead. I am not talking of carriage manufacture. I do not know anything about that.

22,614. I feel an element of doubt about your evidence. You say that it is a very small amount that these people may use, and when I ask you what that small amount is you say that it is impossible to say. It might be a large amount?—No, it cannot be a large amount.

22,615. What proportion do you think it would be of the amount that is used by painters?—I am not in a position to say.

22,616. But you have been in a position to give your figures with great deliberation?—Yes, but the only person who could give an opinion on the relative amount of white lead used for jointing as compared with that used for painting is someone who is actually in the business. I said that it cannot be very large because I think it is clear to everybody that it cannot be very large.

22,617. You asked 125 paint grinders to state the amounts supplied by them for purposes other than painting, did you not?—Yes.

22,618. Of these, 117 replied stating amounts which totalled up to less than 11 tons?—Yes.

22,619. From this do you deduce that the total amount supplied for purposes other than painting does not exceed in round figures some 3,000 tons?—Yes, with the exception of the jointing which is not included.

22,620. (Mr. Sutherland.) There is not much dry lead used by painters, is there?—It is a very small quantity; I can say practically none at all dry.

22,621. Do not plumbers use, for jointing, paste white lead and mix dry red lead with it?—It is a mixture of white lead and barytes ground.

22,622. For jointing?—Yes.

22,623. Do they not use stiff paste for that purpose?—Yes, it is in that form.

22,624. They would not use dry white lead, would they?—No, I do not think so. A builder, generally speaking, does not get dry white lead at all; it is no good to him dry.

22,625. So what he uses for jointing purposes would not add to these figures at all?—It would add to a certain extent—not very much.

22,626. But they do not use it dry, which is what you were asked. The plumber does not buy his lead dry and mix it or grind it himself?—No.

22,627. He buys it in the paste?—Yes. In the ordinary way the plumber who is employed by the builder simply goes and takes a little white lead out of the same cask that the painters use.

The witness withdrew.

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Sir HENRY TANNER, C.B., I.S.O.

[Continued.]

Sir HENRY TANNER, C.B., I.S.O., examined.

22,628. (*Chairman.*) You are the principal architect in His Majesty's Office of Works?—Yes, for England and Wales.

22,629. And for the Diplomatic and Consular Services?—Yes. I have nothing to do with Scotland. We have another architect for Scotland.

22,630. I understand that you are not a practical painter?—No; I am an architect.

22,631. But you have had upwards of forty years' experience, I understand?—Yes. I have been in the office 42 years.

22,632. Do I understand that you approached the subject of leadless paint from a humanitarian standpoint?—The Home Office wrote to us in 1901 with reference to the subject of the use of white lead, and then I began to make experiments. I thought it was very desirable that we should get rid of the poisonous paints, and, as well as that, zinc white kept its colour, and that seemed to me to be rather an advantage.

22,633. With that object in view you instructed certain of your subordinates to make experiments?—Yes. I began about that time some tentative experiments. We tried them at the Post Office in the main. Then in 1904 I carried them on rather more systematically. We tried a great number of paints—I cannot tell you how many, probably about fifty I should think—on the roof of the new Patent Office Library which had been finished a little while before. It was a cast-iron roof. It had a series of panels which enabled us to do this quite well.

22,634. I understand that your experiments were pursued for several years before you requested Mr. Patterson to take the matter up?—Yes. I began very soon after we had this letter in 1901. He began, I should say, about 1905.

22,635. Since you asked Mr. Patterson to take the matter up the experiments have been more thorough and systematic?—Yes.

22,636. Now, we have been informed that after the principal experiments at the Savings Bank buildings in West Kensington had been in progress for one year, a general instruction was issued to specify zinc paints?—That is so. We gave the instruction in 1907, and here it is if you would like to have it. I am not sure whether this is the last print of it; it may be (*producing the instruction*).\* That was in June of 1907. I think that that was the final print at that time. You will see that there are some alterations made on it, but I think they belong to a later period.

22,637. Were you fully satisfied that the disuse of lead was justifiable after the experiment at the Savings Bank buildings had been in progress for only a short time?—Yes, because the Savings Bank experience was only at the end of a considerable experience before. We began, as I said just now, in 1901, and we were continuing the experiment up to the time of the Savings Bank experience, so that it had really been going on for nearly six years.

22,638. Did you also go and look at the paint work at the Savings Bank buildings yourself?—Yes, I always did that.

22,639. Did you give the instruction to use zinc paints on your own judgment alone?—My own judgment and the judgment of Mr. Patterson mainly, who has been carrying out these later experiments for me. He made the experiments and reported to me, and upon that I formed my own opinion.

22,640. Did you get the Government analyst to assist?—Yes. We had every paint that we used or tried analysed.

22,641. Have you taken steps to ascertain whether your instruction has been complied with?—I have no doubt that it has in the main, and as time has gone on we have been more strict.

22,642. Do you mean that, as there is no law prohibiting the use of lead, the general instruction of the Office of Works is in a sense tentative, and not absolute?—I do not think that it has anything to do

with the law. It is simply a question of carrying out my instructions or not carrying them out. Everybody is supposed, when I issue an instruction, to carry it out, and I think that this has been generally done.

22,643. I understand that all the paint work in the country is under your jurisdiction?—Yes, and all carried out on the instructions which I issue and on the schedules which are formed for the purpose.

22,644. (*Mr. Sutherland.*) That is in England and Wales and Ireland?—No, not Ireland; we have nothing to do with Ireland. They have their own Board of Works. It is England and Wales.

22,645. (*Chairman.*) And you know also that there are only a very few recalcitrants amongst your clerks of works?—I do not think I can say that any of them are recalcitrant. Lead paint may have been used occasionally by inadvertence or prejudice at the beginning, but I do not think that it is at all likely now.

22,646. But take the last point—prejudice—would not that be insubordination?—Yes.

22,647. What penalties are there for that?—Not a very serious penalty, but we reprimand them of course if we find them out, and as a rule we do find them out. They have not the opportunity for using other paints much.

22,648. Are you convinced now that you are right in prohibiting the use of lead?—I think so. We are getting on very well indeed with zinc white. It answers our purpose perfectly.

22,649. Will you, in the near future, issue a much more stringent order forbidding the use of lead?—We have done that already, except in the case of priming on iron or steel. We are not quite satisfied about having a good leadless paint for that yet.

22,650. Have you any system by which you can enforce the order of prohibition?—I do not quite follow. We expect that everybody will carry out our orders.

22,651. Are you able to apply a direct check in Provincial districts?—Yes. In the same way we have our printed specifications and we have our schedules which tell them what to do.

22,652. Is it not more difficult in isolated cases, where your architect or clerk of works cannot always be on the spot?—Of course we have some difficulty there sometimes in getting the builders to carry out their contracts properly, but that would apply to any circumstances.

22,653. Can you give us any particulars of details of the painting of various buildings, and the kind of paint actually used in districts other than Mr. Patterson's district?—The same regulations apply to all districts. That printed circular which I have given you, supplemented by others from time to time, is sent to everybody who has authority.

22,654. (*Sir Godfrey Baring.*) It governs all work under your control?—Yes.

22,655. (*Chairman.*) Can you supply a statement as to the conditions of those paints, where they have been examined after some years of exposure?—No, I cannot do that, I think; we have not got anything very complete in that respect.

22,656. Why is no such record kept?—Because we did not want it for our own purposes.

22,657. Any complaints regarding the unsatisfactory durability of paints would come to you as the principal architect in the ordinary course, would they not?—They would if any complaints were made by the clerks of works as to the badness of paint or anything of the sort that was supplied. They would generally report.

22,658. Are those complaints collected in your office and carefully sifted?—They are sifted at the time, but they are not collected in the sense that they are available.

22,659. Can you tell us what complaints have come to your notice since the adoption of leadless paints?—Clerks of works have complained at times that the

\* See Appendix XXII.

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Sir HENRY TANNER, C.B., I.S.O.

[Continued.]

paint is thin, or that it will not cover, or will not dry, or something of the sort. We have inquired into that, and we generally find that there is some good reason for it, either that it has been tampered with, or it has been put on in wet weather, or something of the sort.

22,660. Have these complaints been more numerous and more serious than they were before lead was generally abandoned?—I think that they have been more numerous since we have had white zinc than they were in the time of lead. We used not to get many complaints then because they were using a material which they thoroughly understood. I think that alters the case rather. And of course there is the prejudice which the ordinary man has against leadless paint. He did not think it was so good as the other, and he did not know how to deal with it. As a matter of fact it wants dealing with in a special manner. But they are getting more used to it now, and we do not get very much trouble.

22,661. Would you say that the complaints are now becoming less and less?—Certainly.

22,662. Are you prepared from your own experience to endorse Mr. Patterson's statement that paints compounded to the Office of Works formula are applicable to all kinds of outside house painting?—Yes, I am quite willing to endorse whatever he said to you in that matter. So far as my experience goes I think he was perfectly right.

22,663. Can you name any respect in which it would be harmful to prohibit the use of lead, or rather to restrict its use to not more than 5 per cent., subject to certain exceptions, such as greens, if found necessary?—I think that is quite correct. From my experience I consider that lead is not required except for the first coat on iron or steel. We hope to get rid of it even for that. We are using orange lead now for the first coat on iron or steel.

22,664. (Mr. Sutherland.) That is a lead?—It is a lead. I said so before, but it is only for the first coat on iron or steel.

22,665. (Sir Godfrey Baring.) Was the Savings Bank the most important experiment you tried with leadless paint?—We had a very large building there, divided up into numerous parts. That is why it was taken, and also because Mr. Patterson was clerk of the works there at that time.

22,666. That was the most extensive experiment?—Yes. That was in 1906.

22,667. Have you had any markedly unsatisfactory results with zinc paint; that is to say, failure as compared with the use of white lead paints?—No, I do not think I have. At the earlier period, when it was not so well understood, we did not always get so satisfactory a job as we should like, or as we get now.

22,668. Speaking generally, you think that the prejudice against zinc paint is abating?—I think so, so far as my knowledge goes at any rate.

22,669. (Mr. Sutherland.) When Mr. Patterson was before the Committee in March 1911, he submitted an estimate of the value of the painting operations carried on by the Office of Works at Question 1048: "Paints" 5,000l. per annum; labour 17,000l. to 18,000l. per annum, a total of 23,000l." Is that approximately the value of the painting work done by the Office of Works?—I could not tell you. I am not in a position to answer that question offhand. I should think that if Mr. Patterson said it, he had very good grounds for saying it, and had got the information from the office.

22,670. 23,000l.?—It is rather under the mark if anything.

22,671. As far as I can estimate there are something like 200,000 painters in the United Kingdom. At an average wage of 1l. a week, which is a fair average I should think, the labour bill of these will amount to 10,000,000l. per annum. Estimating from one's own experience that labour invariably works out at a little more than half the cost of the whole work, which would make the turnover with profit something like 20,000,000l. sterling, would you say that the experience of the Office of Works with a turnover of roughly one seven-hundredth of this amount is an adequate basis for this Committee to make a change

upon of such an enormous character?—I could not tell you. I could not answer on those figures.

22,672. No, but a great deal is being built on the experience of the Office of Works, and I wish to show that it is a very small item compared with the experience of the whole of the painting trade throughout the country?—It is comparatively small, certainly, taking the whole quantity, but it is hopeless to try to enter into the figures at all.

22,673. In view of the assertion you have just made that it is small, would you say that it is sufficient or adequate for this Committee to found upon it such a change as is involved in the abolition of white lead?—I do not think I am qualified to express an opinion on that matter at all.

22,674. But we are attaching great importance to your evidence?—We tell you the facts as far as we can. We cannot go beyond the facts.

22,675. (Lord Henry Bentinck.) Is it not the fact that you are the only person who has really conducted any experiments on a large scale in this country with leadless paints?—I cannot answer that question because I do not know what other people are doing, but I should think that the paint manufacturers with whom we have been dealing have been carrying on experiments to an equal extent.

22,676. (Mr. Sutherland.) Are you aware that there are nearly 200 different colours and shades of colour into which lead enters as a base? Would there not be great interference in the production of these various colours if Parliament prohibited white lead?—There are the greens. It cuts into them.

22,677. And the reds and chromes, all based on lead, and yellows of course?—That is why we suggest that there should be a small allowance of lead.

22,678. Is the abolition of white lead by the Office of Works an accomplished fact?—Practically.

22,679. Last year we were able to show that 5 tons of white lead had been used in London?—Mr. Patterson has already explained that. We got the information at the time.

22,680. I want to know how it came about that that 5 tons of white lead were used in St. James's Palace, Buckingham Palace and offices under your jurisdiction?—That was all explained by Mr. Patterson.

22,681. No?—He has the information.

22,682. Do you not know why it was used; at the time Mr. Patterson said you had abandoned the use of white lead?—It was used for stopping and matters of that kind.

22,683. You could not use 5 tons for stopping?—It was distributed over a great many districts, but you will get all that information from Mr. Patterson. I gave it to him for him to bring forward.

22,684. Then the same thing would apply to how it came about that the Menai Bridge was painted entirely with white lead?—I had nothing to do with the Menai Bridge; it is under the engineer.

22,685. Is it not under the Office of Works?—It is under the Office of Works, but I should have said that certain engineering works were carried out under the engineer.

22,686. Then that proves that your jurisdiction is not complete?—Lead will be stopped in the future. Directly I heard of it I saw the engineer and arranged that it should not be done again.

22,687. As a member of the Royal Institution of British Architects, you are familiar with the present practice of the profession to specify for their painting work genuine white lead, pure linseed oil, and best American turpentine. This is a general formula, is it not?—It may be so, but I do not know what private architects specify.

22,688. It is the regular formula?—He might use zinc white or something else.

22,689. At his discretion, but that is virtually the formula of the profession?—I do not think that that is anything to go by.

22,690. In specifying these, they do so because of their satisfactory experience of the paints produced by these ingredients. They are general, accessible in the open market, impersonal, and can be depended upon to make good paint. If white lead were prohibited, what



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could the architects specify in the light of our present experience?—I think they would specify paint with a zinc basis.

22,691. Whose paint?—That is a matter for the architect. There are plenty of paints which he can choose from.

22,692. The experience of the Office of Works has been almost exclusively with what is known as proprietary paints?—We prefer to get a paint manufacturer to supply mixed paint rather than the ordinary painter should mix his own. We find that that course is very unsatisfactory.

22,693. That is quite proper for you as a Department, but it is not for us as a Committee to recommend any particular paint. Do you think that this Committee could advise the Government to abolish white lead on the basis of your experience of proprietary paints?—I think you might, because there will be more manufacturers than ever of leadless paints. They will be more extensively manufactured.

22,694. You would not call the experiments made by the Office of Works scientific experiments?—I think they have been reasonably so of late.

22,695. The Committee have been informed that the Office of Works have never taken the bare material, white lead, zinc oxide, and lithopone, and mixed them themselves and made comparative tests of their value?—We did at first and more of late; but principally it has been done by the manufacturers.

22,696. The Committee were informed that anybody could send in a paint, and that it was applied, and its record noted?—That was so and analysed.

22,697. But that is not a scientific way of demonstrating the value of other materials against a base pigment like white lead?—We were quite satisfied with the result.

22,698. You as a Department are quite justified in doing that, but it is not a basis sufficient for this Committee to work upon?—I must leave that for the Committee.

22,699. You cannot speak of the toxic effects of your leadless paints, because I understand that the contractor takes on the burden of that (that was Mr. Patterson's statement), so that your experience does not help the Committee as to the effect on the health of the workmen, does it?—No, I cannot say that we know very much about that.

22,700. You keep no records?—No.

22,701. The question is of importance, because eminent chemists and medical men have submitted to this Committee that the emanations from so-called non-poisonous paints (non-lead paints) are poisonous—not lead-poisonous but poisonous. Does not this further complicate the question?—Certainly, I am not in a position to answer medical questions which I cannot deal with.

22,702. But it does not relieve the use of paint from the peril attaching to it?—We have no experience of anything of the kind.

22,703. You have no record?—We have no record.

22,704. You cannot say either way?—We should hear of it if it were so.

(*Mr. Sutherland.*) The Chairman did not accept such an answer from other witnesses.

(*Chairman.*) That is so. Sir Henry would not hear of all the cases probably.

22,705. (*Mr. Sutherland.*) (*To the witness.*) Do you know that this Committee, as a Committee, has never seen a single piece of work executed by the Office of Works or their contractors with these proprietary paints, nor any of the test panels painted with them, and they are relying entirely on the word of Mr. Patterson? Would you think these conclusions, which are in opposition to the embodied experience of every master painter who has been before us, sufficient to base so large a change upon, as to discard a metal which has no equal as a paint base?—So far as the examination of our work is concerned, if the Chairman desires it, we will afford any facility for the Committee to see it.

22,706. But up to now the Committee have not seen a single inch of painted surface?—Well, I am not to blame for that.

22,707. No, of course not, but that is the case. Are we to understand that you do not take exception to white lead as a paint base, but only from its effects on the health of the workmen?—I think myself that the other is rather nicer paint. It keeps its colour, which white lead never does. That is one reason.

22,708. Is it on the ground of health, or on the ground of the superiority of the paint?—And also the health of the men. That was our starting point really.

22,709. Do you know that the use of zinc oxide involves the use of considerably more oil and driers, and that these, with turpentine, are the noxious ingredients of paint, apart from lead dust? Can you suggest any way by which their use could be avoided?—No, I do not think that I can go into questions of that kind. I have said so before. I can only tell you what our experience has been so far.

22,710. You have no jurisdiction over Scotland?—No; not direct, but I think that our arrangements are carried out there just the same. Whatever I settle in London I think is adopted in Scotland, but I would not like to answer that definitely.

22,711. Substantially, there is no lead poisoning in Scotland outside the Glasgow area?—That I do not know.

22,712. You still think it necessary to use red and white lead for priming for steel and iron?—Yes, red lead for the present.

22,713. You have got no table of records of your experiments?—No, I have not them. Mr. Patterson will be able to answer anything of that kind.

22,714. I think you said that complaints were more frequent since you abandoned the use of lead?—Yes, for the reasons that I gave. We are getting over that difficulty. We get very few complaints now.

22,715. You also said that zinc paints require understanding?—They require different treatment from white lead. Workmen understand white lead, or did understand white lead, better than zinc white, but now you may put it the other way, or they understand one quite as well as the other, I think, in the majority of cases of those who work for us.

22,716. But they are a small number?—I quite agree, they are a small number, but what can be done in one case can be done in another.

22,717. Do you think that zinc paint can be applied to all the decorative painting that white lead can?—I should say that for decorative purposes it is better.

22,718. In what way?—Because it keeps its colour.

22,719. That is only one element?—But that is a very important element.

22,720. It makes very much cruder colours?—In decorating, white now takes a very large place.

22,721. Colours from lead give a very much softer effect?—I cannot very well enter into that. I do not do much decorative painting. Our colours are very ordinary.

22,722. You know Mr. Grace?—I know Mr. Grace. (*Mr. Sutherland.*) He was very positive on that point.

22,723. (*Mr. Fell.*) (*To the witness.*) Supposing that lead were prohibited, would it not be necessary to issue regulations to deal with lead painted surfaces that are already treated with lead?—I do not think so. I do not think that they would make any difference.

22,724. There would be an enormous amount of lead in lead painted surfaces that would have to be dealt with for some years in rubbing down and that sort of thing?—Yes, but we cannot help having to rub down lead which already exists in paint.

22,725. But would you not have to have regulations for it?—I should not think so. That would very soon disappear. Wherever you change from lead to zinc you have to prepare the surface.

22,726. But would there not be a big danger whilst that was disappearing, unless regulations were issued?—No, I think not, and I do not quite see what regulations you could issue.

22,727. As to the prohibition of dry rubbing down and that sort of thing?—If anything could be suggested for that, we should no doubt be glad to adopt it, but that is mainly in what you might call decorative

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work. You do not do very much rubbing down in ordinary outside painting, for instance.

22,728. No, it is more for interiors?—And in coach painting and things of that kind.

22,729. (Mr. Mason.) I understood you to say that your instructions, which were issued in 1907, were carried out in the main. If you were so confident of the success of your experiments, why did you not see that your people carried out the letter of the instructions?—We do as far as we are able, but, as I said before, at the beginning we had to deal with some little prejudice, and I do not think that that exists now. I think that everything is done according to our instructions.

22,730. Now with regard to complaints of the paint, I understood you to say that the Clerk of the Works would report to you at the time with regard to paint which had something the matter with it?—Yes.

22,731. But after the Clerk of Works had left, and the paint had been applied, say, for a year, would you get complaints of the paint not lasting?—That was not the effect of the question as I understood it. It was complaints by the Clerk of Works while the painting was being done as to the paint received to do the work with. He would state that the paint did not cover and that kind of thing.

22,732. I am extending the question. To whom would the complaints of the paint not lasting go?—We have not had any complaints of the paint not lasting.

22,733. Would they come to you?—Yes, as a rule. I wanted complaints to gather what information I could.

22,734. Several witnesses have told us of the value of graphite as paint for ironwork. Have you had experience of that?—No, I do not think that we have used much graphite. We have tested it on a very small scale, but not much. I think that we did it quite early in the period. It must have been in 1902 or

1903 that we tried graphite. Whether we have tried it since, I could not say.

22,735. Then you cannot confirm or refute the evidence of the witnesses on these special paints?—We did try graphite and Dixon's Crucible Co.'s graphite. That must have been quite early.

22,736. The result of those experiments was not good enough to warrant your going on?—No. We did not feel quite pleased with them. I do not say that they have not been improved or something of the sort now.

22,737. In your specifications you admit 5 per cent. of lead. Is this done to allow of cheaper zinc being used; or do you consider that it improves the lasting qualities of the paint?—There is a little lead in the zinc. You cannot get zinc quite pure, I think. If we have greens we are obliged to allow some lead at present. We have now found a colour which has little or no lead in it.

22,738. I understood from a witness who was speaking of the paint used on the labour exchanges, which are under your jurisdiction and are painted in two shades of green, to say that those paints were not leadless?—I could not be quite sure about that. I do not know what firm they were got from.

22,739. I could not tell you, but he led us to believe that it meant a very large amount of paint?—I can only make some inquiry about that.

22,740. (Mr. Rice.) I understand you to say that the Chief Engineer will in future use leadless paint in the painting of bridges and other constructional work?—Yes.

22,741. May I ask if that is owing to conviction of the efficacy and suitability of leadless paint, or is it under instruction?—It is because I represented to him that he should do it.

22,742. He has really made no experiments himself?—No, I do not think so. I think that the Menai Bridge is about the principal thing that he has got to paint.

The witness withdrew.

Mr. G. D. PATTERSON recalled and further examined.

22,743. (Chairman.) You have been asked to attend to-day in order to fill in details regarding the previous evidence which you have given on behalf of the Office of Works?—Yes.

22,744. You state that leadless paints were first tried by the Office of Works about 1902?—Yes.

22,745. Where were the leadless paints tried and what were the results?—Here is a table showing the experiments (*handing in a table* \*).

22,746. The next experiments were carried out on the Patent Office roof, were they not?—Yes.

22,747. What was the area of the surface painted with each paint on the Patent Office roof?—About a square yard of each.

22,748. Was a lead undercoating used in each case?—I could not say definitely, but I think that these early experiments were probably on either lead or oxide of iron undercoatings.

22,749. Was that before you had charge of the experiments?—Yes. I had nothing to do with the application of the paints.

22,750. Then you cannot tell us of your own knowledge what results were obtained?—My previous evidence shows that I was one of three who finally judged of their condition.

22,751. Then you have records showing which paints proved most satisfactory in the experiments on the Patent Office roof?—Yes.

22,752. Can you tell which paint was found the most satisfactory?—Nos. 3a, 16, and 204A, on the table which I hand in †.

22,753. Can you tell us who judged the paints and determined their relative merits?—Messrs. Carpenter,

Jones, and Patterson—all three Office of Works Clerks of Works.

22,754. Were all the paints used in those experiments analysed?—Yes.

22,755. Was there any lead in the paints which you have stated were found to be the most satisfactory?—There was 32.9 in No. 3 (green), 6.2 in No. 16 (brown), and 2.81 in No. 204 (brown).

22,756. What is your own opinion of the value of the experiments which were carried out before you were concerned with them?—They were very carefully conducted, and the paints used were all analysed, and the results seem to me to show that pigments as diverse as lead, iron oxide and even silica may make good paints for iron, provided the physical conditions and the medium be right.

22,757. How do you know that the experiments made before your time were very carefully conducted?—From what I heard and saw at the Patent Office, when examining the paint results, I should consider they were.

22,758. Now, when did your own experiments begin?—I was instructed in 1905 to take the matter up. As I mentioned in my previous evidence, I was not very hopeful at first, because a small experiment made about 1903 had not been happy. We very soon found that there were good zinc paints to be had.

22,759. Who instructed you to continue experimenting with leadless paints?—Sir Henry Tanner.

22,760. When did you begin to keep records of your experiments?—About 1906.

22,761. Have you records of any experiments made by you before 1906?—No, I have not, excepting such as I have obtained from official papers.

22,762. Can you give me their general purport?—Their general purport was that I satisfied myself that we could get satisfactory zinc paints, and that we

\* See Appendix XXIII.

† See Appendix XXIV.

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should be justified in carrying out further experiments on a large scale.

22,763. Will you please tell us how you satisfied yourself that you could obtain satisfactory zinc paints?—By getting samples from various makers, and by mixing some myself, and trying them on boards and walls.

22,764. Was the zinc paint as good in every respect as the lead paints previously used?—In some cases they were not so satisfactory at that time, but we set ourselves to correct the defects.

22,765. That time being which year?—1905 and 1906 I am speaking of.

22,766. Will you detail the characteristics in which you found the zinc as satisfactory as the lead?—Opacity, appearance, permanence of colour, and fastness.

22,767. Now when was the experiment on a large scale put in hand?—As previously stated, in June 1906, when five blocks of the Post Office Savings Bank Building, West Kensington, were painted externally with five different ivory white paints, one a white lead paint, the other four, zinc oxide paints.

22,768. Was not the Savings Bank Building painted internally at the same time?—Only partially.

22,769. With the same paint?—With one of the zinc paints.

22,770. Were the zinc paints applied over a lead undercoating internally?—Not internally in all cases. They were externally. In regard to wood that was previously painted internally it was so, but we painted some walls and ceilings which had not been painted before.

22,771. You painted them with zinc paint?—We painted them with zinc paint, and in that case there was no lead undercoating.

22,772. Was lead undercoating used with zinc paint for zinc painting externally at the Post Office Savings Bank Building?—I have already said I think that all external work had been previously painted with lead in 1902. They were repainted in 1906, and you have evidence to show what was done.

22,773. What was the nature of the surfaces painted?—All wood and iron externally, and some of the ceilings, and I think certain of the rooms having plastered walls also on the fourth floor internally.

22,774. Now I want you to tell us in what directions these blocks face?—The boiler house, front, and back blocks run east and west, and the cross blocks north and south.

22,775. Can you tell us whether all the paints, both lead and zinc, were equally well situated for the purpose of a really genuine comparative test?—I think so.

22,776. Are you quite sure of that?—Yes. I wish that you were there to see them.

22,777. (Mr. Sutherland.) Did they all come under the same conditions of sun and the same conditions of rain? Are they exactly four square?—They are all four square, and within a point of the compass. Every part of those blocks on one side or the other gets the sun. The direction of driving rain is mainly from west and south-west.

22,778. Which part did you paint with lead?—The west cross block.

22,779. (Sir Godfrey Baring.) That is where the rain would come?—It would come obviously from the west; the other cross block was in zinc, and whatever the west cross block gets that block would get also.

22,780. (Chairman.) Did you specify a certain formula for the zinc paints?—We had learnt sufficient in the early experiments to be able to specify approximately the composition of the paint to be supplied.

22,781. Do you put in a table showing the composition of each of the five paints used in this big experiment?—Yes. (The table was handed in.)\*

22,782. Do you also indicate the condition in which the paint was found four years later?—Yes. The result of the examination of the paint in 1910 is shown

in the last column of the table which I have just handed in.

22,783. The condition of the different paints is described as "good" and "very good." By whom was the condition of the paint judged?—By myself in the first instance, checked and confirmed by Sir Henry Tanner.

22,784. Will you please explain fully what characteristics you considered it necessary to find before you marked a paint "good"?—I should say gloss fair, surface good, quite fast, and the colour changed.

22,785. What characteristics correspond to the term "very good"?—Gloss good, surface good, fast, and colour maintained.

22,786. Was the composition of the paint as given by you in that table confirmed by analysis?—That table is the result of the analysis.

22,787. How long is Office of Works' paint expected to stand in good condition externally?—Four years.

22,788. Were you so well satisfied with the results obtained with zinc paints in the experiment referred to that you have continued to specify the same formula from 1910 onwards?—We have improved somewhat on that formula.

22,789. Will you tell us in what direction?—We are now specifying that paints shall contain about 58 per cent. of zinc oxide, as compared with 50 and 56 per cent. respectively in the two best paints used in 1906. We lay stress also on the quality of the materials to be used in our paints, and we have decided to allow not more than 5 per cent. of lead in zinc paints, whereas none of the paints used in 1906 contained more than a trace.

22,790. Why have you decided to allow 5 per cent. of lead in zinc paints in the future?—As stated in my previous evidence, we consider that this amount is desirable from the point of view of stability as well as cheapness, and 10 per cent. in some other instances.

22,791. Have you since 1906 continued to use zinc paints exclusively?—Yes, with the exception of priming on wood and iron, which I deal with later in my proof.

22,792. Have you prepared a list of buildings in your own district showing the date of painting and the kind of paint used since 1907?—Yes, here is the list.\*

22,793. Can you augment this list in any way?—I was asked first of all to furnish a list in which I could say that all these paints had been used, and the dates. I am speaking from my personal knowledge. I have furnished you such a list. If you ask me have these paints been used more extensively, I say, as I am instructed, that these paints must have been used for every Crown building in London by this date.

22,794. What do you mean by "as I am instructed"?—What I mean is this: If you ask me whether a certain building is painted with so-and-so, if I know it personally I will say yes. If you ask me how I know it, I say because I visited the building during the time it was being painted. I gave the order for it, saw it in operation, saw the cans out of which the paints were being used, and so on, and therefore I speak from personal knowledge. If you ask me whether a certain other Crown building in London out of my district is painted with a particular paint, I can then only draw upon my official instructions. They are that these same paints should be used in these districts.

22,795. Now can you tell us whether any of the large public buildings, say, for instance, the Law Courts, Buckingham Palace, and the great public departments, have been painted since 1906 with zinc paints?—Of my own personal knowledge no, but, according to office instructions, yes, they have all been.

22,796. Under whose jurisdiction would the painting have been carried out in these buildings about which you have just spoken?—The previous answer was the Clerks of Works under whom they were.

\* See Appendix XXV.

\* See Appendix XXVI.

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[Continued.]

22,797. Now is it possible to call those Clerks of Works to tell us from their own knowledge whether those buildings are painted with zinc paints only?—I cannot say. Sir Henry Tanner would have been able to answer that question.

22,798. Are there certain gentlemen, Clerks of Works, who would have that knowledge?—Yes.

22,799. Have you a record showing the condition of the paint of the Post Office Savings Bank Building and the condition of the paint of the buildings which have been painted under your own superintendence?—No, I have no record.

22,800. Why has no record been kept?—We have too much to do to allow of making any unnecessary records.

22,801. Were zinc paints adopted in all districts under the control of the Office of Works?—No. The first general instruction I am able to trace is dated April, 1907.

22,802. What is the nature of that instruction?—It is that for all ordinary purposes paints with zinc oxide base are to be used, being non-poisonous and more permanent in the lighter colours.

22,803. By whom was that document issued?—By Sir Henry Tanner.

22,804. Your personal jurisdiction applies only to paint work in the London district, I understand?—Up to last year in the west of London, and now at Kew.

22,805. What other districts are there under the control of the Office of Works?—There are several London, provincial and foreign districts.

22,806. What are the authorities in the various districts subordinate to Sir Henry Tanner?—The architects, surveyors, and Clerks of Works in each case.

22,807. What authority have the surveyors and Clerks of Works themselves?—To maintain Crown property as per Office of Works instructions.

22,808. You have stated that an order was issued in April 1907 instructing that for ordinary painting zinc paints should be specified?—Yes.

22,809. This order was issued after only one year of the important test at the Savings Bank Building?—Yes.

22,810. Although master house-painters may consider one year too short a test, the Office of Works considered the zinc paints so satisfactory that they were induced to issue a general order?—Yes, taken in conjunction with previous tests, the particulars of which I have handed in.

22,811. Was that an order binding on Clerks of Works throughout the country?—Yes.

22,812. Did the Clerks of Works in districts outside London put any obstacles in the way of the substitution of zinc paints for lead?—I know of none.

22,813. Have you had any official complaints from Clerks of Works stating that the buildings were suffering in consequence of the change from lead paints to zinc paints?—Not on account of the change from lead to zinc.

22,814. Have they, on the other hand, expressed any opinions to the effect that zinc paints are as good as lead?—I have heard of none, and I can only refer you in that connection to the first table put in of experiments, and the opinions.

22,815. I am speaking now of since the general order was issued for the exclusive use of zinc paints. Have any of the officials, Clerks of Works, &c., expressed any opinion to the effect that zinc paints were as good as lead?—I have not heard of that.

22,816. Are you prepared to answer questions regarding districts other than your own?—Only generally.

22,817. Part of your painting work is done by contract, is it not?—Most of it is done by regular triennial contract. A small part only, as at Buckingham Palace, is done by special decorating contractors.

22,818. Do the special contractors not use lead paints?—No. These special contractors have to conform to our rule, and use zinc paints.

22,819. That means, then, that no lead whatever is now being used for actual paint work?—None, except for primings, which I deal with later.

22,820. Do you have the paints used by outside contractors analysed?—Yes, in case of doubt, otherwise the contractors' statements are accepted.

22,821. Can you tell us anything regarding the disease of lead by the Engineering Branch of the Office of Works?—I cannot give much information on this point, as the Engineering Branch is quite distinct from the Architects' Department, but I understand that they now use leadless paints except for iron primings. It may be of interest to note that manganese is being used in that department in place of red and white lead for jointing hot-water pipes and the like, but, of course, that does not affect painting.

22,822. Now I will ask you a few questions about priming. Are you still using lead primings in the case of woodwork?—No.

22,823. What was the date when non-poisonous primings for wood were adopted?—Instructions were given in May, 1912. We cannot say lead ceased to be used on such and such a day. Stocks in hand would be used up, probably.

22,824. What details can you give regarding the use of leadless primers for wood?—Some of them have been found quite satisfactory. There have been no complaints. I produce a board showing woodwork primed with lead and leadless primers (*producing a board*). The lead priming is put from the centre to the left of the board marked *a, b, c*. The right half of the board, *d, e, f*, is painted with leadless primers—leadless, of course, implying always the 5 per cent. of which I spoke. Over these two primings a zinc undercoating is applied over compartments *b, c, d*, and *e*, followed by a zinc finishing over *c* and *d*, both covering the priming and the undercoating.

22,825. What deduction do you make from this?—I have brought it here so that the Committee might make their own deductions. My deductions are that the primings and the paints over them are standing very well.

22,826. When was it done?—The date is on it—12 months ago.

22,827. Has that been exposed to outside elements?—Yes, all the time.

22,828. You are quite satisfied. Your deductions are that both stand equally well?—Yes.

22,829. Now what experiments did you make before you adopted non-poisonous primings for woodwork?—I tried several mixings, and we adopted the most satisfactory.

22,830. What materials did you experiment with?—Zinc oxide, lithopone, silica, chalk, and asbestos.

22,831. Over what period did you conduct the test?—Some for over three years; the last set for over 12 months.

22,832. How did you determine whether the results were satisfactory or not?—By exposing coated boards to the weather.

22,833. What do you use for priming ironwork?—Up to the present we are still using lead oxides for this purpose.

22,834. Why is this?—We have not yet completed the experiments which we have undertaken with a view of finding a satisfactory substitute.

22,835. Does that mean that you are not prepared to advocate the total prohibition of lead for painting iron?—Personally, I am not yet prepared to advocate such a prohibition of lead for painting on iron at present. Trials with a great variety of paints on iron are now going on.

22,836. Then if a general prohibition of lead were contemplated, would you advocate an exemption permitting the use of lead paints for iron work until such time as evidence is forthcoming that they can be dispensed with?—Yes, I would.

22,837. What limit of time would you suggest should be given?—Until you are able to produce evidence either one way or the other.

22,838. Do you think that if a limit of time were given, it would bring those concerned up to the scratch and they would find a substitute?—It might, but that is supposing, and I am here rather to speak from experience than from supposition or hope.

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[Continued.]

22,839. Is it your opinion that there is a great difference between one pigment and another when used on iron?—Certainly, there is much difference in pigments, but probably more importance is to be attached to the pigment's physical condition and to the medium.

22,840. Can you show us an example of the sort of tests you are making with paints for use on iron?—Yes. That is probably of interest to the Committee (producing an iron plate). Several paints have been put on it. Some of them have clean gone. There are two remaining good.

22,841. (Lord Henry Bentinck.) They have been exposed to the open air?—I produce a sample of iron plate on which seven different paints were applied. You will see that nearly all of them have disappeared in the course of 2½ years' exposure to the south-west. Of the two which remain in fairly good condition, the best is a zinc oxide paint made with boiled linseed oil specially prepared. The value of this paint is probably due to the special preparation of the oil. The second best paint consists of an iron oxide pigment with a tung oil varnish medium.

22,842. Have you records of any tests on iron, on a larger scale?—Yes, in the Savings Bank roof tanks the result was that after nine months use working with a zinc or iron oxide paint, the iron oxide tung oil paint came out best. Graphite and red lead are linked as second best and the last and worst was aluminium paint.

22,843. In your previous evidence, you alluded to the continued use of lead in stoppings?—Very little lead is now used for this purpose.

22,844. What is used in its stead?—Putty for stoppings and the pastes of good washable distempers; also slate powder and japanner's gold size are good for fillers, and we advise their use on Office of Works' work.

22,845. Is any lead still used in stoppings?—When a specially hard stopping is needed, probably some clerks of works may have a little lead added to the putty.

22,846. Can the use of lead in stoppings and fillings be prohibited?—No lead need be used we think in fillings, but the usual 10 per cent. of lead in hard stoppings and jointing putty is useful.

22,847. Does all that you have said apply to stoppings and fillings for use on iron as well as on wood?—Yes, so far as our experience goes.

22,848. Now in your previous evidence you were asked questions as to the use of five tons of lead, which it was suggested you had used recently or which had been sent to the Office of Works. In connection with this question have you now obtained reports concerning the amount of lead used in London?—I have found that at the large London depôts 56½ cwt. of lead were accounted for as having been used for primings, stoppings, plumbers' and smiths' joints and gutters and carpenters' sill and post bedding and small quantities in other places for plumbers' and smiths' work.

22,849. Do you think that any of that five tons has been used for anything except smiths' and plumbers' work, primings and stoppings?—It is very improbable.

22,850. If lead has been so used in ordinary painting, does it not affect the position of your Department?—Not in the least; I am quite sure that this small amount of lead has been used for the purposes already stated.

22,851. Have you taken steps in the district under your own charge to render it impossible for lead to be used in future for painting?—Yes, except with my specific instruction.

22,852. The considered decision, then, of your Department is that zinc and other non-poisonous paints shall be used exclusively?—Yes, with the exceptions I have stated, namely, for iron primings, the 5 per cent. allowance in general paints and the 10 per cent. in greens.

22,853. In your opinion is paint compounded for the Office of Works applicable to all kinds of outside house painting?—Yes, that is my opinion; iron priming excepted.

22,854. Can you then name any respect in which it would be harmful to prohibit the use of lead, or rather to restrict its use to not more than 5 per cent., subject to certain exceptions, such as greens if found necessary?—It might add a little to the cost of painting, and it would cause a little trouble to working painters in learning to manipulate the zinc paints. I cannot say that it would be harmful in any other way. The fact that it would lead to a wider use of ready-mixed paints I regard as a decided advantage.

22,855. (Mr. Mason.) I would like to ask you the condition of that iron plate before it was painted?—I presume you are referring to the iron plate that you have seen. It was clean bare iron; that is to say, sheet wrought iron plate, and it was thoroughly cleaned to brightness before samples of paint were put on.

22,856. With a scratch brush or something of the sort?—With sand or emery paper, cleaned down as far as you could get to the bright iron. That does not render it impossible for there to be peck holes or such like in it, but I wish that we got every iron surface prepared like it.

22,857. (Mr. Sutherland.) When you speak of zinc paints you mean proprietary varnish and enamel paints?—I speak of the zinc paints we have been using.

22,858. But they are proprietary paints, are they not?—Proprietary in the sense that they are got from manufacturing firms.

22,859. Not merely in that sense, but they are sold as "A," and "B," and "C," so and so and so and so?—They all have a name, but there is no patent about them.

22,860. No, there is no patent, but they are proprietary paints?—Yes.

22,861. If you go to the ordinary oil and colourman for a pound of paint he gives you a pound of paint mixed up with lead, or whatever it may be, but that is not A's and it is not C's. Your experience is largely restricted, so far as I can see, to the specifying of particular proprietary paints?—Our experience is based on the paints we have tried, but if you mean have we gone into a shop and said, "Give me a pound of paint," we should run the risk of having anything or nothing.

22,862. I did not suggest that, but if I go in and get a pound of paint, that is nobody's paint?—You have no guarantee.

22,863. But your office deals exclusively with particular paints?—They have done up to the present. Anybody who made up a satisfactory paint to that formula was considered. That is gradually being extended.

22,864. But you did not provide the formula in the first instance. You got your paints, used them and tested them, and then analysed them and adopted particular formulas?—Yes and no. We did that, but, as I have stated this morning, I also got pastes and mixed them myself.

22,865. I am going to ask you about that later. The broad way in which you have proceeded is by allowing anybody to send paint and you have tested them, and if you have considered them satisfactory you have analysed them and adopted that as a formula?—Yes, in part. At the same time many of these were found to be defective in certain respects, and in order to see whether those defects could be overcome we proceeded to mix them ourselves. I should say here, in justice to those firms, that they have been ever ready to help.

22,866. Yes. Nobody is condemning those firms at all. I do not deny that they are good firms?—I mention no names, but I want to say that what we have done we do not claim credit for.

22,867. When you speak of zinc paints, you do not speak of zinc oxide, but of the proprietary varnish and enamel paints that you have used?—Yes, but not enamel. I take exception to that.

22,868. Varnish paint?—Yes.

22,869. You use enamels as well?—Yes.

22,870. They are specified as enamels?—Yes.

22,871. With regard to your contracts, the contractor has the providing of the lead and all subsidiary

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[Continued.]

things, such as oil and turpentine, but these specified O.W. paints are paid for by the Office of Works direct; are they not?—No.

22,872. Does the contractor pay for them and do you report?—There again I should say yes and no to be clear.

22,873. You have a perfectly balanced condition?—With regard to our day work we pay a certain staff of men who go about touching up, doing odd jobs and so on—emergency men. These men use the paint that we get from these firms—what you call proprietary paints. We order direct and it is paid for direct.

22,874. By the Office of Works?—By the Office of Works. With regard to the painting that we put out as measured work (say a house or any large area) we specify the paint that is to be used. The contractor orders that paint and uses it, and so my answer is yes and no.

22,875. Does he pay for that?—He pays for it.

22,876. You have nothing to do with that?—No. He gets his profit and so on in the usual way.

22,877. When you were here before you gave us 18,000*l.* as painting labour, and 5,000*l.* for paint. Is that for your day-work?—No. I think that it means the total of the operation so far as I could get it.

22,878. It is not a large amount. It is only 23,000*l.* If you make it 30,000*l.*, it is not a large amount. I could find two or three painters who do almost that amount of business?—That, I am not concerned with.

22,879. So it is not a large experience to date from, is it?—I think it is.

22,880. It is for a Department, but not otherwise. Now you say that you mixed some samples yourself from zinc and lead?—Zinc.

22,881. That will do. Have you the formulas of those mixtures?—No.

22,882. No records whatever?—No. I can tell you roughly what I was after, and what they were.

22,883. You can tell us how you mixed those?—I was chiefly concerned at that time with the opacity, and I tried different proportions of the zincs with the oil, boiled oil and with double or refined boiled oil, and turps, and I gradually increased from about 40, 50, 60 per cent. and so on till I got a satisfactory opacity.

22,884. Sixty per cent. of zinc?—Yes. Some people, as you know, get as much as 70 per cent. We have had firms who, of their own initiative, sent us in samples with up to 70 per cent.

22,885. Seventy per cent. of pure zinc?—Yes.

22,886. When were the Savings Bank blocks at West Kensington last painted?—In 1910 I think.

22,887. Are they available now for the Committee to see?—Yes; in fact the Chairman and one or two of the Committee have seen them.

22,888. But the Committee have not seen them?—That is the object of the list I have handed in. In fact, gentlemen, with regard to many of these things I say "go and see."

22,889. Do you not think that the outside work at West Kensington may be still reaping some benefits from the lead that was originally put upon it in 1902. The foundation is still there?—It may or may not be. It is quite possible.

22,890. Do you think yourself that there is virtue in a percentage of lead in zinc?—To a certain extent.

22,891. You have not abandoned lead for use as a primer. Even now you are experimenting?—As far as I am concerned personally, I do not know whether you refer to the reservation I made—except when I have given instructions. I hold myself to be a little free in the sense that I carry on all sorts of experiments. I am taking that liberty in spite of departmental instructions. If there are things demanding investigation and so on I do not hesitate to put lead against zinc or one paint against another. What I am after are results.

22,892. Under whose jurisdiction is the painting of the Law Courts done?—Under Mr. Carpenter I think.

22,893. Is he an Office of Works man?—Yes; he is one of the gentlemen who examined the paints on the Patent Office roof. He is one of the three judges.

22,894. And has he to determine whether it is lead or zinc paint that is used in the painting of the Law Courts?—He would have the choosing of any one particular paint.

22,895. Can he say of his own powers "we will have this painted with lead"?—I take it that he is bound by the official instruction to which I have referred this morning—that all paint used shall be zinc paint.

22,896. If Mr. Carpenter desires to use lead, has he authority to do so?—I do not think so.

22,897. You are not sure?—From the evidence that I have already given you, I should say no.

22,898. But you have not given any evidence on this point?—Excuse me; I have already said that there is a general official instruction.

22,899. But that does not carry any weight with me in view of what I know has gone on. I do not attach the slightest weight to it. Do you tell the Committee now that no lead has been used at Buckingham Palace this year in the painting and decorating?—My instructions are that lead is not being used.

22,900. But that is not an answer at all. Can you tell us of your own knowledge that no lead has been used in the painting and decorating work at Buckingham Palace?—I cannot.

22,901. That is what I want to know?—I can only supplement that by saying that the general instructions are that zinc paints are to be used.

22,902. We know that. Those are proprietary paints, but you would not take A's paint and B's paint and the O's paint to decorate the rooms at Buckingham Palace?—I know that there are special contracts entered into for special decorative work under the Crown, and I think I explained that they are in a sense outside us, but I have the architect's assurance that they are zinc paints.

22,903. Who is the architect?—Mr. Reavell. He assures me that in any such contracts zinc is being used and not lead.

22,904. Do you say that no lead was used for painting in Buckingham Palace this year and St. James' Palace? Do you tell the Committee that the five tons of lead that have been sent to the places which I enumerated (last November, I think) were used in stopping?—I have already given evidence which says I do not say so.

(Chairman.) Let me refer to your answer to one of my questions. "In connection with a question put to you the last time you appeared before the Committee, have you now obtained reports concerning the amount of lead used in London?" The answer was, "Yes, I have found that at the large London depôts 56½ cwt. of lead were used for primings and stopping, plumbers' and smiths' joints and gutters and carpenters' sill and post bedding, and small quantities in other places for plumbers' and smiths' work." Then I asked, "Do you think any of that five tons has been used for anything except smiths' and plumbers' work, primings, and stoppings?" and your answer was, "It is very improbable."

22,905. (Mr. Sutherland.) Last year I put this question to you: "Do you know that something like five tons of lead have gone to the following places this year:—British Museum, the Horse Guards, Victoria and Albert Museum," and so on. That is question 12,991. Do you suggest that that five tons of lead, with thinners, oil, turps, and driers accompanying it, was sent to these places for stopping. There is no mention of depôts. These are not the depôts?—They are the depôts.

22,906. Were they sent for stopping purposes?—I have already given what I say they are sent for. Shall I read you the answer again?

22,907. I will ask the question, and you can put that in as the reply to it?—The reply to it is for primings, stoppings, plumbers' and smiths' joints.

22,908. What sort of smiths?—Blacksmiths and fitters, and all that come under the general term of "smith." Let me complete this: "Carpenters' sill and post beddings." You know, I daresay, that every window sill and every door post in a damp place is bedded in white lead. Eaves, gutters, and such like

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usually have about three-sixteenths packing at the joints with red and white lead, and in hot water jointings it is used generally.

22,909. It is mostly red lead, is it not?—No, mixed. We have three smiths at Kew who may be called upon any hour of the day to go and make good joints, and you know that all the trades draw from the material that comes into that dépôt. Why, therefore, should it be thought that it was merely in paint that the lead was used? We are using it in practically every trade.

22,910. Do Leslie's do smith's work?—Leslie's do all the London district work.

22,911. The painting work?—The painting and the fitting, the smiths' work, plumbing and so on. What I said on the last occasion was that doubtless Mr Sutherland has verified his figures, and I accept them assuming that he has.

22,912. How do you know that the instructions sent out are carried out in other districts which are not under your own control?—Because it is understood in the Service that every officer loyally carries out the instructions that are given to him, and for myself, if I am placed in circumstances where a particular instruction does not cover I exercise my discretion, but if an instruction covers the point which I have to decide I naturally take the official instruction, and in justice to others, I should think that any other officer would do the same.

22,913. (Chairman.) Could you tell us the amount of white lead that the Office of Works use ordinarily in a year?—Do you mean in London?

22,914. Supposing that they had used five tons of lead, would not that form only an infinitesimal amount compared with the total?—It would form only a very small amount of the total used for painting. Might I remind you that at the time this statement was made there was no prohibition of lead for priming, but in addition to priming, of which a great deal is done, I suggest to you that there are many other things for which lead can be used, and for which it is used outside painting—in stoppings continually, for instance.

22,915. (Mr. Sutherland.) Such as?—Plumbers', gasfitters' and smiths' joints, hot-water pipe jointing, gutter jointing, the bedding of sills (which are, as you know, thickly bedded along the whole width of the oak sill before it is knocked down), the bottoms of doorposts, and upon cement or stonework and so on. Candidly when I think of it I am astonished that there are not more.

22,916. (Mr. Mason.) May I ask if there is now prohibition against priming with lead?—The instruction has been issued, as previously reported in my evidence, that we are now to use leadless primers.

22,917. Is that from 1907?—No, this year.

22,918. (Chairman.) Only for wood?—Yes.

22,919. (Mr. Kinggate.) With regard to the stopping you seem to infer that white lead is necessary for hard stopping. Have you tried at all zinc white with gold size for stopping? By stopping I mean the puttying up of the holes, you understand?—For puttying up holes we have not tried zinc. I have tried zinc in various combinations for fillers, but I have not tried zinc in the usual 5 or 10 per cent. for puttles for that purpose. The fact is that I have had so much to do with paints and fillers incidentally that I have not had time.

22,920. One of the great points of our industry is hard stopping. A quantity is used. We find that zinc white can be used equally as well as dry white lead with gold size for stopping. It is the rubbing-down very often with sandpaper that causes so much harm?—Are you referring now to filling or to stopping?

22,921. Stopping?—I am glad to have the hint and it shall not be lost.

22,922. (Mr. Robins.) Have you found much difficulty with regard to the painter who is in the habit of manipulating white lead having to use zinc white. Stress has been laid on the difficulty of getting a man to alter his hand from one to the other. Is that a real difficulty or is it a myth because it has been raised as a

difficulty?—I think that time would obviate any difficulty of that sort.

22,923. (Mr. Parsonage.) Could you give a formula as a standard substitute for white lead, allowing for a percentage not exceeding 5 per cent., that would do away with the necessity of specifying any proprietary paint?—I think that a formula as near that as can be given you have in the evidence which has been put in. As to every man mixing his own, which, of course, is a convenient method, there is much to be said. One class of objectors say that a man is incapable if he does not properly mix and grind the constituents together and so on, and another school say "Yes, and a man never gets the chance of making a good paint because he does not get the proper materials to do it." We find that paint manufacturers can make better paint than painters by the improvised methods of the painter's shop.

22,924. (Mr. Sutherland.) You will allow us liberty to disagree with that, will you not?—I am giving you the opinions of two schools, as well as our experience.

22,925. (Mr. Parsonage.) I think that the majority of master painters in the country would prefer to have the materials and mix their own. If some definite efficient formula could be used as a standard substitute for lead, it would go a long way towards solving the problem. I do not think that the majority of master painters would care to adopt any proprietary paint. They would prefer to mix their own, and use the thinners required according to the job?—If they got the right quality of materials, I doubt not that that is possible.

22,926. They specify for genuine white lead now. Could they have something specified definitely which was not white lead at all? Could architects specify to a certain formula to take the place of white lead?—The formula we have given is as far as we can go in answer to that.

22,927. (Mr. Sutherland.) We had barytes?—One or two of the paints tried on the Patent Office roof and marked "good" were of silica, and it must not be lost sight of by those who cling to lead as irreplaceable that in those tests barytes and silica were found equally as good as lead paints.

22,928. (Mr. Parsonage.) There is one with 56 per cent. of zinc oxide and 2 per cent. of lead, and it is very good. One with 69 per cent. of lead, has 29 per cent. of oil and varnish, against 36.6 for the one that has the zinc oxide. So that there is very little difference—only 7 per cent. The one with lead is good and the one with zinc oxide very good. If you could give us the exact quantities and something that could be put out as a standard substitute for lead, it would help us?—Might I refer to the evidence previously given—with all due deference. I have left out something which I am afraid I should not have done, but after all the proportions used so much depend on the quality of the materials used, and on the limitations of price. Nobody knows better than Mr. Sutherland that whether you can mix up a paint at 5s., 6s., or 7s., depends not only on your pigment but on your class of oil, and particularly on your class of varnish and proportion of varnish.

22,929. (Mr. Sutherland.) That is the dilemma we are in?—In previous evidence you have the proportions of varnish.

22,930. Separated?—Yes. If you look again at the official instructions, you will see that we specify good oil and copal varnish. We insist on good materials, and if you come to soft gums or resins you must not expect a good paint whatever pigment you have.

(Mr. Mason.) I think that there ought to be something more definite. I agree with what you say, Mr. Patterson, but I quite appreciate what the other side say. It certainly is a great point with Mr. Sutherland. He says, "When I ask for white lead I know exactly what I am going to have," and the other side say "We want to be able to specify something else that will make an equally good paint."

22,931. (Mr. Parsonage.) Leaving the medium out of the question altogether, could you give the formula of a pigment that would take the place of genuine

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white lead that is specified now, and leave the medium to be used to suit the nature of the job?—The pigment that we are using and have had experience of appears in the table that has already been given to you.

22,932. (*Chairman.*) I quite agree with what Mr. Mason says, that before we could write a report and use your case as a strong argument in favour of the prohibition of lead, we would have to put before Parliament the component parts of the formula which has succeeded in your case?—You have that already.

22,933. But not in detail?—Yes, in detail. In the instruction of April, 1907, you have the formula to which we were then working. You have had reference also to any improvement upon that formula which has subsequently been made.

(*Mr. Mason.*) We have had given to us the mixture of oil and varnish. I ask the practical side of this Committee, "Could you mix up from that formula a suitable paint without knowing anything about it?"

(*Mr. Kinggate.*) Any man who has any technical knowledge at all could do it. He must know the varnish to begin with. If he is going to do it according to cost that is a different thing altogether.

(*Mr. Rice.*) This is the formula: "Ivory white undercoat, 58; zinc oxide, 5; chalk, silica and barium sulphate, 29; refined boiled oil and varnish, 8; per cent. volatile matter."

22,934. (*Mr. Mason.*) The difficulty is with regard to the quality of the varnish?—Do you ask the proportion of the varnish. My answer to that is that it was given on the last occasion I was here, as, roughly, for the paint we were using about a third of good copal varnish to two-thirds of oil. You will see that in the previous evidence.

22,935. (*Mr. Parsonage.*) That is for outside work?—Yes.

(*Mr. Gardner.*) If refined boiled oil was used you would not need a third of varnish even for outside work.

22,936. (*Mr. Sutherland to the witness.*) Do you think that the Office of Works experience is of that nature that it can set aside the embodied experience of the master painters of the United Kingdom?—We do not presume to say that. We offer you our experience, and it is for your Committee to settle what they think should be done.

The witness withdrew.

## FORTY-FIRST DAY.

Thursday, 11th December 1913.

PRESENT:

SIR ERNEST F. G. HATCH, BART. (*Chairman.*)

Sir GODFREY BARING, Bart., M.P.  
Lord HENRY BENTINCK, M.P.  
Mr. E. L. COLLIS, M.B.  
Mr. W. G. SUTHERLAND.

Mr. F. G. RICE.  
Mr. A. GARDNER.  
Mr. J. PARSONAGE.  
E. A. R. WERNER (*Acting Secretary.*)

Mr. B. J. MORLEY called and examined.

22,937. (*Chairman.*) Are you the foreman painter at Messrs. Cadbury Brothers Works?—Yes.

22,938. Where?—At Bournville. It is near Birmingham.

22,939. Have you been instructed to attend here to-day to give evidence regarding the use of leadless paints by Messrs. Cadbury?—Yes, by the firm.

22,940. Will you tell us what experience you have had in practical painting work?—34 years to be correct. It is between 34 and 35 years since I entered the trade.

22,941. What experience have you had during those years?—Practically a life-long experience. I have been at it all the time. I have had control of men now for 25 or 26 years.

22,942. Have you had control of a large number of men?—Yes. I have control now of anything from 30 to 50 painters.

22,943. In all kinds of work?—In all kinds of work, pretty well. It is very varied, from the mansion to the cottage.

22,944. Has the use of white lead as a paint been given up entirely by your firm?—Yes.

22,945. At what date was the change from lead to leadless paints made?—I could not quite say. It has been an evolution which commenced in 1902 when I took over the management of this department, and the change has been gradual. It commenced by experiments with half and half, and gradually we eliminated lead. It has been very gradual.

22,946. Can you fix the time when you agreed to discontinue the use of lead paint?—Three years ago it was absolutely discontinued; but seven years ago we decided to do without it as much as possible. It was one of those things that we had to move very carefully in.

22,947. Why was it one of the things that you had to move carefully in?—We knew very little about the use of oxide of zinc up to the last few years, and as to what could be done with it. The whole of the painting trade were practically in ignorance at the time as to the advantages of zinc and the disadvantages of lead. There were very many mistaken ideas. I am speaking now of my practical opinion.

22,948. (*Lord Henry Bentinck.*) Seven years ago?—Seven years ago. Three years ago we actually eliminated lead; very nearly so five years ago; very largely so seven ago; and 12 years ago we commenced the change.

22,949. (*Chairman.*) What paint materials do you now use for the Bournville works?—For our white base, pure oxide of zinc; for our general reds, oxide of iron; for our greens, what is termed a leadless green. Sometimes it is barium, sometimes it is zinc, but our principal green is made from ferrocyanide of potassium and ochre, which is an earth, that is if it is not tinted ochre. When it is tinted with a chromate of lead, it is detrimental immediately.

22,950. Are there any other things?—There are various other sorts—better class materials. We even go so far as to use carmine, which no one would think of as being lead. It is quite leadless. We use a fair amount of carmine sometimes in different works. We also use a red that is made by one firm in the country to take the place of vermilion, which stands better; it is leadless. The composition of it they will not give us.

22,951. (*Lord Henry Bentinck.*) Is carmine leadless?—Yes, it is leadless. It is practically made from the American cochineal.

22,952. (*Chairman.*) You have told us that you have altogether abandoned the use of red lead?—Yes, absolutely. It is never bought in any form.



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Mr. B. J. MORLEY.

[Continued.]

22,953. By whom are these paints, which you have spoken to us about, applied?—Mostly by my own men, but occasionally by outsiders.

22,954. What do you mean by your own men?—Men employed by the firm themselves.

22,955. By Messrs. Cadbury?—By Messrs. Cadbury Brothers.

22,956. They are applied by those men?—The paints are applied by the men that we employ.

22,957. Do you buy your paints ready mixed?—No.

22,958. How do you get them?—We buy all of them in the paste—every one of them—ground in oil or turps, as the case may require. Our oxide of zinc is bought ground in pure linseed oil.

22,959. Do you specify any particular standard for the zinc oxide you use?—Yes. My specification is 99 per cent. oxide of zinc without a trace of lead, but we have to make a little bit of an allowance, as we cannot get it all quite 99 per cent., but so long as it is free from lead, cadmium or barium and there is 98 per cent. of pure oxide of zinc we accept it.

22,960. Do you mean lead, cadmium and barium, or lead, cadmium and bismuth?—It is lead, cadmium and barium. Those are the three things so seriously affected by sulphur.

22,961. Do you also specify a standard of purity for iron oxide?—97 per cent. ferric oxide.

22,962. Are you entirely satisfied with the results obtained with leadless paints?—Yes.

22,963. Does that apply to all the paint work under your supervision?—Yes, all of it.

22,964. Can you give me a description of the kinds of painting that are under your supervision?—Yes, we have good office-work where we are now, and greenhouse work and factory work in general, both exterior and interior, comprising iron work, steel work and wood work. There are also our motor vans, locomotives and other incidental things that come into a very large works. They are all done under my supervision, and all done according to the specifications which I lay out.

22,965. Do you still buy any lead?—Yes, we buy about 5 cwt. of lead a year, which is used by our pipe fitters, much against my will.

22,966. Why must the pipe fitters have lead?—I am afraid that we have to deal with people who will not study their own interests. The firm have issued orders that they are to do without it if possible. I introduced sulphate of barium for their work, but they would not take to it.

22,967. But none of the lead is used for painting?—No; it is only used for flange work, by pipe fitters, and engine fitters.

22,968. Are you quite sure that all the actual painting work under your supervision is done entirely without lead?—I could not say but what there may be a trace, say 3 per cent. in it, because we cannot always guarantee, though we analyse things, that makers do not supply a little lead in oils or driers, which we do not expect to get, and which makers will eliminate in time. It is possible there may be 3 per cent., not more than that, creeping into it in some cases.

22,969. You said just now that the paints are mixed under your supervision?—Yes, but we cannot say that the driers do not contain a little lead, though they are specified to be pure.

22,970. Do you analyse the driers?—Yes.

22,971. Do you take a sample?—Yes, and we reject the sample if it shows much trace of lead.

22,972. What is the maximum amount of lead you would accept?—I should reject it if there was a trace really in any of it; but, in dealing with large quantities, a cask may come in, and we cannot analyse every cask. We might analyse one cask out of three, and be satisfied with the consignment, but I would not bind myself to say that the others did not contain a slight amount.

22,973. Do you tell the Committee that there is never more than 3 per cent.?—Yes. There is never more than 3 per cent., and it is not our intention to have even 3 per cent.

22,974. Do you find that the use of leadless paint materials is more costly?—No, except in very exceptional cases. I do not think that it is more costly in general.

22,975. But do not you know the quantities positively?—I can say positively that for general work it has not proved more costly to us. I have not been able to detect any difference in it.

22,976. No difference one way or the other?—No.

22,977. It is not cheaper?—I could not say positively whether it was either cheaper or dearer, because I have not been able to trace any difference in the cost of the work. It has not shown itself.

22,978. As to its durability, can you give us examples of exterior painting which has stood for a number of years; first, with the zinc-oxide paint?—Yes, both on the buildings and vehicles. There are buildings in our grounds that have been standing for seven years, and one that has been standing for 11; but with regard to the one which has been up for 11 years I would not be quite positive about its being absolutely free from lead. That was done when we were evolving this method. But with regard to seven years ago I can speak positively of two buildings that are painted absolutely without lead—absolutely.

22,979. What size of buildings were they?—Very large ones. The two that I am particularly speaking of now might be 600 feet long and 40 feet wide. All the windows and sills are done with oxide of zinc and ochre. There is simply a white and a cream colour on them. Doors—oxide of iron.

22,980. Did you paint the wood and iron with zinc paint?—Not all the wood and iron. Some of the iron has been. The whole of my colour work is done with oxide of zinc and ochre.

22,981. With regard to these two buildings which you have described to us, did you paint the wood and iron in those two buildings?—Yes, wood and iron. I could give you other instances as well. There are many about the place.

22,982. Were they new buildings?—No.

22,983. Repainted?—Yes, they were repainted. That was one disadvantage to us, because we were painting on the top of lead.

22,984. Why was it a disadvantage to you?—Because there was still a certain amount of lead left underneath.

22,985. But in what sense is that a disadvantage?—It attacks the zinc, and also because lead has a tendency to powder when it is exposed to the air, especially if there are any sulphurous fumes about, and if it has begun to deteriorate before the zinc is applied it will attack it more quickly.

22,986. Have you any instance where you have painted entirely new buildings with zinc?—Yes, two or three blocks of buildings.

22,987. How many years ago?—They are more recent. One of them is three years ago, another probably five years ago. I could tell by my books at home the date when they were painted, but not from memory.

22,988. How does the zinc paint on new buildings compare with zinc paint on old buildings with a base of lead?—My experience is that oxide of zinc paints wear better than hydro-carbonate of lead. They keep the colour better. They want more judgment in mixing, but I have never known a case of flaking or powdering from oxide of zinc when mixed with good material. When they are mixed with common rubbish it is different, and I will not say about that.

22,989. Will you give us further instances?—There is an experiment that I would like to call your attention to. In October 1910 I had a greenhouse put up, with a division in the middle of it, so that really there are two houses, and both houses are at the same temperature, and under the same conditions. I had one house painted with lead, and the other house painted with oxide of zinc. In October 1911, I examined these two houses again, and I found that the one painted with lead had discoloured seriously, and the paint had commenced to decompose very badly. What was happening was that the paint was turning quite pink.

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Probably it may have been from a fungus of some description or from some sulphur given off from disinfectants. I would not say, but there it is. The zinc had remained perfectly white. In November of the present year I inspected these places again, and the lead paint is again turning quite black. That is quite a preliminary examination with regard to that. The zinc paint is still holding a pure white. This is my test book with many of the tests in. (*The witness produced a book.*)

22,990. When was that greenhouse painted?—That was painted in October of 1910. That is three years last October. The inside of a greenhouse is a good test.

22,991. Is the zinc paint not only white out thoroughly established?—Yes. It has not begun to powder, but the lead paint has begun to powder up into a small black powder.

22,992. (*Mr. Rice.*) Do you mean the inside or outside?—The inside. It is a big test inside a greenhouse. The outsides of the greenhouses were painted with oxide of zinc. The comparative test inside the greenhouses is important, I take it, on account of something published in "The Gardener" in respect of some of the houses at Kew Gardens.

(*Mr. Sutherland.*) Mr. Patterson mentioned those.

22,993. (*Chairman.*) Have you any other instances to give us?—There are a lot I could not enumerate. I might say that the whole of the factory now is painted with either oxide of iron or oxide of zinc or leadless green.

22,994. How often do you paint the different parts of your factory?—I have one place which I am going to re-paint now, which has gone eleven years since it was done, and another over ten. I might say in passing that a local place under the same conditions as the one that has been painted eleven years (our baths) has only been done 2½ years, and wants doing worse than the other. That may be from various causes.

22,995. What paint was that?—I cannot say whether it was painted with more than 75 per cent. of oxide of zinc in this particular case, because it was during the time that we were evolving the Scheme.

22,996. (*Mr. Sutherland.*) Has that gone bad?—No, it has not, and it is 11 years since it was done. One painted with lead within a stone's throw, belonging to the city of Birmingham, has been done 2½ years with lead, and it is time it was done again. The conditions are the same, as I have said.

22,997. (*Chairman.*) When do you generally begin to re-paint a building?—We do not very often re-paint more than once in seven years. We do not find it necessary, and I may say that we are finding it less necessary. This refers to outsides only. Insides are painted in advance of Factory Acts for comfort of workers and also absolute purity of manufacture.

22,998. Do you tell the Committee that you find that when you paint any building with zinc paint it wears as well as in the old days when lead paints were used?—I can say, better. There are reasons for that. I believe that I can safely say that it stands better.

22,999. Have you found that leadless paints stand equally as well as lead paints for interior painting?—That can be answered without hesitation. I have made the test, and I find that it is infinitely better.

23,000. Now what about priming?—We use zinc priming sometimes, not always. Sometimes I use for special occasions a preparation called "Duresco" or "Walpamur." There are two sorts, which are absolutely leadless.

23,001. Do I understand you to tell the Committee that in your opinion priming can be done without lead?—Yes.

23,002. (*Sir Godfrey Baring.*) Is there any work at your factory which has been done with zinc paint and which has given you any special trouble or anxiety?—No, I have not found any difficulty at all.

23,003. Under no conditions has there been any special difficulty with zinc paint?—We have found some difficulties in respect of drying, and also some difficulties in respect of getting a perfect flattening, but I am thankful to say I have overcome those difficulties.

23,004. At the present time you have no special difficulties owing to the adoption of zinc paint?—Where my difficulty is is to get the men to understand that they should do it in their own interests.

23,005. Have you used zinc paint so much that they are growing accustomed to it?—Yes, my men are, but the strange men from outside are a difficulty.

23,006. (*Dr. Collis.*) Had you in your earlier years any experience of the effect of lead upon the health of people applying lead paint?—Yes.

23,007. What was your experience then when you yourself worked with lead paint?—It has never affected me. One reason that has helped me a good deal, I believe, is that I am a teetotaler. A man who drinks should never use lead—neither a plumber nor a painter.

23,008. Have you known others affected in their health?—I have seen several affected. I have seen them lose the use of their hands. The back would be turned the opposite way to what mine is now, and the fingers would be turned up *this way* (*describing*).

23,009. Do you mean men working under your direction or your colleagues?—They have worked under my direction. They change about. They have worked for us sometimes. They are men I have met working with me, and they go at different times.

23,010. Did you during the earlier part of your time with Cadbury Brothers see men affected in that way?—No, fortunately not there.

23,011. Did you ever hear any of the men before the change was made to zinc complain in any way of their health?—No.

23,012. Not at all?—No, I have heard no complaints in this particular place.

23,013. You have not heard any complaints since the change to zinc has been made?—No. The health of my men is very good; it stands very high.

23,014. So that the change at Cadburys' from the use of lead paints to the use of zinc paints has not been associated with any alteration in the health of the men?—No, I cannot say that it has. I could not say that it has made a difference in that respect.

23,015. They were quite well before?—As soon as I took the business over I began to change to zinc. It was 1902 when I took the business over.

23,016. You began to change immediately?—Yes.

23,017. Were there any on the staff of workmen who had any sign or symptom; to your knowledge, of the effect of lead?—No, I did not see any in those left behind that showed signs of it. Once there was a doubt about one man. We had a doctor on the ground, but the doctor could not say definitely what was the matter with the man, but he showed symptoms at the top of his finger nails. That was eleven years ago. The doctor could not say it was lead but he could not say it was not.

23,018. Dr. Robb is there, is he not?—Yes, but he was not then. Dr. Richardson was our doctor then.

23,019. Does Dr. Robb see the painters at all?—Frequently.

23,020. Has he ever made any remark with regard to the condition of their health?—No, I cannot say that he has. I have heard no remark from him. I send them up with a note to be examined periodically, and he signs the note and sends it back to me, and I know it is all right. If it was not all right he would make some remark.

23,021. You say that the men are examined periodically. How often are they examined?—About every 12 months.

23,022. All the painters are examined about every twelve months?—Yes. If we get a lot of inside work, they are examined more frequently.

23,023. Do you know whether they were so examined in the old days, ten years ago, when lead was being used?—No, they were not.

23,024. So that we could not get any words to compare the doctor's remarks then and now?—No. It is only ten years ago since the firm instituted the medical staff, so one could not make comparisons in that respect.

23,025. (*Mr. Sutherland.*) If a workman is off for a day has he to explain why he is away?—Yes.

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23,026. And when he is sick, has he to submit himself to the doctor?—Not necessarily to our doctor now. Since the Insurance Act has come into force he can attend his own private doctor. We have no control over him in that way, but he has to submit himself to our medical man before he can resume work, and if he is taken ill on the ground he has to submit himself to our medical man before he can leave the ground.

23,027. If he is seriously ill?—It does not matter whether it is serious or not. If he wanted to go home, I should say, "Take this note to the doctor and see him first," and he would have to report himself to the doctor before he came back to work, unless it was only two or three days, when he could come to work, and report himself to the doctor afterwards. He has to report himself if he is only away half a day, and the doctor examines him.

23,028. Has he to explain his absence?—Yes, he has to explain his absence to me and to the doctor, and I keep a record of his explanation.

23,029. What do you use for your thinners with the zinc oxide?—Raw linseed oil (Baltic), American turps, and boiled oil. I have a little sample in my pocket of what I am having analysed. That is a pale boiled oil which is guaranteed absolutely leadless. (*The witness produced a sample.*) I shall have that analysed before I accept the next consignment. I do not go very far away for varnishes to mix with it. I use the ordinary varnishes we use on our general work outside.

23,030. You use varnish on it?—Yes, I use to about 56 lbs. of oxide of zinc, according to the work, anything from a pint to a quart of oak varnish.

23,031. (*Lord Henry Bentinck.*) For outside work, you say?—Yes, for outside work and inside—and liquid driers. Linoleate of manganese driers I like best.

23,032. (*Mr. Sutherland.*) Is there no lead in that?—No, it is manganese only—manganese and raw oil and turps.

23,033. Do you say that you get all your greens from a zinc base?—Not all of them. Some we get from ferrocyanide of potassium and ochre which is leadless.

23,034. Do you use lead green?—No.

23,035. Are the zinc paints more expensive?—Yes, all zincs are more expensive, but we must bear in mind, that the specific gravity of lead is about 11.35, and that of zinc is 6.4; consequently zinc will cover a considerably larger area than lead will.

23,036. Are you speaking of white or of colours?—I do not mind which it is. They are all the same in that respect. The metallic zinc and lead are somewhat different in specific gravity to the salts.

23,037. The body of the green that you would get would be an inert material. It would not be pure zinc?—We sometimes get them in bariun. They are not pure zinc, but they are not lead.

23,038. No?—I get a chromate of zinc for the yellow matter. That is a good yellow.

23,039. That is dearer, is it not?—But it is very much lighter.

23,040. Lighter in weight?—Yes, that is where it comes in, though zinc is very much dearer than lead.

23,041. It has not the staining power has it?—I rather doubt that assertion.

23,042. We have had that evidence from disinterested witnesses before the Committee?—I would certainly take my personal experience myself.

23,043. It is very much lighter to begin with?—Stainers generally are more satisfactory when used with zinc than with lead, zinc having no destructive action. They are very much more beneficial.

23,044. Do they stain zinc better than lead?—Lead has a detrimental effect on many of the stainers. I should not attempt to stain lead with zinc.

23,045. What experiment did you make in your greenhouse? What was it primed with?—It was one that had been moved from one part of our ground to another, and I had to take it as it was.

23,046. It was an old painted one?—Yes.

23,047. And it probably had lead underneath it?—Yes, I should say so. There is no doubt about that, in fact.

23,048. (*Mr. Rice.*) I am not clear as to what buildings you have painted with zinc entirely. Have you painted any new buildings? I rather gathered that you mentioned a building 600 feet long and 40 feet wide?—Two of them.

23,049. Was that building entirely painted with zinc?—Yes.

23,050. No lead at all?—No lead at all.

23,051. When was that painted?—Seven years ago. I did another about four years ago.

23,052. Are you keeping to zinc paint?—Yes. I mean zinc.

23,053. Entirely zinc paint?—Zinc and oxide of iron.

23,054. No lead?—No lead. One was done four years ago, an entirely new building. One, entirely new, was done about three years ago, and it was added to two years ago by an outside contractor. The specification then was pure oxide of zinc, but I could not say that it was.

23,055. (*Mr. Sutherland.*) There may be a doubt?—Yes. I was not clerk of the works on the job; therefore it was not my business.

23,056. (*Mr. Rice.*) Has the building which you propose to repaint next year, which has been painted for 10 years, ever been painted with lead?—Anything 10 years ago I could not guarantee with regard to lead.

23,057. With regard to this particular building that you are going to paint next year, is that lead or zinc?—Principally zinc.

23,058. It has been done 10 years?—Yes. The major part is zinc, but I could not guarantee that the building does not contain a little lead, because, as I say, it was in the stage of evolution, but I can speak with regard to seven years for certain buildings.

23,059. I gather that that building chiefly painted with zinc has lasted 10 years, and only wants repainting next year?—Yes.

23,060. The building altogether painted with zinc seven years ago is still in good condition, and does not require re-painting?—No, it does not.

23,061. You have spoken of the ignorance of people with regard to lead. When did you first discover the disadvantage of the use of lead?—I might say when I was working at Westminster Abbey.

23,062. That does not tell me when?—Twenty-six years ago. That was when I first discovered it. I saw a man break down with lead poisoning, and that set me thinking and thinking seriously.

23,063. And then when you became foreman at Cadbury's you put into practice the result of your investigations?—Yes, before then, but I did not stay where I was to see the results. When I was in Northampton, with a gentleman who has retired now, we used to use a considerable amount of zinc. The man, who was foreman of our shop when I was an apprentice, was a very great lover of zinc.

23,064. With regard to the examination of painters by the medical men at the works, he is not there for the examination of painters only, I take it, but he is there for all the staff?—Yes, it applies to everyone.

23,065. The experiment with the greenhouse we have heard about was one half lead and one half oxide of zinc. Can you tell us the comparative cost?—As I say, I could not detect any difference. The initial cost per hundredweight is considerably greater with zinc than lead, but zinc does spread so much further. It covers a greater area.

23,066. What do you say with regard to the application of zinc?—I am inclined to think that zinc is applied rather more easily than lead; I rather think so. It is my experience that it is lighter in the brush.

23,067. And therefore cheaper?—Slightly cheaper, but it would not do to say it was cheaper, because there is such a little difference.

23,068. (*Mr. Sutherland.*) You have no records?—No. I have tried to determine between the two, but I could not determine any difference between the two in labour or material. It is so slight.

23,069. That is your opinion?—I estimate for every bit of work, and if it had been much dearer I should have known. I do not just go and see a job and think

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I can have it as I like. Everything is regarded from the point of view of cost.

23,070. Is the cost recorded afterwards?—Yes.

23,071. (*Mr. Parsonage.*) You mentioned doing work with Walpamur or Duresco. What special reason have you for using that on woodwork?—If I had timber full of resin, I should use it to try to keep the resin where it was. That is one reason. If I had timber that was a hurried job, and wanted quickly, and could not give the priming a thorough time to harden, I should use Walpamur, and petrifying liquid. If anything else is required, which occasionally is the case, it would be boiled oil. It is only in special cases, and particularly when we have to hurry a thing, and when there is an excess of resin in the timber. It is a very good cure for keeping the resinous veins from pushing through.

23,072. The oil and turps you use in your works would be generally purer than those ordinarily used by outside contractors?—I would not like to say all contractors, because there are some very good men, and very honest men, in the trade. There are some that will use anything. I could give you an instance from a specification here. Our standard is very high. It has to pass the analyst as well as me. It passes me first, and then it passes the analyst, so you can tell it is fairly high.

23,073. I have heard complaints from men using leadless paint that it makes them ill, and they put it down to substitutes for turpentine, and the cheap thinners that are used?—May I give you an instance of what has occurred in my experience with regard to that? I specified a job at our milk factory in Shropshire. The specifications are here. Everything was specified leadless, the greens leadless and oxide of zinc and oxide of iron. I went down to that work as clerk of the works. (I superintended the job for the firm. It was done by a firm in Newport, Shropshire.) Immediately I picked up or looked at the material I knew it was not to specification. I may tell you that the first thing was the so-called turps which were what the painter will call "blue Billy." That is a petroleum mixture. One sample was good and that was the linseed oil. That was good. The zinc was not zinc at all. The brown was full of lead. The analyst's description of it after he had sampled it was, "It was not paint; it is muck." They were his words, and I had to condemn the whole lot, of course. Those things have a very detrimental effect upon a man's hands. They are liable to cause paralysis if he washes his hands in them.

23,074. Even if he is not using lead?—Yes. An excess of that sort of thing when washing your hands is liable to cause paralysis; at least so our medical man told me.

23,075. (*Chairman.*) You have supported that by an authority?—It is the medical man that told me so.

23,076. (*Mr. Gardner.*) Do you do the dwelling house work on the estate?—No. Only 18 houses come under me; the rest do not. The 18 are done on the same lines as our other work.

23,077. Outside work?—Outside and inside.

23,078. The outside work has always stood perfectly well?—Yes. The outsides of my few cottages are painted regularly every six years.

23,079. More than six years ago they were painted with white lead?—Yes, before six years ago they were painted with white lead. That was before my time.

23,080. Have you painted any houses that have stood six years with zinc?—There are six of them now—just under six years.

23,081. They have been painted with zinc and stood six years before repainting?—Yes.

23,082. What do you first coat steel and ironwork with? Do you do it with zinc?—No.

23,083. Always oxide?—Oxide of iron. If it was not previously painted, then I should coat it with oxide of iron first, if it was outdoors, not indoors. For outside steel and ironwork I should first coat with oxide of iron unless it was galvanised.

23,084. Are you of opinion that for outside work zinc would be of no use for the first coating on steel and iron?—I do not think that it is suitable for steel and iron. I do not think that oxide of zinc is really a good paint for the first coat for that.

23,085. You told us that all your colours are leadless, even the permanent reds you get?—Yes.

23,086. The manufacturer will not tell you what it is composed of?—No, but we can tell it is not lead. We have an analyst.

23,087. Are you certain that it is not stained on a base of orange lead?—Yes. We should not have it if there was lead in it at all.

23,088. You are sure that it is not a stain on orange lead?—Yes.

23,089. (*Mr. Sutherland.*) Do you have your colours analysed to see that they are leadless?—I analyse them myself, and then send them on to our analyst.

23,090. Always?—Yes, but not every consignment. We may get three casks in, and analyse two out of the three. I would not say that absolutely every one is analysed in a consignment, but every sample is analysed.

23,091. (*Lord Henry Bentinck.*) Do you always use varnish in your outside paints?—Yes, with zinc paints always.

23,092. Why do you use it?—To harden it and help it to dry.

23,093. Does it give it any lasting quality?—Yes, there is no doubt, I think, that a drop of varnish gives it a longer life. It hardens the surface, and at the same time it will allow it to be elastic, which is a great feature.

23,094. Does the addition of the varnish add very much to the cost?—No, I do not think so, for the simple reason that if you put a drop of varnish in, it does away with some of the drier. In the summer time I have had work done as a matter of fact absolutely without driers, and only used the varnish without driers. We have twenty and one things to consider.

23,095. (*Chairman.*) The zinc paint plus the varnish would cost no more than the ordinary lead paint?—More per hundredweight, but not more per yard. I do not think that it costs any more per yard. I have not been able to trace it at any rate.

The witness withdrew.

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 No cases known of, 11,309-14.  
 Realises extent of evil, 11,315-23.  
 Regrettable that this country should be behind others in legislation regarding, 11,325.  
 Meals:  
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 Danger of contaminating food by unwashed overalls not great, 11,382-91.  
 Outdoor clothing: storage away from paint and dust difficult in some cases, 11,342.  
 Overalls:  
 Provided and washed by men, 11,331-6.  
 Provision and washing by employer difficult, 11,337-9.  
 Storage away from paint and dust difficult in some cases, 11,341.  
 Painters:  
 Ages of, 11,401-15.  
 Sickness among, 11,392-400.  
 Periodical medical examination: unwilling to bear expense of, 11,351.  
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 Preferred to regulations, 11,449-50.  
 Would reduce range of colours, 11,440-4.  
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 As to washing hands and clean overall sufficient to mitigate evil, 11,363-81.  
 Impossible to observe, 11,354-5.  
 Necessary in England but not in Scotland, 11,445-8.  
 Washing: accommodation impossible to provide in some cases, 11,343.  
 White lead: best paint pigment, 11,418-27, 11,433-9.
- Antimony Paints.** (See evidence of *T. R. Atkins*: Part II. of Index.)
- ARMSTRONG, PROFESSOR HENRY EDWARD,** F.R.S. (Professor of Chemistry at the City and Guilds of London Central Institute):  
 Evidence, 15,934-16,169, 22,108-180.

- ARMSTRONG, PROFESSOR HENRY EDWARD, F.R.S.—continued.**  
 Dust: principal danger, 22,175-6.  
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 French experiments criticised and duplicated, 22,108-12, 22,151-8.  
 Hygienic effect of, 22,150, 22,159-65, 22,173.  
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 Quicker with white lead and oil than with zinc and oil, 15,953-4.  
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 Cause of illness from drying paint, 15,949-51, 15,966.  
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 Effect on blood, 16,152-6.  
 Volatile lead compounds not given off from drying lead paints, 15,935-48, 16,102-7.  
 Turpentine: substitutes have probably same ill-effects, 16,142-4.
- BALY, PROFESSOR E. O. C., F.R.S. (Professor of Chemistry in the University of Liverpool):**  
 Evidence, 1666-763, 16,998-7063.  
 Emanations:  
 Possibility of evolution at ordinary temperatures, 1707-9.  
 Possibility of large proportion of oil increasing rate at which given off, 1725-47.  
 Possibility of volatile compounds from burning off containing lead, 1710-2.  
 Possibility of volatile compounds from white lead paste containing lead, 1695-701.  
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 Volatile compounds, other than linseed oil, given off from white lead paste, but not from zinc white or purex (spectroscopic test), 1666-94, 16,998-7001.  
 Volatile lead compounds not given off from drying white lead, 17,002-9.  
 Very poisonous, 1702.  
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 Lead poisoning: contracted from emanation experiments, 1677, 1703-6, 1748-50.
- BANOROFF, JOHN (London Organiser of the National Amalgamated Society of Operative House and Ship Painters and Decorators):**  
 Evidence, 4051-172.  
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 Indispensable in some cases, 4067-72.  
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 Principal danger, 4065.  
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 Stippling causes spray, 4075-6.  
 Ventilation would reduce spray in stippling, 4077.  
 Lead poisoning: statistics of trade societies, 4053-9.  
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 Mixing: danger from fumes, not dust, 4060-2.  
 Overalls: generally worn and washed weekly, 4103-6.  
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 Present-day methods tend to increase danger, 4110-31.  
 Spraying machines very dangerous, 4079.  
 Periodical medical examination: practicable, 4107.  
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- BANOROFF, JOHN—continued.**  
 Washing:  
 Accommodation important, 4098.  
 Hot water necessary, but not always obtainable, 4099-100, 4106-7.
- BARKER, JOHN WILLIAM (of the National Association of Master House Painters and Decorators):**  
 Evidence, 6879-7103.  
 Compensation for suspension: would not agree to, 7002-6.  
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 Indispensable in some cases, 6957-60.  
 Moistening sandpaper suggested to avoid dust, 7058-60.  
 Respirators practicable, 6979-7016.  
 Dust and spray: respirators suggested for avoiding splashing in painting ceilings and stippling, 6964-74, 6979.  
 Foreign regulations: aware of legislation abroad, 6929-31.  
 Hours of employment: would not agree to limitation of, because of casual nature of trade, 6993-5.  
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 None as good as white lead, 7080-2.  
 Office of works test of four years not sufficient trial, 6987-92.  
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 Lead poisoning:  
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 Unaware of and surprised at official figures showing extent of evil, 6913-23, 7075.  
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 Would not take exception to prohibition of lead, 7103.  
 Meals: accommodation away from paint and dust impossible in some cases, 6954-6.  
 Outdoor clothing: kept in room where paint is being used, 6950-3, 7094.  
 Overalls:  
 Provided by men, 7009.  
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 Periodical medical examination: would agree to, 6996-7001.  
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 Cost much greater than change to leadless paints, 7100-1.  
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 Removal of old paint:  
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- BENNETT, COLONEL R.** (of the Association of Master House Painters in Scotland):  
 Evidence, 11,190-304.  
 Compensation for suspension: Expense would fall on public, 11,254-6.  
 Dry rubbing-down: dust less in Scotland, as flat paints almost unknown, 11,294-9.  
 Dust: no way of removing, 11,237-44, 11,266-9.  
 Emanations: no way of removing, 11,246-50.  
 Foreign legislation: aware of legislation abroad, 11,208-9.  
 Lead poisoning:  
 No cases known of, 11,194-8, 11,270.  
 Regrettable that this country should be behind others in legislation regarding, 11,210.  
 Surprised and unaware of extent of evil, 11,199-207.  
 Meals: accommodation away from paint and dust impossible in some cases, 11,228.  
 Outdoor clothing: storage away from paint and dust impossible in some cases, 11,230.  
 Overalls:  
 Provision and washing by employer objected to, 11,226-7.  
 Storage away from paint and dust impossible in some cases, 11,229.  
 Periodical Medical Examination:  
 Expensive, 11,252-3.  
 Thinks men would object, 11,251.  
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 Difficult and expensive to observe, but possible, 11,257-61.  
 Necessary in England but not in Scotland, 11,221-5.  
 Preferred to prohibition, 11,260, 11,271-5.  
 Thinks public would prefer, even if more expensive, to prohibition, 11,277-92, 11,300-1.  
 Removal of old paint: solvents could replace burning off, 11,245.  
 Washing:  
 Accommodation already provided, 11,231-3.  
 Hot water not always practicable, 11,234.  
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 Zinc paints: trials unsatisfactory, 11,212-26.
- BETTINK, PROFESSOR WEFERS** (Investigator for Dutch Government):  
 Evidence, 18,414-547.  
 Emanations: do not contain lead compounds, 18,441.  
 Foreign legislation:  
 Dutch Commissions, conclusions and criticism of, 18,415-30, 18,468-73, 18,486-91, 18,504-13, 18,544-7.  
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 Number of inspectors in Holland, 18,501-3.  
 Removal of old paint: burning off not dangerous, 18,442.  
 Turpentine: fumes dangerous, 18,517-21, 18,536-41.  
 White lead: in dry states should be prohibited, 18,497-8.  
 Zinc paints:  
 Cost greater than lead, 18,446.  
 Covering power less than lead, 18,433, 18,481-2.  
 Durability less than lead, 18,445.  
 Not so good as lead in sulphurous atmospheres, 18,431-2, 18,474-9.  
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 Satisfactory for inside work, 18,483.
- Bituminous Paints:**  
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 See also evidence of *Mr. William Cail*.
- BONNER, FREDERICK** (Working master house decorator):  
 Evidence, 4286-432.
- BONNER, FREDERICK—continued.**  
 Dry rubbing-down:  
 Causes dust, 4313-4.  
 Indispensable in some cases, 4308-12, 4405-9.  
 Dust and spray:  
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 Difficult to safeguard against, 4367.  
 No spray caused in stippling, 4315-22, 4410-2, 4421-4.  
 Lead poisoning: cases known of, 4296-7.  
 Meals: where taken, 4343-6.  
 Mixing:  
 Danger from fumes in burning-out paint cans, 4302-7.  
 No danger as lead in paste form, 4298.  
 Overalls:  
 Danger from dust, 4351-4.  
 Washing of, 4348-50.  
 Periodical medical examination: practicable, 4355-62.  
 Prohibition:  
 Best solution, 4368.  
 Discovery of a good white pigment would follow, 4373.  
 Would agree to, 4371-2.  
 Regulations: only partial remedy, 4363-5.  
 Removal of old paint:  
 Danger from fumes in burning off, 4323-4.  
 Danger from sandpapering after burning off, 4325-8.  
 Respirators suggested, 4331, 4375-89.  
 Solvents less dangerous but more expensive, 4329-30.  
 Stopping: no dust as lead in paste form, 4299-301.  
 Washing:  
 Accommodation important, 4338.  
 Hot water important but not always obtainable, 4339-40.  
 Zinc paints:  
 Application easy, 4374.  
 Better than white lead paints, 4390-1.  
 Satisfactory for ironwork, 4413-5.  
 Satisfactory for outside work, 4394-5.  
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- Bridge Painting.** (See evidence of *Messrs. Ellison and Hunter*.)
- BYWATERS, C. H.** (of the Granitic Paint Co., Barking):  
 Evidence, 402-477.  
 Zinc paints:  
 Applied on bare walls, 441.  
 Body same as white lead, 461-2.  
 Costs same as white lead, 415.  
 Covering capacity same as lead, 417-8.  
 Durability as good as lead, 422-3.  
 Efficient substitute for lead, 442.  
 Instances of use on interiors, 424-40, 454-6, 468-73.  
 Lead chromates for colouring purposes could be dispensed with, 408-12, 463-6.  
 Medium important, 421.  
 Retains colour better than white lead, 419.  
 Use of on exteriors, 474-7.  
 Used by Office of Works, 444-50.
- CAIL, WILLIAM** (of Cail's Bitum Co., Ltd., Newcastle-on-Tyne):  
 Evidence, 19,167-19,280.  
 Bituminous compositions:  
 Composition of, 19,200-2.  
 Contain no lead, 19,210-1.  
 Contain no turpentine, 19,212.  
 Covering power twice that of lead, 19,252-9.  
 Durability, no complaints, 19,266.  
 Fumes dangerous in confined places, 19,207-8.  
 Instances of its use, 19,242-5, 19,279-80.  
 Method of application, 19,191-9, 19,214-6.  
 Not affected by atmospheric conditions or sulphur and acid fumes, 19,231-41, 19,277.  
 Price of, 19,280-5.  
 Time taken to dry, 19,227-30.  
 Where used, 19,167-90, 19,267-76.

- CAMPBELL, HENRY ALEXANDER** (of the National Association of Master House Painters and Decorators of England and Wales):  
Evidence 3371-3636.
- Dry rubbing-down:**  
Causes very little dust, 3432-3, 3503, 3526-30.  
Exhaust fans impracticable, 3495-7.  
Impossible to get rid of all the dust, 3438-41.  
Indispensable in some cases, 3421-8.  
Of sharp colours causes more dust, 3612-5.  
Proportion of to total, one-third, 3536, 3549, 3578-85, 3588-92, 3637-8.  
Suggestion to moisten sandpaper to obviate dust, 3421, 3434, 3593-4.
- Dust and spray:** no way of removing danger in painting ceilings, stippling, etc., 3442-56.
- Foreign legislation:** aware of legislation abroad, 3390-3.
- Hours of employment:**  
Men object to short hours, 3617.  
Shorter hours more healthy for men, 3616.  
Would not agree to limitation of, 3496-7.
- Insurance rates:** recent increase due to lead poisoning, 3484-9.
- Leadless paints:**  
No prejudice against them, 3516-8.  
Not as good as lead, 3513-4.  
Office of Works test of four years not sufficient trial, 3631-3.  
Trade would welcome efficient substitute, 3558-9.
- Lead paints:** should be prohibited if efficient substitute found, 3470-4.
- Lead poisoning:**  
Cases of poisoning and sickness known of very few, 3376-82, 3561-4.  
Casual men might have lead poisoning without employer's knowledge, 3565-75; 3604-8.  
Casual men more liable to, 3597-603.  
Regrettable that this country should be behind others in legislation regarding, 3393.  
Unaware of figures showing extent of evil, 3383-9.
- Meals:**  
Accommodation away from paint and dust could be provided, 3414-8.  
Food could be kept away from overalls and brushes, etc., 3551-4.  
Food rarely brought in pockets now, 3555-7.  
Messroom generally provided on large jobs, 3550.
- Mixing:**  
Done on job, 3463.  
Done with lead in paste form, 3464.
- Overalls:**  
Should be provided, 3402.  
Storage away from paint and dust could be provided, 3404-13.  
Periodical medical examination impracticable, 3524-5.  
Prohibition: preferred to regulations, 3483.
- Regulations:**  
Could not be enforced, 3479-83.  
Would carry them out if lead retained, 3475-8.
- Removal of old paint:**  
Mask impracticable to prevent fumes in burning off, 3461-3.  
Solvent should be used, 3458-60.
- Wages:** rates paid, 3586-7.
- Washing:**  
Accommodation should be provided, 3396.  
Hot water essential, 3397.  
Practicable to provide, 3398-401.  
No difficulty in supplying accommodation, 3531-3.  
Soap, towels, nailbrushes, etc., already provided, 3504-5, 3576-7.
- Zinc paints:**  
Could not replace lead paints at present, 3623-4.  
Covering power less than lead, 3625.
- CANTRILL, WILLIAM HENRY** (of the National Association of Master House Painters and Decorators of England and Wales):  
Evidence, 3817-3965.
- Dry rubbing-down:**  
Causes dust, 3873-5.  
Exhaust fans impracticable, 3876-7.  
Indispensable in some cases, 3864-72.
- CANTRILL, WILLIAM HENRY—continued.**  
**Dry rubbing-down—continued.**  
Not dangerous, 3937.  
Reasons for, 3938-9.
- Dust and spray:**  
No splashing in stippling, but from painter who applies paint, 3885-6, 3940, 3959-65.  
No way of removing spray in painting ceilings, 3878-84.
- Foreign legislation:** aware of legislation abroad, 3835-8.
- Insurance rates:** recently increased, 3941-2.
- Leadless paints:**  
Experience with, 3898-9.  
Five years' test by H.M. Office of Works sufficient to recommend prohibition, 3943-4.  
Government should make tests before prohibiting lead, 3926-9.  
Used satisfactorily by men ignorant of composition, 3900-6.
- Lead poisoning:**  
Considers it can be contracted through the skin, 3957-8.  
Legislation regarding, overdue, 3839.  
Particulars of cases, 3947-51.  
Realises extent of, 3830-5.  
Several cases known of, 3824-6.
- Meals:** sometimes taken in rooms where painting is in progress, 3856-60.
- Mixing:**  
Done on job, 3893.  
Done with lead in paste form, 3894.
- Overalls:**  
Should be washed weekly, 3852.  
Should be worn, 3851.  
Storage of, 3853-5.
- Prohibition:**  
Exemption period, five years, 3921-5.  
Only solution, 3896-7.  
Preferred to regulations, 3914.
- Regulations:** impossible to carry out, 3861-3, 3908-13.
- Removal of old paint:**  
Danger from fumes from burning off outside very small, 3887-92, 3931-3.  
Solvents should be used for interior work, 3934.
- Washing:**  
Accommodation should be provided, 3840-1.  
Hot water:  
Essential, 3842.  
Generally obtainable, 3843-50, 3925-6.
- Zinc paints:**  
Effect of climate on, 3945-6.  
Standard should be fixed, 3915-20.
- Carbon Paints.** (See evidence of Messrs. Flatau and Milne and Mr. Ellison.)
- CARFRAE, G.** (of the Association of Master House Painters in Scotland):  
Evidence, 10,803-914.
- Compensation for suspension:** would agree to, 10,859-60.
- Dry rubbing-down:**  
Dust less in Scotland, because flat paints almost unknown, 10,823-30.  
No way of avoiding dust, 10,846-9, 10,865.  
Prohibition possible, but expensive, 10,902-4.
- Emanations:** no way of removing, 10,852-4.
- Foreign legislation:** aware of legislation abroad, 10,819-22.
- Lead poisoning:**  
No cases known of, 10,807-11, 10,882-6.  
Regrettable that this country should be behind others in legislation regarding, 10,822.  
Unaware of extent of evil, 10,812-8.  
Would be reduced by use of more oil in paints, 10,862-4, 10,887-92, 10,900-1.
- Meals:** accommodation away from paint and dust difficult in some cases, 10,836-7.
- Outdoor clothing:** storage away from paint and dust impossible, 10,840-1.



CARFRAE, G.—*continued.*

- Overalls:  
 Provision and washing by employer agreed to, 10,834-5.  
 Storage away from paint and dust could be provided, 10,838-9.  
 Periodical medical examination:  
 Practicable, 10,857, 10,876-81.  
 Would agree to, 10,855-8.  
 Prohibition: would increase cost of work, 10,911.  
 Regulations:  
 Preferred to prohibition, 10,861.  
 Would be expensive, 10,912-3.  
 Removal of old paint: no way of avoiding fumes in burning off, 10,850-1.  
 Washing:  
 Hot water better than cold, 10,843-5.  
 Not always practicable, 10,842.  
 White lead: more durable than zinc, 10,905-10.  
 Zinc paints: unsatisfactory trials, 10,866-75, 10,898-9.

## CARSON, K. K. (of the London Colour, Paint, Oil and Varnish Trades Association):

- Evidence, 11,749-945.  
 Compensation for lead poisoning: no difficulty in getting re-employment, 11,849-51.  
 Dry rubbing-down:  
 Could be dispensed with, 11,781-4.  
 Respirator practicable, 11,785-97, 11,855-79, 11,891, 11,894.  
 Serious danger, 11,780.  
 Time occupied at, 11,892-3.  
 Dust: principal danger, 11,824.  
 Lead poisoning:  
 Chiefly caused by paint on hands, 11,895-900, 11,931.  
 Cleanliness alone does not give immunity from, 11,921-5.  
 Men having several attacks should leave trade, 11,832-6, 11,852-4, 11,901-9.

## Mixing:

- Fumes do not cause lead poisoning, 11,930.  
 Should be done by paint grinders, and dry white lead prohibited, 11,752-5, 11,929.

## Overalls:

- Separate room for storage should be provided, 11,758-70.  
 Should be worn and washed weekly, 11,756-7.  
 Paint grinding: same machinery could be used for zinc as for lead, 11,847.

## Periodical medical examination:

- Difficulties in, 11,812-5, 11,823, 11,891.  
 Essential, 11,799-800, 11,848.  
 Frequency of, 11,804-11.

## Prohibition: would cause unemployment, 11,884-6.

## Regulations

- Enforcement:  
 Cost of, 11,820-2.  
 Foreman should be made responsible, 11,825-31.  
 Not very difficult, 11,802-3.  
 Number of inspectors necessary, 11,816-9.  
 Not very difficult to observe, 11,843-6.  
 Would reduce lead poisoning, 11,801.

## Removal of old paint: chipping paints off ships should be prohibited, 11,839-41, 11,940-5.

## Smoking and chewing tobacco should be prohibited, 11,798.

## Washing:

- Accommodation:  
 Essential, 11,771, 11,918-20.  
 Not always used by painters, 11,914-7.  
 Practicable, 11,936-9.  
 Cold water preferred, 11,772-5.  
 Soap, towels, and brushes essential, 11,776-7, 11,935.  
 Time should be allowed, 11,778.

## CHANCELLOR, H. G., M.P., and PENWARDEN,

S. P. (of Messrs. C. Chancellor & Co., Paint Merchants):

## Evidence, 21,359-496.

## Enamels:

- Costly if used as undercoats, 21,436-8.  
 Dry slowly, 21,439-52.

CHANCELLOR, H. G., M.P. and PENWARDEN, S. P.—*continued.*

## Leadless paints:

- Composition, mixing, medium, &c., 21,359-72.  
 Trade prejudice against new materials, 21,383.

## Prohibition:

- Difficult, 21,454-9.  
 Effect on public, 21,429-30, 21,463-5.

## Zinc oxide:

- Increase demand would probably increase price, 21,423-8.  
 Supply ample, 21,421.

## Zinc paints:

- Cheaper than lead paints, 21,374-9, 21,480-1.  
 Covering power twice as great as lead, 21,373, 21,486-8.  
 Instances of use, 21,380-418.  
 No difficulty in application, 21,474-9.  
 Suitable for sulphurous atmospheres, 21,431-4.

## CHAPPELL, J. B. (of the National Association of Master House Painters and Decorators of England and Wales):

## Evidence, 6443-662.

## Compensation for suspension: would agree to, 6571-4.

## Dry rubbing-down:

- Amount of dust caused, 6587-95, 6600-2.  
 Indispensable in some cases, 6532, 6650-3.  
 Moistening sandpaper suggested to avoid dust, 6535-8.

## No means of removing dust created, 6539-41.

## Dust and spray:

- Dangerous if inhaled, 6529-31.  
 No way of avoiding splashes in painting ceilings and stippling, 6542-7.

## Emanations: not aware that volatile lead compounds are given off from lead paint, 6599-601.

## Hours of employment:

- Number per week, 6561-2.  
 Would not agree to limitation of, 6563-5, 6578.  
 Insurance rates: have recently increased, 6449-53, 6621-5.

## Leadless paints:

- Office of Works test of four years not sufficient trial, 6556-60.  
 Only way of removing danger, 6552-3, 6588.

## Lead poisoning:

- No cases of poisoning or sickness known of, 6448, 6432, 6454-6, 6602-4.  
 Regrettable that this country should be behind others in legislation regarding, 6480-1.  
 Surprised at and unaware of figures showing extent of evil, 6472-7.

## Master House Painters Association:

- Have made tests to discover substitute by painting boards with different pigments, 6467-71.  
 Have taken no steps to discover extent of lead poisoning, 6457-64, 6620.  
 Have taken no steps to mitigate poisoning, 6465-6.

## Meals:

- Accommodation away from paint and dust could be provided, 6525-6, 6633-7.  
 Should not be taken near paint, 6522-4.

## Mixing:

- Done on job, 6550.  
 Done with lead in paste form, 6551.

## Outdoor clothing: storage away from paint and dust sometimes difficult, 6515-21.

## Overalls:

- Men should wear, 6494.  
 Should be cleansed weekly, 6501-10.  
 Storage of, 6511-4.  
 Trousers overalls not necessary, 6495-500.

## Painters:

- Follow no other occupation in slack season, 6612-3.  
 Formerly were exposed to lead poisoning, 6614.  
 Healthy class of men, 6605-11.  
 Periodical medical examination: would not agree to, 6568-70.

## Prohibition of lead: would abide by decision of Committee, 6584-5.

## Regulations:

- Certain dangers would not be removed, 6583.  
 Preferred to prohibition, 6581-2.

**CHAPPELL, J. R.—continued.**

Removal of old paint: can suggest nothing to remove fumes in burning off, 6548-9.

**Washing:**

Accommodation should be provided, 6485-6, 6627-9.

**Hot water:**

Not essential, but better than cold, 6487-9, 6493. Practicable to obtain, 6630-2.

Would allow time for washing, 6489-92.

White lead: best paint pigment for exterior work, 6586.

**Zinc paints:**

Satisfactory for inside work, 6555.

Unsatisfactory for outside work, 6555, 6639-49.

**Coal Tar Paints. (See evidence of Mr. Ellison.)****COLLIS, EDGAR LEIGH, M.B. (Member of Committee: H.M. Medical Inspector of Factories):**

Evidence, 3983-4050.

Compensation for suspension: painters excluded from Hearts of Oak Society, 4049-50.

Insurance rates: recent increase in, 4015-9, 4046-8.

**Lead poisoning:**

Effect of seasonal occupation, 4021-30, 4035.

Registrar-General's figures show:

11 per cent. excess mortality, 3989-97.

Excessive Bright's disease, phthisis, and nervous disease, 3998, 4040-5.

Median age at death eight years lower than for all males, 4002-6.

Statistics of Trade Societies: 3984-9, 4007-9, 4036-9.

Show 13-14 deaths due to lead poisoning in every 100, 3999-4001.

Show median age at death eight years lower than for all males, 4002-6.

**Compensation:****For lead poisoning:**

Claims: *Parsonage*, 2750-2.

Difficulty in re-insurance and re-employment after being compensated: *Legge*, 290-2; *Devine*, 20,494-7.

Discharge of workmen through claiming: *Walsh*, 3123-9.

No difficulty in re-employment after being compensated: *Carson*, 11,849-51.

Painters excluded from Hearts of Oak Society: *Collis*, 4049-50; *Dobie*, 11,024-7.

Payable in Holland: *Nooijen*, 15,313-8, 15,323, 15,414-30.

Payable in Switzerland: *De Morsier*, 16,651.

Some men reluctant to claim: *Parsonage*, 2753; *Devine*, 20,427-33; *Walsh*, 3116; *Smith, A.*, 21,233-5.

Unaware of any claims: *Orr*, 10,764-8.

Workers unaware of: *McKillop*, 20,960-3.

**For Suspension:**

Difficult or impracticable: *Anderson, C. J.*, 19,609-10; *Honeychurch*, 20,063.

Expense would fall on public: *Bennett*, 11,254-6.

Would agree to: *Chappell*, 6571-4; *Wiltshire*, 6770-1; *Carfrae*, 10,859-60; *Dobie*, 10,990-2; *Scott*, 12,273-6.

But for permanent painters only: *Orr*, 10,607-15.

But would get rid of delicate men: *Guest*, 11,192-3.

If law: *Puttroll*, 6336; *Wilkinson*, 19,962-3.

Would insure against: *Vaughan*, 13,692-5.

Would not agree to: *Barker*, 7002-6; *Holliday*, 8536; *Walker*, 9106-7; *Anderson, R. L.*, 11,352; *Donald*, 12,348; *Wallis*, 20,631.

**CONNELL, A. (of Messrs. Meister, Lucius and Bruning):**

Evidence, 21,890-946.

**Leadless colours:**

Cost has little effect on cost of painting, 21,930.

Cost slightly more than lead, 21,908-9.

Demand increasing, 21,914-24.

Hansa colours satisfactory for reds, yellows, and greens: 21,894-907, 21,926-9.

**COOKSON, C. (of Messrs. Cookson and Co., Ltd.**

White Lead Corrodors, Newcastle-on-Tyne):

Evidence, 2119-309.

**Dry rubbing-down:**

Moistening sandpaper with wet-felt backing suggested, 2150-7, 2201-5, 2243-5.

Respirator practicable, 2142-9, 2192-200.

Emanations: does not think they contain lead, 2238-42.

Hours of work: should be as short as possible, 2184-6.

Lead poisoning: Doubtful cases, 2166-70, 2219-29, 2274-83.

**Meals:**

Accommodation away from paint and dust difficult to provide, 2176.

Should be prohibited where lead dust is in air, 2177-9.

**Overalls:**

Should be worn, 2180.

Washing of, 2181-3.

Paint grinding: white lead in dry state preferred, 2234-7.

**Periodical medical examination:**

Government should pay for, 2248-50.

Important, 2173, 2213-6, 2259-60.

Practicable, 2210-12, 2246-7.

Would minimise danger, 2131-3, 2207-8.

**Prohibition:**

Complete, regulations only partial remedy, 2129-30, 2164-5.

Loss to white lead manufacturers involved, 2126-8.

Regulations: difficult to enforce, 2230-2.

Removal of old paint: no lead fumes given off in burning off, 2158-61, 2233-7, 2251-3.

**Washing:**

Accommodation should be provided by employer, 2265-73.

Accommodation sometimes difficult to provide, 2134-6.

Hot water desirable but not always practicable, 2187-9.

**White lead:**

Dry white lead nearly all sent to colour grinders, 2306-9.

Manufacturers should be compensated if lead prohibited, 2256.

Sulphate as soluble as carbonate, 2187.

**COYSE, COMMANDER W. H., R.N.R. (Marine Superintendent, Great Eastern Railway Company):**

Evidence, 9569-9660.

Iron oxide paints, satisfactory, 9606-8.

**Ship painting:**

Lead paints still used for iron primings, 9596-602.

Possibility of finding substitute for red lead as priming coat, 9606-22.

Prohibition of lead would not affect G. E. Railway Company, 9588-91, 9657-60.

Repainting necessary on account of mechanical damage, 9636-46, 9654-6.

**Zinc paints:**

Adopted for business, not humanitarian, reasons, 9592-5.

Better than white lead, 9577-87, 9623-9.

Retain colour better than lead, 9653.

Vehicle used, 9649-52.

Will be used exclusively in future, 9574-5, 9587, 9634-5.

**CRACE, JOHN DIBBLEE (of the Incorporated Institute of British Decorators):**

Evidence, 1880-2118.

**Dry rubbing-down:**

Causes little dust, 1944, 2020, 2060.

Not indispensable, 1945-50, 2059.

Reasons for, on new paint, 2019.

Education and training of painters, 2003-8.

Foreign legislation: unaware of legislation abroad, 1993-8.

**Hours of employment:**

Number per week, 1976.

Overtime worked, 1977.

ORACE, JOHN DIBBLEE—*continued.*

Lead poisoning :  
Fewer cases in decorative work than plain painting 2096-101.  
Incidence shown by official statistics very deplorable, 1988.  
Particulars of cases known of, 1912-20, 2065-72.  
Regrettable that this country should be behind others in legislation regarding, 1999.  
Surprised at figures showing extent of evil, 1981-7.  
Leadless paints: surprised at results of Office of Works experiments: 2026-9.

## Meals:

Generally taken away from paint, 1970-5.  
Times when taken, 1968.

## Mixing paints:

Lead used in paste form, 1937-40.  
Mostly done on job, 1934-6.  
With hands unknown, 2088-9.

## Overalls:

Provided by men, 1930-1.  
Washing of, 1932, 2062-4, 2075.

## Painters:

Apprenticeship system advocated, 2003-8.  
Health of, 2032-5.

Prohibition of lead: would be disastrous to trade, 2021-5.

Regulations: difficult to enforce, 2040-5.

Removal of old paint: solvents used, 2000-2.

## Rubbing down:

Sandpaper used between coats, 2102-3.  
Sandpaper used on old coats, 1941-3.  
Wet method can generally be used throughout, 1945-50, 2059.

Stopping: composition and application, 1952-6.

Wages, 2091-3; 2109-14.

Washing accommodation, 1921-9, 1992, 2056-8, 2036-9, 2076-87, 2104-7.

Provision of hot water, 1957, 2015-8, 2048-55, 2081-7.

Zinc paints: improvements in recent years, 2018-4.

## CROW, J. K., D.Sc. (of the London Colour, Paint, Oil, and Varnish Trades Association):

Evidence, 11,946-12,183.

Driers: small amount of lead necessary: 12,039-47, 12,178-80.

## Dry rubbing-down:

Causes very little dust, 11,994-7.  
Danger very small, 12,007-8.

## Lead colours:

Greens: amount of lead required, 12,005-16.

Reds: lead necessary to obtain bright shades, 12,024-37, 12,091-113.

## Yellows:

Pale colours could be obtained with 5 per cent. soluble lead in form of chromate, 11,955, 12,067-71, 12,084-5, 12,089-90, 12,117-9.  
Strong colours require more lead than permitted by 5 per cent. solubility limit, 12,072-82.

## Leadless colours:

Dearer than lead, 11,978, 11,982-4, 12,017-8, 12,022-3.

Zinc chromate in place of lead would reduce range of colours: 11,971-6, 11,985-93.

Paint grinding: same machinery could be used for zinc as for lead, 12,181-2.

## Restriction to 5 per cent. solubility:

Admits 20 per cent. lead chromate, 12,073.  
Preferable to absolute prohibition, 12,061-3.  
Would allow sufficient lead for driers, 12,047.

Solubility of lead compounds in dilute HCl: Lead chromate only slightly soluble, 11,998-2002, 12,019-21.

Zinc: price would rise with prohibition of lead: 12,135-6.

## Zinc Oxide Combine:

Broken Hill Mines not included, 12,142-3.  
Entire corner in zinc hardly possible, 12,133-46.

## Zinc paints:

Cost more than lead, 12,065.  
Zinc sulphide unsatisfactory for outside, 12,130-2.

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## CUNNEW, A. (of Messrs. Szerelmey &amp; Co., Leadless Paint Manufacturers, Rotherhithe):

Evidence, 10,181-281.

Driers: no lead used; 10,199-203.

## Leadless paints:

Cost more in package but cheaper in work, 10,226.  
Covering power as good as lead, 10,219-24.  
Durability very good, 10,228-9, 10,238-41.  
Prejudice against in building trade, 10,264-74.  
Satisfactory for outside and inside work, 10,230-7, 10,242-9.

## Paints:

Greens contain 5-7 per cent. lead, 10,187, 10,250-1, 10,253.

No lead used except for greens, 10,189-98.

Prohibition: effect of, on small leadless paint manufacturers, 10,280-1.

Restriction to 5 per cent. soluble lead—some colours require more than 5 per cent. lead, 10,205-18, 10,260-3.

## Zinc paints:

No sediment with keeping, 10,277-8.

Suitable for outside painting in manufacturing towns, 10,254-6.

## CUNYNGHAME, SIR HENRY, K.C.B. (Legal Assistant Under Secretary of State for the Home Department):

Evidence, 10,282-356.

Building, definition of, 10,306.

## Foreign legislation:

Observance of regulations slack, 10,342-4  
Summary of Austrian regulations, 10,289-91.  
Summary of Belgian regulations, 10,296.  
Summary of French law, 10,288, 10,345-7.  
Summary of German regulations, 10,292-5.

## Lead poisoning:

Combined system of regulations and prohibition suggested to prevent evil, 10,302-4  
Some action necessary to prevent evil, 10,284-6.

## Prohibition:

Easy to enforce, 10,300-1.

Effect of, on imported goods painted with lead, 10,352-6.

Exemption for special articles, 10,329.

Exemption for special cases accompanied by regulations, 10,318-27.

If white lead scheduled, power should be given to add other dangerous paints to schedule, 10,306.

Summary of difficulties, exemptions, &c., 10,306-15.  
Time should be allowed for change from lead to zinc, 10,328.

With exemptions preferred to 5 per cent. solubility limit, 10,316-7, 10,335.

Regulations: practicable, and could remedy evil, 10,297-9.

## Restriction to 5 per cent. of soluble lead:

Administrative difficulty, 10,337-41.

Difficulty of painters adhering to standard, 10,348-51.

White lead: sale should be prohibited for making of paints, 10,336.

Zinc oxide: standard of purity, 10,331-4.

## DE MORSIER, M. (Reporter to the Swiss White Lead Commission):

Evidence, 16,481-673.

Compensation for lead poisoning payable in Switzerland, 16,651.

Dry rubbing-down: not indispensable, 16,581-2.

## Foreign legislation:

French Commission's findings criticised, 16,561-9, 16,626-31.

Geneva Commission's findings criticised, 16,481-518, 16,612-6, 16,664-5, 16,672-3.

Swiss Federal Councils' Proceedings, 16,519-49.

Leadless paints: experience of, 16,608-11.

## Lead poisoning:

Decrease following regulations in Switzerland, 16,600-1.

Statistics in Switzerland, 16,550-6 16,602-3, 16,641-2.

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DE MORSIER, M.—*continued.*

- Prohibition:  
Easier to enforce than regulations, 16,657-60.  
Should follow if an efficient substitute found, 16,668.  
Would require inspection equally with regulations, 16,636.  
Regulations: enforcement in Switzerland, 16,574-80, 16,583-97, 16,617-25.  
White lead: no efficient substitute yet found, 16,640.  
Zinc paints: more difficult to apply than lead, 16,646-9.

## DEPIERRES, GASTON (of the Indestructible Paint Co., Ltd., Limhouse, B.):

- Evidence, 18,996-19,166.  
Leadless colours:  
Dearer than lead, 19,090-1.  
Reds: improvements in, 19,083-94.  
Leadless paints:  
Lithopone: increasing use of, 19,137-8.  
Satisfactory for inside work, 19,038-45.  
Lead poisoning: doubtful cases, 19,157-60.  
Paints: should be supplied ready mixed, 19,131-3.  
Prohibition:  
Easiest solution, 19,163-6.  
Practicable, 19,007-12.  
Quality of painting would not be reduced, 19,008.  
Would not interfere with business, 19,074-5.  
Restriction to 5 per cent. soluble lead: lead chromate so insoluble as not to be affected, 19,095-104.  
White lead: bad effect of sulphur gases, 19,003-6.  
Zinc: supply sufficient if lead prohibited, 19,141-5.  
Zinc oxide:  
By direct process cheaper and better, 19,016-31.  
With 4 per cent. lead admitted by certain foreign Governments, 19,034.  
With 4 per cent. lead most suitable, 19,032-7.  
Zinc paints:  
Application: special knowledge required but no great difficulty, 19,043-50.  
Better than lead for keeping, 19,052-9.  
Cost same as lead, 19,051.  
Covering power better than lead, 19,060-1, 19,114-8.  
Efficient substitute for white lead, 19,073.  
Guarantee given, 19,054, 19,059.  
Retain colour as well as lead, 19,119-27.

## DEVINE, JOSEPH (of the National Amalgamated Society of Operative House and Ship Painters):

- Evidence, 20,334-556.  
Compensation for lead poisoning:  
Difficulty in re-engagement after receiving compensation, 20,494-7.  
Some men reluctant to claim, 20,427-35.  
Dry rubbing-down: cheaper than wet process, 20,379-80.  
Dust and spray:  
Greatest danger, 20,414.  
No way of avoiding spray in stippling unless lead prohibited, 20,362-5, 20,381, 20,415-22.  
Leadless paints:  
Practicable for outside, 20,437-9.  
With varnish durability increased for outside, 20,440-5, 20,469-86.  
Lead poisoning:  
Clean men may be affected, 20,340, 20,391-2.  
Details of cases, 20,337-51, 20,451-68, 20,502-6, 20,522-3, 20,533-5.  
Distribution of regulations and literature may tend to lessen evil, 20,498-501, 20,507-17, 20,524-9.  
Principal causes of, 20,352-61, 20,366-70.  
Meals:  
Accommodation away from paint and dust impossible in some cases, 20,395-8.  
Food sometimes contaminated by dust, 20,554-6.  
Mixing: methods of, 20,332-3, 20,540-3.  
Periodical medical examination: not favoured, 20,423-6.  
Prohibition: only remedy, 20,436.  
Regulations: will not remove danger, 20,384-5, 20,527.  
Rubbing down: wet method impossible in some cases, 20,371-8, 20,519-21.

DEVINE, JOSEPH—*continued.*

- Overalls:  
Generally worn, 20,399-403.  
No hardship for men to provide and wash, 20,487-93.  
Washed weekly, 20,404-5.  
When washed, 20,544-53.  
Turpentine: causes danger from paint fumes, 20,355-7.  
Washing accommodation essential, 20,387.  
Hot water:  
Better than cold, 20,388-93.  
Not always practicable, 20,394.  
Zinc paints:  
No difficulty in application, 20,449-50.  
No effect on health, 20,446-8.

## DOBBIE, JAMES J., D.Sc. (Principal Chemist of the Government Laboratory):

- Evidence, 22,481-548.  
Dry rubbing-down: prohibition would do away with direct lead poisoning, 22,519-22.  
Emanations:  
Not sufficient in amount to be detectable from painted surfaces, 22,490-6, 22,523-48.  
No volatile lead compounds given off from metallic lead, 22,485-9, 22,505.  
Spectroscopic test, 22,497-9, 22,506.  
Trillat's test not reliable, 22,481-4, 22,501-4.  
Turpentine source of most of the decomposition products, 22,500, 22,507-18.

## DOBIE, W. F. (of the Association of Master House Painters in Scotland):

- Evidence, 10,915-11,068.  
Compensation for suspension:  
Painters excluded from Hearts of Oak Society, 11,024-7.  
Would agree to, 10,990-2.  
Driers: kinds used, 11,030-1.  
Dry rubbing-down:  
Dust less in Scotland, 10,978-83.  
Might be dispensed with, but quality of work would suffer, 11,051-3.  
Reasons for, 11,053-7.  
Time occupied at, 10,988.  
Emanations: no way of avoiding, 10,986-7.  
Lead poisoning:  
Cases known of, 10,919-23.  
Deplorable, if statistics reliable, 10,937.  
Does not think either stringent regulations or prohibition necessary to prevent, 10,998-1002.  
Does not think official figures refer to Scotland in the same way as to England, 10,924-36, 10,940-50, 11,004-18.  
Meals: accommodation away from paint and dust difficult in some cases, 10,955-8, 11,060-3.  
Outdoor clothing: storage away from paint and dust difficult in some cases, 11,060-3.  
Overalls:  
Collect dust if not stowed away, 10,959-64.  
Provision and washing by employer difficult, 10,952-4.  
Painting: a healthy occupation, 11,023-9.  
Periodical medical examination:  
In England but not in Scotland, 10,926-30.  
Would agree to, 10,989.  
Prohibition: would lead to adulteration of paints, 11,065-8.  
Regulations:  
If impracticable, prohibition only alternative, 11,002-3.  
Impossible to observe, 10,998.  
Would entail increased charges, while use of leadless paints would mean more frequent painting, 10,993-8.  
Removal of old paint: solvents could replace burning off, 10,984-5.  
Washing:  
Danger in wiping hands on handkerchiefs, 10,973-7.  
Hot water not always practicable, 10,966.  
Towels, soap, and nailbrushes: would agree to provide, 10,967-72.

DOBLE, W. F.—*continued.*

- Zinc paints:  
 Defects in Office of Works paints, 11,036-9.  
 Excellent, but flat surface cannot be obtained, 11,032-5, 11,042-4, 11,064.  
 Not so good as lead for outside work, 11,045.

## DONALD, JOHN R. (of the Association of Master

- House Painters in Scotland):  
 Evidence, 12,294-354.  
 Compensation for suspension: would not agree to pay, 12,348.  
 Dry rubbing-down:  
 Can suggest no way of removing dust, 12,344.  
 Causes little dust, 12,341-3.  
 Leadless paints:  
 Could replace lead paints, 12,323-4.  
 Dearer than lead paints, 12,325.  
 Experience with, 12,315-24.  
 Lead poisoning:  
 Cases known of very few, 12,298-303.  
 Incidence shown by official statistics very deplorable, 12,312.  
 Surprised at figures showing extent of evil, 12,304-11.  
 Meals: accommodation away from paint and dust impossible in some cases, 12,334-6.  
 Outdoor clothing: storage of away from paint and dust impossible, 12,338.  
 Overalls:  
 Provided by men, 12,332.  
 Provision by employers difficult, 12,333.  
 Storage of, 12,337.  
 Periodical medical examination:  
 Difficult to carry out, 12,346-7.  
 Would agree to if law, 12,345.  
 Washing: accommodation difficult to provide, 12,339-40.

## Driers:

- Amount of lead necessary small: *Crow*, 12,039-47, 12,178-80; 10-15 per cent.: *Holzappel*, 11,524-31.  
 Kinds used: *Dobie*, 11,030-1.  
 No lead used: *Cumneo*, 10,199-203.

## Dry Rubbing-down:

- Amount of: *Parsonage*, 2884; *Lowe*, 3303-5, 3316-30; *Campbell*, 3536, 3549, 3578-85, 3588-92, 3637-8; *Harris*, 3699, 3796-9; *Bancroft*, 414-65; *Anderson, R. L.*, 11,428-31; *McKillop*, 20,776-8, 20,888-98.  
 Amount of sandpaper used: *Parsonage*, 2899-909.  
 Cheaper than wet process: *Devina*, 20,379-80.  
 Danger:  
 Great: *McKillop*, 20,765.  
 Not recognised: *Cantrill*, 3937; *Grundy*, 7199-217, 7283-7.  
 Very small: *Crow*, 12,007-8; *Simpson*, 21,577-83.  
 Unless person susceptible to poisoning: *Plumb*, 18,401-11.  
 Dangerous: *Wait*, 1465.  
 Dust created: *Webb*, 4191-2; *Bonner*, 4313-4; *White*, 9515-8; *McKillop*, 20,781-6, 20,797-800; *Smith, A.*, 21,113-5.  
 Amount of: *Legge*, 201-6; *Harris*, 3703, 3763-9; *Cantrill*, 3873-5; *Bancroft*, 4083-4, 4132-41; *Chappell*, 6587-95, 6660-2; *Wiltshier*, 6850-2; *Barker*, 6961-2; *McDermid*, 7379-85; *Anderson, J.*, 19,641-57.  
 Large: *Parsonage*, 2648-52, 2844; *Holzappel*, 11,550.  
 Less in Scotland, as flat paints almost unknown: *Carfrae*, 10,823-30; *Dobie*, 10,978-83; *Gucst*, 11,146-54; *Bennett*, 11,294-9.  
 Small: *Crace*, 1944, 2020, 2060; *Campbell*, 3432-3, 3503, 3526-30; *Puttrel*, 6273-8, 6282; *Crow*, 11,994-7; *Scott*, 12,256-7, 12,287; *Donald*, 12,341-3; *Plumb*, 18,291-2; *Wilkinson*, 19,990-5.  
 And not injurious: *Orr*, 10,618-32, 10,674-6, 10,779-81.  
 From carbon paints: *Flatau and Milnes*, 386-7.  
 Dust does not float in air but falls to ground: *Wilkinson*, 19,949-59.

Dry Rubbing-down—*continued.*

- Dusty process: *Wiltshier*, 6727.  
 Exhaust fans impracticable: *Walsh*, 3112-3; *Campbell*, 3435-7; *Harris*, 3709; *Cantrill*, 3876-7; *Bancroft*, 4066; *Webb*, 4198; *Puttrel*, 6281; *Wiltshier*, 6725-6; *Barker*, 6963; *McDermid*, 7378; *Holliday*, 8493; *Higgs*, 8927; *Holzappel*, 11,554; *Kaup*, 14,235.  
 Felt and polish suggested as an alternative: *McDermid*, 7453-65.  
 Frequent sweeping of floors suggested to remove dust: *Puttrel*, 6286-93.  
 Indispensable in some cases: *Parsonage*, 2653-6, 2727-31, 2886-98; *Pickles*, 2956-61, 2995; *Walsh*, 3088-9, 3114; *Wilson*, 3165-6; *Lowe*, 3265-7; *Campbell*, 3421-8; *Harris*, 3697, 3702; *Cantrill*, 3864-72; *Bancroft*, 4067-72; *Webb*, 4199-207; *Bonner*, 4308-12, 4405-9; *Chappell*, 6532, 6650-3; *Wiltshier*, 6722-4; *Barker*, 6957-60; *Grundy*, 7198, 7289-96; *Holliday*, 8491; *Higgs*, 8925; *Walker*, 9077; *White*, 9256-61, 9416-7, 9444-5; *Orr*, 10,633-47; *Styles*, 14,082-3, 14,152; *McKillop*, 20,779-80, 20,792-6, 20,801-2.  
 Methods in Belgium: *Ricker-Devroede*, 14,897-909.  
 Moistening paint before sandpapering done in Germany: *Niederhauser*, 16,374-9.  
 Moistening sandpaper to prevent dust:  
 Impracticable: *Parsonage*, 2845-8; *Plumb*, 18,378-83.  
 Not known of: *Bancroft*, 4170-2.  
 Rarely done: *Harris*, 3790-2.  
 Suggested: *Cookson*, 2150-7, 2201-5, 2243-5; *Campbell*, 3434, 3523-4; *Chappell*, 6535-8; *Barker*, 7058-60; *White*, 9872-7, 9514, 9519-20; *Orr*, 10,760-3; *Wilkinson*, 19,946-8.  
 No way of removing dust created: *Campbell*, 3438-41; *Harris*, 3710-7; *Chappell*, 6539-41; *Wiltshier*, 6730-1; *McDermid*, 7377; *Carfrae*, 10,846-9, 10,865; *Anderson, E. L.*, 11,346; *Donald*, 12,344; *Styles*, 14,084; 14,153-5.  
 Not indispensable: *Crace*, 1945-50, 2059; *Puttrel*, 6272; *Holzappel*, 11,551, 11,556-7; *Carson*, 11,781-4; *Vaughan*, 13,645-58, 13,733-42; *Morton*, 13,900-8; *Griffiths*, 13,996-4000; *Kaup*, 14,230-4; *Meissl*, 14,688, 14,725-9; *Ricker-Devroede*, 14,896; *Nootjen*, 15,283; *Niederhauser*, 16,303-4; *De Morsier*, 16,581-2; *Sibthorp*, 17,790-3, 17,900-6, 18,000-14; *Plumb*, 18,106, 18,295-304; *Anderson, J.*, 19,713-9; *Smith, A.*, 21,088-9, 21,125-6, 21,286-9, 21,352-4.  
 But would not like to do without it: *McDermid*, 7369-76.  
 Of zinc painted surfaces, containing lead dangerous: *Klein*, 16,906-11.  
 Of zinc paints as dangerous as lead: *Ricker-Devroede*, 14,886-95.  
 Of zinc paints dangerous: *Plumb*, 18,156-62, 18,268-81, 18,354-5.  
 Only done on good work: *McKillop*, 20,976-80.  
 Principal danger: *Parsonage*, 2637, 2647, 2883; *Pickles*, 2954, 3026; *Wilson*, 3164, 3217-22; *Bancroft*, 4065; *Mockford*, 8738-9; *Higgs*, 9006-7; *Holzappel*, 11,549; *Carson*, 11,780.  
 Prohibited in Germany: *Niederhauser*, 16,292.  
 Prohibition:  
 Essential: *Rambousek*, 14,526.  
 Might be tried: *Orr*, 10,771-5.  
 But quality of work would suffer: *McDermid*, 7492-8; *Dobie*, 11,051-3.  
 No insuperable difficulties: *Rivet*, 15,609-15.  
 Not strictly enforced in Belgium: *Ricker-Devroede*, 15,062-5.  
 Possible but expensive: *Carfrae*, 10,902-4.  
 Possible for old work but not for new work: *Wiltshier*, 6728-9; *McDermid*, 7436-49.  
 Would do away with direct lead poisoning: *Dobbie*, 22,519-22.  
 Would greatly reduce lead poisoning: *Klein*, 16,943, 16,966.  
 Would not remove all danger: *Pickles*, 2996-9.  
 Reasons for: *Crace*, 2019; *Cantrill*, 3935-7; *White*, 9442-3; *Orr*, 10,776-8; *Dobie*, 11,053-7; *Smith, A.*, 21,349-51.

**Dry Rubbing-down—continued.****Respirators:**

Only suggestion: *Holliday*, 8402; *Higgs*, 8928-9, 8974-8; *Walker*, 9078-80, 9119-20; *Scott*, 12,200-8, 12,280-3; *Morton*, 13,909-12; *McKillop*, 20,766-74.

But thinks impracticable: *Harris*, 3707-8.

Practicable: *Cookson*, 2142-9, 2192-200; *Darker*, 6979, 7016; *White*, 6202-7; 9298-306; *Carson*, 11,785-97, 11,855-79, 11,891, 11,894.

Should be worn: *Puttrell*, 6279-80; *Willis*, 11,706-8.

Suggested: *Orr*, 10,638-40; *Rivet*, 15,424-8; *Klein*, 16,839.

Uncomfortable: *McKillop*, 20,775.

Sandpapering of coats most dangerous: *Holzappel*, 11,543.

Sharp colours create more dust: *Campbell*, 3612-5.

Should be prohibited: *Klein*, 16,858; *Johnson*, 22,465.

After burning off: *Sibthorpe*, 17,765-7.

On old work: *Higgs*, 9008-21.

Time occupied at: *Webb*, 4198-4, 4278-85; *Dobie*, 10,988; *Carson*, 11,892-3; *Plumb*, 18,293-4; *Anderson, J.*, 19,965-6; *Smith, A.*, 21,090-9, 21,346-8.

**Dust and Spray (See also Dry Rubbing Down):**

Danger in paperhanging: *Bonner*, 4332-6.

Danger in stippling diminished by increased use of distempers: *Parsonage*, 2849-53.

Dangerous if inhaled: *Chappell*, 6529-31.

Determination of amount in air: *Kaup*, 14,194.

Difficult to safeguard workers against: *Bonner*, 4367; *Griffiths*, 14,051.

Exhaust fans to remove dust:

Impracticable: *Legge*, 177-8, 198-9; *Parsonage*, 2683, 2726; *Pickles*, 2994; *Orr*, 10,586-8; *Wilkinson*, 19,943-5; *Honeychurch*, 20,061; *Willis*, 20,628.

Possible but difficult to apply: *Anderson, J.*, 19,562-97, 19,790-5.

Inhalation experiments (animals) with dust of zinc and lead: *Goadby*, 15,761-84.

No dust in paint-shop: *McKillop*, 21,016, 21,037-40.

No splashes created in stippling: *Harris*, 3724-7, 3811-3; *Bonner*, 4315-22, 4410-2; 4421-4; *Grundy*, 7229-33.

But from man who applies the paint: *Cantrill*, 3885-6, 3949, 3959-65.

No way of avoiding danger from splashes in stippling or painting ceilings: *Campbell*, 3442-56; *Harris*, 3718-21; *Cantrill*, 3878-84; *Puttrell*, 6294-7, 6306-10; *Chappell*, 6542-7; *Wiltshier*, 6732-7; *Grundy*, 7218-26; *McDermid*, 7980-95; *Holliday*, 8494-8, 8501-2; *Higgs*, 8930-5; *Walker*, 9081-4; *Vaughan*, 13,659-69; *Morton*, 13,913-8; *Griffiths*, 14,001; *McKillop*, 20,808-10; *Smith, A.*, 21,158-69.

Unless lead prohibited: *Devino*, 20,362-5, 20,381, 20,415-22.

No way of removing dust: *Laidler*, 744-6; *Guest*, 11,117-20; *Bennett*, 11,237-44, 11,266-9.

Not breathed by painters: *Harris*, 3722-3; *Grundy*, 7227-8, 7255-8.

Not dangerous if inhaled: *Wiltshier*, 6720-1.

Not enough created to be dangerous: *Anderson, R. L.*, 11,344-5.

Principal danger: *Legge*, 273-4, 302, 334; *Parsonage*, 2861; *Carson*, 11,824; *Edginton*, 13,095; *Kaup*, 14,227, 14,239; *Leyendecker*, 16,459-62; *Goadby*, 15,925-8; 21,996-7, 22,034-50, 22,064-70; *Klein*, 16,838-42, 16,944; *Devino*, 20,414; *Smith, A.*, 21,240, 21,282; *Armstrong*, 22,175-6.

**Respirators:**

Impracticable: *Parsonage*, 2680-2, 2857, 2910.

No knowledge of wearing: *McKillop*, 20,888-91.

Only suggestion: *White*, 9275, 9347-60.

Storage of, difficult: *Parsonage*, 2858-9, 2911-4.

Suggested for avoiding splashes created in stippling and painting ceilings: *Webb*, 4212-6, 4267; *Barker*, 6964-74, 6979; *McKillop*, 20,811-4.

Splashes created in stippling and painting ceilings: *Parsonage*, 2672-9; *Bancroft*, 4075-6.

Dangerous: *Pickles*, 2962, 3024-5, 3029-32; *Walsh*, 3090; *Wilson*, 3167; *Lowe*, 3264; *Webb*, 4208-11, 4264-6.

**Dust and Spray—continued.**

Ventilation would reduce danger of spray in stippling: *Bancroft*, 4077.

Very little splashing in stippling: *Higgs*, 8936-9.

Washable distempers could replace lead paints for walls and ceilings: *Puttrell*, 6298-305, 6311; *Holliday*, 8499-500, 8557-70.

Washing hands and face suggested as remedy for splashes in stippling: *Wiltshier*, 6738-45; *White*, 9268-72.

**EDGINTON, R. W., M.D. (Certifying Factory Surgeon for North Birmingham):**

Evidence, 13,082-165.

Dust: principal danger, 13,095.

Emanations: may cause lead poisoning, 13,151-2.

Leadless paints: only way of removing danger, 13,101.

Lead poisoning:

Cleanliness alone will not prevent, 13,105-13.

Confirmatory symptoms in every case, 13,092.

Details of cases, 13,090-1.

Eagerness of men to be certified, 13,132-4.

Eleven cases observed, three reported to Home Office, 13,083-9.

Increase in known cases due to Workmen's Compensation Act, 13,160-5.

Knowledge of cases due to application for certificates under Workmen's Compensation Act, 13,123-31.

Long hours increase danger, 13,139-49.

Regulations: impracticable, 13,102-4.

Washing: accommodation difficult to provide, 13,153-6.

**Education of Painters:**

Apprentices:

Instructed in cleanliness rather than in avoidance of dust: *Puttrell*, 6373-83.

Taught to avoid lead poisoning: *Puttrell*, 6403-4.

Apprenticeship system advocated: *Crace*, 2003-8; *Wilkinson*, 20,015-6; *Johnson*, 22,267.

Important: *Klein*, 16,863-8, 16,912-22, 16,940-2; *Francis*, 17,393-6; *Humphreys*, 17,375-401.

Trade guilds suggested: *Johnson*, 22,409-15.

Would obviate danger of paint on hands, &c.: *Anderson, J.*, 19,761-74, 19,847-52.

**ELLISON, GEORGE (Resident Engineer to the South-Eastern and Chatham Railway at Charing Cross and Cannon Street Stations):**

Evidence, 10,424-506.

Bridge painting:

Leadless paints widely used by South-Eastern and Chatham Railway, 10,426-7.

Prohibition of use of lead would not interfere with, 10,468.

Carbon paints:

As durable and efficient as lead, 10,459-6.

Cost, 10,458-62.

Coal tar paints:

Cost, 10,458-62.

Durable and very efficient, 10,432-43, 10,502.

Preparation, uses, and application, 10,428-31.

Graphite paints:

Silica-graphite paints:

Can be covered by lighter tinted paints, 10,478-92.

Cannot be used white, 10,452.

Cost, 10,458-62.

Superior to lead, 10,447-9, 10,503-6.

Where used, 10,444-6.

Zinc paints: as good as lead, 10,463-7, 10,493-501.

**Emanations:**

Bacterial growth experiments: *Goadby*, 21,947-22,001.

French experiments disagreed with: *Goadby*, 15,831-42.

Dangerous: *Webb*, 4227.

French experiments criticised: *Klein*, 16,854-5, 16,898-905; *Armstrong*, 22,108-42, 22,151-3.

From burning off old lead paint:

Do not contain lead: *Klein*, 16,951-7.

Possibility of their containing lead: *Bäly*, 1710-2.

**Emanations—continued.**

- From dry white lead do not contain lead: *Baly*, 17,002-9.
- From drying paint:  
Do not contain lead: *Goadby*, 15,660-79; *Armstrong*, 15,935-48, 16,102-7; *Klein*, 16,790-901, 16,846-8, 16,877-80; *Bettink*, 18,441.
- Does not think they contain lead: *Cookson*, 2238-42; *Chappell*, 6599-601; *Orr*, 10,596-8; *Rambousek*, 14,636-7; *Leyendecker*, 16,398.
- Produce headache, but not lead poisoning: *Legge*, 213-5.
- Thinks they contain lead: *Parsonage*, 2689-92, 2860; *Plumb*, 18,234-45, 18,338-9.
- May cause lead poisoning: *Edginton*, 13,151-2.
- Not sufficient to be detectable: *Dobbie*, 22,490-6, 22,523-48.
- From heating metallic lead do not contain lead: *Dobbie*, 22,485-9, 22,505; *Goadby*, 15,828-30.
- From white lead or litharge do not contain lead: *Klein*, 16,789-9, 16,950.
- From white lead paste, possibility of their containing lead: *Baly*, 1695-701.
- Given off from paint: *Klein*, 16,774-9, 16,881-92.
- Hygienic effect of: *Armstrong*, 22,150, 22,159-65, 22,173.
- Nature of volatile products given off from linseed oil: *Klein*, 16,781-2.
- No way of removing: *Pickles*, 2993; *Carfras*, 10,852-4; *Dobie*, 10,986-7; *Guest*, 11,122-6; *Bennett*, 11,246-50.
- Opening windows suggested to remove danger: *Wiltshier*, 6791-2; *Anderson, R. L.*, 11,347-50.
- Possibility of evolution at ordinary temperatures: *Baly*, 1707-9.
- Prohibition of lead only remedy for: *McDermid*, 7451-7, 7466-72.
- Pug mill vapours free from lead: *Klein*, 16,811, 16,893-7.
- Rate of drying of paints: *Klein*, 16,780.
- Rate of evaporation:  
Different for turpentine, oil, and mixtures with zinc and lead: *Armstrong*, 15,956-63, 16,001-35, 16,057-66, 16,091-8, 16,108-31.
- Of turpentine: *Armstrong*, 16,067-72, 16,081-9, 16,144-5; *Klein*, 16,812-5.
- Possibly increased by using large proportion of oil: *Baly*, 1725-47.
- Quicker with white lead and oil than zinc and oil: *Armstrong*, 15,953-4.
- Respirators would not prevent inhalation: *Parsonage*, 2787-90.
- Smell of lead paint due to oxidation of oil: *Armstrong*, 15,981-9.
- Spectroscopic test: *Baly*, 1666-94, 16,998-7001; *Dobbie*, 22,497-9, 22,506.
- Trillat's test unreliable: *Goadby*, 15,679-88, 15,918; *Armstrong*, 16,036-55, 22,134-9; *Dobbie*, 22,481-4, 22,501-4.
- Turpentine vapour:  
Cause of illness from drying paints: *White*, 9504-6; *Kaup*, 14,441-5, 14,462; *Goadby*, 15,689-752, 15,789-96, 15,843-60, 15,861-80, 22,098-107; *Armstrong*, 15,949-51, 15,966; *Sibthorpe*, 17,971-3.
- Danger varies with rate at which given off: *Armstrong*, 16,159-64.
- Effect on the blood: *Armstrong*, 16,152-6.
- Effects transitory and can be got rid of by opening windows: *Armstrong*, 15,990-9, 16,073-80, 16,134-41, 22,177-80.
- May predispose to lead poisoning: *Goadby*, 15,797-800; 15,881-3.
- Might account for higher incidence of Bright's disease among painters: *Goadby*, 15,801-3.
- Unsaturated aldehydes cause of illness from drying lead paint: *Baly*, 17,010-63.
- Volatile lead compounds very poisonous: *Baly*, 1702.
- Cannot be prepared from linseed oil and lead compounds: *Klein*, 16,802-10, 16,854.

**Enamels:**

- Costly, if used as undercoats: *Chancellor and Penwarden*, 21,436-8.
- Dry slowly: *Chancellor and Penwarden*, 21,439-52.
- Generally made from zinc: *Rivet*, 15,445-7.
- Initial cost higher, but cheaper in end: *Philip*, 8641-7, 8687-8, 8694-704.
- Trade not increasing: *Rivet*, 15,442-4.
- Zinc satisfactory for outside work: *Wilson*, 3206-10.
- Zinc superior to lead for inside work: *Philip*, 8631-6.

**EXPERT-BEZANÇON, EUGENE (of E. Expert-Bezançon & Co., White Lead Manufacturers, Aubervilliers, France):**

- Evidence, 15,078-205.
- Foreign legislation, France: law relating to use of white lead in paints, 15,079-83.
- Parliamentary Commission's Inquiry, 15,085-99.
- Hours of employment: in white lead factories, 15,201-4.
- Lead poisoning:  
Cleanliness alone does not give immunity, 15,115-6.
- Statistics:  
French method of collecting criticised, 15,134-41, 15,153-9, 15,195-6.  
In France, 15,129-33, 15,142-51.
- Prohibition: mistake made in France, 15,118-20.
- White lead:  
Specified by architects, 15,161-8.  
Still largely used in France, 15,108-12.
- Zinc: price would rise with prohibition, 15,102.
- Zinc oxide:  
Failure of attempts to manufacture, 15,100.  
Kind of zinc used in indirect process, 15,178-87.  
Monopoly in France, 15,101, 15,173-7.  
Zinc oxide combine: Broken Hill probably included, 15,188-91.
- Zinc paints:  
Cost more than lead, 15,121-4.  
Render bridges and structures unsafe, 15,125-8.  
Use of, in France, 15,169-71, 15,192-4.

**FLATAU, CAPT. L. S., and MILNES, F. H. (of the Rabok Manufacturing Co., Carbon Paint Manufacturers, Sheffield):**

- Evidence, 344-401.
- Carbon paint:  
Composition, 348-51.  
Costs only half as much as lead, 354, 391, 400.  
Covering capacity same as lead, 356-7.  
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Instances of its use on interiors and exteriors, 363-76, 381-2.  
Medium important, 384, 401.  
Mixes well with other pigments and ordinary medium, 359-60.  
Superior to lead, 380.  
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Dry rubbing-down of carbon paints causes very little dust, 386-7.

**Filling:**

- Alabastine:  
Could replace lead, *Smith, A.*, 21,146-57.  
Used, *McKillop*, 20,803-7, 20,892-7.
- Composed largely of lead generally, *Plumb*, 18,363-8.
- Method of smoothing: *Harris*, 3704, 3782-4.  
And application, *Parsonage*, 2658-62.
- Seventy-five per cent. leadless, *Wiltshier*, 6849.
- White lead can be prohibited, *Nooijen*, 15,214.

**Foreign Legislation:**

- Austria:  
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Report of Commission, *Kaup*, 14,188-210, 14,426-7.
- Use of lead:  
Prohibited for interior painting, *Cumyngham*, 10,289-91.  
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**Foreign Legislation—continued.**

- Austria—continued.**  
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Aware of legislation abroad, *Garson*, 2524-5; *Campbell*, 3590-4; *Harris*, 3660-2; *Cantrill*, 3835-8; *Barker*, 6929-31; *Holliday*, 8460-3; *Higgs*, 8895-6; *White*, 9224-6; *Orr*, 10,541-6; *Carfras*, 10,819-22; *Bennett*, 11,208-9; *Anderson, R. L.*, 11,324.
- Belgium:**  
Dry rubbing-down prohibited, *Cunynghame*, 10,296.  
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Summary of regulations, *Leyge*, 187-90.
- France:**  
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*Expert-Bezançon*, 15,085-99.  
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Prohibition:  
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Of white lead, with exemptions, *Cunynghame*, 10,288, 10,345-7.  
Summary of law, *Leyge*, 191-4; *Expert-Bezançon*, 15,079-83.
- Germany:**  
Dry rubbing-down prohibited, *Cunynghame*, 10,293.  
Inquiry and conclusions of Department of Commerce and Industry, *Leyendecker*, 16,388-93.  
Putting off working clothes and washing compulsory, *Cunynghame*, 10,292-5.  
Smoking of cigars or cigarettes prohibited, *Cunynghame*, 10,295.  
Summary of regulations, *Leyge*, 183-6; *Kaup*, 14,215-6, 14,423-5, 14,435-7; *Leyendecker*, 16,385-6.  
Taking of food or drink at work prohibited, *Cunynghame*, 10,295.
- Holland:**  
Commission's Inquiry: *Nooijen*, 15,231-82.  
Findings criticised, *Nooijen*, 15,332-43, 15,400-13; *Bettink*, 18,415-30, 18,468-73, 18,486-91, 18,504-13, 18,544-7.  
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- Switzerland:**  
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- FRANCIS, CAPT. MATTHEW** (of Matthew Francis & Sons, Halkyn, near Holywell, North Wales):  
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Lead:  
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Suggestions for, 17,287-92.  
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Washing accommodation difficult to provide, 17,337-9.
- GARDNER, ARCHIBALD** (Member of the Committee and Secretary of the Scottish Society of Operative House and Ship Painters):  
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Lead Poisoning: Statistics of Trade Societies, 3973-8, 3982.

**GARDNER, ARCHIBALD—continued.**

- Painters: more liable to accident in Scotland than England, 3979-81.  
Painting: same process in Scotland as in England, 3979.
- GARDNER, HENRY** (of Messrs. Henry R. Merton & Co., Ltd., and the Merton Metallurgical Co. Ltd., London):  
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English better for white lead making and commands better price than foreign, 17,419-22, 17,448-9, 17,484-8.  
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Proportion used for white lead making, 17,404.  
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- GARSON, J. W.** (of Messrs. Lewis Berger & Sons Ltd., Paint Manufacturers, Homerton, London):  
Evidence, 2490-587.  
Foreign legislation: aware of legislation abroad, 2524-5.  
Insurance rates: would decrease with prohibition of lead, 2542-4.  
Leadless paints: experiments being made to find good substitute for lead, 2558-63.  
Office of works: paints cost more than lead paints to produce, 2572-6.  
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White lead: best paint for outside work, 2549, 2553.  
Zinc paints:  
Addition of varnish increases durability and cost, 2564-5, 2571.  
As good as lead paints, 2495-500.  
Cost greater than lead, but cover 10 per cent. more, 2501-3.  
Durability equal to lead if properly mixed, 2508-12.  
Price would fall with increased demand, 2576.  
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Retain colour better than lead, 2504-5.  
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- GIRAUD, M.** (of Giraud & Co., Zinc Oxide Manufacturers, London), and **PETIT, M.** (of Carlier Frères, Zinc Oxide Manufacturers in France):  
Evidence, 21,694-819.  
Zinc oxide: supply sufficient if lead prohibited, 21,742-3.  
Zinc paints:  
Cheaper on work but dearer by weight than lead, 21,707-8.  
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- GOADBY, KENNETH WELDON, M.R.C.S., D.P.H., &c.** (Consulting Pathologist, Specialist Medical Referee under Workmen's Compensation Act):  
Evidence, 15,652-15,933, 21,947-22,107.  
Dust:  
Inhalation experiments (animals) with dust of zinc and lead, 15,761-84.  
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- GOADBY, KENNETH WELDON, M.R.C.S., D.P.H., &c.—continued.**  
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 Might account for high incidence of Bright's disease among painters, 15,801-3.  
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- GRIFFITHS, FRANK (of the National Federation of Building Trades Employers):**  
 Evidence, 13,972-14,053.  
 Dry rubbing-down: Could be dispensed with, 13,996-4000.  
 Dust and spray:  
 Difficult to safeguard workers against, 14,051.  
 No way of avoiding splashes in stippling, 14,001.  
 Lead poisoning: more prevalent among casual men, 14,023-30.  
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 Periodical medical examination:  
 Difficult, 14,002, 14,004-7, 14,044-50.  
 Serious if occupier has to pay, 14,020-2.  
 Regulations:  
 Enforcement difficult, 13,988-95, 14,009-14, 14,018-9, 14,031, 14,041-2.  
 Should be tried before prohibition, 14,015-7.  
 Washing accommodation could be provided, 13,985-7.
- GRUNDY, FREDERICK (of the National Association of Master House Painters and Decorators of England and Wales):**  
 Evidence, 7104-296.  
 Dry rubbing-down:  
 Danger not recognised, 7199-217, 7283-7.  
 Indispensable in some cases, 7198, 7289-96.  
 Dust and spray:  
 No way of avoiding splashes in painting ceilings, 7218-26.  
 No splashing in stippling, 7229-33.  
 Not breathed by workers, 7227-8, 7255-8.
- GRUNDY, FREDERICK—continued.**  
 Leadless paints:  
 Insufficient covering power and durability for priming, 7240-3.  
 Satisfactory for last coat for interior and exterior work, 7236-9.  
 Lead poisoning:  
 Cases of poisoning and sickness known of, very few, 7108-19, 7259-61.  
 Chief cause is eating food with unwashed hands, 7148.  
 Regrettable that this country should be behind others in legislation regarding, 7147.  
 Unaware of figures showing extent of evil, 7137-45.  
 Master House Painters Association:  
 Have made no scientific experiments to discover substitute for lead, 7128-31.  
 Have taken no steps to discover extent of poisoning, 7120-7.  
 Realise extent of lead poisoning evil, 7132-6.  
 Meals:  
 Accommodation away from paint and dust impossible in some cases, 7196-7.  
 Sometimes taken in rooms where painting is in progress, 7192-5.  
 Outdoor clothing: hung up in rooms where painting is in progress, 7189-91.  
 Overalls:  
 No danger in taking home dirty overalls, 7178-85.  
 Provision by employer difficult, 7279-82.  
 Should be cleaned weekly, 7168-70.  
 Should be worn, 7160-1.  
 Sometimes stored in room where painting is in progress, 7186-8.  
 Trouser overalls not necessary, 7162-7.  
 Workers should be responsible for washing, 7171-7, 7268-70, 7271-8.  
 Removal of old paint: no fumes in burning off, 7233-5.  
 Substitutes: paints composed of lead and zinc satisfactory, 7243-4.  
 Washing:  
 Accommodation essential, 7149-50.  
 Hot water not essential but better than cold, 7151, 7156-7.  
 Not always obtainable, 7158-9.  
 Only necessary to remove loose paint off hands, 7152-5, 7246-54.  
 Soap, towels, &c., already provided, 7263-5.
- GUEST, E. (of the Association of Master House Painters in Scotland):**  
 Evidence, 11,069-189.  
 Compensation for suspension: Would agree to, but would get rid of delicate men, 11,132-3.  
 Dry rubbing-down: Dustless in Scotland as flat paints almost unknown, 11,146-54.  
 Dust: no way of removing, 11,117-20.  
 Emanations: no way of removing, 11,122-6.  
 Leadless paints: not so good as lead, 11,155-60.  
 Lead poisoning:  
 Does not admit we are behind other nations in legislation regarding, 11,088-91.  
 No cases known of, 11,073-7.  
 Some action necessary, 11,092-3.  
 Surprised at figures showing extent of evil, 11,078-88.  
 Meals: accommodation away from paint and dust could be provided, 11,097-102, 11,176-9.  
 Outdoor clothing: storage away from paint and dust impracticable, 11,108-11.  
 Overalls:  
 Provision and washing by employer impossible, 11,096.  
 Storage away from paint and dust difficult, 11,103-7, 11,175-6.  
 Periodical medical examination: would agree to, but difficult, 11,127-31.  
 Prohibition:  
 Would agree to, if efficient substitute found, 11,182-5.  
 Would reduce quality of work, 11,187-9.

GUEST, E.—*continued.*

- Regulations:  
 Difficult to enforce, 11,135-45.  
 Preferred to prohibition: 11,134, 11,142.  
 Would eliminate evil, 11,094-5.  
 Removal of old paint: solvents could replace burning off, 11,121.  
 Washing: accommodation difficult to provide, 11,112-6.  
 Zinc paints:  
 Cost more and not so satisfactory as lead, 11,170-3.  
 Unlikely to stand Scottish climate, 11,162-9.

## HALL, THOMAS (of the London Master Builders Association):

- Evidence, 9530-568.  
 Leadless paints:  
 Nothing against Office of Works' paints, 9555-8.  
 Satisfactory tests, 9564-5.  
 Lead poisoning:  
 Cases known of, 9535-41, 9566-8.  
 Extent of evil realised, 9550-1.  
 Regrettable that this country should be behind others in legislation regarding, 9553.  
 London Master Builders Association: have taken no steps to reduce lead-poisoning evil, 9542-9.  
 Prohibition: preferred to regulations, 9553-4, 9559.

## HARDWICK, WILLIAM ROSCOE, B.Sc., F.I.C. (Consulting Chemist to Purex, Ltd., Greenford):

- Evidence, 1764-879.  
 Lead paints:  
 Purex:  
 Cheaper than white lead or zinc, 1781.  
 Comparison of qualities with white lead, 1767-88.  
 Less poisonous than white lead, 1798-806, 1845-7.  
 More durable than white lead, 1778.  
 Retains colour better than white lead, 1777.  
 Where used, 1872-7.  
 Lead poisoning: cases occurring in manufacture and spraying of Purex, 1807-11, 1821-6, 1832-41.  
 Painting: spraying dangerous, 1862-4.  
 Prohibition:  
 Purex should be exempted, 1819.  
 Would entail loss to white lead manufacturers, 1813-4.  
 Rubbing down: less required with Purex than white lead, 1789-97, 1827-30, 1859-61, 1865-7.

## HARRIS, H. VIGURS (of the National Association of Master House Painters and Decorators of England and Wales):

- Evidence, 3639-816.  
 Dry rubbing-down:  
 Amount of dust caused, 3703, 3763-9.  
 Can suggest no way of removing dust, 3710-7.  
 Exhaust fans impracticable, 3709.  
 Extent of, 3699, 3796-9.  
 Indispensable in some cases, 3697, 3702.  
 Mask only suggestion, but thinks it impracticable, 3707-8.  
 Moistening sandpaper with turpentine rarely done, 3790-2.  
 Dust and spray:  
 No splashes on face and hands in stippling, 3724-7, 3811-3.  
 No way of removal in painting ceilings, 3718-21.  
 Not breathed by painters, 3722-3.  
 Filling: could be rubbed down with pumice-stone and water, 3782-4, 3704.  
 Foreign regulations: aware of legislation abroad, 3660-2.  
 Hours of employment: restriction in hours would not save painters from poisoning, 3787-9.  
 Lead paints: necessary for some outside work, 3738-43.  
 Lead poisoning:  
 Cases of poisoning and sickness known of very few, 3645-53.  
 Incidence among paint mixers, 3803-10.  
 Realises magnitude of evil, 3654-9.  
 Regrettable that this country should be behind others in legislation regarding, 3661.

HARRIS, H. VIGURS—*continued.*

- Meals:  
 Sometimes taken in rooms where painting is going on, 3689-94, 3780-1.  
 Taking meals in paint shop might be injurious, 3770-73, 3775-9.  
 Mixing paints:  
 Breaking up of lead done by machinery, 3731.  
 Done in paint shop, 3730.  
 Overalls:  
 Should be provided, 3675-9.  
 Trousers not necessary, 3680.  
 Very little dust collects on them, 3686-8.  
 Workers should not be made responsible for washing the overalls, 3681-5.  
 Paints: Mixtures one-third lead and two-thirds zinc stand better than white lead, 3785-6.  
 Prohibition of lead:  
 Only solution, 3732-5.  
 Preferred to regulations, 3745-62.  
 Regulations: difficult to enforce, 3695.  
 Removal of old paint: can suggest nothing to prevent inhalation of fumes in burning off, 3728-9.  
 Rubbing down; wet process cannot be used between coats, 3701, 3705-6.  
 Washing accommodation essential, 3663-7.  
 Hot water:  
 Not always obtainable, 3672-4, 3774.  
 Not essential but better than cold, 3668-71.

## HEYDORN, A. F. (of Ragsone &amp; Co. Ltd., Bow):

- Evidence, 478-571.  
 Zinc paint:  
 Can be used for filling and flattening and enamelling, 543-55.  
 Cost same as lead, 488.  
 Covering capacity greater than lead, 490-2, 512, 517-9, 537-42.  
 Does not chalk, 493-5, 520-3.  
 Durability equal to lead, 489.  
 Instances of its use, 500-4.  
 Mixes well with other pigments and ordinary vehicles, 493-9, 526, 534, 568-71.  
 Not recommended for sign-writing, 486, 535-6.  
 Retains colour better than lead, 496.  
 Spreading capacity greater than lead, 497, 511, 513-6.

## HIGGS, FREDERICK (of the National Federation of Building Trades Employers):

- Evidence, 8852-9024.  
 Dry rubbing-down:  
 Exhaust fans impracticable, 8927.  
 Indispensable in some cases, 8925.  
 Principal danger, 9006-7.  
 Respirators suggested, 8928-9, 8974-8.  
 Should be prohibited on old work, 9008-21.  
 Dust and spray:  
 No way of removal in painting ceilings, 8930-5.  
 Very little splashing in stippling, 8936-9.  
 Foreign legislation: aware of legislation abroad, 8895-6.  
 Hours of employment: would agree to limitation of, but inconvenient, 8958-61, 8997-9001.  
 Insurance rates:  
 Have recently increased, 8858-9;  
 But not due to lead poisoning, 8860-4, 8990-1.  
 Leadless paints:  
 Committee could not recommend proprietary articles, 8983-6.  
 Covering power not good, 8945-6.  
 Would welcome Office of Works' formula if satisfactory, 8954-7.  
 Lead poisoning:  
 No cases of poisoning or sickness known of, 8857, 8865-9, 8972-3.  
 Regrettable that this country should be behind others in legislation regarding, 8897-8.  
 Unaware of figures showing extent of evil, 8883-94.  
 Meals: accommodation away from paint and dust generally practicable, 8917-23.  
 National Federation of Building Trades Employers:  
 Have made no experiments to discover substitute, 8879-82.  
 Have taken no steps to discover extent of lead poisoning, 8873-8.

HIGGS, FREDERICK—*continued.*

- Overalls:  
Men should provide their own, 8908-11.  
Some being kept in paint shop, 8915-6.  
Would object to washing them at employer's expense, 8911-4.  
Prohibition: preferred to regulations, 8962-8, 9022-4.  
Regulations: difficult to carry out, 8924.  
Removal of old paint: no means of preventing fumes in burning off, 8940-4.  
Washing:  
Accommodation essential, 8899-900.  
Hot water desirable, but not always obtainable, 8901-7.  
Would allow time for, 9002-3.  
White lead: best paint pigment, 8979-82, 8987-9.  
Zinc paints:  
Covering power not so good as lead, 8947-51.  
Durability not so good as lead, 8952-3.

## HOLLIDAY, J. S. (of the Institute of Builders):

- Evidence, 8417-616.  
Compensation for suspension: would not agree to, 8536.  
Dry rubbing-down:  
Exhaust fans impracticable, 8493.  
Indispensable in some cases, 8491.  
Respirators suggested, 8492.  
Dust and spray:  
No way of removal in painting ceilings and stippling, 8494-8, 8501-2.  
Washable distempers could replace lead paints for walls and ceilings, 8499-500, 8557-70.  
Foreign legislation: aware of legislation abroad, 8460-3.  
Hours of employment:  
Limitation of, impracticable, 8576-7.  
Would not agree to limitation of, 8522-5.  
Institute of Builders:  
Have taken no steps to discover extent of lead poisoning, 8441-7.  
Have taken no steps to discover substitute, 8451-4.  
Would have considered question of lead poisoning if it had been brought before them, 8591-5.  
Insurance rates: recent increase not due to lead poisoning, 8425-35, 8553.  
Leadless paints:  
Experiments should be made before prohibiting lead, 8582-4.  
If efficient one found, lead should be prohibited, 8512, 8596-8.  
Office of Works' test of four years not sufficient to warrant prohibition, 8513-21, 8581.  
Twelve months suggested for making trials, during which time no regulations should be made, 8599-616.  
Lead poisoning:  
No cases of poisoning or sickness known of, 8422-3, 8436-7, 8529-30, 8541-9.  
Regrettable that this country should be behind others in legislation regarding, 8463.  
Surprised at and unaware of figures showing extent of evil, 8455-9.  
Meals:  
Accommodation away from paint and dust should be provided, 8479-82.  
Generally practicable, 8485-90.  
Outdoor clothing: storage away from paint and dust impossible, 8478-9.  
Overalls:  
Storage away from paint and dust sometimes difficult, 8475-7.  
Would not object to provide them if custom, 8469-71.  
Would wash them if custom, 8472-4.  
Periodical medical examination:  
Impracticable, 8570-80.  
Would not say whether in favour or not, 8531-5.  
Prohibition of lead:  
Only remedy, 8506-8.  
Preferred to regulations, 8537-40.  
Removal of old paint:  
No way of removing fumes in burning off, 8504-5.  
Solvents generally used, 8503, 8554-6.

HOLLIDAY, J. S.—*continued.*

- Washing:  
Accommodation essential, 8465.  
Hot water not generally obtainable, 8466-8.  
Zinc paints: not so good as lead, 8510-11.  
HOLZAPFEL, M. (of the North-East Paint and Oil Trades Association):  
Evidence, 11,452-632.  
Driers: 10-15 per cent. of lead necessary, 11,524-31.  
Dry rubbing-down:  
Could be prohibited, 11,551, 11,556-7.  
Creates considerable dust, 11,550.  
Exhaust fans impracticable, 11,554.  
Principal danger, 11,549.  
Iron oxide paints: cheaper than lead, 11,485.  
Leadless paints: nature and uses of, 11,454-67, 11,474-80, 11,493-5.  
Lead paints:  
Necessary for certain purposes, 11,510-3.  
Valuable in promoting drying, 11,518.  
Lead poisoning: thinks it can be caused by absorption through skin, 11,568-71.  
Mixing: red lead dangerous, 11,572-5.  
Prohibition: would affect decorating trade, 11,514-7, 11,529.  
Removal of old paint: chipping red lead from ships holds dangerous, 11,544.  
Rubbing down:  
Length of time before new paint can be rubbed down wet, 11,560-1, 11,564-7.  
Wet process more expensive than dry, 11,552-3, 11,558-9.  
White lead: better paint base than zinc, 11,502-3.  
Zinc:  
Dependent on foreign countries for supplies, 11,540.  
Dust not harmful, 11,468-73.  
Zinc oxide: amount of lead present, 11,519-23.  
Zinc paints:  
Addition of varnish:  
Adds to cost, 11,504-6.  
Gives permanency, 11,496-500.  
Might facilitate drying sufficiently, 11,611-2.  
Dearer by weight, but cheaper in bulk than lead, 11,486-92, 11,608.  
Dry slowly (interiors), 11,586-7, 11,605-6, 11,609-10.  
Durability as good as lead, 11,585.  
Satisfactory for ships, 11,464, 11,481-3, 11,616-8, 11,624-32.  
Where applied, 11,576-84, 11,621-3.

## HONEYCHURCH, J. J. (of the London Association of Master Decorators):

- Evidence, 20,017-190.  
Compensation for suspension impracticable, 20,063.  
Dust: exhaust draught impossible, 20,061.  
Leadless paints: no scientific trials made, 20,074-81, 20,105-11.  
Lead poisoning:  
Cases of poisoning and sickness known of, 20,023, 20,117-26.  
No steps taken by London Association of Master Decorators to diminish evil, 20,030-1.  
Some action necessary, 20,043.  
Unaware of extent of evil, 20,035-42.  
Very deplorable, 20,041-2.  
Meals:  
Accommodation away from paint and dust impossible in some cases, 20,047.  
Mostly taken away from work, 20,048-52.  
Outdoor clothing: storage away from paint and dust impossible, 20,054-6.  
Overalls:  
Provision and washing by employers impossible, 20,046, 20,139-49.  
Storage apart from paint and dust practicable, 20,053.  
Storage in paint-shop not dangerous, 20,150-1.  
Painting: comparative cost of lead and zinc, 20,099-104.  
Paints: effect of introduction of ready-mixed paints, 20,127-33.  
Periodical medical examination: possible, 20,062.

**HONEYCHURCH, J. J.—continued.**

- Prohibition complete, regulations only partial, remedy, 20,044-5.  
Would not agree to, 20,065-9.
- Regulations:  
Difficult to observe, 20,064, 20,072.  
Householders should provide facilities for mess-rooms, washing, cloakrooms, &c., 20,152-3.  
Wages: rates of, 20,176-8, 20,181-90.  
Washing:  
Accommodation should be provided, 20,057.  
Hot water not always obtainable, 20,058.  
Provision of towels, soap, &c., possible, 20,059-60.  
White lead: better than zinc for outside, 20,154-8.  
Zinc paints:  
Could replace lead for inside work, 20,159-67.  
Easy as lead to apply, 20,179-80.  
More expensive than lead, 20,091-8, 20,134-6.  
Retain colour better than white lead, but not such good covering power, 20,082-90.  
Twice as many coats required as with lead, 20,174-5.

**HOOPER, EGBERT GRANT, F.I.C., F.C.S. (Super-**

- intending Chemist at the Government Laboratory):  
Evidence, 10,104-180.  
Leadless colours:  
Reds: how obtainable, 10,157-61.  
Yellow dyes used as substitute for lead chromate, 10,154-5.  
Zinc chromate could replace lead chromate in dark green colours so as to bring it within 5 per cent. solubility limit, 10,130-40, 10,162-4.  
Zinc chromate could replace lead chromate without serious increase of cost, 10,149-53, 10,165.  
Restriction to 5 per cent. soluble lead:  
Difficulty of matching paints, 10,168-72.  
Guarantee should be given by makers of ready-made paints, 10,167.  
Proportion of soluble lead could easily be determined, 10,107-12.  
Standardisation of paints, 10,175-80.  
Solubility of lead compounds in dilute HCl: of different lead compounds, 10,113-29.  
Solubility test could be made in Government laboratory, 10,156-7:  
Method of analysis, 10,142-8, 10,166.  
Would involve no difficulty, 10,141.

**Hours of Employment:**

- In white lead factories: *Expert-Bezançon*, 15,201-4.  
Limitation of:  
Advocated: *Roeh*, 16,771-2.  
Difficult owing to seasonal nature of trade: *McDermid*, 7,405-8, 7,417.  
Impracticable: *Holliday*, 8576-7.  
Workers would probably object: *Laidler*, 972-4;  
*Campbell*, 3617; *White*, 9,439-41.  
Would agree to: *Puttrel*, 6326-30, 6338; *Wiltshier*, 6762-4, 6804-6; *White*, 9287-9; *Vaughan*, 13,682-7.  
But inconvenient: *Higgs*, 8958-61, 8997-9001.  
If custom, *Walker*, 9094-9.  
Would make trade more healthy: *Campbell*, 3616.  
Would not agree to *Campbell*, 3496-7; *Chappell*, 6563-5, 6578; *Holliday*, 8522-5.  
Because of seasonal nature of trade: *Barker*, 6993-5.  
Would not save painters from lead poisoning: *Harris*, 3787-9.  
Number per week: *Laidler*, 714-5, 910-3; *Grace*, 1976-7; *Parsonage*, 2684-8, 2915-7; *Chappell*, 6561-2; *Morton*, 13,929; *McKillop*, 20,922-3; *Smith*, 21,355.  
Overtime worked: *Grace*, 1977.  
Should be as short as possible: *Cookson*, 2184-6.
- HUMFREY, WILLIAM A. (of the Brimsdown Lead Co., Ltd., Brimsdown, Middlesex):**  
Evidence, 2588-624.  
Foreign legislation: method of dealing with white lead question in U.S.A., 2610-6.  
Prohibition:  
Loss to white lead manufacturers involved, 2594, 2604-7.  
Should follow if complete substitute found, 2603,

**HUMFREY, WILLIAM A.—continued.**

- Regulations:  
Difficult to enforce, 2617-21.  
Suggestions to reduce lead poisoning, 2595-602
- HUMPHREYS, EDWARD NOEL (of the East Halkyn Mining Co., Ltd., and the New North Halkyn Mines, Ltd.):**  
Evidence, 17,340-401.  
Education of workers: important, 17,375-401.  
Lead: proportion used for white lead making, 17,352-62, 17,383-4.  
Lead mining:  
Capital and number of men employed, 17,340-6, 17,385-94.  
Prejudicial effect of prohibition, 17,347, 17,363-72.  
Painting: other trades as dangerous, 17,348-9, 17,373-5.  
Regulations:  
Difficult to enforce, 17,376-82.  
Would reduce lead poisoning 17,350
- HUNTER, PETER JOHNSTONE (Inspector of the Forth Bridge Railway Co.):**  
Evidence, 21,497-567.  
Bridge painting:  
Iron oxide:  
Better than lead for outer coats, 21,513-30.  
Cheaper than lead, 21,521.  
Leadless primings could probably be found, 21,522-3, 21,563-7.  
Lead paints best for priming, 21,508-9, 21,558-61.  
Red lead used alone unsatisfactory, 21,555-7.  
Three-quarters of paint used on Forth bridge lead-  
less, 21,499-507.  
Lead poisoning: cases known of, 21,525-52.  
Prohibition: practicable with reservations for iron primings, 21,562.

**Institute of Builders:**

- Have taken no steps to discover extent of lead poisoning: *Holliday*, 8441-7.  
Have taken no steps to discover substitute for lead: *Holliday*, 8451-4.  
Would have considered question of lead poisoning if it had been brought before them: *Holliday*, 8591-5.

**Insurance Rates for Painters:**

- Higher than for plasterers: *Laidler*, 718-25.  
Lower in Scotland than in England: *Orr*, 10,647-56, 10,782-6.  
Recent increase: *Laidler*, 726; *Cantrill*, 3941-2; *Collis*, 4015-9, 4046-8; *Puttrel*, 6174-5, 6343-9; *Chappell*, 6449-53, 6621-5; *Wiltshier*, 6671-2; *Barker*, 6888-91, 7024-8; *McDermid*, 7304-5; *Higgs*, 8858-9; *White*, 9489-93; *Vaughan*, 13,534-6; *Morton*, 13,831-2.  
Due to lead poisoning: *Campbell*, 3484-9; *Anderson, J.*, 19,887-93.  
No knowledge of: *Walker*, 9032-3.  
Not due to lead poisoning: *Higgs*, 8860-4, 8990-1.  
Would decrease with prohibition of lead: *Garson*, 2542-4.

**Iron Oxide Paints:**

- Can replace red lead on double bottoms in Navy: *Philip*, 8623-5; *Mockford*, 8729-35, 8836-7.  
Cheaper than lead paints: *Schobert*, 9686, *Holzappfel*, 11,485.  
Composition and vehicle used in anti-corrosive paints: *Schobert*, 9661-73; 9705-27.  
Covering power greater than lead: *Schobert*, 9674-5.  
Instances of use:  
*Schobert*, 9687-95; 9729-34.  
On Belginn State Railways: *Pisart*, 21,846-8.  
Not so good as lead for priming: *Mockford*, 8830-5.  
Satisfactory on ships: *Coysh*, 9606-8.  
Satisfactory protection for iron and steel: *Schobert*, 9696-704; *Rivet*, 15,484; *Morley*, 23,082-4.  
Used in confined spaces: *Simpson*, 21,593-5, 21,643-6.
- JOHNSON, EDWARD M. (of Messrs. Locke Lancaster and W. W. & R. Johnson & Sons, Ltd., Lead Desilverisers and White Lead Corrodors, Millwall, London):**  
Evidence, 22,181-480.

- JOHNSON, EDWARD M.—*continued*.  
 Dry rubbing-down: should be prohibited, 22,465.  
 Education of workers:  
 Advocated, 22,267.  
 Trade guilds suggested, 22,409-15.  
 Lead:  
 Combine for white lead making, 22,383-4.  
 Pig-lead mainly a British product, 22,278-85.  
 Lead Mining: prejudicial effect of prohibition, 22,370-82.  
 Lead Poisoning:  
 Mortality and sickness not disputed, 22,286-98.  
 National Health Insurance records might be used for compiling statistics, 22,392-400.  
 Reduction following on regulations elsewhere, 22,242-62, 22,333-8.  
 Some action necessary, 22,299-301.  
 Painters: registration suggested, 22,474-6.  
 Painting: other occupations more dangerous, 22,341-6.  
 Paints: specification of, 22,452-4.  
 Periodical medical examination: cost would fall on consumers, 22,403-4.  
 Prohibition:  
 Failure in foreign countries, 22,227-41, 22,351-5.  
 Inspection necessary, 22,467-8.  
 No statistical or scientific reason for, 22,184-226, 22,269-72.  
 Total prohibition preferred to 5 per cent. solubility limit, 22,442.  
 Regulations:  
 Enforcement, 22,356-60, 22,389-91.  
 Cost would be borne by consumers, 22,420-37.  
 Suggestions for, 22,263-6, 22,361-9, 22,385-6.  
 Turpentine: predisposes to lead poisoning, 22,302-3.  
 Washing: special soap to prevent poisoning, 22,405-8.  
 Zinc oxide:  
 Difficulty in manufacture in England, 22,461-4.  
 Supply would not be sufficient if lead prohibited, 22,455.  
 Toxicity of, 22,311-5.  
 Zinc paints: more turpentine and oil necessary than with lead, 22,305-10.
- KAUP, DR. IGNAZ (Departmental Chief of the Central Organisation of Social Hygiene in Berlin):  
 Evidence, 14,186-512.  
 Dry rubbing-down:  
 Can be dispensed with, 14,230-4.  
 Exhaust impossible, 14,235.  
 Dust:  
 Determination of amount in air, 14,194.  
 Principal danger, 14,227-9.  
 Emanations: danger from turps and oil but not from lead, 14,441-5, 14,462.  
 Foreign legislation:  
 Austria:  
 Lead restricted, 14,271-8.  
 Regulations have reduced lead poisoning, 14,212-4.  
 Summary of Commissions Report, 14,188-210, 14,426-7.  
 Regulations, 14,211, 14,463-7.  
 Witnesses heard before Commission, 14,236-7, 14,249-59.  
 Germany:  
 Regulations have reduced lead poisoning, 14,217-25.  
 Summary of regulations, 14,215-6, 14,423-5, 14,435-7.  
 Leadless paints:  
 No special medium used in Austrian and German experiments, 14,280-3.  
 Trials made in Austria and Germany not conclusive, 14,238-48, 14,260-70.  
 Lead paints:  
 Only necessary for final coat, 14,261.  
 Should be labelled poisonous, 14,226.  
 Lead poisoning:  
 Attacks among house painters not reportable in Germany, 14,217, 14,225.  
 Minimum attack rate in Vienna (3.5%) still unduly high, 14,367-8.  
 Slow reduction in Germany due to lack of control of regulations, 14,397-403.
- KAUP, DR. IGNAZ—*continued*.  
 Lead poisoning—*continued*.  
 Statistics for Germany, 14,417-22.  
 Vienna, 14,345-77, 14,409-16, 14,459-61, 14,473-6.  
 Training painters would reduce evil, 14,468-70.  
 Prohibition for inside work would reduce lead poisoning to ordinary trade risk, 14,379-84.  
 Regulation:  
 Enforcement of:  
 By inspection in Austria and Germany, 14,287-90, 14,291-329, 14,385-96.  
 Insufficient inspection, 14,385, 14,443-9.  
 Number of inspectors in various countries, 14,291-5.  
 Practicable by sanitary inspectors, &c., 14,224, 14,405-6.  
 Exemptions for small employers in Vienna, 14,336-44.  
 Practicable for users of leadless paints, 14,330-5, 14,452.
- KLEIN, CARL ADOLPHE (Chief Chemist, Brimsdown Lead Co.):  
 Evidence, 16,773-997.  
 Dry rubbing-down:  
 Of zinc-painted surfaces which contain lead dangerous, 16,906-11.  
 Prohibition of, would greatly reduce lead poisoning, 16,943, 16,966.  
 Respirator suggested, 16,839.  
 Should be prohibited, 16,858.  
 Dust: principal danger, 16,838-42, 16,944.  
 Education of painters important, 16,863-8, 16,912-22, 16,940-2.  
 Emanations:  
 French experiments disagreed with, 16,854-5, 16,898-905.  
 Nature of volatile products given off by linseed oil, 16,781-2.  
 Pug-mill vapours free from lead, 16,811, 16,893-7.  
 Rate of evaporation of turpentine in drying paints, 16,812-5.  
 Drying of paints, 16,780.  
 Trillat's list unreliable, 16,856-7.  
 Volatile compounds given off from paint, 16,774-9, 16,881-92.  
 Volatile lead compounds:  
 Cannot be prepared from linseed oil and lead compounds, 16,802-10, 16,845.  
 Not given off from drying lead paint, 16,790-801, 16,846-8, 16,877-80.  
 Not given off from white lead or litharge (distillation experiments), 16,783-9, 16,950.  
 Not given off in burning of lead paints, 16,951-7.  
 Leadless paints: qualities of, 16,816-29.  
 Lead poisoning:  
 Absorption through skin given as a cause by painters, 16,962-5.  
 Casual workers more liable to, 16,923-30.  
 Effect of:  
 Alcohol, 16,931-8, 16,972-6.  
 Social conditions, 16,945-8, 16,967-71, 16,984-96.  
 Paint: effect of sulphurous fumes on lead and zinc paints, 16,832-4.  
 Paint grinding: importance as regards durability, 16,836.  
 Regulations: enforcement of, 16,859-62, 16,977-8.  
 Washing: hot water unnecessary, 16,981-3.  
 White lead:  
 Best paint pigment, 16,837.  
 Spreading power better than zinc, 16,835.
- LADLER, G. G. (of the National Association of Master House Painters and Decorators of England and Wales):  
 Evidence, 572-1040.  
 Dust and spray: no way of removing dust, 744-6.  
 Hours of employment:  
 Men like to work overtime, 972-4.  
 Number of hours per week, 714-5, 910-3.  
 Insurance rates:  
 Higher than for plasterers, 718-25.  
 Recent increase in, 726.

LAIDLER, G. G.--*continued.*

- Lead poisoning:  
Better training of men would reduce evil, 760-6, 1011-5.  
Deplorable, 731.
- Leadless paints:  
No experience with, 895-909, 926.  
Office of Works test not sufficient trial, 995-1008.
- Meals:  
Places where taken, 703-10, 914-7, 970-1.  
Times when taken, 699-702.
- Mixing paints:  
Mostly done on job, 1018-21.  
No exhaust where mixing done dry, 642-3.  
Way in which done, 614-22.
- Overalls:  
Provided by men, 637.  
Washing of, 639-41, 1016-7.
- Painting: hands and clothes got soiled, 691-6, 940-3.
- Paints: durability on exteriors, 987-94.
- Regulations:  
Difficult to enforce, 1010.  
Preferred to prohibition, 732-7, 767-81.
- Removal of old paint: methods of, 674-86.
- Rubbing-down: methods of, 644-58, 789-94, 834-84, 953-8.
- Stopping: composition and application of, 666-9.
- Washing:  
Accommodation should be provided, 623-36, 660-4, 782-8, 741-3.  
Not now provided, 622-36.
- Hot water:  
Essential, 670-2.  
Practicable, 806-8, 944-52, 964-6, 1021-40.
- LANCASTER, HARRY C. (of Messrs. Locke, Lancaster & Co., and W. W. & R. Johnson & Sons, Ltd., Lead Desilverers and White Lead Corroders, Millwall, London):  
Evidence, 17,559-656.  
Lead: combine for white lead making, 17,585-8.  
Prohibition:  
Exemption period five years, 17,643-4.  
Would make trade dependent on foreign sources for raw material, 17,568.  
Zinc: shortage would occur if lead prohibited, 17,610-34.  
Zinc oxide:  
British ores unsuitable for manufacture by direct process, 17,560-6, 17,569-76.  
Difficulties in manufacture in England, 17,582-609, 17,641-2.  
Direct process best, 17,567, 17,577-81.  
Five per cent. lead necessary, 17,648-53.  
Production of, 17,635-40.

#### Lead:

- Capital invested and number employed in smelting industry: *Miller*, 17,071-3; 17,103-4, 17,130-2.
- Combine for white lead making: *Lancaster*, 17,585-8; *Johnson*, 22,383-4.
- Consumption:  
For painting purposes: *Rivet*, 15,567-73.  
In England: *Matton*, 17,489, 17,497-8.  
Decrease in British output: *Francis*, 17,241-2.  
Dependent on foreign sources for supply: *Miller*, 17,159-60.  
English lead better for white lead making and slightly dearer than foreign lead: *Gardner, H.*, 17,419-22, 17,448-9, 17,484-8; *Matton*, 17,524-30.  
Fluctuation in price and output: *Francis*, 17,259-73, 17,308-23; *Gardner, H.*, 17,413-8, 17,439-47, 17,465-83; *Matton*, 17,500-17.  
Pig lead mainly a British product: *Johnson*, 22,278-85.  
Prejudicial effect of prohibition on price: *Miller*, 17,069, 17,096-7.  
Prejudicial effect of prohibition on smelting industry: *Miller*, 17,074.  
Production in England: *Miller*, 17,094-5, 17,152-8.  
Proportion used for white lead making: *Francis*, 17,247-57; *Humphreys*, 17,352-62, 17,383-4, *Gardner, H.*, 17,404; *Matton*, 17,499.  
Reasons why foreign importer should not suffer as much as English producer if white lead prohibited: *Matton*, 17,518-23, 17,531-58.

Lead Colours. (See evidence of *Dr. Crow.*)

#### Leadless Colours:

- All colours obtainable: *Line*, 10,092-102.  
Aniline, use of, *Patterson*, 1165-7.  
Cost has little effect on cost of painting: *Connell*, 21,930.  
Cost more than lead: *Crow*, 11,978, 11,982-4, 12,017-8, 12,022-3; *Depierres*, 19,090-1; *Connell*, 21,908-9, 21,930.  
Cost of painting would not be increased, *Line*, 10,093.  
Demand increasing: *Connell*, 21,914-24.  
Greens likely to be available soon: *Patterson*, 12,928.
- Reds:  
How obtainable: *Hooper*, 10,157-61.  
Improvements in: *Depierres*, 19,083-94.  
Satisfactory: *Morley*, 23,037-44, 23,085-90.  
For reds, yellows, and greens: *Connell*, 21,894-907, 21,926-9.
- Yellow dyes used as substitute for lead chromate: *Hooper*, 10,154-5.
- Zinc chromate:  
Could replace lead chromate in dark greens so as to bring it within 5 per cent. solubility limit: *Hooper*, 10,130-40, 10,162-4.  
Could replace lead chromate without serious increase in cost: *Hooper*, 10,149-53, 10,165.  
In place of lead chromate would reduce range of colours: *Crow*, 11,971-6, 11,985-93.

Leadless Paints. (See also *Bituminous Paints, Carbon Paints, Coal Tar Paints, Graphite Paints, Iron Oxide Paints, Zinc Paints.*)

- Application and mixing: no insuperable difficulties: *Parsonage*, 2759-60; *Pickles*, 3010-1.  
As good as lead paints: *Patterson*, 12,935, 13,047-53.  
Better than lead paints for greenhouses: *Morley*, 22,989-92.  
Climate of England may affect less than climate of Vienna: *Meissl*, 14,703-4.  
Composition, mixing, medium, &c.: *Chancellor and Penwarden*, 21,359-72; *Morley*, 22,949-73, 23,029-32, 23,072-3.  
Cost:  
More than lead: *Donald*, 12,325.  
In package, but cheaper on work: *Cunnew*, 10,226.  
Of painting would be increased: *McDermid*, 7402-3.  
Same as lead: *Morley*, 22,974-7.  
With special medium not much more than lead: *Milton*, 20,278-82, 20,325-31.  
Could replace lead paints: *Donald*, 12,323-4.
- Covering power:  
As good as lead: *Cunnew*, 10,219-24.  
Better than lead: *Milton*, 20,270.  
Insufficient for priming: *Grundy*, 7240-3.  
Not good: *Higgs*, 8945-6.  
Drying difficulties overcome: *Morley*, 23,002-3.
- Durability:  
As good as lead: *Wilson*, 3245-6.  
Increased by addition of varnish: *Patterson*, 12,905-6; *Devino*, 20,410-5, 20,469-86.  
Insufficient for priming: *Grundy*, 7240-3.  
On Canterbury Post Office: *Wiltshier*, 6756-8, 6823-35, 6863-75; *Patterson*, 12,918-25, 13,006-12.  
Stand well for seven years: *Morley*, 22,994-7.  
Very good for outside and inside work: *Cunnew*, 10,228-9, 10,238-41.
- Effect on health:  
No complaints: *Patterson*, 13,036-8.  
Not toxic: *Tanner*, 22,699-704.  
Efficiency of: *Leggs*, 164-5.  
Efficient substitute for lead would be welcomed by trade: *Campbell*, 8558-9.
- Experience of: *Cantrill*, 3898-9; *Barker*, 7065-72; *Scott*, 12,206-17; *Donald*, 12,315-24; *De Morsier*, 16,608-11.  
Commissioners of Irish Lights: *Sibthorpe*, 17,814-8.  
Guinness's Brewery: *Sibthorpe*, 17,835-47.  
Length of: *Patterson*, 1043-7.

**Leadless Paints—continued.**Experience of—*continued.*

None: *Laidler*, 895-909, 926; *Wallis*, 20,633-4, 20,647-9, 20,658-68; *McKillop*, 20,929-31.

Very little: *Orr*, 10,683-94; *Anderson, R. L.*, 11,416-7.

Extent of use: *Legge*, 169-71.

Formula for: *Patterson*, 22,923-36.

If Office of Works can dispense with lead, other firms should be liable to do so: *Vaughan*, 13,679A-80, 13,767-8, 13,798-9, 13,810-2.

Instances of use: *Patterson*, 22,792-5; *Morley*, 22,879-88, 23,048-63.

Instructions for use by Office of Works: *Tanner*, 22,632-54, 22,729.

Leadless primings used for woodwork by Office of Works: *Patterson*, 22,822-32, 22,916-8.

## Lithopone:

Defects in regard to light: *Vickers*, 19,359-62.

Increasing use of: *Depierres*, 19,137-8.

Largely used in France: *Pisart*, 18,925-8.

Satisfactory for inside work: *Pisart*, 18,919-22; *Milton*, 20,275-7.

Unsatisfactory for outside work: *Wait*, 1474-8.

London Chamber of Commerce Inquiry: *Miller*, 17,078-81, 17,112-4, 17,133-7.

## Medium:

Important: *Milton*, 20,245, 20,264-6, 20,269-71.

No special medium used in German and Austrian tests: *Kaup*, 14,280-3.

Nature and uses of: *Holzappel*, 11,454-67, 11,474-80, 11,493-5.

No objectionable smell: *Wilson*, 3202-5.

Not appreciated by workers: *Patterson*, 1062.

Not so good as lead paints: *Campbell*, 3513-4; *Barker*, 7080-2; *Mockford*, 8758-61; *White*, 9402-4, 9414-5; *Guest*, 11,155-60.

## Office of Works paints:

Kinds used: *Patterson*, 22,857-69, 22,880-5.

Nothing against them: *Hall*, 9555-8.

Only possible way of removing danger: *Cantrill*, 3896-7; *Chappell*, 6552-3, 6583; *Wiltshier*, 6752; *Barker*, 6982-4; *McDermid*, 7400-1; *Edginton*, 13,101; *Vaughan*, 13,676-9.

## Practicable:

For ceilings: *White*, 9446-50.

For outside work: *Devine*, 20,437-9.

## Prejudice:

Against new materials: *Philip*, 8651; *Chancellor and Penwarden*, 21,383; *Milton*, 20,283-9.

Due to adulteration: *Schobert*, 9677.

In the building trade: *Cunnew*, 10,264-74.

None: *Campbell*, 3516-8; *Patterson*, 1060-1.

Proportion of varnish and driers used: *Patterson*, 12,902-4.

Proprietary articles could not be recommended by Committee: *Higgs*, 8983-6.

Qualities of: *Klein*, 16,816-29.

Satisfactory: *Morley*, 22,962-3.

For inside work: *Depierres*, 19,038-45.

For inside and outside work: *Cunnew*, 10,230-7; 10,242-9.

For last coat for interior and exterior work: *Grundty*, 7236-9.

Strange that Office of Works should succeed where others have failed: *Willis*, 11,720-3.

Superior to lead as well as better for workmen: *Tanner*, 22,707-8.

## Tests:

Being made to find good substitute for lead: *Garson*, 2558-63.

Five years' test by Office of Works sufficient to recommend prohibition: *Cantrill*, 3943-4.

Made in Austria and Germany not conclusive: *Kaup*, 14,238-48, 14,260-70; *Rambousek*, 14,584-91, 14,633-4, 14,648-52.

Made by Office of Works: *Patterson*, 22,743-57, 22,886-9.

Surprised at results of: *Crace*, 2026-9.

No scientific trials made: *Honeychurch*, 20,074-81, 20,105-11.

Of leadless primings for ironwork being made: *Patterson*, 22,833-42.

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**Leadless Paints—continued.**Tests—*continued.*

Office of Works in same position as ordinary employer regarding: *Patterson*, 12,936-9.

Office of Works test of four years not sufficient trial: *Laidler*, 995-1008; *Campbell*, 3631-3;

*Chappell*, 6556-60; *Barker*, 6987-92; *Holliday*, 8513-21, 8581; *White*, 9284-6, 9375-6, 9380, 9405; *Orr*, 10,706-12; *Scott*, 12,219-24; *Vaughan*, 13,793-6; *Styles*, 14,120-4.

Satisfactory: *Hall*, 19564-5; *Styles*, 14,101-14; *Milton*, 20,246-63, 20,290-5.

Should be made before lead prohibited: *Cantrill*, 3926-9; *Barker*, 7083-7; *Holliday*, 8582-4; *Philip*, 8684; *White*, 9381-3, 9388-9.

Nature of: *White*, 9384-5, 9371-2.

Twelve months suggested for trials, during which time no regulations should be made: *Holliday*, 8599-616.

Two years not sufficient trial: *Sibthorpe*, 17,965.

Unsatisfactory and costly: *Morton*, 13,926-8.

Unsatisfactory: *Rambousek*, 14,523-5, 14,562-6; *Meissl*, 14,678-9, 14,689-702, 14,790-6.

## Use of:

Decreases lead poisoning in Navy: *Mockford*, 8827-9.

In England: *Leyendecker*, 16,424-8.

In Liverpool University: *Baly*, 1751-6.

Would entail more labour: *Sibthorpe*, 17,865-88.

Used satisfactorily by men ignorant of composition: *Cantrill*, 3900-6.

Varnish should be added for outside work: *Line*, 9930.

Very few complaints received by Office of Works: *Tanner*, 22,652-61, 22,714.

Water distempers largely used for flattening and ceiling work: *Wiltshier*, 6843-6.

White, with special medium, more durable than lead: *Milton*, 20,245.

Will be used on bridges in future: *Tanner*, 22,740.

Would be accepted if equal to lead: *White*, 9396-7.

Would welcome Office of Works formula if satisfactory: *Higgs*, 8954-7; *Walker*, 9091-3.

Zinc sulphide useless for exteriors: *Willis*, 11,660.

**Lead Mining:**

British ore contains very little silver: *Miller*, 17,127-9.

Capital invested and number of men employed: *Humphreys*, 17,340-6, 17,385-94.

Prejudicial effect of prohibition: *Miller*, 17,070, 17,098-101a; *Francis*, 17,239-40, 17,258, 17,274-80; *Humphreys*, 17,347, 17,363-72; *Gardner, H.*, 17,405-12, 17,423-38, 17,450-8; *Mutton*, 17,492-5; *Johnson*, 22,370-82.

**Lead Paints:**

Application easier than zinc: *Villomot*, 16,201-3, 16,246-8.

Best paint for outside work: *Rival*, 15,469-72, 15,485, 15,529-34; *McIlugh*, 20,687.

Change colour in impure atmospheres: *Smith, J. C.*, 1611, 1633-4.

Covering power greater than zinc: *Mockford*, 8756-7.

Dangers recognised by Admiralty: *Philip*, 8622.

Defects of: *Patterson*, 1059.

Durability greater than zinc: *Carfrac*, 10,905-10; *Vaughan*, 13,779-80.

Essential for outside work, but could be prohibited for inside work: *Walker*, 9090; *Milton*, 20,239-43; 20,267-8.

Guarantee given: *Niederhauser*, 16,362.

## Necessary:

For certain purposes: *Holzappel*, 11,510-3.

For final coat only: *Kaup*, 14,261.

No better than zinc on greenhouses or in warm, moist atmospheres: *Patterson*, 12,929-33.

No efficient substitute yet found: *Niederhauser*, 16,277, 16,355; *De Morsier*, 16,640.

For outside work: *Ricker-Devroede*, 14,825; *Sibthorpe*, 17,894; *Anderson, J.*, 19,703.

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**Lead Paints—continued.**

- Overrated, because obtainable pure. *Schobert*, 9676-7.
- Preferred to zinc :
- By master painters of Belgium : *Ricker-Devroede*, 14,934-8.
- For painting greenhouses : *Ricker-Devroede*, 14,865-73.
- Priming on iron and steel :
- Possibly needed for : *Mockford*, 8 805-9.
- Still used for, by Office of Works : *Tanner*, 22,662-4, 22,712; *Patterson*, 22,833-4.
- Purex (see evidence of *Mr. W. R. Hardwick*).
- Sharp colour, amount used in Scotland : *McKillop*, 20,933-1003.
- Should be labelled poisonous ; *Smith, J. C.*, 1626-7; *Kaup*, 14,226; *Rambousek*, 14,668; *Meissl*, 14,685; *Sibthorpe*, 17,916-7.
- Prohibited if efficient substitute found : *Campbell*, 3470-4.
- Smell injurious : *Mockford*, 8742.
- Specified by architects : *Expert-Bezançon*, 15,161-8.
- As a matter of habit : *Munby and Worriacott*, 2390-2.
- Spreading power better than zinc : *Klein*, 16,835.
- Superior to zinc : *Plumb*, 18,101-2, 18,104, 18,122-3, 18,305.
- Used for painting outsides of ships in Navy : *Philip*, 8652-6.
- Valuable in promoting drying : *Holzappel*, 11,518.

**Lead Poisoning :**

- Absorption through the skin :
- Considered as a cause of poisoning : *Cantrill*, 3957-8; *Holzappel*, 11,568-71.
- Given as a cause by painters : *Klein*, 16,962-5.
- Lead not absorbed, *Goadby*, 22,057.
- Surprised that it is not a cause of poisoning : *Puttrel*, 6384-8.
- Action taken on notified cases : *Legge*, 150-1, 234-7.
- Among plumbers : *Legge*, 238-9.
- Attacks among house painters not reportable :
- In Germany : *Kaup*, 14,217, 14,225.
- In United Kingdom : *Legge*, 148 9; *Schooling*, 18,725-7.
- A very serious evil : *Goadby*, 15,804-8; *McHugh*, 20,683, 20,694, 20,701.
- Blood examination important : *Goadby*, 15,816-26, 22,022-9.
- Cases arising in manufacture and spraying of Purex : *Hardwick*, 1807-11, 1821-6, 1832-41.
- Cases arising in paint mixing : *Harris*, 3803-10.
- Cases decreasing in number : *Anderson, J.*, 19,625-7, 19,634-40.
- Cases in Belgium : *Ricker-Devroede*, 14,950-4.
- Cases in Holland : *Bottink*, 18,447-66, 18,514-6, 18,530-2.
- Cases in which compensation has been paid : *McKillop*, 20,966-75.
- Cases may escape employers' knowledge : *Campbell*, 3565-75, 3604-8; *Barker*, 7039-51; *Walker*, 9130, 9137-40.
- Cases occur in best works : *Anderson, J.*, 19,862-7.
- Cases occur in spite of precautions : *Mockford*, 8825-6.
- Cases of poisoning and sickness due to lead known of : *Lowe*, 9256-63; *Webb*, 4176 87; *Bonner*, 4296-7; *Wiltshier*, 6669-70, 6673-7; *Mockford*, 8726; *White*, 9147-55; *Hall*, 9535-41, 9566-8; *Orr*, 10,511-8; *Dobie*, 10,919-23; *Leyendecker*, 16,430-7; *Sibthorpe*, 17,695, 17,988-95; *Plumb*, 18,115-21; *Anderson, J.*, 19,467-87; *Honeychurch*, 20,023, 20,117-26; *Milton*, 20,201-23; *Hunter*, 21,525-52; *Simpson*, 21,571-6; *Morley*, 23,006-9.
- Details of : *Grace*, 1912-20, 2065-72; *Wilson*, 3195-201; *Cantrill*, 3947-51; *Barker*, 6883-7, 6891-6; *White*, 9316-9, 9471; *Edginton*, 13,090-1; *Devine*, 20,337-51, 20,451-68, 20,502-6, 20,522-3, 20,533-5; *McKillop*, 20,717-64, 20,932-59; *Smith, A.*, 21,046-78, 21,083-7, 21,306-37.

**Lead Poisoning—continued.**

- Cases of poisoning and sickness due to lead known of—continued.
- None : *Chappell*, 6448, 6452 6, 6602-4, *McDermid*, 7,301, 7306-10; *Holliday*, 8422-3, 8436-7, 8529-30, 8541 9; *Higgs*, 8858, 8865-9, 8972-3; *Carfrae*, 10,807-11, 10,882-6; *Guest*, 11,073-7; *Bennett*, 11,194-8, 11,270; *Anderson, R. L.*, 11,309-14; *Wilkinson*, 19,897-907.
- In Holland : *Nooijen*, 15,221-30, 15,321-2, 15,431-4.
- Several : *Cantrill*, 3824-6.
- Very few : *Campbell*, 3376-82, 3561-4; *Harris*, 3645-53; *Puttrel*, 6173-80, 6389-402, 6407-14; *Grundy*, 7108-19, 7259-61; *Walker*, 9029-31, 9034-8, 9112-8; *Scott*, 12,188-94; *Donald*, 12,298-303; *Vaughan*, 13,533-40; *Morton*, 13,828-30, 13,833-6, 13,953-5; *Wallis*, 20,559, 20,564-73.
- Casual men more liable to : *Campbell*, 3597-603; *Griffiths*, 14,023-30; *Klein*, 16,923-30.
- Cleanliness alone does not give immunity from : *Parsonage*, 2814-7; *Pickles*, 3063-7; *Wiltshier*, 6787-90; *Carson*, 11,921-5; *Edginton*, 13,105-13; *Expert-Bezançon*, 15,115-6; *Devine*, 20,340, 20,391-2; *Smith, A.*, 21,238-9.
- Compensation for : see Compensation.
- Compulsory notification useful : *Legge*, 160, 293-5; *Smith, J. C.*, 1624-5.
- Confirmatory symptoms in every case : *Edginton*, 13,092.
- Contracted from emanation experiments : *Baly*, 1677, 1703-6, 1748-50.
- Danger from smoking : *Legge*, 208-12, 216-7.
- Danger from unclean hands : *Legge*, 208-12, 216-7; *Pickles*, 2973-5.
- Considered to be greater than from dust : *Puttrel*, 6353-72; *Grundy*, 7148; *McDermid*, 7434-5; *Carson*, 11,895-900, 11,931; *Ricker-Devroede*, 14,989-94.
- Surprised that it only accounts for 5 per cent. of cases : *Puttrel*, 6435-7.
- Danger in house painting greater than in other lead industries : *Legge*, 175-6.
- Death rates : *White*, 9364-70, 9470.
- Diseases predisposing to : *Rambousek*, 14,672-3.
- Diseases resulting from or aggravated by : *Legge*, 243-50; *Parsonage*, 2754-5; *Orr*, 10,677-82.
- Distribution of literature and regulations may tend to lessen evil : *Devine*, 20,498-501, 20,507-17, 20,524-9.
- Does not admit we are behind other countries in legislation regarding : *Guest*, 11,088-91.
- Does not think either stringent regulations or prohibition necessary to prevent evil : *Dobie*, 10,998-11,002; *Anderson, R. L.*, 11,355-61.
- Doubtful cases : *Cookson*, 2166-70, 2219-29, 2274-83; *Goadby*, 15,809-15; *Depiarras*, 19,157-60.
- Eagerness of men to be certified : *Edginton*, 13,132-4.
- Education of painters in cleanliness would reduce evil : *Laidler*, 760-6, 1011-5; *White*, 9513; *Kaup*, 14,468-70; *Plumb*, 18,107, 18,112; *Anderson, J.*, 19,623-4, 19,628-30, 19,658-64, 19,761-74; *Wilkinson*, 19,987-8, 19,996-9.
- Effect of alcohol : *Puttrel*, 6405-6; *Klein*, 16,931-8, 16,972-6.
- Effect of seasonal nature of trade : *Collis*, 4021-30 4035; *White*, 9463-9, 9494-7; *Sibthorpe*, 17,673.
- Effect of social conditions : *Klein*, 16,945-8, 16,967-71, 16,984-96.
- Eleven cases observed, three reported to Home Office : *Edginton*, 13,083-9.
- Extent of evil :
- As shown by official figures very deplorable : *Laidler*, 731; *Craco*, 1988; *Campbell*, 3389; *Harris*, 3659; *Cantrill*, 3835; *Puttrel*, 6217; *Chappell*, 6477; *Wiltshier*, 6690; *Barker*, 6928; *Grundy*, 7145; *McDermid*, 7338; *Holliday*, 8459; *Higgs*, 8893; *Walker*, 9054-5; *White*, 9223; *Hall*, 9551; *Orr*, 10,540; *Carfrae*, 10,818; *Dobie*, 10,937; *Guest*, 11,088; *Bennett*, 11,207; *Anderson, R. L.*, 11,323; *Scott*, 12,203; *Donald*, 12,312; *Vaughan*, 13,572-3; *Morton*, 13,859; *Styles*, 14,067; *Wilkinson*, 19,917-20; *Honeychurch*, 20,041-2; *Wallis*, 20,582.



**Lead Poisoning—continued.**Extent of evil—*continued.*In certain districts: *Sibthorpe*, 17,943-50.Partly realised: *Harris*, 3654-9; *Cantrill*, 3830-5; *Puttrel*, 6439-42; *Wiltshier*, 6682-8, 6690; *Hall*, 9550; *Anderson, R. L.*, 11,315-22.Serious in Birmingham, and many cases not classed as lead poisoning which should be: *Line*, 9913-25, 9976-85, 10,029-34, 10,102-3.Unaware of, and surprised at: *Crace*, 1981-7; *Campbell*, 3383-9; *Chappell*, 6472-6; *Barker*, 6921-8, 7061-4; *Grundy*, 7137-44; *McDermid*, 7499-506; *Holliday*, 8455-9; *Higgs*, 8883-94; *Walker*, 9046-55; *Carfrae*, 10,812-8; *Guest*, 11,078-88; *Bennett*, 11,199-207; *Scott*, 12,195-203; *Donald*, 12,304-11; *Vaughan*, 13,584-73, 13,776-8; *Morton*, 13,843-59; *Styles*, 14,058-67; *Wilkinson*, 19,908-16; *Honeychurch*, 20,035-42; *Milton*, 20,226-38; *Wallis*, 20,574-81.Fewer cases in decorative work than in plain painting: *Crace*, 2096-101.Fewer cases in Scotland: *Orr*, 10,526-8, 10,662-73, 10,714-46.Due to better training of men: *Anderson, J.* 19,704-12; *Sibthorpe*, 17,896-9.Due to more white work done in England: *Smith, A.*, 21,079-82.Reasons for: *Parsonage*, 2828-43.Incidence greater among railway painters than house painters: *Vaughan*, 13,781-5.Increase in number of cases due to Workmen's Compensation Act: *Edginton*, 13,160-5.Inhalation danger: *see* Dust and Spray.Inoculation experiments: *Goadby*, 15,753-60, 22,071-92.Inquiry by National Federation: *White*, 9328-40.Knowledge of cases due to application for certificates under the Workmen's Compensation Act: *Edginton*, 13,123-31.Large number of cases due to carelessness of men: *Puttrel*, 6268-71.Legislation regarding, overdue: *Cantrill*, 3839.Men having several attacks should leave trade: *Carson*, 11,832-6, 11,852-4, 11,901-9.Minimal dose: *Goadby*, 15,884-93.Minimum attack rate in Vienna (3.5 per cent.) still unduly high: *Kaup*, 14,367-8.Mortality and sickness not disputed: *Johnson*, 22,286-98.No steps taken by London Association of Master Decorators to diminish evil: *Honeychurch*, 20,030-1.Not a serious evil: *Anderson, J.*, 19,485-516, 19,619-92.Occurrence, etiology, and prevention: *Roch*, 16,681-91, 16,699-708.Plumbers do not suffer because they are trained: *Wiltshier*, 6818-9.Possibility of cases among ship painters being classed as house painters: *Legge*, 298-301, 314.Precautionary measures taken by Admiralty: *Mookford*, 8766-78, 8811-24.Suggested, *Rambousek*, 14,527-30, 14,635.Pressure of work and long hours increase danger: *Legge*, 268-72; *Edginton*, 13,139-49.Principal causes of: *Legge*, 162-3; *Pickles*, 2991-2; *Walsh*, 3087; *Plumb*, 18,163-77, 18,181-4, 18,289-90, 18,384; *Devine*, 20,352-61, 20,366-70.Produced by liberation of latent lead in the body by other diseases: *Goadby*, 22,017-21.Proportion of cases among painters and plumbers: *Legge*, 297.Reduction in cases following on regulations: *Willis*, 11,693-702; *Johnson*, 22,242-62, 22,333-8.In Austria: *Kaup*, 14,211-4; *Rambousek*, 14,516-7, 14,629-32, 14,638-47; *Meissl*, 14,676.In Germany slew: *Kaup*, 14,217-25, 14,397-404; *Niederhäuser*, 16,269-70, 16,278-87; *Leyendecker*, 16,387, 16,417-20, 16,456-8.In Switzerland: *De Morsier*, 16,600-1.**Lead Poisoning—continued.**Regrettable that this country should be behind others in legislation regarding: *Crace*, 1999; *Campbell*, 3393, *Harris*, 3661; *Puttrel*, 6221-4; *Chappell*, 6480-1; *Barker*, 6931; *Grundy*, 7147; *McDermid*, 7340; *Holliday*, 8463; *Higgs*, 8897-8; *Walker*, 9057; *White*, 9227; *Hall*, 9553; *Carfrae*, 10,822; *Bennett*, 11,210; *Anderson, R. L.*, 11,325; *Vaughan*, 13,575; *Morton*, 13,861; *Styles*, 14,068-70.Regulations would reduce evil: *Plumb*, 18,188-95.Severity of cases: *Legge*, 161.Sickness mainly due to lead dust and turpentine: *Goadby*, 22,004-7.Small experience of, due to casual employment of men: *White*, 9479-85.Some action necessary to prevent evil: *Smith, J. C.*, 1631-2; *Cunynghame*, 10,284-6; *Orr*, 10,642; *Guest*, 11,092-3; *Sibthorpe*, 17,658-9, 17,697-8; *Anderson, J.*, 19,517-25; *Wilkinson*, 19,921; *Honeychurch*, 20,043; *Johnson*, 22,299-30.

Statistics:

Could be compiled from returns under National Insurance Act: *Anderson, J.*, 19,692-5; *Johnson*, 22,392-400.For Amsterdam none: *Bettink*, 18,449.For Austria: *Kaup*, 14,345-77, 14,409-16, 14,459-61, 14,473-6; *Meissl*, 14,715-24, 14,734-46.For Bohemia: *Rambousek*, 14,573-8, 14,622-8, 14,660-1.For France: *Expert-Bezançon*, 15,129-33, 15,142-51.Method of collecting criticised: *Expert-Bezançon*, 15,134-41, 15,153-9, 15,195-6.For Geneva: *Roch*, 16,677-8, 16,709-25, 16,757-66.For Germany: *Kaup*, 14,417-22.For Switzerland: *De Morsier*, 16,550-6, 16,602-3, 16,641-2.For trade unions: *Parsonage*, 2627-31, 3966-72; *Gardner, A.*, 3973-8, 3982; *Baneroft*, 4053-9. Disputed: *Wilkinson*, 19,982-6.For United Kingdom: *Legge*, 152-8, 278-80, 306-7.Accuracy of: *Legge*, 251-7.Disputed: *Orr*, 10,519-40, 10,713; *Dobie*, 10,924-36, 10,940-50, 11,004-18.Estimation of probable number of cases: *Legge*, 159, 240-2.Occupational mortality: *Schooling*, 18,549-601, 18,665-95, 18,747-803.Occupational sickness: *Schooling*, 18,602-64, 18,704-46, 18,831-65.One death in 54 among housepainters: *Schooling*, 18,698-703.Registrar-General's figures, *Collis*, 3989-4006.Trade Societies' figures, *Collis*, 3984-9, 3999-4009, 4036-9.Surprised that properly trained men should contract lead poisoning: *Wilkinson*, 20,007-9.Susceptibility and immunity: *Goadby*, 15,785-8; *Smith, A.*, 21,241-5.System of combined regulations and prohibition suggested, *Cunynghame*, 10,302-5.Unclean men more liable to: *Lowe*, 3362-6.Untrained or careless men most liable to: *Legge*, 276-7; *Parsonage*, 2744-9, 2811-3, 2865, 2881; *Wiltshier*, 6813-7; *White*, 9307-15; *Vaughan*, 13,743-55; *Rambousek*, 14,653; *Meissl*, 14,730-3; 14,807-10; *Anderson, J.*, 19,843-6; *Wilkinson*, 20,013-4.Would be reduced by use of more oil in paints: *Carfrae*, 10,862-4, 10,887-92, 10,900-1.**LEGGÉ, THOMAS MORISON (H.M. Senior Medical**

Inspector of Factories):

Evidence, 148-343.

Dry rubbing down: amount of dust created, 201-6.

Dust:

Chief cause of lead-poisoning, 273-4, 302, 334.

Exhaust impracticable, 177-8, 198-9.

Emanations produce headache but not lead-poisoning, 213-5.

Foreign legislation:

Austrian regulations, 193.

Belgian regulations, 187-90.

LEGG, THOMAS MORISON—*continued.*

- Foreign legislation—*continued.*  
 French regulations, 191-4.  
 German regulations, 183-6.
- Leadless paints:  
 Efficiency of, 164-5.  
 Extent of use of, 169-71.
- Lead-poisoning:  
 Action taken on notified cases, 150-1, 234-7.  
 Among house painters not notifiable as outside scope of Factories and Workshops Act, 148-9.  
 Among plumbers, 238-9.  
 Compulsory notification of house painters useful, 160, 293-5.  
 Danger from smoking and lead on hands, 208-12, 216-7.  
   In house-painting greater than in other lead industries, 175-6.  
 Diseases resulting from or aggravated by, 243-50.  
 Estimation of probable number of cases, 159, 240-2.  
 More frequent in first two years of employment, 308-10.  
 More prevalent among unskilled men, 276-7.  
 Possibility of cases among ship painters being classed as house painters, 298-301, 314.  
 Pressure of work increases danger, 268-72.  
 Proportion of cases among painters and plumbers, 297.  
 Severity of cases, 161.  
 Sources of, 163-3.  
 Statistics, 152-8, 278-80, 306-7.  
   Accuracy of, 251-7.
- Mixing:  
 Exhaust impracticable, 342-3.  
 No dust if lead in paste form, 282-3.
- Overalls:  
 Cleaning of, 339-40.  
 Provided by men, 337.  
 Occupiers in Germany, 338.
- Painting:  
 No regulations as outside scope of Factory Act, 172-4.  
 Spraying dangerous, 304-5.  
 Workshops often in dirty condition, 327-30.
- Periodical medical examination:  
 At six monthly intervals not of much use, 260-2.  
 Difficulties of, 179-82.  
   In Belgium, 189-90.  
 Transference of men showing signs of lead absorption to other work useful, 264-5.
- Turpentine: ezema from substitutes, 316-8.
- Washing:  
 Provision of buckets and soap could be enforced, 335-6.  
 Very little accommodation now provided, 331-3.
- Workmen's Compensation Act:  
 Difficulty in re-insurance and re-employment of men after receiving compensation, 290-2.  
 Duties of certifying surgeon under, 284-9.  
 Procedure in cases of poisoning, 228-33.
- Zinc paints, different in application to lead paints, 166-7.

## LEYENDEOKER, HANS (President of the German

- White Lead Manufacturers' Association):  
 Evidence, 16,383-480.  
 Dust: principal danger, 16,459-62.  
 Emanations: does not think they contain lead, 16,398.
- Foreign legislation:  
 German regulations, summary of, 16,385-6.  
 Inquiry and conclusions, 16,388-93.
- Leadless paints: use of in England, 16,424-8.
- Lead poisoning:  
 Cases known of, 16,430-7.  
 Reduction following on regulations slow in Germany, 16,387, 16,417-20, 16,456-8.
- Paints: standardisation of, 16,396.
- Regulations: enforcement in Germany, 16,394-5, 16,401-16, 16,421-2, 16,438-55.
- White lead: best paint base, 16,465-80.

## LINE, CHARLES A. (Consultant on House Decoration):

- Evidence, 9903-10,103.  
 Graphite paints: with zinc oxide durable protection for iron and steel, 9932 3, 10,023-7.
- Leadless colours:  
 All colours obtainable, 10,092-102.  
 Would not increase cost of painting, 10,093.
- Leadless paints: varnish should be used with, for outside work, 9930.
- Lead poisoning: serious evil in Birmingham, and many cases not classed as lead which should be, 9913-25, 9976-85, 10,029-34, 10,102-3
- Paints: vehicle more important than pigment, 9931-2.
- Prohibition: practicable, 9974.
- Zinc oxide:  
 Increased demand would:  
   Lead to manufacture in England, 9972.  
   Not lead to increase in price, 9973.  
 Method of production, 9954-5.
- Zinc paints:  
 Durability very good, 9958-69.  
 Lead not necessary, and water paints satisfactory for undercoats, 9946-50, 9986-92, 10,074-89.  
 Require special treatment as regards vehicle, 9934-41, 10,045-8.  
 Vehicles recommended, 10,042-4, 10,055-62.
- Zinc sulphide:  
 Covering power double that of lead, 9943-5.  
 More durable than lead for outside, 9993-10,022.

## LOWE, FRANK (of the National Amalgamated Society of Operative House and Ship Painters and Decorators):

- Evidence, 3254-370.
- Dry rubbing-down:  
 Amount of, 3303-5, 3316-30.  
 Indispensable in some cases, 3265-7.
- Dust and spray: danger from spray in stippling or painting ceilings, 3264.
- Lead poisoning:  
 Cases known of, 3256-63.  
 Unclean men more liable to, 3362-6.
- Meals: where taken, 277-8.
- Mixing:  
 Danger from fumes, 3271-3.  
   In burning out paint-caus, 3294-302, 3306-15.
- Overalls:  
 Danger of contaminating food by dirty overalls, 3281-4.  
 Generally worn and washed weekly, 3279-80.
- Prohibition: only solution, 3285.
- Removal of old paint:  
 Danger from:  
   Fumes in burning off, 3268, 3289-92, 3331-2.  
   Sandpapering after burning off, 3269-70.
- Rubbing-down: wet process impracticable after burning off, 3333-6.
- Washing:  
 Accommodation important, 3274.  
 Hot water difficult to obtain, 3275, 3337-44, 3366-70.
- Zinc paints:  
 Application easy after a little experience, 3348, 3352-3.  
 As good as lead, 3286-7.  
 Instances of use, 3345-52, 3355-61.  
 With varnish added satisfactory for outside, 3354.

## McDERMID, JOHN HENRY (of the National Association of Master House Painters and Decorators of England and Wales):

- Evidence, 7297-506.
- Dry rubbing-down:  
 Abolition of, would mean rougher work, 7492-8.  
 Causes dust, 7379-85.  
 Could be abolished for old work but not for new, 7436-49.  
 Exhaust fans impracticable, 7378.  
 No means of removing dust created, 7377.  
 Suggests felt and polish as an alternative, 7458-65.  
 Would not like to do without it between coats, 7369-76.

**McDERMID, JOHN HENRY—continued.**

Dust and spray: no way of removing danger in painting ceilings and stippling, 7386-95.  
Emanations: prohibition of lead only remedy, 7451-7, 7466-72.

Hours of employment: restriction to 48 hours difficult owing to seasonal nature of trade, 7405-8, 7417.

Insurance rates: recently increased, 7304-5.

Leadless paints:

Only way of removing danger, 7400-1.

Would increase cost of painting, 7402-3.

Lead poisoning:

Considers danger from uncleanness greater than from dust, 7434-5.

No cases of poisoning or sickness known of, 7301, 7306-10.

Regrettable that this country should be behind others in legislation regarding, 7340.

Unaware of extent of evil, 7499-506.

Master House Painters Association:

Extent of lead-poisoning evil not realised, 7323-38.

Have made tests to discover substitute by painting boards with different pigments, 7318-22.

Have taken no steps to discover extent of poisoning, 7311-7.

Meals:

Accommodation away from paint and dust impossible in some cases, 7422-4.

Invariably taken away from paint-work, 7363-8.

Mixing: done in paste form, 7398, 7484.

Outdoor clothing:

Storage away from paint and dust difficult in some cases, 7360-1, 7491.

Would provide suitable storage, 7429, 7489-90.

Overalls:

Generally taken home daily, 7353-6.

Should be provided, 7347-8.

Should be washed weekly, 7349-52.

Sometimes left in room where painting is done, 7357-9.

Storage apart from paint and dust sometimes impossible, 7362.

Would object to provide and wash overalls, 7425.

Periodical medical examination: would agree to it, but not for employer to pay, 7409-13, 7431.

Regulations: preferred to prohibition of lead, 7432.

Removal of old paint: can suggest nothing to remove fumes in burning off, 7396-7.

Washing:

Accommodation essential, 7341-2.

Hot water:

Desirable, 7343.

Generally obtainable, 7344-6, 7488.

Would agree to provide hot water, towels, soap, &c., 7418-21.

Zinc paints: cost more and are less stable than lead, 7477-81.

**McHUGH, J. (of the National Association of Master House Painters and Decorators):**

Evidence, 20,681-712.

Lead paints: considered best for outside work, 20,687.

Lead poisoning: very serious evil, 20,683, 20,694, 20,701.

Meals: times when taken, 20,707-12.

Prohibition preferred to Regulations by Liverpool Master Builders Association, 20,693, 20,704-6.

Regulations: impossible to carry out, 20,694.

Zinc paints:

As easy to apply as lead, 20,697-9.

Cost about same as white lead, 20,689-91.

Cost would rise if lead prohibited, 20,692.

Increasing use of, in Liverpool, 20,695-6.

Pure zinc oxide with varnish as good as white lead, 20,687-8.

**McKILLOP, DAVID (of the Scottish Painters' Society):**

Evidence, 20,713-21,040.

Dry rubbing-down:

Amount of, 20,776-8, 20,988-98.

Causes dust, 20,781-6, 20,797-800.

Great danger, 20,765.

Indispensable in some cases, 20,779-80, 20,792-6, 20,801-2.

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**McKILLOP, DAVID—continued.**

Dry rubbing-down—continued.

Only done on good work, 20,976-80.

Respirators:

Only suggestion, 20,766-74.

Uncomfortable, 20,775.

Dust and spray:

No dust in paint-shop, 21,016, 21,037-40.

No way of removing danger in painting ceilings, 20,808-10.

Respirator:

No knowledge of wearing, 20,888-91.

Only possible remedy for danger in stippling, 20,811-4.

Filling: alabastine used, 20,803-7, 20,892-7.

Hours of employment in Edinburgh, 20,922-3.

Leadless paints: no experience with, 20,929-31.

Lead paints: amount of sharp colour used in Scotland, 20,993-1003.

Lead poisoning:

Cases in which compensation has been paid, 20,966-75.

Details of cases among members of Scottish Painters' Society, 20,717-64, 20,932-59.

Many men do not know of compensation for, 20,960-3.

Meals:

Food sometimes kept in bag, 20,907-9.

Taken to work in paper in pocket, 20,864-6.

Time allowed, 20,924-6.

Mixing:

Done in shop or on job, 20,819-22.

Done with lead in paste form, 20,823-5.

No dust created, 21,015.

Overalls:

Kept in workroom, 20,906.

No hardship for men to supply and clean, 21,033-6.

Provided and washed by men, 20,858-60, 20,867-74.

Periodical medical examination advocated, 20,876-7a.

Prohibition: only remedy, 20,881-7.

Regulations: difficult to enforce by inspection, 20,910-2.

Removal of old paint: no danger from fumes in burning off, 20,815, 20,913-21.

Rubbing down:

Length of time required before new paint work can be rubbed down wet, 21,004-12.

Wet method can be used on old coats, 20,787-91.

Stopping: material not likely to soil hands, 20,832-4.

Turpentine: danger of substitutes, 20,816-8, 20,898-900.

Washing:

Accommodation important, 20,836.

Hot water: not essential and prefers cold, 20,840-6, 20,894-7.

Soap, towels, nail-brushes, &c., not always available, 20,852-7, 20,904-5, 21,025-32.

Time should be allowed, 20,837.

Water difficult to obtain sometimes, but generally available, 20,847-51, 21,019-24.

Zinc paints: prejudice against, 20,901-3.

**Master House Painters Association:**

Extent of poisoning:

Not realised: *Barker*, 6913-28, 7075; *McDermid*, 7323-38.

Realised: *Puttrel*, 6210-6; *Grundy*, 7132-6.

Have made no scientific experiments to discover a substitute for lead: *Puttrel*, 6192-7; *Grundy*, 7128-31.

Have made tests to discover substitute by painting boards with different pigments: *Chappell*, 6467-71; *Wiltshier*, 6678-81; *Barker*, 6909-12; *McDermid*, 7318-22.

Have taken no steps to discover extent of lead poisoning: *Puttrel*, 6181-91; *Chappell*, 6457-64, 6620; *Barker*, 6897-908; *Grundy*, 7120-7; *McDermid*, 7311-7.

Or prevent it: *Vaughan*, 13,541-7.

Have taken no steps to mitigate lead poisoning: *Chappell*, 6465-6.

Have tried to educate apprentices at technical schools to be clean and so combat lead poisoning: *Puttrel*, 6198-209.

**Master House Painters Association—continued.**

- Untrained men taken on in busy season: *Wiltshier*, 6820-2.  
 Will take up the question of lead poisoning: *Barker*, 7077-9.  
 Would not take exception to prohibition of lead: *Barker*, 7103.

**MATTON, JULIUS (Member of the Metal Exchange):**

- Evidence, 17,489-558.  
 Lead:  
 Consumption in England, 17,489, 17,497-8.  
 English better for white lead making and commands better price than foreign, 17,524-30.  
 Fluctuation in prices and output, 17,500-17.  
 Proportion used for white lead making, 17,499.  
 Reasons why foreign importer should not suffer so much as English producer if white lead prohibited, 17,518-23, 17,531-58.  
 Lead mining: prejudicial effect of prohibition, 17,492-5.

**Meals:**

- Accommodation away from lead paint and dust:  
 Can generally be provided: *Campbell*, 3414-8; *Bancroft*, 4101-2; *Puttrell*, 6255-9; *Chappell*, 6525-6, 6633-7; *Wiltshier*, 6709-15; *Holliday*, 8483-90; *Higgs*, 8917-23; *Orr*, 10,565-71, 10,789-96; *Guest*, 11,097-102, 11,176-9; *Scott*, 12,232-4.  
 Difficult or impossible in some cases: *Cookson*, 2176; *Parsonage*, 2721-3; *Pickles*, 2983-5; *Walsh*, 3104-6; *Barker*, 6954-6; *Grundy*, 7196-7; *McDermid*, 7422-4; *Walker*, 9074; *Carfrae*, 10,836-7; *Dobie*, 10,955-8, 11,060-3; *Bennett*, 11,228; *Anderson, R. L.*, 11,340; *Donald*, 12,334-6; *Vaughan*, 13,640-4, 13,815-6; *Morton*, 13,898-9; *Styles*, 14,077a-80; *Anderson, J.*, 19,536-41; *Wilkinson*, 19,926-7; *Honeychurch*, 20,047; *Devine*, 20,395-8; *Wallis*, 20,592-7.  
 Generally provided on large jobs: *Parsonage*, 2927-38; *Campbell*, 3550.  
 Should be provided: *Holliday*, 8479-82.  
 By householders: *Wallis*, 20,644-5.  
 Sometimes provided but no real need for it: *White*, 9252.  
 Danger of contamination of food by dirty overalls, paint brushes, &c.: *Lowe*, 3281-4; *Campbell*, 3551-4; *Anderson, R. L.*, 11,382-91; *Devine*, 20,554-6.  
 Eating meals in paint shop might be injurious: *Harris*, 3770-3, 3775-9.  
 How taken to, and kept at, work: *Campbell*, 3555-7; *McKillop*, 20,864-6, 20,907-9.  
 Should be prohibited near paint or lead dust: *Cookson*, 2177-9; *Puttrell*, 6251-4, 6260-2; *Chappell*, 6522-4.  
 Times when taken: *Laidler*, 699-702; *Crace*, 1968; *Sibthorpe*, 17,937-42, 17,978-80; *McHugh*, 20,707-12; *McKillop*, 20,934-6.  
 Where eaten: *Laidler*, 703-10, 914-17, 970-1; *Wilson*, 3239-42, 3250-3; *Lowe*, 3277-8; *Webb*, 4270-1; *Bonner*, 4343-6.  
 Away from work mostly: *Crace*, 1970-5; *McDermid*, 7363-8; *Honeychurch*, 20,043-52.  
 In rooms when painting is in progress sometimes: *Harris*, 3689-94, 3780-1; *Cantrill*, 3856-60; *Grundy*, 7192-5; *Wilkinson*, 19,928-31.

**MEISSI, ODO MARIA (Master Painter, of Vienna):**

- Evidence, 14,688-832.  
 Dry rubbing-down could be dispensed with, 14,688, 14,725-9.  
 Leadless paints:  
 Climate of England may affect less than climate of Austria, 14,703-4.  
 Unsatisfactory, 14,678-9, 14,689-702, 14,790-6.  
 Lead paints should be labelled "Poisonous," 14,685.  
 Lead poisoning:  
 Decrease in, due to Regulations in Austria, 14,676.  
 In Austria, 14,715-24, 14,734-46.  
 More prevalent among unclean and untrained men, 14,730-3, 14,807-10.  
 Paints: effect of varnish, 14,771-5.

**MEISSI, ODO MARIA—continued.**

- Periodical medical examination: Austrian regulations regarding, not strictly enforced, 14,721.  
 Red lead: indispensable for ironwork, 14,682-5, 14,823-32.  
 Regulations:  
 Enforcement of, in Austria, 14,677, 14,705-14, 14,758-9.  
 Necessary, 14,757.  
 Zinc paints:  
 Cost about same as lead, 14,797-801.  
 Covering power less than lead, 14,680-1.  
 Not so durable as lead, 14,761-4.  
 Oil separates from pigment if kept a long time, 14,749-53.  
 With varnish satisfactory for outside, 14,816-20.
- MILLER, HEDLEY (of the London Chamber of Commerce):**  
 Evidence, 17,064-235, 22,549-627.  
 Lead:  
 Capital invested and number employed in smelting industry, 17,071-3, 17,103-4, 17,130-2.  
 Dependent on foreign sources for supply, 17,159-60.  
 Prejudicial effect of prohibition:  
 On price, 17,069, 17,096-7.  
 On smelting industry, 17,074.  
 Production in England, 17,094-5, 17,152-8.  
 Leadless paints: London Chamber of Commerce Inquiry, 17,078-81, 17,112-4, 17,133-7.  
 Lead mining:  
 British ore contains very little silver, 17,127-9.  
 Prejudicial effect of prohibition, 17,070, 17,098-101a.  
 Paints: relative prices of zinc and lead, 17,116-8.  
 Prohibition:  
 Effect on other industries, 17,067-8.  
 Would close white lead works, 17,088-9.  
 Red lead: capital invested and output, 17,074, 17,106-8.  
 Regulations: should be given a trial before lead prohibited, 17,199.  
 White lead:  
 Amount manufactured, exported, re-exported, and consumed in United Kingdom, 17,065, 17,086-7, 17,090-3, 22,551-2, 22,556-71.  
 Amount used for painting purposes, 17,228-35, 22,553-5.  
 Amount used for purposes other than painting, 17,119-22, 22,576-82, 22,606-27.  
 Best paint pigment, 17,110-1.  
 Capital invested, 17,066.  
 Effect of prohibition:  
 On export trade, 22,596-605.  
 On market, 22,572-86.  
 Foreign competition, 22,587-95.  
 Trade dependent on foreign sources in some measure, 17,123-6.  
 Zinc:  
 Dependent on foreign sources for supply, 17,161-2.  
 Production in England, 17,152-8.  
 Zinc oxide:  
 History, capital invested, production, &c., 17,076-7, 17,082.  
 Importation increasing, 17,138-40.  
 Mainly a foreign product, 17,194-6.  
 Manufacture in England, 17,167-72.  
 Difficult, 17,198, 17,216-20.  
 Only substitute for lead in any way efficient, 17,075.  
 Price would rise with increased demand, 17,173-83, 17,197.  
 Used for other purposes than painting, 17,223-6.  
 Zinc paints:  
 Application difficult, 17,147-51, 17,202-6.  
 Failure of experiments, 17,190-2.  
 Increasing use of, 17,207-15.  
 Satisfactory for inside work, but not for outside, 17,077, 17,083.
- MILNES, F. H.:** See FLATAU, CAPT. L.S.  
**MILTON, JOHN (of the London Association of Master Decorators):**  
 Evidence, 20,191-333.

**MILTON, JOHN—continued.**

- Leadless paints:  
 Cost with special medium not much more than white lead, 20,278-82, 20,325-31.  
 Covering power better than white lead, 20,270.  
 Lithopone satisfactory for inside, 20,275-7.  
 Medium important, 20,245, 20,264-6, 20,269-71.  
 Satisfactory trials, 20,246-63, 20,290-5.  
 Trade prejudice against new materials, 20,283-9.  
 White, with special medium, more durable than lead, 20,245.
- Lead poisoning:  
 Cases of poisoning and sickness known of, 20,201-23.  
 Surprised at extent of evil, 20,226-38.
- Overalls:  
 Provided and washed by men, 20,299-302.  
 Provision by employer objected to, 20,305-7.  
 Would agree to wash them, 20,303-4.
- Periodical medical examination: would agree to, 20,321.
- Prohibition:  
 Possible effect on public, 20,244.  
 Preferred to regulations, 20,240, 20,324.
- Washing:  
 Facilities already provided, 20,308-11, 20,315-20.  
 Hot water not essential, 20,312-4.  
 Provision of towels objected to, 20,321.
- White lead: could be prohibited for inside work, but not for outside, 20,239-43, 20,267-8.
- Zinc paints: pure zinc oxide not such good covering power as white lead, 20,272-3.

**Mixing paints:**

- Breaking up of lead done by machinery, *Harris*, 3731.
- Dangerous: *Rivet*, 15,462-3.
- Difficulty in bringing process under Factory Act: *Smith, J. C.*, 1636-8.
- Dropped hands among colourmen after several years' work: *Parsonage*, 2694-709.
- Dust not created as lead in paste form: *Crace*, 1937-40; *Campbell*, 3464; *Cantrill*, 3894; *Banner*, 4298; *Wiltshier*, 6785, 6847-8; *McDermid*, 7398, 7484; *Sibthorpe*, 17,907; *McKillop*, 20,823-5, 21,015; *Smith, A.*, 21,181-2, 21,187.  
 If lead in paste form: *Legge*, 282-3.
- Exhaust fans impracticable: *Legge*, 342-3.  
 Not installed where mixing done dry, *Laidler*, 642-3.
- Fumes, dangerous: *Pickles*, 2970-2; *Walsh*, 3094-5; *Wilson*, 3174-84, 3193-4; *Low*, 3271-3; *Bancroft*, 4060-2; *Wobb*, 4188-9, 4195-6.  
 In burning out paint cans: *Low*, 3294-302, 3306-15; *Wobb*, 4190; *Banner*, 4302-7.  
 Do not cause lead poisoning: *Carson*, 11,930.
- No decrease in amount of dry-mixing: *Plumb*, 18,246-61.
- Red lead dangerous: *Holzappel*, 11,572-5.
- Should be done by paint manufacturers: *Wait*, 1457-61, 1515-6, 1530; *Carson*, 11,752-5, 11,929.  
 With lead in paste form: *Puttrel*, 6316-9; *Chappell*, 6551.
- Use of ready-mixed paints increasing: *Rivet*, 15,464-7.
- Way in which done: *Laidler*, 614-22; *Devine*, 20,382-3, 20,540-3.  
 With hands known: *Wait*, 1511-4, 1524-9.  
 Unknown: *Crace*, 2088-9.
- Where done: *Pickles*, 2966-9.  
 In paint shop: *Harris*, 3730; *Smith*, 21,180.  
 Or on job: *McKillop*, 20,819-22.  
 Mostly on job: *Laidler*, 1018-21; *Crace*, 1034-6; *Campbell*, 3463; *Cantrill*, 3893; *Chappell*, 6550; *Wiltshier*, 6749, 6784.

**MOCKFORD, GEORGE BEVAN (Foreman of Painters at H.M. Dockyard, Portsmouth):**

- Evidence, 8721-851.
- Dry rubbing-down: principal danger, 8738-9.
- Iron oxide paints:  
 Not so good as lead for priming, 8830-5.  
 Substituted satisfactorily for lead in confined spaces, 8729-35, 8836-7.
- Leadless paints:  
 Results not so good as lead, 8758-61.

**MOCKFORD, GEORGE BEVAN—continued.**

- Leadless paints—*continued.*  
 Use of, decreases lead poisoning in Navy, 8827-9.
- Lead paints:  
 Greater covering power than zinc, 8756-7.  
 Possibly needed for priming on iron and steel, 8805-9.  
 Smell injurious, 8742.
- Lead poisoning:  
 Cases known of, 8726.  
 Cases still occur in spite of precautions, 8825-6.  
 Precautions against, taken by Admiralty, 8766-78, 8811-24.
- Prohibition:  
 For insides not a hardship, 8810.  
 Practicable with reservations for iron primings, 8780-5.
- Ship painting: interiors in Navy done every two or three years, 8786, 8793-8, 8801-3.
- Washing: hot water essential, 8768-9.
- Zinc paints:  
 As durable as white lead, 8791-2.  
 Extended use of, requisite to obviate danger, 8741, 8764.  
 Grey colour for outsides of ships in Navy could be obtained, 8839-51.  
 Preferred to white lead for finishing coats in Navy, 8736.  
 Retain their colour better than lead, 8804.  
 Used for interior painting in Navy, 8743-6.  
 Used for royal apartments on H.M. Yacht "Victoria and Albert," 8747-52.

**MORLEY, B. J. (Foreman Painter of Messrs. Cadbury, Ltd., of Bournville):**

- Evidence, 22,937-23,095.
- Iron oxide paints: satisfactory on iron and steel, 23,082-4.
- Leadless colours: satisfactory, 23,037-44, 23,085-90.
- Leadless paints:  
 Better than lead on greenhouses, 22,989-92.  
 Composition, mixing, medium, application, 22,949-73, 23,029-32, 23,072-3.  
 Cost same as for lead, 22,974-7.  
 Drying difficulties overcome, 23,002-3.  
 Instances of use, 22,978-88, 23,048-63.  
 Satisfactory, 22,962-3.  
 Stand well for seven years, 22,994-7.
- Lead poisoning: cases known of, 23,006-9.
- Painters: health of, 23,010-28.
- Turpentine: danger of inferior qualities, 23,074-5.
- Zinc paints:  
 Addition of varnish does not increase cost, 23,094-5.  
 Increases durability, 23,091.  
 Cost more than lead but cover greater area, 23,035-6.  
 Easy to apply, 23,066.  
 Satisfactory for outside work, 23,076-81.

**MORTON, G. H. (of the National Federation of Building Trades Employers):**

- Evidence, 13,824-971.
- Dry rubbing-down:  
 Could be dispensed with, 13,900-8.  
 Respirators, only suggestion, 13,909-12.
- Dust and spray: no way of avoiding splashes in painting ceilings and stippling, 13,913-8.
- Hours of employment: number per week, 13,929.
- Insurance rates: have recently increased, 13,831-2.
- Leadless paints: unsatisfactory and costly trials, 13,926-8.
- Lead poisoning:  
 Cases known of very few, 13,828-30, 13,833-6, 13,953-5.  
 Regrettable that this country should be behind others in legislation regarding, 13,861.  
 Unaware of extent of evil, 13,848-59.
- Meals: accommodation away from paint, &c., impossible in some cases, 13,898-9.
- National Federation of Building Trades Employers:  
 Have taken no steps to prevent evil, 13,837-43.  
 Realise extent of evil, 13,844-7.
- Outdoor clothing: storage away from paint difficult in some cases, 13,880-97.
- Overalls: provision and washing by occupier objected to, 13,871-8.

**MORTON, G. H.—continued.**

- Periodical medical examination:  
 Transference of suspended persons to other work practicable, 13,948-52.  
 Would not agree to, 13,930-8.
- Prohibition:  
 Complete, regulations only partial, remedy, 13,924-5.  
 Preferred to regulations, 13,939-42, 13,957.
- Regulations:  
 Enforcement impossible, 13,867-70.  
 Would involve increased charges, while use of lead would involve more frequent painting, 13,958-62.
- Removal of old paint: no way of avoiding fumes in burning off, 13,919-23.
- Rubbing-down: time occupied at, 13,943-7.
- Washing:  
 Accommodation should be provided, 13,862-4.  
 Hot water difficult to provide in some cases, 13,865-6.
- Zinc paints:  
 More expensive than lead for outsides, 13,967-71.  
 Satisfactory for outside work, 13,963-6.

**MUNBY, A. E., A.R.I.B.A., and WONNACOTT, W., A.R.I.B.A., F.S.I. (of the Royal Institute of British Architects):**

- Evidence, 2310-489.
- Lead paints: specified as a matter of habit, 2390-2.
- Paints:  
 Comparative covering powers of lead and zinc, 2471-6.  
 Fine grinding:  
 Importance of, 2320-6.  
 Increased durability, 2318-19, 2412-21.
- Greens:  
 Difficult to obtain without lead, 2346.  
 Materials generally used, 2369-78.
- Medium important, 2379-88.
- Standardisation needed, 2317.
- Use of barium sulphate, 2366-8.
- Weight for given area should be specified, 2327-8, 2422-6.
- Prohibition: architects generally would welcome if possible, 2394-5.
- Restriction to 5 per cent. soluble lead: safe to assent to, 2350-6, 2452-7.
- White lead: lead sulphate has excellent durability, 2365.
- Zinc oxide: recent improvements in, 2401-9.
- Zinc paints:  
 As good as lead for inside, 2329.  
 Cost no greater than lead, 2330, 2333-4.  
 Could replace lead for interior work, 2335-6.  
 Covering power:  
 Increased by addition of basic sulphate of lead, 2479-88.  
 Not so good as lead, but spreading power greater, 2331-2, 2427-8.  
 Difficulty in specifying by architects, 2440-50.  
 Failings of, 2359-64.  
 Lighter colour not so durable as lead outside, 2345.  
 Not so easy to apply as lead, 2338, 2429-30.  
 Treatment needed not same as lead, 2340-4.  
 Unsatisfactory for iron work, 2477-8.

**National Federation of Building Trades Employers:**

- Extent of evil not thoroughly recognised: *White*, 9177-223, 9372-4.
- Extent of evil realised: *Morton*, 13,844-7.
- Have made no experiments to discover substitute: *Higgs*, 8879-82; *White*, 9174-6.
- Have taken no action to prevent evil: *Morton*, 13,837-43.
- Have taken no steps to discover extent of lead poisoning: *Higgs*, 8873-8.
- Have taken steps to discover extent of lead poisoning: *White*, 9156-73.

**NIEDERHAÜSER, EMIL (Master Painter, of Cologne):**

- Evidence, 16,267-382.
- Dry rubbing-down:  
 Can be dispensed with, 16,303-4

**NIEDERHAÜSER, EMIL.—continued.**

- Dry rubbing-down—continued.  
 Moistening paint before sandpapering in Germany, 16,374-9.  
 Prohibited in Germany, 16,292.
- Lead poisoning: reduction following on regulations in Germany slow, 16,269-70, 16,278-87.
- Overalls: provided and washed by men in Germany, 16,319-24.
- Prohibition:  
 Effect on other trades, 16,276.  
 Impracticable, 16,330, 16,335.
- Regulations:  
 Enforcement in Germany, 16,271, 16,288-302, 16,314-6, 16,325-9.  
 Should be tried before prohibition, 16,356.
- Rubbing down: length of time required before new paint can be rubbed down wet, 16,305-9.
- Washing:  
 Hot water impracticable, 16,311-2.  
 Time not allowed in Germany, 16,366-9.
- White lead:  
 Better than zinc for outside work, 16,272-3.  
 Guarantee given, 16,302.  
 No satisfactory substitute found, 16,277, 16,355.
- Zinc paints:  
 Addition of varnish increases durability, 16,347-8.  
 No difficulty in application, 16,370-1.  
 Not so durable as lead, 16,344-6, 16,349-54.  
 Would not guarantee, 16,363.

**NOOIJEN, M. (of the Guild of Dutch Master Painters)**

- Evidence, 15,206-436.
- Compensation for lead poisoning payable in Holland, 15,313-8, 15,323, 15,414-30.
- Dry rubbing-down: can be dispensed with, 15,283.
- Filling: white lead can be prohibited, 15,214.
- Foreign legislation:  
 Dutch White Lead Commission:  
 Findings, 15,231-82.  
 Findings criticised and disagreed with, 15,332-43, 15,400-13.  
 Reasons for, 15,301-8.
- Lead poisoning: no cases in Holland, 15,221-30, 15,321-2, 15,431-4.
- Paints: medium important, 15,379-86.
- Regulations: enforcement of, in Holland, 15,294-300.
- Rubbing down: wet method can be used between coats, 15,283-9, 15,374-8.
- White lead: best paint for outside work, 15,208, 15,212, 15,361.
- Zinc paints:  
 Cost more for labour than lead, 15,251-7, 15,349-56.  
 Dry slower than lead, 15,387-93.  
 Effect of climate on, 15,344-8.  
 Effect of sulphurous atmospheres, 15,213, 15,231-40.  
 Inferior to lead in humid atmospheres, 15,242-50.  
 No special training of painters needed to apply it, 15,363-8.  
 With suitable medium suitable for inside and outside, but still inferior to lead, 15,209-11, 15,327-31.

**Office of Works (See also evidence of Sir H. Tanner and Mr. J. D. Patterson):**

- Large users of paints: *Willis*, 11,661-4.
- Paints cost more than lead paints to produce: *Garson*, 2572-6.
- Paints generally mixed by manufacturers: *Tanner*, 22,695-8.
- Supply lead to: *Rivet*, 15,636-51.

**ORR, JAMES M. (of the Association of Master House Painters in Scotland):**

- Evidence, 10,507-802.
- Compensation:  
 For lead poisoning: unaware of any claims, 10,764-8.  
 For suspension: would agree to, but for permanent painters only, and not casual men, 10,607-15.

**ORR, JAMES M.—continued.**

- Dry rubbing-down:  
 Amount of dust caused very little and not injurious, 10,618-32, 10,674-6, 10,779-81.  
 Indispensable in some cases, 10,633-47.  
 Moistening sandpaper suggested to avoid dust, 10,760-3.  
 Prohibition might be tried, 10,771-5.  
 Reasons for, 10,776-8.  
 Respirator suggested, 10,638-40.  
 Dust: exhaust fans impossible, 10,586-8.  
 Emanations: does not think they contain lead, 10,596-8.  
 Foreign legislation: is aware of legislation abroad, 10,541-6.  
 Insurance rates: lower in Scotland than England, 10,647-56, 10,782-6.  
 Leadless paints:  
 Office of Works test of 4 years not sufficient trial, 10,706-12.  
 Very little recent experience of, 10,683-94.  
 Lead poisoning:  
 Cases known of, 10,511-8.  
 Reliability of official statistics disputed, 10,519-40, 10,713.  
 Some action necessary, 10,642.  
 Thinks Scottish painters suffer less than English, 10,526-8, 10,662-73, 10,714-46.  
 Unaware that it predisposes to consumption, 10,677-82.  
 Meals: accommodation away from paint, &c., could be provided, 10,565-71, 10,789-96.  
 Outdoor clothing: storage away from dust, &c., possible, but difficult, 10,573-7, 10,791, 10,797-8.  
 Overalls:  
 Provision and washing by employer objected to, 10,558-64.  
 Should be worn, 10,752-4.  
 Periodical medical examination:  
 Impracticable, 10,769.  
 Would agree to, 10,599-606.  
 Prohibition:  
 Would agree to, if regulations impracticable, 10,547-57.  
 Would lower quality of painting, 10,641.  
 Regulations:  
 Difficult to observe, 10,589, 10,696-704.  
 Preferred to prohibition, 10,616-7, 10,695.  
 Removal of old paint: no remedy for fumes in burning off, 10,590-5.  
 Washing:  
 Accommodation important, 10,578.  
 Impracticable in some cases, 10,579-85.  
 Hot water practicable, 10,801-2.

**Outdoor Clothing:**

- Danger from dust: *Pickles*, 3057-8.  
 Sometimes hung up in room where painting is in progress: *Barker*, 6950-3, 7094; *Grundy*, 7189-91.  
 Storage away from paint and lead dust:  
 Could be provided: *Wiltshier*, 6708, 6717-9.  
 Difficult or impossible: *Chappell*, 6515-21; *McDermid*, 7360-1, 7491; *Holliday*, 8478-9; *Carfrae*, 10,840-1; *Dobie*, 11,060-3; *Guest*, 11,108-11; *Bennett*, 11,230; *Anderson, R. L.*, 11,342; *Donald*, 12,337; *Vaughan*, 13,630-9, 13,729-32; *Morton*, 13,880-97; *Griffiths*, 14,043; *Styles*, 14,077; *Anderson, J.*, 19,547; *Honeychurch*, 20,054-6; *Wallis*, 20,603-4.  
 Possible, but difficult: *Orr*, 10,573-7, 10,791, 10,797-8.  
 Would agree to provide, *McDermid*, 7429, 7489-90.

**Overalls:**

- Dust collecting on overalls:  
 Dangerous: *Parsonage*, 2718-20; *Pickles*, 2988-9; *Walsh*, 3109-10; *Bonner*, 4351-4; *Dobie*, 10,959-64.  
 None: *Sibthorpe*, 17,908-15.  
 Not dangerous: *Grundy*, 7178-85; *Plumb*, 18,316-8.  
 Very little: *Harris*, 3686-8.  
 No hardship for workers to provide and clean: *Anderson, J.*, 19,731-3; *Devine*, 20,487-93; *Wallis*, 20,636-8; *McKillop*, 21,033-6.

**Overalls—continued.**

- Not worn by railway painters: *White*, 9510-2.  
 Provided and washed by workers in Germany: *Niederhäuser*, 16,319-24.  
 Provided by men: *Legge*, 337; *Laidler*, 637; *Crace*, 1930-1; *Barker*, 7009; *Anderson, R. L.*, 11,331-6; *Scott*, 12,230; *Donald*, 12,332; *Milton*, 20,299-302; *McKillop*, 20,858-60, 20,867-74.  
 Provision and washing:  
 Difficult or impossible: *Orr*, 10,558-64; *Dobie*, 10,952-4; *Guest*, 11,096; *Bennett*, 11,226-7; *Anderson, R. L.*, 11,337-9.  
 In Germany: *Legge*, 338.  
 Not objected to: *Carfrae*, 10,834-5; *Vaughan*, 13,623-8.  
 Serious item: *Styles*, 14,073-5.  
 Workers might object: *Sibthorpe*, 17,920-5.  
 Provision by employer:  
 Difficult or impossible: *Grundy*, 7279-82; *Donald*, 12,333; *Griffiths*, 14,032-6; *Anderson, J.*, 19,531-5, 19,725-8; *Wilkinson*, 19,924-5; *Honeychurch*, 20,046, 20,139-49.  
 No reason for: *Walker*, 9064-9.  
 Not objected to, if custom: *Holliday*, 8469-71.  
 Objected to: *McDermid*, 7425; *White*, 9237-40; *Scott*, 12,231, 12,288-9; *Morton*, 13,871-8; *Sibthorpe*, 17,768-71; *Milton*, 20,305-7.  
 Should be provided by workers: *Higgs*, 8908-11; *Plumb*, 18,314-5.  
 Should be worn: *Cookson*, 2180; *Campbell*, 3402; *Harris*, 3675-9; *Cantrill*, 3851; *Puttrell*, 6240; *Chappell*, 6494; *Wiltshier*, 6698; *Barker*, 6938; *Grundy*, 7160-1; *McDermid*, 7347-8; *Orr*, 10,752-4; *Carson*, 11,756; *Wilkinson*, 20,010-2.  
 Storage: *Cantrill*, 3853-5; *Chappell*, 6511-4; *Walker*, 9073; *Scott*, 12,235-51; *Donald*, 12,337.  
 Away from paint and dust:  
 Difficult or impossible: *McDermid*, 7362; *Holliday*, 8475-7; *Guest*, 11,103-7, 11,175-6; *Bennett*, 11,229; *Anderson, R. L.*, 11,341; *Griffiths*, 14,037-40; *Styles*, 14,076; *Anderson, J.*, 19,542-6; *Wilkinson*, 19,932-3; *Wallis*, 20,598-602, 20,678-80.  
 Could be provided: *Campbell*, 3404-13; *White*, 9244-51; *Carfrae*, 10,838-9; *Honeychurch*, 20,053.  
 In paint shop not dangerous: *Honeychurch*, 20,150-1.  
 In rooms where painting is in progress: *Wiltshier*, 6704-7; *Barker*, 6940-9; *Grundy*, 7186-8; *McDermid*, 7357-9.  
 Separate room should be provided: *Carson*, 11,758-70.  
 Trousers overalls unnecessary: *Harris*, 3680; *Chappell*, 6495-500; *Grundy*, 7162-7.  
 Washing of: *Legge*, 339-40; *Laidler*, 639-41, 1016-7; *Crace*, 1932, 2062-4, 2075; *Cookson*, 2181-3; *Bonner*, 4348-50; *Walker*, 9070-2; *Devine*, 20,404-5; *Wallis*, 20,587-8, 20,590-1.  
 Done at home or in laundry: *Wiltshier*, 19,942; *Devine*, 20,544-53; *Smith, A.*, 21,213-27.  
 Should be done by men: *Puttrell*, 6241-2; *Plumb*, 18,314-5.  
 Should be done weekly: *Cantrill*, 3852; *Chappell*, 6501-10; *Wiltshier*, 6699-701; *Barker*, 6939; *Grundy*, 7168-70; *McDermid*, 7349-52; *Carson*, 11,756.  
 Workers should be made responsible for: *Grundy*, 7171-7, 7271-8.  
 Workers should not be made responsible for: *Harris*, 3681-5.  
 Would agree to: *White*, 9241-3; *Milton*, 20,303-4.  
 In custom, *Holliday*, 8472-4.  
 Would not agree to, at employers' expense: *McDermid*, 7425; *Higgs*, 8912-4.  
 Where kept when not in use:  
 In bags with food: *Puttrell*, 6243-6; *Wiltshier*, 6702-3.  
 In paint shop: *Higgs*, 8915-6.  
 In work-room: *McKillop*, 20,906.  
 Left on job: *Puttrell*, 6247-50.  
 Taken home daily: *McDermid*, 7353-6.

**Overalls—continued.**

Worn and washed weekly: *Parsonage*, 2716-7; *Pickles*, 2986-7, 3056, 3071-5; *Walsh*, 3107-8; *Lowe*, 3279-80; *Bancroft*, 4103-6; *Webb*, 4235-42; *Devine*, 20,399-403; *Smith, A.*, 21,205-9.  
In Belgium: *Ricker-Devroede*, 14,910.

**Painters:**

Ages of: *Anderson, R. L.*, 11,401-15.  
Conditions, system of employment, mealtimes, &c.: *Anderson, J.*, 19,811-37, 19,868-78.  
Estimated number of: *White*, 9361-3.  
Follow no other occupations in slack seasons: *Chappell*, 6612-3.  
Formerly more exposed to dangers of lead poisoning: *Chappell*, 6614.  
Health of: *Crace*, 2032-5; *Chappell*, 6605-11; *Morley*, 23,010-28.  
More liable to accidents in Scotland than in England: *Gardner, A.*, 3979-81.  
Proportion of unskilled men in Trade Unions: *Sibthorpe*, 17,702-30.  
Registration advocated: *Plumb*, 18,869-73; *Johnson*, 22,474-6.  
Should be provided with work in winter: *Scott*, 12,292-3.  
Sickness among: *Anderson, R. L.*, 11,392-400.

**Paint Grinding** (See also "Mixing"):

Important as regards durability: *Klein*, 16,836.  
Industry should be considered in any action to reduce lead poisoning among house painters: *Willis*, 11,648-50.  
No difference to trade whether lead or zinc ground: *Willis*, 11,670-87.  
Same machinery could be used with zinc as lead: *Carson*, 11,847; *Crow*, 12,181-2.  
White lead in dry state preferred: *Cookson*, 2284-7.

**Painting:**

Amount done by Office of Works: *Tanner*, 22,669-74.  
Architects responsible for specifications: *White*, 9393-5.  
Ceilings could be done without lead, *White*, 9446-50.  
Cost:  
Comparison of lead and zinc: *Honeychurch*, 20,099-104.  
Lead cheaper than zinc: *Patterson*, 1114.  
Hands must get soiled in certain operations: *Laidler*, 691-6, 940-3; *Smith, A.*, 21,188-9.  
Healthy occupation: *Dobie*, 11,023-9.  
Instructions of:  
Commissioners of Irish Lights and Public Works: *Sibthorpe*, 17,679-88.  
Office of Works: *Patterson*, 22,796-820, 22,892-8.  
Office of Works:  
Contracts:  
Extent of: *Patterson*, 1048-52, 22,877-9.  
Way in which carried out: *Patterson*, 1168-74, 12,971-82, 13,054-70, 22,871-6.  
Other trades as dangerous: *Francis*, 17,243, 17,281-6, 17,304-7; *Humphreys*, 17,348-9, 17,373-5; *Johnson*, 22,341-6.  
Present-day methods tend to increase danger: *Bancroft*, 4110-31.  
Process same in Scotland as in England: *Gardner, A.*, 3979.  
Spraying:  
Abandoned because unhealthy: *Philip*, 8692, 8711-3.  
Dangerous: *Legge*, 304-5; *Wait*, 1462-4; *Hardwick*, 1862-4; *Bancroft*, 4079.  
Trade not regulated, as outside scope of Factory Act: *Legge*, 172-4.  
Workshops often in dirty condition, *Legge*, 327-30.

**Paints:**

Barium sulphate: use of, in paints: *Munby and Wonnacott*, 2366-8.  
Composition, mixing: comparative qualities of lead and zinc: *Villemot*, 16,172-86.  
Constituents and their functions: *Smith, J. C.*, 1566-89, 1652-3.

**Paints—continued.**

Cost: comparison of lead and zinc: *Smith, J. C.*, 1615-22; *Patterson*, 12,910-4; *Rivet*, 15,476-80, 15,486-7; *Miller*, 17,716-8.  
Covering power: comparison of lead and zinc: *Munby and Wonnacott*, 2471-6; *Rivet*, 15,495-503; 15,543-5.  
Dark colours: some do not contain lead: *Anderson, J.*, 19,879-86.  
Durability:  
Four years a good trial: *Wiltshier*, 6876-7.  
Increased by fine grinding: *Munby and Wonnacott*, 2318-9, 2412-21.  
Mixtures of one-third lead and two-third zinc better than white lead: *Harris*, 3785-6.  
On exteriors: *Laidler*, 987-94.  
Effect of varnish: *Meissl*, 14,771-5.  
Efficiency tests: comparison of lead and zinc: *Smith, J. C.*, 1601-10, 1654-7; *Patterson*, 12,944-67, 12,983-8; *Rivet*, 15,473-83; *Sibthorpe*, 17,850-64.  
Fine grinding: importance of, *Munby and Wonnacott*, 2320-6.  
Grades used by Office of Works: *Patterson*, 1053-8.  
Greens:  
Contain 5-7 per cent. of lead: *Cunnew*, 10,187, 10,250-1, 10,253.  
Difficult to obtain without lead: *Munby and Wonnacott*, 2346.  
Materials generally used: *Munby and Wonnacott*, 2369-78.  
Lead necessary for some outside work: *Harris*, 3738-43.  
Lead sulphate a good and nearly harmless paint base: *Wait*, 1467-71.  
Medium:  
Important: *Munby and Wonnacott*, 2379-88; *Nooijen*, 15,379-86.  
More important than pigment: *Line*, 9931-2.  
No lead used except for greens: *Cunnew*, 10,189-98.  
Obliterating power: comparison of lead and zinc: *Vickers*, 19,331-55.  
Ready-mixed paints:  
Effect of introduction: *Honeychurch*, 20,127-33.  
Should be supplied: *Depierres*, 19,131-3.  
Specification by architects: *Johnson*, 22,452-4; *Tanner*, 22,687-91.  
Standardisation: *Munby and Wonnacott*, 2317; *Leyendecker*, 16,396.  
Sulphurous atmospheres: effect on lead and zinc: *Klein*, 16,832-4.  
Weight for given area should be specified: *Munby and Wonnacott*, 2327-8, 2422-6.  
Weight important: *Philip*, 8673-5.

**PARSONAGE, JOSEPH** (Member of the Committee and Representative of the National Amalgamated Society of Operative House and Ship Painters and Decorators):  
Evidence, 2625-949, 3966-972.  
Compensation for lead poisoning:  
Claims, 2750-2.  
Some men reluctant to claim, 2753.  
Dry rubbing down:  
Amount of, 2884.  
Sandpaper used, 2890-909.  
Causes considerable dust: 2648-52, 2844.  
Indispensable in some cases: 2653-6, 2727-31, 2886-98.  
Moistening sandpaper with turps impracticable, 2845-8.  
Principal danger, 2637, 2647, 2883.  
Dust and spray:  
Caused in painting ceilings and stippling, 2672-9.  
Danger in stippling diminished by increase in use of distempers, 2849-53.  
Exhaust fans impracticable, 2683, 2726.  
Principal danger, 2861.  
Respirator impracticable, 2680-2, 2857, 2910.  
Storage of difficult, 2858-9, 2911-4.  
Emanations:  
Respirator would not prevent inhalation, 2787-90.  
Thinks they cause poisoning, 2689-92, 2860.  
Filling: application, and methods of smoothing, 2658-62.  
Hours of work: number per week, 2684-8, 2915-7.



PARSONAGE, JOSEPH—*continued*.

- Leadless paints : no insuperable difficulties in application or mixing, 2759-60.
- Lead poisoning :  
Cleanliness alone does not give immunity, 2814-7.  
Fewer cases in Scotland : reasons for, 2828-43.  
Predisposes to other diseases, 2754-5.  
Statistics of trade societies, 2627-31, 3966-72.  
Untrained men more liable to, 2744-6, 2748-9, 2811-13, 2865, 2881.
- Meals :  
Accommodation away from paint impossible in some cases, 2721-3.  
Generally provided on building jobs, 2927-38.
- Mixing : dropped hands among colourmen after several years' work, 2694-709.
- Overalls :  
Danger from dust, 2718-20.  
Generally worn and washed weekly, 2716-7.
- Periodical medical examination : impracticable as too many men would be rejected, 2738-43, 2797-810.
- Prohibition : only solution, 2725, 2732, 2747, 2756.
- Removal of old paint :  
Rubbing down after burning off dangerous, 2693.  
Scraping off causes dust, 2710.
- Rubbing down :  
Methods of, 2638-45, 2663-6.  
Wet rubbing between coats impracticable, 2667-71.  
Very little danger, 2885.
- Wages : rates of, 2866-78.
- Washing :  
Accommodation important, 2711-5.  
Impracticable in some cases, 2767-77.  
Painters generally take advantage of it, 2782-3.  
Facilities sometimes refused by employer, 2943-9.  
Hot water never refused to men when available, 2939-42.  
Not always obtainable, 2713, 2778-81, 2818-28.  
Time not allowed, 2920-4, 2926.

## PATTERSON, GEORGE DOBSON (of H.M. Office of Works) :

- Evidence, 1041-178, 12,902-13,081, 22,743-936.
- Leadless colours :  
Greens likely to be available soon, 12,928.  
Use of aniline, 1165-7.
- Leadless paints :  
As good as lead, 12,935, 13,047-53.  
Durability increased by addition of varnish, 12,905-6.  
Durability on Canterbury Post Office, 12,918-25, 13,006-12.  
Instances of use, 22,792-5.  
Kinds used by Office of Works, 22,857-69, 22,880-5.  
Leadless primings being tested for ironwork, 22,833-42.  
Used for wood by Office of Works, 22,822-32, 22,916-8.  
Length of experience, 1043-7.  
Men do not complain of ill-health from, 13,036-8.  
No prejudice against, 1060-1.  
Not appreciated by workers, 1062.  
Office of Works in same position as ordinary employer as regards experiments, 12,936-9.  
Proportion of driers and varnish used, 12,902-4.  
Standard formula, 22,923-36.  
Tests made by Office of Works, 22,743-57, 22,886-9.
- Lead paints :  
Defects of, 1059.  
No better than zinc in greenhouses or warm moist atmospheres, 12,929-33.  
Still used for priming on iron and steel, 22,833-4.
- Lead poisoning : cases in painting Menai Bridge, 13,039-40.
- Painting :  
Cheaper with zinc than lead, 1114.  
Extent of Office of Works contracts, 1048-52, 22,877-9.  
Instructions of Office of Works, 22,796-820, 22,892-3.  
Way in which Office of Works contracts are carried out, 1168-74, 12,971-82, 13,054-70, 22,871-6.

PATTERSON, GEORGE DOBSON—*continued*.

- Paints :  
Comparative tests with lead and zinc by Office of Works, 12,944-67, 12,983-8.  
Grades used by Office of Works, 1053-8.  
Relative prices of lead and leadless paints, 12,910-4.
- Prohibition :  
Exemption period two or three years, 1149-51.  
Office of Works experience sufficient to warrant it, 12,968-70.  
Practicable and not a dangerous step, 1116-7.  
Practicable with reservations for greens and iron primings, 1121, 13,001-2, 22,852-4.  
Restriction to five per cent. soluble lead :  
Greens require up to ten per cent. lead, 1120, 12,927-8, 12,940-1, 13,013-24.  
Practicable except for greens, 13,071-9.  
Stopping : ten per cent. lead useful, 22,843-9, 22,919-21.
- White lead : reasons for continued use by Office of Works, 12,989-3,000, 13,025-36, 13,041-6, 22,899-915.
- Zinc paints :  
Continual improvements in, 1128-30.  
Difficulties in drying, opacity, &c., overcome by experiment, 1063-71.  
Difficulty in getting dark shades, 1093-106.  
Difficulty in specification by architects, 1154-7.  
Flat finish practicable, 12,916-7.  
Less coats required than with lead, 1072.  
Medium :  
Important, 1143-8, 1175.  
Used, 1107-12.  
No practical difficulty in application, 1123-5, 22,922.  
Percentage of impurity which should be allowed in pure zinc oxide, 1134-41.  
Repainting only done at normal intervals, 22,816-7.  
Satisfactory for outside and inside work, 1092, 1118-9, 1131.  
Tests made by Office of Works :  
Details of, 22,767-87.  
Satisfactory, 22,758-66.  
Trade prejudice against new materials, 1158-61.  
With varnish added :  
Better than lead, 12,909.  
No more costly than lead, 12,907-8.  
With five per cent. lead :  
Gives stability and lessens cost, 22,788-90.  
Good substitute for white lead for interior painting, 1079-90.
- PENWARDEN, S. P. : See CHANCELLOR, H. G.
- Periodical Medical Examination :  
Invented, *McKillop*, 20,876-7.
- Cost :  
Cannot afford to pay : *Styles*, 14,081.  
Expensive : *Bennett*, 12,252-3; *Anderson, J.*, 19,796-8.  
In Belgium : *Rieker-Devroede*, 15,002-6.  
Serious if occupier has to pay : *Griffiths*, 14,020-2.  
Should be borne by Government : *Cookson*, 2248-50.  
Would fall on public : *Johnson*, 22,403-4.  
Would be unwilling to pay : *Anderson, R. J.*, 11,351.  
Difficulties of : *Leggo*, 179-82; *Carson*, 11,812-5, 11,823, 11,891; *Donald*, 12,346-7; *Griffiths*, 14,002, 14,004-7, 14,044-50; *Anderson, J.*, 19,796-8; *Smith, A.*, 21,230-2.  
In Belgium : *Leggo*, 189-90.  
None : *Sibthorpe*, 17,930.  
Frequency of : *Carson*, 11,804-11.  
At six-monthly intervals not of much value : *Leggo*, 260-2.  
Important or essential : *Cookson*, 2173, 2213-6, 2259-60; *Carson*, 11,799-800, 11,848; *Smith, A.*, 21,229.  
Impracticable : *Campbell*, 3524-5; *Holliday*, 8570-80; *Orr*, 10,769.  
As too many men would be rejected : *Parsonage*, 2738-43, 2797-810.  
Might be a good thing : *Wilkinson*, 19,960-1.  
Necessary in England; but not in Scotland : *Dobie*, 10,926-30.  
Not favoured or of much use : *Walsh*, 3115; *Devine*, 20,423-6.

**Periodical Medical Examination—continued.**

Objection by workers possible: *Bennett*, 11,251; *Smith, A.*, 21,230-2.

Onerous: *Wallis*, 20,630-5.

Practicable or possible: *Cookson*, 2210-12, 2246-7; *Pickles*, 3004-6; *Bonner*, 4255-62; *Carfrae*, 10,857, 10,876-81; *Honeychurch*, 20,062.

Regulation regarding:

Not strictly enforced in Austria: *Meissl*, 14,721.

Not severe enough in Belgium: *Ricker-Devroede*, 14,921-8, 14,955-6, 14,987-9, 14,995-5001.

Should be made by Insurance doctors: *Rivet*, 15,578-80.

Transference of men showing signs of lead absorption to non-lead work possible: *Morton*, 13,948-52; *Anderson, J.*, 19,679-82.

And useful: *Lagge*, 264-8; *Sibthorpe*, 17,931-4, 18,081-5.

Vexatious and useless: *Ricker-Devroede*, 14,926.

Would agree to: *Barker*, 6996-7001; *White*, 9290-3; *Orr*, 10,599-606; *Carfrae*, 10,855-8; *Dobie*, 10,989; *Vaughan*, 13,689-91; *Sibthorpe*, 17,794-5; *Plumb*, 18,108; *Anderson, J.*, 19,604-8; *Milton*, 20,321.

But difficult: *Guest*, 11,127-31.

But not for employers to pay: *Willshier*, 6765-9; *McDermid*, 7409-13, 7431.

If law: *Puttrell*, 6331-5; *Donald*, 12,345; *Scott*, 12,269-72.

Would minimise danger: *Cookson*, 2131-3; 2207-8.

Would not agree to: *Chappell*, 6568; *Walker*, 9100-5; *Morton*, 13,930-8.

PETIT, M.: See GIRAUD, M.

**PHILIP, ARNOLD (Admiralty Chemist):**

Evidence, 8617-720.

Iron oxide paints: can replace red lead on double bottoms, &c., in Navy, 8623-5.

Lead paints:

Dangers recognised by Admiralty, 8622.

Used for painting outsides of ships in Navy, 8652-6.

Leadless paints:

Tests should be made before prohibiting lead, 8684.

Trade prejudice against new materials, 8651.

Painting: spraying abandoned because unhealthy, 8692, 8711-3.

Paints: weight important in painting in Navy, 8673-5.

Ship painting: durability on exteriors not important, as repainting due to mechanical damage, 8657, 8669-71.

Zinc paints:

Could replace lead for outsides in Navy, 8665-8, 8705-9.

Enamels superior to lead for insides of ships, 8631-6.

Initial cost higher, but cheaper in end, 8641-7, 8687-8, 8694-704.

Increasing use of, in Navy for inside painting, 8626-30.

Not used for outsides in Navy, 8658, 8681-3.

Proportion used in paints in Navy, 8637-40, 8663-4.

Retain colour better than lead, 8714-20.

Satisfactory for interior work on ships, 8648-50.

**PICKLES, WILLIAM (of the National Amalgamated Society of Operative House and Ship Painters and Decorators):**

Evidence, 2950-3084.

Dry rubbing-down:

Indispensable in some cases, 2956-61, 2995

Principal danger, 2954, 3026.

Prohibition of, would not remove all dangers, 2996-9.

Dust and spray:

Exhaust fans impracticable, 2994.

Stippling dangerous, 2962, 3024-5, 3029-32.

Emanations: no way of avoiding, 2993.

Leadless paints: no insuperable difficulties in application or mixing, 3010-1.

Lead poisoning:

Cleanliness alone does not give immunity, 3063-7.

Danger from paint on hands, 2973-5.

Source of 2991-2.

**PICKLES, WILLIAM—continued.**

Meals: accommodation away from paint and dust impracticable in some cases, 2983-5.

Mixing:

Danger from fumes of lead, 2970-2.

Where done, 2966-9.

Outdoor clothing: danger from dust, 3057-8.

Overalls:

Danger from dust, 2988-9.

Generally worn and washed weekly, 2986-7, 3056, 3071-5.

Periodical medical examination: practicable, 3004-6.

Precautionary measures: difficult to carry out, 2990.

Prohibition:

Only solution, 3007, 3062.

Practicable, 3008-9, 3012-3.

Total prohibition preferred to 5 per cent. limit of solubility, 3014.

Regulations: observance of, difficult, 2990.

Removal of old paint:

Rubbing down after burning off dangerous, 2963-5.

Use of solvents in place of burning off not desirable, 3033-4.

Rubbing down: wet process not dangerous, 3000-3.

Washing:

Accommodation important, 2976.

Hot water practicable, but difficult in some cases, 2977-81, 3035-49, 3081-4.

Time should be allowed, 3050-5, 3083.

Zinc paints:

As good as lead for inside, 3015, 3059-60.

Satisfactory for outside, 3017-23.

**PISART, F. (Managing Director of the Maastricht Zinc White Co.):**

Evidence, 18,866-995, 21,820-889.

Foreign legislation: France, prohibition law permits 3 per cent. lead, 18,882-9.

Iron oxide paints: use of, on Belgian State Railways, 21,846-8.

Leadless paints:

Lithopone satisfactory for inside, 18,919-22.

Largely used in France, 18,925-8.

Restriction to 5 per cent. solubility: admits 8 per cent. lead sulphate, giving great covering power for outside work, 21,839-45.

Zinc: price would rise with prohibition of lead temporarily, 18,905-18, 18,992-5.

Zinc oxide:

Difficulty in manufacture in England, 18,933-46, 18,984-7.

Dust not dangerous, 21,853-65.

Pure zinc oxide not satisfactory, 18,948-9, 18,957-8, 21,838.

Zinc paints:

As good as lead, 18,876-80.

Covering power greater than lead, 18,903-4, 18,959-61.

Durability good, 18,880.

Satisfactory substitute for lead paints, 18,871, 18,890-2, 18,929-3, 18,950.

Use of:

In Norway and Sweden, 18,872-5.

On Belgian State Railways, 18,951-3, 18,988-90, 21,820-35, 21,876-89.

Zinc oxide with 4 per cent. lead most suitable, 18,893-902, 18,923-4.

**PLUMB, GEORGE (Foreman Painter of G. Trollope, Ltd.):**

Evidence, 18,100-413.

Dry rubbing-down:

Can be dispensed with, 18,106, 18,295-304.

Danger very small unless person susceptible to poisoning, 18,401-11.

Time occupied at, 18,293-4.

Very little dust created, 18,291-2.

Emanations: thinks they contain lead, 18,234-45, 18,338-9.

Filling: generally composed largely of lead, 18,363-8.

Lead poisoning:

Cases known of, 18,115-21.

Greater cleanliness will reduce evil, 18,107, 18,112.

**PLUMB, GEORGE—continued.**

- Lead poisoning—*continued.*  
 Modes of causation, 18,163-77, 18,181-4, 18,289-90, 18,384.  
 Regulations would reduce evil, 18,188-95.  
 Mixing: no diminution in amount of dry mixing, 18,246-61.  
 Overalls:  
 No danger from dust, 18,316-8.  
 Workers should provide and wash them, 18,314-5.  
 Painters: registration advocated, 18,369-73.  
 Periodical medical examination: would agree to, 18,108.  
 Prohibition: would not obviate need for inspection, 18,111, 18,319-21, 18,359-62.  
 Red lead: best paint for ironwork, 18,103, 18,135-6, 18,395-400.  
 Regulations:  
 Amount of inspection necessary, 18,196-233.  
 Householders should provide facilities as to mess-rooms, &c., 18,344-9.  
 Inspectors should have right of entry into private houses, 18,350-3.  
 Would agree to, 18,322-7.  
 Rubbing down:  
 Glass-paper moistened with turps impracticable, 18,378-83.  
 Moist method impracticable in some cases, 18,178-80, 18,262-7.  
 Washing accommodation:  
 Difficulty in some cases, 18,306-13.  
 Essential, 18,109.  
 White lead:  
 Superior to zinc, 18,101-2, 18,104, 18,122-3, 18,305.  
 Use of, in ship painting, 18,328-37.  
 Zinc paints:  
 Not so durable as lead, 18,133, 18,386-94.  
 Often adulterated with lead, 18,124-32.  
 Thinks dust harmful, 18,156-62, 18,268-81, 18,354-5.

**Prohibition of Lead:**

- All employers equally affected by: *Anderson, J.*, 19,678.  
 Architects generally would welcome, if possible: *Munby and Wonnacott*, 2394-5.  
 Best solution: *Bonner*, 4368.  
 Better for the trade than regulations: *Puttrel*, 6339-42.  
 Complete, regulations only partial, remedy: *Cookson*, 2129-30, 2164-5; *Puttrel*, 6320-2; *Morton*, 13,924-5; *Honeychurch*, 20,044-5.  
 Desirable if only means of safeguarding health: *Anderson, J.*, 19,530.  
 Difficult to carry out: *Rambousek*, 14,519-22; *Anderson, J.*, 19,671-3, 19,780-5; *Chancellor and Penwarden*, 21,454-9.  
 Difficulty in standardising paints: *Sibthorpe*, 17,960-3.  
 Discovery of a good leadless white pigment would follow: *Bonner*, 4373.  
 Easiest solution: *Depierres*, 19,163-6.  
 Effect on:  
 Imported goods painted with lead: *Cunynghame*, 10,352-6.  
 Other trades: *Niederhauser*, 16,276; *Miller*, 17,067-8.  
 Painting trade: *Hardwick*, 1813-4; *Crace*, 2021-5; *Humphrey*, 2594, 2604-7; *Barker*, 7022-3; *White*, 9453-5; *Bennett*, 11,263; *Holzappel*, 11,514-7, 11,529; *Styles*, 14,173-5; *Depierres*, 19,074-5.  
 Paint-making trade: *Garson*, 2526-9, 2545-6, 2551-2; *Cunnaw*, 10,280-2; *Willis*, 11,642, 11,724-7; *Rivet*, 15,488-94.  
 Public: *White*, 9401; *Bennett*, 11,303-4; *Anderson, J.*, 19,526-9, 19,675-7, 19,775; *Milton*, 20,244; *Chancellor and Penwarden*, 21,429-30, 21,463-5.  
 Spelter trades: *Francis*, 17,270-1, 17,324-8.  
 White lead trade: *Cookson*, 2126-8; *Miller*, 17,088-9.  
 Enforcement:  
 Difficult: *Roch*, 16,753-4.  
 Easier than regulations: *De Morsier*, 16,657-60.  
 Easy: *Cunynghame*, 10,300-1.

**Prohibition of Lead—continued.**

- Exemption:  
 For special articles: *Cunynghame*, 10,329.  
 For special cases accompanied by regulations: *Cunynghame*, 10,318-27.  
 Period: *Patterson*, 11,49-51; *Cantrill*, 3921-5; *Cunynghame*, 10,328; *Rivet*, 15,573; *Lancaster*, 17,643-4.  
 Failure in foreign countries: *Johnson*, 22,227-41, 22,351-5.  
 For inside work:  
 Not a hardship: *Mockford*, 8810.  
 Would reduce lead poisoning to ordinary trade risk: *Kaup*, 14,379-84.  
 If white lead scheduled, power should be given to add other dangerous paints to schedule: *Cunynghame*, 10,306.  
 Impracticable: *Niederhauser*, 16,330, 16,335; *Sibthorpe*, 17,674-8.  
 Inspection necessary: *De Morsier*, 16,636; *Sibthorpe*, 17,797-801, 17,969-70; *Plumb*, 18,111, 18,319-21, 18,359-62; *Johnson*, 22,467-8.  
 Master House Painters' Association would not take exception to: *Barker*, 7103.  
 Mistake made in France: *Expert-Bezançon*, 15,118-20.  
 No statistical or scientific reason for: *Johnson*, 22,184-226, 22,269-72.  
 Not warrantable: *Gouldby*, 22,008-9.  
 Office of Works' experience sufficient to warrant it: *Patterson*, 12,968-70; *Tanner*, 22,693.  
 Only solution: *Parsonage*, 2725, 2732, 2747, 2756; *Pickles*, 3007, 3062; *Wilson*, 3137-92; *Walsh*, 3111; *Lowe*, 3285; *Harris*, 3732-5; *Cantrill*, 3896-7; *Bancroft*, 4073; *Holliday*, 8506-8; *Devine*, 20,436; *Wallis*, 20,583-4; *McKillop*, 20,881-7.  
 If mask impracticable: *White*, 9276-80.  
 Opinion of master house painters in Belgium: *Ricker-Devroede*, 14,957-66, 15,029-45.  
 Opposition to, comes chiefly from white lead manufacturers: *Rambousek*, 14,583.  
 Practicable: *Pickles*, 3008-9, 3012-3; *Line*, 9974; *Depierres*, 19,007-12.  
 And not a dangerous step: *Patterson*, 1116-7.  
 For inside work only: *White*, 9398-400, 9406-11; *Styles*, 14,147-9.  
 With reservations for iron primings and greens: *Patterson*, 1121, 13,001-2, 22,852-4; *Mockford*, 8780-5; *Hunter*, 21,562.  
 Preferred to regulations: *Campbell*, 3483; *Harris*, 3745-62; *Cantrill*, 3914; *Wiltshier*, 6778-83; *Barker*, 7019-21, 7097-9; *Holliday*, 8537-40; *Higgs*, 8962-8, 9022-4; *Walker*, 9108-11; *Hall*, 9553-4, 9559; *Anderson, R. L.*, 11,449-50; *Morton*, 13,939-42, 13,957; *Milton*, 20,240, 20,324; *Wallis*, 20,632.  
 By Liverpool Master Builders' Association, *McHugh*, 20,693, 20,704-6.  
 By Master Painters' Federation of Belgium: *Ricker-Devroede*, 14,841.  
 In his own interests: *Anderson, J.*, 19,674.  
 Purox should be exempted: *Hardwick*, 1819.  
 Quality of painting:  
 Would be reduced: *Orr*, 10,641; *Guest*, 11,187-9.  
 Would not be reduced: *Depierres*, 19,008.  
 Should follow:  
 If complete substitute found: *Humphrey*, 2603; *Holliday*, 8512, 8596-8; *De Morsier*, 16,668.  
 If regulations impracticable: *Francis*, 17,293-4.  
 Summary of difficulties, exemptions, &c.: *Cunynghame*, 10,306-15.  
 Total prohibition:  
 Preferred to 5 per cent. solubility limit: *Pickles*, 3014; *Johnson*, 22,442.  
 With exemptions for certain purposes: *Cunynghame*, 10,316-7, 10,335.  
 Would abide by decision of Committee: *Chappell*, 6584-5.  
 Would agree to: *Bonner*, 4371-2;  
 If efficient substitute found: *White*, 9451-2, 9460; *Guest*, 11,182-5.  
 If regulations impracticable: *Orr*, 10,547-57.

**Prohibition of Lead—continued.**

- Would cause repainting of ships to be done in foreign ports : *Sibthorpe*, 17,691.
- Would increase cost of painting : *Carfrae*, 10,911 ; *Sibthorpe*, 17,689, 17,820-34.
- Would lead to adulteration of paints : *Dobie*, 11,065-8.
- Would make trade dependent :
  - On foreign sources for material : *Lancaster*, 17,568.
  - On proprietary paints : *Anderson, J.*, 19,753-4.
- Would mean more painters, and public would suffer : *Anderson, J.*, 19,674-8, 19,775.
- Would not affect :
  - Great Eastern Railway Company : *Coysh*, 9,588-91, 9,657-60.
  - Orient Steamship Company : *Tuke*, 10,393.
- Would not agree to : *Honeychurch*, 20,065-9.
- Would reduce range of colours : *Anderson, R. L.*, 11,440-4 ; *Willis*, 11,640.

**PUTTRELL, J. (of the National Association of Master House Painters and Decorators of England and Wales) :**

- Evidence, 6165-442.
- Compensation for suspension: would agree to it if law, 6336.
- Dry rubbing-down :
  - Causes very little dust, 6273-8, 6282.
  - Exhaust fans impracticable, 6281.
  - Frequent sweeping of floors suggested to remove dust, 6286-93.
  - Not indispensable, 6272.
  - Respirators should be worn, 6279-80.
- Dust and spray :
  - Lead could be abandoned for ceilings and stippling surfaces, 6298-305, 6311.
  - No way of avoiding splashes in painting ceilings and stippling, 6294-7, 6306-10.
- Education of painters :
  - Apprentices instructed in cleanliness rather than in avoidance of dust, 6373-83.
  - Apprentices taught to avoid lead poisoning, 6403-4.
- Hours of employment: would adhere to limitation of, 6326-30, 6338.
- Insurance rates for painters have recently increased. 6174-5, 6343-9.
- Lead poisoning :
  - Cases of sickness and poisoning known of, 6173, 6176-80, 6389-402, 6407-14.
  - Cases would be less if painters were abstainers, 6405-6.
  - Considers danger from unclean hands greater than from lead dust, 6353-72.
  - Deplorable, 6217.
  - Extent of, not recognised locally, 6439-42.
  - Large number of cases due to carelessness of men, 6288-71.
  - Regrettable that this country should be behind others in legislation regarding, 6221-4.
  - Surprised that danger from unclean hands only accounts for 5 per cent. of cases, 6435-7.
  - Surprised that poisoning cannot be contracted by absorption of lead through skin, 6384-8.
- Master House Painters Association :
  - Have made no scientific experiments to discover a substitute for lead, 6192-7.
  - Have taken no steps to discover extent of lead poisoning, 6181-91.
  - Have tried to educate apprentices at technical schools to be clean and so combat lead poisoning, 6198-209.
  - Realise extent of lead poisoning evil, 6210-6.
- Meals :
  - Can be taken generally away from lead paints and dust, 6255-9.
  - Should not be taken near paint or dust, 6251-4, 6260-2.
- Mixing of paints should be done with lead in paste form, 6316-9.
- Overalls :
  - Kept in bags with food, 6243-6.
  - Left on job, 6247-50.
  - Should be cleaned by men, 6241-2.
  - Should be worn, 6240.
- Periodical medical examination: would agree to if necessary, 6331-5.

**PUTTRELL, J.—continued.**

- Prohibition of lead :
  - Better for trade than regulations, 6339-42.
  - Complete, regulations only partial, remedy, 6320-2.
  - Regulations : would increase cost of painting, 6433-4.
  - Removal of old paint : can suggest nothing to remove fumes in burning off, 6312-5.
  - Rubbing down: generally done by wet process and very little dust caused, 6264-7.
  - Turpentine: no substitutes used, 6431-2.
- Washing :
  - Accommodation necessary, 6225-7, 6438.
  - Already provided for painters, 6417-25.
  - Hot water :
    - Generally obtainable, 6236-9.
    - Not essential, but better than cold, 6228-35.
- Zinc paints :
  - Covering power not so good as lead, 6324, 6427-9.
  - Durability not so great as lead, 6324.

**RAMBOUSEK, DR. JOSEF (Official of the Government of the Kingdom of Bohemia) :**

- Evidence, 14,513-673.
- Dry rubbing-down: prohibition of, essential, 14,526.
- Emanations: do not contain lead, 14,636-7.
- Leadless paints :
  - Trials made in Bohemia, 14,584-91, 14,648-52.
  - Austria not conclusive, 14,633-4.
  - Unsatisfactory, 14,523-5, 14,562-6.
- Lead paints: should be labelled "Poisonous," 14,668.
- Lead poisoning :
  - Diseases predisposing to, 14,672-3.
  - Great reduction of, in lead works, 14,516-7, 14,629-32, 14,638-47.
  - Statistics for Bohemia, 14,573-8, 14,622-8, 14,660-1.
  - Suggested precautions, 14,527-30, 14,635.
  - Untrained men more liable, 14,653.
- Prohibition :
  - Difficult, 14,519-22.
  - Opposition to, comes chiefly from white lead makers, 14,583.
- Regulations :
  - Distinction between inside and outside painting difficult, 14,518.
  - Effect of in reducing lead poisoning in Austria, 14,516-7, 14,629-32, 14,638-47.
  - Enforcement of :
    - By inspection in Austria, 14,531-72, 14,671.
    - Insufficient inspection, 14,518, 14,526.
  - Turpentine: danger of substitutes, 14,656-7.
  - White lead: important industry in Austria, 14,598-617.

**Red Lead :**

- Best paint for iron and steel work: *Sibthorpe*, 17,757-60, 18,044-52 ; *Plumb*, 18,103, 18,135-6, 18,395-400 ; *Simpson*, 21,632-8.
- Capital invested and output: *Miller*, 17,074, 17,106-8.
- Indispensable for iron work: *Meissl*, 14,682-5, 14,823-32.
- Only material which will dry under water: *Sibthorpe*, 17,744-8, 17,810-3, 18,029-32.

**Regulations :**

- As to washing overalls and mess rooms, &c., could be carried out: *White*, 9253-5.
- Building to be defined: *Cunynghame*, 10,306.
- Certain dangers would not be removed: *Chappell* 6583.
- Cost much greater than change to leadless paints: *Barker*, 7100-1.
- Cost of, in paint-grinding works: *Willis*, 11,709-18.
- Cost of painting would be increased: *Puttrell*, 6433-4 ; *Carfrae*, 10,912-3 ; *Rivet*, 15,585-601 ; *Anderson, C. J.*, 19,776-9 ; *Wallis*, 20,657 ;
- While use of leadless paints would mean more frequent painting: *Dobie*, 10,993-8 ; *Vaughan*, 13,706-19, *Morton*, 13,958-62.
- Distinction between outside and inside painting difficult: *Rambousek*, 14,518.
- Enforcement of: *Rivet*, 15,620-5 ; *Roch*, 16,738-43, 16,746-50 ; *Klein*, 16,859-62, 16,977-9 ; *Francis*, 17,295-303 ; *Johnson*, 22,356-60, 22,389-91.

**Regulations—continued.****Enforcement of—continued.**

- By local policemen, or sanitary inspectors, or Inland Revenue officers, or by special sub-inspectors: *Vaughan*, 13,588-622, 13,817-23.
- By sanitary inspectors practicable: *Kaup*, 14,224, 14,405-6.
- Cost: *Carson*, 11,820-2; *Sibthorpe*, 17,785-9.  
Less than prohibition: *Sibthorpe*, 17,671.  
Would be borne by consumers: *Johnson*, 22,420-37.
- Difficult: *Cookson*, 2230-2; *Humphrey*, 2617-21; *Humphreys*, 17,376-82; *McKillop*, 20,910-2; *Smith, A.*, 21,295-6.
- Foreman should be made responsible: *Carson*, 11,825-31.
- In Austria: *Kaup*, 14,287-329, 14,385-96; *Rambousek*, 14,531-72, 14,671; *Meissl*, 14,677, 14,705-14, 14,758-9.
- In Belgium: *Ricker-Devroede*, 14,911-20.
- In Germany: *Kaup*, 14,287-329, 14,385-96; *Niederhauser*, 16,271, 16,288-302, 16,314-6, 16,325-9; *Leyendecker*, 16,394-5, 16,401-16, 16,421-2, 16,438-55.
- In Holland: *Nooijen*, 15,294-300; *Bettink*, 18,492-6.
- In Switzerland: *De Morsier*, 16,574-80, 16,583-97, 16,617-23.  
Slack: *Roch*, 16,767.
- Inspection insufficient, amount necessary: *Plumb*, 18,196-233; *Kaup*, 14,385, 14,448-9; *Rambousek*, 14,518, 14,526.
- Not very difficult: *Carson*, 11,802-3.
- Number of inspectors in various countries: *Kaup*, 14,291-5; *Bettink*, 18,501-3.  
Necessary: *Carson*, 11,816-9.  
For Dublin: *Sibthorpe*, 17,776-84, 18,069-71.
- Private house inspection: *Ricker-Devroede*, 14,883; *Rivet*, 15,616-9; *Plumb*, 18,350-3.
- Evasion by certain employers would handicap others: *Anderson, J.*, 19,616-8, 19,631.
- Exemptions:  
For small employers in Vienna: *Kaup*, 14,336-44.  
Practicable for leadless paint users: *Kaup*, 14,330-5, 14,452.
- Facilities for messrooms, cloakroom, and washing should be provided by householders: *Sibthorpe*, 17,926-9; *Plumb*, 18,344-9; *Anderson, J.*, 19,734-51; *Honeychurch*, 20,152-3.
- If impracticable, prohibition only alternative: *Dobie*, 11,002-3.
- Impracticable: *Edginton*, 13,102-4.  
Some: *Wilkinson*, 19,965-81.
- Observance:  
Difficult and expensive, but possible: *Bennett*, 11,257-61.  
Difficult or impossible: *Laidler*, 1010; *Crace*, 2040-5; *Pickles*, 2990; *Campbell*, 3479-83; *Harris*, 3695; *Cantrill*, 3861-3, 3908-13; *Wiltshier*, 6772-5; *Barker*, 7017-8; *Higgs*, 8924; *Walker*, 9075-6; *Orr*, 10,589, 10,696-704; *Dobie*, 10,998; *Guest*, 11,135-45; *Anderson, R. L.*, 11,354-5; *Scott*, 12,278-9, 12,284-6; *Morton*, 13,867-70; *Griffiths*, 13,988-95, 14,009-14, 14,018-9, 14,031, 14,041-2; *Styles*, 14,162-72; *Anderson, J.*, 19,632-3, 19,696-9, 19,720-4; *Honeychurch*, 20,064, 20,072; *Wallis*, 20,627-8; *McHugh*, 20,694.
- Difficulty with small jobs: *Wiltshier*, 6776  
Necessary and not objected to: *White*, 9296; *Meissl*, 14,757; *Plumb*, 18,322-7.  
Necessary in England, but not in Scotland: *Bennett*, 11,221-5; *Anderson, R. L.*, 11,445-8.  
Not as important as education of painters: *Anderson, J.*, 19,729-30.  
Not necessary for old lead-painted surfaces if lead prohibited: *Tanner*, 22,723-8.  
Not troublesome or vexatious: *Sibthorpe*, 17,700-1.  
Not very difficult: *Carson*, 11,843-6.  
Practicable: *Rivet*, 15,522-3, 15,577.  
And would remedy evil: *Cunynghame*, 10,297-9.  
If reasonable: *Wallis*, 20,585.

**Regulations—continued.****Observance—continued.**

- Preferred to prohibition of lead: *Laidler*, 732-7, 767-81; *Chappell*, 6581-2; *McDermid*, 7432; *White*, 9297; *Orr*, 10,616-7, 10,695; *Carfrae*, 10,861; *Guest*, 11,134, 11,142; *Bennett*, 11,260, 11,271-5; *Scott*, 12,277; *Vaughan*, 13,696-705; *Sibthorpe*, 17,699, 18,067-8; *Wilkinson*, 19,964.
- But as they are impossible to carry out, would agree to prohibition: *Styles*, 14,085-99, 14,125-46, 14,176-85.
- By public, even if more expensive: *Bennett*, 11,277-92, 11,300-1.  
In the interest of his clients: *Anderson, J.*, 19,611-5, 19,800-10.
- Proposed code or suggestions for: *Humphrey*, 2595-602; *Roch*, 16,696, 16,734-7; *Francis*, 17,287-92; *Sibthorpe*, 17,660-70; *Johnson*, 22,263-6, 22,361-9, 22,385-6.
- Should be given a trial before lead prohibited: *Griffiths*, 14,015-7; *Styles*, 14,116-9; *Rivet*, 15,575; *Niederhauser*, 16,356; *Roch*, 16,697; *Miller*, 17,199; *Sibthorpe*, 18,086-99.
- Should be made while tests for discovering a suitable leadless paint are carried out: *White*, 9386-7.  
Would eliminate or greatly reduce evil: *Guest*, 11,094-5; *Carson*, 11,801; *Scott*, 12,205; *Goadby*, 15,906; *Roch*, 16,694; *Francis*, 17,244; *Humphreys*, 17,350.  
Would not remove evil: *Devine*, 20,384-5, 20,527.
- Removal of old paint:**
- Burning off:**  
Can suggest no way of removing fumes: *Harris*, 3728-9; *Webb*, 4217-9, 4226; *Puttrel*, 6312-5; *Chappell*, 6548-9; *Wiltshier*, 6746-8; *Barker*, 6975-6; *McDermid*, 7396-7; *Holliday*, 8504-5; *Higgs*, 8940-4; *Orr*, 10,590-5; *Carfrae*, 10,850-1; *Morton*, 13,919-23.  
Danger from fumes: *Walsh*, 3091; *Wilson*, 3168-9; *Lowe*, 3268, 3289-92, 3331-2; *Bonner*, 4323-4; *Goadby*, 15,901-5, 15,924.  
Very small: *Cantrill*, 3887-92, 3931-3; *Walker*, 9087-8, 9122-5; *White*, 9377-9, 9390; *Sibthorpe*, 17,761-4.  
No fumes given off: *Grundy*, 7233-5; *McKillop*, 20,815, 20,913-21; *Smith, A.*, 21,170-5.  
No lead fumes given off: *Cookson*, 2158-61, 2233-7, 2251-3.  
Not dangerous: *Bettink*, 18,442.
- Chipping paint off ships:  
Dangerous: *Holzappel*, 11,544.  
Should be prohibited: *Carson*, 11,839-41; 11,940-5.  
Method of: *Laidler*, 674-86.  
No danger from lead: *Wail*, 1466.
- Respirator or mask:  
Impracticable to prevent inhalation of fumes in burning off: *Campbell*, 3461-3.  
Suggested to prevent inhalation of fumes in burning off: *Bonner*, 4331, 4375-89; *White*, 9273-4; *Vaughan*, 13,670-5.
- Rubbing down with sand-paper after burning off dangerous: *Parsonage*, 2693; *Pickles*, 2963-5; *Walsh*, 3092-3; *Wilson*, 3170-1; *Lowe*, 3269-70; *Bancroft*, 4084-5; *Webb*, 4220-2; *Bonner*, 4325-8.
- Scraping off:  
Causes dust: *Laidler*, 680-4; *Parsonage*, 2710; *Bancroft*, 4086.  
Dangerous: *Webb*, 4223-4.
- Solvents:  
Better than burning off: *Smith, A.*, 21,176-9, 21,290-1.  
Could be used instead of burning off and so avoid fumes: *Crace*, 2000-2; *Campbell*, 3458-60; *Barker*, 7095; *Walker*, 9085-6, 9121; *Dobie*, 10,984-5; *Guest*, 11,121; *Bennett*, 11,245; *Anderson, J.*, 19,598-603.  
Generally used: *Holliday*, 8503, 8554-6.  
For inside work: *Cantrill*, 3934.  
Less dangerous but more expensive than burning off: *Bonner*, 4329-30.  
Use of, in place of burning off not desirable: *Pickles*, 3033-4.

**Removal of old paint—continued.**

Ventilation would reduce danger from fumes. *Bancroft*, 4080-3, 4087-94, 4142-3.

**Restriction to 5 per cent. of soluble lead:**

Administration difficulty: *Cunynghame*, 10,337-41.

Admits:

20 per cent. lead chromate: *Crow*, 12,073.

8 per cent. lead sulphate, giving great covering

power for outside work: *Pisart*, 21,839-45.

Difficulty of painters in adhering to standard:

*Cunynghame*, 10,348-51.

Greens:

No difficulty involved: *Smyth*, 13,454-64.

Require up to 10 per cent. lead: *Patterson*, 1120, 12,927-8, 12,940-1, 13,013-24.

Guarantee should be given by makers of ready-mixed paints: *Hooper*, 10,167.

Lead chromate so insoluble as not to be affected: *DePierres*, 19,095-104.

Matching paints: difficulty in: *Hooper*, 10,168-72.

Might do more harm than good: *Sibthorpe*, 17,802-3.

Practicable except for greens: *Patterson*, 13,071-9.

Preferable to absolute prohibition: *Crow*, 12,061-3.

Proportion of soluble lead could easily be determined, *Hooper*, 10,107-12.

Reds:

Difficulty can be overcome: *Smyth*, 13,549.

Difficulty involved: *Rivet*, 15,506-15.

Safe to assent to: *Munby and Wonnacott*, 2350-6, 2452-7.

Some colours require more than 5 per cent. lead: *Cunnew*, 10,205-18, 10,260-3.

Standardisation of paints: *Hooper*, 10,175-80.

Would allow sufficient lead for driers: *Crow*, 12,047.

Would still involve danger: *Roch*, 16,728-33.

**RICKER-DEVROEDE, CHARLES (Master Painter, of Brussels):**

Evidence, 14,833-15,077.

Dry rubbing-down:

Can be dispensed with, 14,896.

Methods of, in Belgium, 14,897-909.

Of zinc paints as dangerous as with lead, 14,886-95.

Prohibition of, not strictly enforced in Belgium, 15,062-5.

Foreign legislation: Belgium: inquiry leading to law regarding white lead, 14,836-52.

Lead poisoning:

Cases in Belgium, 14,950-4.

Cleanliness more important than removal of dust in diminishing, 14,989-94.

Overalls: worn and washed weekly in Belgium, 14,910.

Periodical medical examination:

Cost of, in Belgium, 15,002-6.

Not severe enough in Belgium, 14,921-8, 14,955-6, 14,987, 14,995-501.

Vexatious and useless, 14,926.

Prohibition:

Opinion of master painters in Belgium, 14,957-66, 15,029-45.

Preferred to regulations by Master Painters Association of Belgium, 14,841.

Regulations:

Enforcement of:

In Belgium, 14,911-20.

Private house inspection difficult, 14,883.

White lead:

Manufacture important industry in Belgium, 14,972-4.

No efficient substitute for outside work, 14,835.

Preferred by master painters of Belgium, 14,934-8.

Preferred for painting greenhouses, 14,865-73.

Zinc paints:

Difficulty in mixing and application, 14,857-9, 14,948-61, 15,075-7.

Drying difficult on outsides, 14,860-1.

Largely used for interior work, 14,834.

Not durable for outside work, 15,016-20.

Use of, by Belgian State Railways, 14,968-70, 15,009-15.

**RIVET, ALBERT ROBERT (of Messrs. T. and W. F. Miloe, Ltd., Paint and Colour Manufacturers, London):**

Evidence, 15,437-651.

Dry rubbing-down:

No insuperable difficulties in prohibition, 15,609-15.

Respirator suggested, 15,524-8.

Enamels:

Generally made from zinc, 15,445-7.

Trade not increasing, 15,442-4.

Iron-oxide paints: satisfactory for iron work, 15,484.

Lead consumption for painting purposes, 15,567-73.

Lead paints: best for outside work, 15,469-72, 15,485, 15,529-34.

Mixing:

Dangerous, 15,462-3.

Use of ready-mixed paints increasing, 15,464-7.

Office of Works: supply lead to, 15,636-51.

Paints:

Comparative covering powers of lead and zinc, 15,495-503, 15,543-5.

Comparative prices of lead and zinc, 15,476-80, 15,486-7.

Comparative tests with lead and zinc, 15,473-83.

Periodical medical examination: should be made by insurance doctors, 15,578-80.

Prohibition:

Effect on paint grinders, 15,488-94.

Exemption period, 3-5 years, 15,573.

Regulations:

Enforcement of, 15,620-5.

Increased cost involved, 15,585-601.

Practicable, 15,522-3, 15,577.

Private house inspection, 15,616-9.

Should be tried before prohibition, 15,575.

Restriction to 5 per cent. soluble lead: would leave great difficulty for red colours, 15,506-15.

White lead: in dry state should be prohibited in paint shops, 15,630-5.

Zinc oxide:

Combine: Broken Hill Mines connected, 15,566.

Containing small proportion of lead inferior to

pure zinc oxide, 15,457-61, 15,537-40, 15,548-55.

Price would rise with increased demand, 15,454-6.

Supply dependent on foreign sources, 15,449-53, 15,563-5.

Zinc paints:

Cost greater than lead, because needing more oil, 15,555-62.

Pure zinc paints next best to white lead, 15,504-5.

**ROCH, Dr. MAURICE (Chef de Clinique at the Cantonal Hospital, Geneva):**

Evidence, 16,674-772.

Hours of work: restriction advocated, 16,771-2.

Lead poisoning:

Occurrence, etiology, and prevention, 16,681-91, 16,699-708.

Statistics for Geneva, 16,677-8, 16,709-25, 16,757-66.

Prohibition: difficulty in enforcement, 16,753-4.

Regulations:

Enforcement, 16,738-43, 16,746-50.

In Switzerland slack, 16,767.

Should be tried before prohibition, 16,697.

Suggested code, 16,696, 16,734-7.

Would prevent lead poisoning, 16,694.

Restriction to 5 per cent. soluble lead: would still involve danger, 16,728-33.

Washing: time should be allowed, 16,744-5.

**Rubbing-down. (See also "Dry Rubbing-down.")**

Amount of, on preparatory work: *Smith, A.*, 21,338-45.

Length of time before new paint can be rubbed down wet: *Holzappel*, 11,560-1, 11,564-7; *Niederhäuser*, 16,305-9; *McKillop*, 21,004-12; *Smith, A.*, 21,107-12, 21,268-72.

Less required with purex than with white lead: *Hardwick*, 1789-97, 1827-30, 1859-67.

Methods of: *Laidler*, 644-58, 789-94; *Crace*, 1941-3; *Parsonage*, 2638-45, 2663-6.

Time occupied at: *Morton*, 13,943-7.

Undercoats generally done with sandpaper: *Laidler*, 835-84, 953-8; *Crace* 2102-3.

**Rubbing-down—continued.**

- Unnecessary on one-coat work: *Smith, A.*, 21,121-4.  
 Wet method:  
 Can be used between coats: *Nooijen*, 15,283-9, 15,374-8.  
 Can generally be used throughout: *Crace*, 1945-50, 2059.  
 Cannot be used between coats: *Parsonage*, 2667-71; *Harris*, 3701, 3705-6.  
 Generally used and very little dust created: *Puttrel*, 6264-7.  
 Impracticable after burning off: *Lowe*, 3333-6.  
 Impracticable in some cases: *Plumb*, 18,178-80, 18,262-7; *Devine*, 20,371-8, 20,519-21.  
 More expensive than dry method: *Holzappel*, 11,552-3, 11,558-9; *Smith, A.*, 21,273-5.  
 Not dangerous: *Parsonage*, 2885; *Pickles*, 3000-3.  
 Suitable for new work if paint sufficiently hardened: *Smith, A.*, 21,104-6, 21,116-20, 21,127-44.  
 Suitable for old work: *McKillop*, 20,787-91; *Smith, A.*, 21,100-3, 21,285.  
 Used for all woodwork: *Laidler*, 649-55.
- SCHOBERT, G. (of Messrs. Schoberts, Ltd., Paint Manufacturers, London):  
 Evidence, 9661-743.  
 Iron oxide paints:  
 Composition: vehicle used in anti-corrosive paints, 9661-73, 9705-27.  
 Cost less than lead, 9686.  
 Covering power greater than lead, 9674-5.  
 Instances of use, 9687-95, 9729-34.  
 Lightness an advantage, 9678-85.  
 Satisfactory protection for iron and steel, 9696-704.  
 Leadless paints: trade prejudice against new materials due to adulteration, 9677.  
 Lead paints: over-rated because obtainable pure, 9676-7.
- SCHOOLING, JOHN HOLT, F.R.S.S. (Consulting Actuary):  
 Evidence, 18,548-865.  
 Lead poisoning: attacks among house painters not reportable in United Kingdom, 18,725-7.  
 Statistics:  
 Occupational mortality, 18,549-601, 18,665-95, 18,747-803.  
 Sickness, 18,602-64, 18,704-46, 18,831-65.  
 One death in 54 of English house painters, 18,698-708.
- SCOTT, J. (of the Association of Master House Painters in Scotland):  
 Evidence, 12,184-293.  
 Compensation for suspension: would agree to 12,273-6.  
 Dry rubbing-down:  
 Causes little dust, 12,256-7, 12,287.  
 Indispensable in some cases, 12,259.  
 Suggests nothing but respirators to obviate the dust, 12,260-8, 12,280, 12,282-3.  
 Leadless paints:  
 Experience with, 12,206-17.  
 Office of Works test of four years not sufficient trial, 12,219-24.  
 Lead poisoning:  
 Cases of poisoning and sickness known of very few, 12,188-94.  
 Unaware of figures showing extent of evil, 12,195-203.  
 Meals: accommodation can be provided away from lead paint and dust, 12,232-4.  
 Overalls:  
 Provided by men, 12,230.  
 Storage of, 12,235-51.  
 Would object to provide, 12,231, 12,288-9.  
 Painters should be provided with work in winter, 12,292-3.  
 Periodical medical examination: would agree to if law, 12,269-72.  
 Regulations:  
 Difficult to observe in some cases, 12,278-9, 12,284-6.  
 Might mitigate lead poisoning, 12,205.  
 Preferred to prohibition of lead, 12,277.  
 Washing: hot water could be provided, 12,252-4.

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**Ship-painting:**

- (See evidence of *Commander Coysh, Mr. Mockford, Mr. Philip, Mr. Simpson, Captain Tuke.*)  
 Frequent painting of exteriors due to mechanical damage to paint: *Philip*, 8657, 8659-71; *Coysh*, 9636-46, 9654-6; *Tuke*, 10,399-403.  
 Hulls painted with leadless black paint: *Tuke*, 10,379-80.  
 Interiors in Navy done every two or three years: *Mockford*, 8786, 8793-8, 8801-3.  
 Lead only used as a small proportion of funnel and ventilator paint: *Tuke*, 10,362, 10,365-6, 10,382-5.  
 Lead paints still used for iron primings: *Coysh*, 9596-602.  
 More dangerous than house-painting: *Walsh*, 3117-22, *White*, 9320-1.  
 Possibility of finding substitute for red lead as priming coat: *Coysh*, 9606-22.  
 Surprised that precautions taken by Admiralty have not prevented lead poisoning: *White*, 9322-4.
- SIBTHORPE, JOHN (Master House Painter of Dublin):  
 Evidence, 17,657-18,099.  
 Dry rubbing-down:  
 After burning off should be prohibited, 17,765-7.  
 Could be dispensed with and enforced, 17,790-3, 17,900-6, 18,000-14.  
 Emanations: illness comes from turpentine and not lead, 17,971-3.  
 Foreign legislation: exception taken to life of zinc paints in Dutch Report, 17,954-9.  
 Leadless paints:  
 Experience of Commissioners of Irish Lights, 17,814-8.  
 Guinness's Brewery, 17,835-47.  
 Two years' test not sufficient trial, 17,965.  
 Use of, would entail one-quarter more labour, 17,865-88.  
 Lead paints: should be labelled "Poisonous," 17,916-7.  
 Lead poisoning:  
 Cases known of, 17,695, 17,988-95.  
 Effect of seasonal occupation, 17,673.  
 Fewer cases in Scotland due to better training, 17,896-9.  
 Incidence in certain districts, 17,943-50.  
 Some action necessary, 17,658-9, 17,697-8.  
 Meals: times when taken, 17,939-42, 17,978-80.  
 Mixing: done in paste form, 17,907.  
 Overalls:  
 Men might resent wearing overalls supplied by employer, 17,920-5.  
 No dust from spots of paint, 17,908-15.  
 Provision by employer objected to, 17,768-71.  
 Painters: proportion of unskilled men in Trade Unions, 17,702-30.  
 Paints:  
 Comparative tests with lead and zinc, 17,850-64.  
 Instructions of Commissioners of Irish Lights and Public Works, 17,679-88.  
 Periodical medical examination:  
 No difficulty, 17,930.  
 Transference of men suspended to other work useful and practicable, 17,931-4, 18,081-5.  
 Would agree to, 17,794-5.  
 Prohibition:  
 Difficulty in standardising paints, 17,960-3.  
 Impracticable, 17,674-8.  
 Would cause re-painting of ships to be done in foreign parts, 17,691.  
 Would increase cost of painting 50 per cent., 17,689, 17,820-34.  
 Would not obviate need for inspection, 17,797-801, 17,969-70.  
 Red lead:  
 Best material for first coat on iron, 17,757-60, 18,044-52.  
 Only material that will dry under water, 17,744-8, 17,810-3, 18,020-32.  
 Regulations:  
 Enforcement, cost of, 17,785-9.  
 Less than cost of prohibition, 17,671.  
 Number of inspectors necessary for Dublin, 17,776-84, 18,069-71.

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SIBTHORPE, JOHN—*continued.*Regulations—*continued.*

Householders should provide facilities for mess-rooms, &c., 17,926-9.

Not troublesome or vexatious, 17,700 1.

Preferred to prohibition, 17,699, 18,067 8.

Proposed code, 17,660-70.

Should be given a trial before prohibition, 18,086-99.

Removal of old paint: fumes from burning off not dangerous, 17,761-4.

Restriction to 5 per cent. soluble lead: might do more harm than good, 17,802-3.

Washing accommodation and facilities could be provided, 18,015-9.

White lead: no efficient substitute for outside work, 17,894.

## Zinc paints:

Durability not so good as lead, 17,804-9.

Experiments a failure, 18,033-43.

Extra coats required, 17,891-3.

No difficulty in application, 17,996-9.

## SIMPSON, WALTER (Foreman Painter at Messrs. John Brown &amp; Co.'s Engineering and Shipbuilding Works, Clydebank):

Evidence, 21,568-693.

Bituminous paints: danger from fumes in confined spaces, 21,653-7.

Dry rubbing-down: not very dangerous, 21,577-83.

Lead poisoning: cases known of, 21,571-6.

Oxide of iron paints: used in confined spaces, 21,593-5, 21,643-6.

Red lead: best priming for iron and steel, 21,632-8.

Turpentine: danger from fumes, 21,648-51.

Washing: facilities provided insufficient, 21,665-93.

## Zinc paints:

Get soft in water, 21,640-2.

Not so durable as lead, 21,619-29.

Stand well, but experience with, limited, 21,584-92, 21,596-618, 21,658-62.

## SMITH, ARTHUR (of the Scottish Painters' Society):

Evidence, 21,041-358.

## Dry rubbing-down:

Causes dust, 21,113-5.

Could be dispensed with almost entirely, 21,088-9, 21,125-6, 21,286-9, 21,352-4.

Reasons for, 21,349-51.

Time occupied at, 21,090-9, 21,346-8.

Dust and spray: no way of removing danger in painting ceilings, stippling, &c., 21,158-69.

Filling: alabastine could replace lead, 21,146-57.

Hours of employment in Aberdeen, 21,355.

## Lead poisoning:

Cleanliness alone would not remove evil, 21,238-9.

Details of cases, 21,046-78, 21,083-7, 21,306-37.

Fewer cases in Scotland due to more white work being done in England, 21,079-82.

Inhalation main cause, 21,240, 21,282.

Men reluctant to claim compensation, 21,233-5.

Some men more susceptible than others, 21,241-5.

## Mixing:

Done with lead in paste form, 21,181-2.

Generally done in paint shop, 21,180.

No danger with lead in paste form, 21,187.

## Overalls:

Generally worn and washed weekly, 21,205-9.

Washed at home or in laundry, 21,213-27.

Painting: hands must get soiled in certain operations, 21,188-9.

## Periodical medical examination:

Difficult, and men might resent it at first, 21,230-2.

Necessary precaution, 21,229.

Regulations: difficulty of enforcement by inspection, 21,295-6.

## Removal of old paint:

No danger from fumes in burning off, 21,170-5.

Solvents better than burning off, 21,176-9, 21,290-1.

## Rubbing down:

Amount of on preparatory work, 21,338-45.

Length of time required before new paint work can be rubbed down wet, 21,107-12, 21,268-72.

Not necessary on one coat work, 21,121-4.

SMITH, ARTHUR—*continued.*Rubbing down—*continued.*

Pumice-stone and water suitable for old work, 21,100-3, 21,285.

Pumice-stone or powder and water more suitable for new paint if sufficiently hardened, 21,104-6, 21,116-20, 21,127-44.

Wet method more expensive than dry, 21,273-5.

## Washing:

Accommodation important, 21,190.

Hot water better than cold, 21,198.

Time should be allowed, 21,191-4.

Towels, soap, nail-brushes, &c., should be provided, 21,195-7.

Water sometimes difficult to obtain, 21,199-204.

White lead: smell dangerous, 21,233-4.

## Zinc paints:

Covering power as good as lead, 21,254-67.

Durability equal to lead except in sulphurous atmospheres, 21,250-3.

Retain colour better than lead, 21,249.

Very little used in Scotland, 21,292-4, 21,300-2.

## SMITH, J. CRUICKSHANK, B.Sc. (Director, Technical Adviser, Indestructible Paint Co., Ltd.):

Evidence, 1554-665.

Lead paints: should be labelled poisonous, 1626-7.

## Lead poisoning:

Compulsory notification useful, 1624-5.

Lead should either be prohibited or trade regulated, 1631-2.

Mixing: difficult to bring it under Factory Act, 1636-8.

## Paints:

Comparative cost of lead and zinc, 1615-22.

Efficiency of lead and zinc, 1601-10, 1654-7.

Constituents of, and their functions, 1566-89, 1652-3.

## White lead:

Better for priming on wood than zinc, 1661-5.

Changes colour in impure atmospheres, 1611, 1633-4.

## Zinc paints:

Could replace lead without increase in cost, 1623, 1639-40, 1658.

Increasing use of, 1635.

Superior to lead for inside: 1612-3.

For outside with proper vehicle, 1614.

Trade prejudice against new materials, 1590-600.

Zinc oxide: standard of purity, 1641-51.

## SMYTH, C. J. (of Messrs. Mauder Bros., Wolverhampton):

Evidence, 13,398-526.

## Restriction to 5 per cent. soluble lead:

Involves no difficulty for green colours, 13,454-64.

Thinks difficulty for reds can be overcome, 13,459.

## Zinc paints:

Cost by weight slightly dearer, by quantity same as lead, 13,402, 13,443-5.

Cost increased when varnish is added, 13,504-6, 13,518-21.

Covering power good, 13,416-9.

Durability good, 13,404, 13,420-42, 13,446-53.

Medium important, 13,507-17.

Suitable for decorators, 13,488-503.

## Solubility of Lead Compounds in dilute Hydrochloric Acid:

Lead chromate only slightly soluble: *Crow*, 11,998-2002, 12,019-21.

Of different lead compounds: *Hooper*, 10,113-29.

## Solubility test:

Could be made in Government laboratory: *Hooper*, 10,156-7.

Method of analysis: *Hooper*, 10,142-S, 10,166.

Would involve no difficulty: *Hooper*, 10,141.

## Stopping:

Composition and application: *Laidler*, 666-9; *Crace*, 1952-6.

Dangerous: *Webb*, 4229.

Material not likely to soil hands: *McKillop*, 30,832-4.

No dust created as lead in paste form: *Bonner*, 4299-301.



**Stopping**—*continued.*

Ten per cent. lead useful: *Patterson*, 22,843-9, 22,919-21.

**STYLES, W. J.** (of the London Master Builders' Association):

Evidence, 14,054-185.

Dry rubbing-down:

Indispensable in some cases, 14,082-3, 14,152.  
No way of removing dust, 14,084, 14,153-5.

Leadless paints:

Office of Works' test not sufficient trial, 14,120-4.  
Trials very good for internal and external work, 14,101-14.

Lead poisoning:

Regrettable that this country should be behind others in legislation regarding, 14,068-70.  
Unaware of extent of evil, 14,058-67.

Meals: accommodation away from paint, &c., difficult, 14,077a-80.

Outdoor clothing: storage away from paint, &c., impossible, 14,077.

Overalls:

Provision and washing by employer serious, 14,073-5.

Storage away from paint, &c., impossible, 14,076.

Periodical medical examination: cannot afford to pay, 14,081.

Prohibition:

Practicable for interior work but not for exterior, 14,147-9.

Would not interfere with business, 14,173-5.

Regulations:

Impossible to carry out, 14,162-72.

Preferred, but as they are impossible to carry out, would agree to prohibition, 14,085-99, 14,125-46, 14,176-85.

Should be tried before lead prohibited, 14,116-9.

Washing:

Accommodation not always practicable, 14,071.

Hot water impossible in some cases, 14,072.

**TANNER, SIR HENRY** (Principal Architect of H.M. Office of Works):

Evidence, 22,628-742.

Graphite paints: not found satisfactory, 22,734-6.

Leadless paints:

No knowledge of toxic effect, 22,699-704.

Origin of, and instructions for use, by Office of Works, 22,632-54, 22,729.

Superior to lead as well as better for workmen, 22,707-8.

Very few complaints received by Office of Works, 22,655-61, 22,714.

Will be used on bridges, &c., in future, 22,740.

Lead paints: still used for priming on iron and steel, 22,662-4, 22,712.

Office of Works' paints generally mixed by manufacturers, 22,695-8.

Painting: amount done by Office of Works, 22,669-74.

Paints: specification by architects, 22,687-91.

Prohibition: Office of Works' experience sufficient to warrant, 22,693.

Regulations: not necessary for old painted surfaces if lead prohibited, 22,723-8.

White lead: use of by Office of Works, 22,676-86.

Zinc paints:

Different treatment required, 22,715-6.

No complaints as to durability, 22,730-2.

Prejudice against abating, 22,668.

Retain colour better than lead, 22,717-22.

**TUKE, CAPT. F. M.** (Marine Superintendent of the Orient Steamship Co.):

Evidence, 10,357-423.

Frequent painting of exterior of ships due to mechanical damage to paint, 10,399-403.

Hulls painted with leadless black paint, 10,379-80.

Lead only used as a small proportion of funnel and ventilator paint, 10,362, 10,365-6, 10,382-5.

Prohibition of lead would not affect Orient Steamship Co., 10,393.

Zinc paints:

Cost of exterior painting of ships slightly dearer than lead, 10,390-1, 10,394.

**TUKE, CAPT. F. M.**—*continued.*

Zinc paints—*continued.*

Cost—*continued.*

Of interior painting of ships same as with lead, 10,375-6.

Easy to apply, 10,409, 10,412-5.

How mixed, 10,416-21.

Reasons for use of, 10,395-8, 10,422.

Satisfactory for ships, 10,374, 10,378, 10,388-9, 10,392.

Used exclusively for ordinary painting for 35 years, 10,363-4.

Except for funnels and ventilators, 10,367-73, 10,381.

Used for priming both on wood and metal, 10,404-8.

**Turpentine:**

Causes of danger from fumes of paint: *Bettink*, 18,517-21, 18,536-41; *Devine*, 20,355-7; *Simpson*, 21,648-51.

Minimal dose: *Goadby*, 15,922.

Poisoning or ill-effects from: *Wilson*, 3225-8; *Goadby*, 15,914, 22,004-7.

Predisposes to lead poisoning: *Johnson*, 22,302-3.

Source of most of the decomposition products: *Dobbie*, 22,500, 22,507-18.

Substitutes or inferior qualities:

Dangers from: *Webb*, 4228, 4268-9, 4272; *Rambousek*, 14,656-7; *Armstrong*, 16,142-4; *McKillop*, 20,816-8, 20,898-900; *Morley*, 23,074-5.

Eczema from: *Legge*, 316-8.

None used: *Puttrell*, 6451-2.

**VAUGHAN, J. C.** (of the National Association of Master House Painters and Decorators of England and Wales):

Evidence, 13,527-823.

Compensation for suspension: would have to insure against, 13,692-5.

Dry rubbing-down: could be dispensed with, 13,645-58, 13,733-42.

Dust and spray: no way of avoiding splashes in painting ceilings and stippling, 13,659-69.

Hours of employment: would agree to limitation to 48 hours, 13,682-7.

Insurance rates: have recently increased, 13,534-6.

Leadless paints:

If Office of Works can dispense with lead, other people should be able to do so, 13,679a-80, 13,767-8, 13,798-9, 13,810-2.

Office of Works' test of four years not sufficient trial, 13,793-6.

Only complete remedy, 13,676-9.

Lead-poisoning:

Cases known of very few, 13,533, 13,537-40.

Incidence greater among railway painters than house painters, 13,781-5.

Regrettable that this country should be behind others in legislation regarding, 13,575.

Unaware of extent of evil, 13,548-73, 13,776-8.

Untrained and dirty men suffer most, 13,743-55.

Meals: accommodation away from paint impossible in some cases, 13,640-4, 13,815-6.

National Association of Master House Painters: have taken no steps to discover extent of lead poisoning or prevent it, 13,541-7.

Outdoor clothing: storage away from paint difficult in some cases, 13,630-9, 13,729-32.

Overalls: provision and washing by employer not objected to, 13,623-5.

Periodical medical examination: would agree to, 13,689-91.

Regulations:

Enforcement by local policemen, or sanitary inspectors, or Inland Revenue officers, or by special sub-inspectors, 13,588-622, 13,817-23.

Preferred to prohibition, 13,696-705.

Would involve increased charges, while use of leadless paints would mean more frequent painting, 13,706-19.

Removal of old paint: respirator suggested against fumes in burning off, 13,670-5.

- VAUGHAN, J. C.—continued.**  
 Washing:  
 Accommodation essential, 13,577-9.  
 Hot water impracticable in some cases, 13,580-6.  
 White lead:  
 Best paint for outside work, 13,759-66.  
 More durable than zinc, 13,779-80.  
 Zinc paints:  
 Increasing use of, 13,757-8.  
 Not equal to lead for outside work, 13,802-8.
- VICKERS, ARCHIBALD** (of Messrs. Archibald Vickers, Ltd., Paint and Varnish Manufacturers, London):  
 Evidence, 19,281-432.  
 Leadless paints: defects of lithopone in regard to light, 19,359-62.  
 Zinc paints:  
 As good as lead, 19,375-8.  
 Better for sea atmospheres than lead, 19,403-11.  
 Can replace lead paints for inside and outside, 19,356-8.  
 Comparative obliterating power of zinc and lead paints, 19,331-55.  
 Cost no greater than lead, 19,297-308, 19,413-23.  
 Covering power good, 19,296, 19,363-8.  
 Durability good, 19,310-2.  
 Instances of their use, 19,313-30.  
 Medium important, 19,286, 19,424-5.  
 No difficulty in application, 19,426-32.  
 Trade prejudice against new materials, 19,379-402.  
 Zinc oxide by indirect process most suitable, 19,289-91.
- VILLEMOT, A.** (President of the Colour and Varnish Manufacturers' Association, Paris):  
 Evidence, 16,170-266.  
 Foreign legislation: France: Commission's findings criticised, 16,187-95, 16,221-35.  
 Lead paints: easier to apply than zinc, 16,201-3, 16,246-8.  
 White lead:  
 Not dangerous enough to be prohibited, 16,184-6.  
 Still largely used in France, 16,208-9, 16,252-5.  
 Zinc oxide:  
 Difficulty in manufacture, 16,236-40.  
 Supply would not be enough if lead prohibited, 16,211-6.  
 Zinc paints:  
 Comparison with white lead, 16,172-81.  
 Covering power not so good as lead, 16,177.  
 Increasing use of, 16,259-66.  
 Unsatisfactory for outside work, 16,171, 16,241.  
 With varnish not so durable as lead, 16,242-4.
- Wages:**  
 Rates of: *Crace*, 2091-3, 2109-14; *Parsonage*, 2866-78; *Campbell*, 3586-7; *Wiltshier*, 6807-12; *Wilkinson*, 20,002-6; *Honeychurch*, 20,176-8; 20,181-90.
- WAIT, D.** (Works Chemist of Messrs. R. Gay & Co. Ltd., Paint Manufacturers, Stratford, London):  
 Evidence, 1452-553.  
 Dry rubbing-down dangerous, 1465.  
 Leadless paints: lithopone not satisfactory for outside work, 1474-8.  
 Mixing:  
 Should be done by paint manufacturers, 1457-61, 1515-6, 1530.  
 Sometimes done with hands, 1511-4, 1524-9.  
 Painting: spraying dangerous, 1462-4.  
 Paints: lead sulphate a good and nearly harmless paint base, 1467-71.  
 Removal of old paint: no danger from lead, 1466.  
 Zinc paints:  
 Composition of, 1493-4, 1499-501.  
 Durability good, 1484-7.  
 Equal to lead, 1509-10.  
 No difficulty in application, 1532-4.  
 Not so popular as white lead, 1481-2.  
 Price of, 1495-8.  
 Same as lead, 1540-1.  
 Require thinning if exposed to air for long time, 1535-9.  
 Satisfactory for inside and outside work, 1479-80.  
 Standardisation of, 1502-8.
- WAIT, D.—continued.**  
 Zinc paints—continued.  
 Tendency to settle of ready-made paints, 1531, 1550-2.  
 Trials of, 1483.
- WALKER, F. L.** (of the London Master Builders Association):  
 Evidence, 9025-140.  
 Compensation for suspension: would not agree to, 9106-7.  
 Dry rubbing-down:  
 Indispensable in some cases, 9077.  
 Respirator suggested, 9078-90, 9119-20.  
 Dust and spray: no means of removal in painting ceilings and stippling, 9081-4.  
 Hours of employment: would agree to limitation if custom, 9094-9.  
 Insurance rates: no knowledge of increase, 9032-3.  
 Leadless paints: if Office of Works substitute satisfactory, it should be used, 9091-3.  
 Lead poisoning:  
 Cases may occur without employer's knowledge, 9130, 9137-40.  
 Cases of poisoning and sickness known of very few, 9029-31, 9034-8, 9112-8.  
 Regrettable that this country should be behind others in legislation regarding, 9057.  
 Unaware of figures showing extent of evil, 9046-55.  
 Meals: accommodation away from lead paint and dust impossible in some cases, 9074.  
 Overalls:  
 No reason why employer should provide them, 9064-9.  
 Storage of, 9073.  
 Washing of, 9070-2.  
 Periodical medical examination: would not agree to, 9100-5.  
 Prohibition of lead: preferred to regulations, 9108-11.  
 Regulations: difficult to carry out, 9075-6.  
 Removal of old paint:  
 Fumes from burning off not dangerous, 9087-8, 9122-5.  
 Solvents could be used, 9085-6, 9121.  
 Washing:  
 Accommodation essential, 9058-9.  
 Hot water not generally obtainable, 9060-3.  
 Towels, soap, &c., already provided, 9131-3.  
 White lead: essential for outside work, but could be prohibited for inside, 9090.
- WALLIS, WILLIAM F.** (of the National Federation of Building Trades Employers):  
 Evidence, 20,557-680.  
 Compensation for suspension: would not agree to, 20,631.  
 Dust: exhaust impossible, 20,628.  
 Leadless paints: no experience with, 20,633-4, 20,647-9, 20,658-68.  
 Lead poisoning:  
 Cases known of very few, 20,559, 20,564-73.  
 Unaware of extent of evil, 20,574-82.  
 Meals:  
 Accommodation away from dust, &c., impossible in some cases, 20,592-7.  
 Household should provide facilities, 20,644-6.  
 Outdoor clothing: storage away from dust, &c., difficult, 20,603-4.  
 Overalls:  
 No hardship for men to provide, 20,636-8.  
 Provision and washing by employer practicable, 20,597-91.  
 Storage away from dust, &c., difficult, 20,598-602, 20,678-80.  
 Periodical medical examination: onerous, 20,630, 20,635.  
 Prohibition:  
 Only remedy, 20,584.  
 Preferred to regulations, 20,632.  
 Regulations:  
 Difficult to enforce, 20,627.  
 Practicable if reasonable, 20,585-6.  
 Would increase cost of work, 20,657.  
 Removal of old paint: no way of removing fumes in burning off, 20,629.

**WALLIS, WILLIAM F.—continued.**

- Washing:  
 Accommodation important, 20,605-10.  
 Hot water: not always practicable, 20,611-3.  
 Nailbrushes, towels, soap, &c., should be provided, 20,618-20, 20,639-43.  
 Time should be allowed, 20,614-7.  
 White lead: men averse to giving it up, 20,650-2.

**WALSH, J. (of the National Amalgamated Society of Operative House and Ship Painters and Decorators).**

- Evidence, 3085-157.  
 Compensation for lead poisoning:  
 Man discharged through claiming, 3123-9.  
 Men reluctant to claim, 3116.  
 Dry rubbing-down:  
 Exhaust fans impracticable, 3112-3.  
 Indispensable in some cases, 3088-9, 3114.  
 Dust and spray: danger from spray in stippling and painting ceilings, 3090.  
 Lead poisoning: chief causes of, 3087.  
 Meals: accommodation impracticable in some cases, 3104-6.  
 Mixing: danger from fumes, 3094-5.  
 Overalls:  
 Danger from dust, 3109-10.  
 Generally worn and washed weekly, 3107-8.  
 Periodical medical examination: not much use, 3115.  
 Prohibition: only solution, 3111.  
 Removal of old paint:  
 Burning off dangerous, 3091.  
 Rubbing down after burning off dangerous, 3092-3.  
 Ship painting: more dangerous than house painting, 3117-22.  
 Washing:  
 Accommodation essential, 3099.  
 Hot water desirable, but not always obtainable, 3100-1.  
 Zinc paints:  
 Application easy after a little experience, 3139-48.  
 As good as lead, 3130-8, 3149-50.  
 Failure due to bad mixing, 3155-7.

**Washing:**

- Accommodation:  
 Already provided: *Crace*, 1921-9; *Puttrell*, 6417-25; *Bennett*, 11,231-3.  
 Difficult or impossible to provide: *Cookson*, 2134-6; *Parsonage*, 2767-77; *Orr*, 10,579-85; *Guest*, 11,112-6; *Anderson, R. L.*, 11,343; *Edginton*, 13,153-6; *Donald*, 12,339-40; *Styles*, 14,071; *Francis*, 17,337-9; *Plumb*, 18,306-13.  
 Generally used by painters if provided: *Parsonage*, 2782-3.  
 Important: *Parsonage*, 2711-5; *Pickles*, 2976; *Walsh*, 3099; *Lowe*, 3274; *Bancroft*, 4098; *Wobb*, 4230; *Bonner*, 4338; *Orr*, 10,578; *Carson*, 11,771, 11,918-20; *McKillop*, 20,836; *Smith, A.*, 21,191.  
 Not always used by painters: *Carson*, 11,914-7.  
 Not provided: *Laidler*, 623-36.  
 Now provided very scanty: *Leggo*, 331-3.  
 Practicable to provide: *Crace*, 2036-9; *Campbell*, 3531-3; *Carson*, 11,936-9; *Griffiths*, 13,985-7; *Sibthorpe*, 18,015-9.  
 Should be provided: *Laidler*, 623-36, 660-4; 741-3, 782-8; *Crace*, 1992; *Cookson*, 2265-73; *Campbell*, 3396; *Harris*, 3663-7; *Cantrill*, 3840-1; *Puttrell*, 6225-7, 6438; *Chappell*, 6485-6, 6627-9; *Wiltshier*, 6693-4; *Barker*, 6932-3; *Grundy*, 7149-50; *McDermid*, 7341-2; *Holliday*, 8465; *Higgs*, 8899-900; *Walker*, 9058-9; *White*, 9228-9; *Vaughan*, 13,577-9; *Morton*, 13,862-4; *Plumb*, 18,109; *Anderson, J.*, 19,548-50; *Honeychurch*, 20,057; *Devine*, 20,387; *Wallis*, 20,605-10.  
 Sometimes provided: *Wilson*, 3229-38.  
 Cold water preferred to hot: *Carson*, 11,772-5; *McKillop*, 20,840-6, 20,894-7.  
 Facilities (Towels, soap, nail-brushes, &c.):  
 Already provided: *Campbell*, 3504-5; 3176-7; *Grundy*, 7263-5; *Walker*, 9131-3; *Milton*, 20,308-11, 20,315-20.  
 Insufficient: *Simpson*, 21,665-93.

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**Washing—continued.**

- Facilities—continued.  
 Could be provided: *Bennett*, 11,235-6; *Honeychurch*, 20,059-60; *Wallis*, 20,618-26, 20,639-43.  
 Difficult to provide: *Anderson, J.*, 19,561.  
 Essential: *Carson*, 11,776-7, 11,935; *Smith, A.*, 21,195-7.  
 Not always available: *McKillop*, 20,852-7, 20,904-5, 21,025-32.  
 Sometimes refused by employer: *Parsonage*, 2943-9.  
 Would agree to provide: *McDermid*, 7418-21; *Dobie*, 10,967-72.  
 Handkerchiefs used for wiping hands: *Anderson, J.*, 19,551-3.  
 Dangerous, *Dobie*, 10,973-7.  
 Hot water:  
 Better than cold: *Barker*, 6395; *Carfrae*, 10,843-5; *Devine*, 20,388-93; *Smith, A.*, 21,198.  
 Could be provided: *Laidler*, 806-8, 944-52, 964-66, 1021-40; *Crace*, 2048-55, 2031-7; *Campbell*, 3398-401; *Cantrill*, 3843-50, 3925-6; *Puttrell*, 6236-9; *Chappell*, 6630-2; *McDermid*, 7344-6, 7488; *White*, 9230-6; *Orr*, 10,801-2; *Scott*, 12,232-4.  
 Desirable: *McDermid*, 7343.  
 Desirable, but not always obtainable: *Crace*, 2015-8; *Cookson*, 2137-9; *Walsh*, 3100-1; *Wilson*, 3185-6, 3243-4; *Wiltshier*, 6695-7; *Barker*, 6935-7, 7092-3; *Grundy*, 7158-9; *Higgs*, 8901-7.  
 Essential: *Laidler*, 670-3; *Campbell*, 3397; *Cantrill*, 3842; *Mockford*, 8768-9.  
 Essential, but not always obtainable: *Bancroft*, 4099-100, 4166-7.  
 Never refused to men when available: *Parsonage*, 2939-42.  
 Not essential: *Klein*, 16,981-3; *Anderson, J.*, 19,554-60; *Milton*, 20,312-4; *Joadby*, 22,061-3.  
 Not essential, but better than cold: *Harris*, 3668-71; *Puttrell*, 6228-35; *Chappell*, 6487-8, 6493; *Grundy*, 7151, 7156-7.  
 Not obtainable always: *Parsonage*, 2713, 2778-81, 2818-28; *Lowe*, 3275, 3337-44, 3366-70; *Harris*, 3672-4, 3774; *Wobb*, 4231-3; *Bonner*, 4339-40; *Holliday*, 8466-8; *Walker*, 9060-5; *Carfrae*, 10,842; *Dobie*, 10,966; *Bennett*, 11,234; *Vaughan*, 13,580-6; *Morton*, 13,865-6; *Styles*, 14,072; *Niederhaiser*, 16,311-2; *Honeychurch*, 20,059-60; *Devine*, 20,394; *Wallis*, 20,611-3.  
 Practicable, but difficult to obtain in some cases: *Pickles*, 2977-81, 3035-49, 3081-4.  
 Only necessary to remove loose paint off hands: *Grundy*, 7152-5, 7246-54.  
 Provision of buckets and soap could be enforced: *Leggo*, 335-6.  
 Regulation not necessary as men provide their own facilities: *Wilkinson*, 19,934-41.  
 Soap: special kind to prevent lead poisoning, *Johnson*, 22,405-8.  
 Time for washing:  
 Not allowed: *Parsonage*, 2920-4, 2926; *Wobb*, 4274-7.  
 In Germany: *Niederhaiser*, 16,366-9.  
 Should be allowed: *Pickles*, 3050-5, 3083; *Carson*, 11,778; *Roeh*, 16,744-5; *McKillop*, 20,837; *Smith, A.*, 21,191-4.  
 Would agree to allow: *Chappell*, 6489-92; *Higgs*, 9002-3; *Wallis*, 20,614-7.  
 Towels: objects to provide: *Milton*, 20,321.  
 Wash-leathers, which are used for washing paint, used as towels: *Anderson, J.*, 19,858-61.  
 Water sometimes difficult to obtain: *Smith, A.*, 21,199-204.  
 But generally available: *McKillop*, 20,847-51, 21,019-24.

**WEBB, GEORGE (Foreman Painter):**

- Evidence, 4173-285.  
 Dry rubbing-down:  
 Causes dust, 4191-2.  
 Exhaust fans impracticable, 4198.  
 Indispensable in some cases, 4199-207.  
 Time occupied at, 4193-4, 4278-85.

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WEBB, GEORGE—*continued.*

- Dust and spray:  
 Danger from spray in stippling and painting ceilings, 4208-11, 4264-6.  
 Mask suggested, 4212-6, 4267.  
 Emanations: dangerous, 4227.  
 Lead poisoning: cases known of, 4176-87.  
 Meals: where taken, 4270-1.  
 Mixing:  
 Danger from fumes, 4188-9.  
 In burning out paint cans, 4190.  
 Principal danger, 4195-6.  
 Overalls: generally worn and washed weekly, 4235-42.  
 Removal of old paint:  
 Danger from sandpapering after burning off, 4220-2.  
 No way of avoiding fumes in burning off, 4217-9, 4226.  
 Scraping off dangerous, 4223-4.  
 Stopping: dangerous, 4229.  
 Turpentine: substitutes dangerous, 4228, 4268-9, 4272.  
 Washing:  
 Accommodation important, 4230.  
 Hot water difficult to obtain, 4231-3.  
 Time not allowed, 4274-7.  
 Zinc paints:  
 Experience of, 4245-52.  
 Ill-effects from, less than from lead, 4244, 4253-5.

## WHITE, A. G. (of the National Federation of Building Trades Employers):

- Evidence, 9141-529.  
 Dry rubbing-down:  
 Causes dust, 9515-8.  
 Indispensable in some cases, 9256-61, 9416-7, 9444-5.  
 Mask practicable, 9262-7, 9298-306.  
 Reasons for, 9442-3.  
 Dust and spray:  
 Frequent washing of face suggested to avoid danger in stippling and painting ceilings, &c., 9268-72.  
 Mask only suggestion, 9275, 9347-60.  
 Emanations: colic due to turpentine and not lead, 9504-6.  
 Foreign legislation:  
 Is aware of it, 9224-6.  
 Will obtain information of, 9425-38.  
 Hours of work:  
 Workers would probably object to limitation, 9439-41.  
 Would agree to limitation, 9287-9.  
 Insurance rates: recent increase in, 9489-93.  
 Leadless paints:  
 Nature of tests which should be made before lead prohibited, 9384-5, 9371-2.  
 None efficient after many experiments, 9402-4, 9414-5.  
 Office of Works' test of four years not sufficient trial, 9284-6, 9375-6, 9380, 9405.  
 Test of 10 years necessary before lead prohibited, 9381-3, 9388-9.  
 Would be accepted if equal to lead, 9396-7.  
 Lead poisoning:  
 Careful training would reduce evil, 9513.  
 Cases more frequent among lower class of painters, 9307-15.  
 Cases of poisoning and sickness known of, 9147-55.  
 Death rates, 9364-70, 9470.  
 Deplorable, 9223.  
 Details of cases, 9316-19, 9471.  
 Effect of seasonal nature of trade, 9463-9, 9494-7.  
 Regrettable that this country should be behind others in legislation regarding, 9227.  
 Results of inquiry by National Federation, 9328-40.  
 Small experience of, probably due to casual employment, 9479-85.  
 Meals: accommodation sometimes supplied, but no real need for it, 9252.  
 National Federation of Building Trades Employers:  
 Extent of lead poisoning evil not thoroughly realised, 9177-223, 9372-4.

WHITE, A. G.—*continued.*

- National Federation of Building Trades Employers—*continued.*  
 Have made no experiments to discover substitute, 9174-6.  
 Have taken steps to find out extent of lead poisoning, 9156-73.  
 Overalls:  
 Not worn by railway painters, 9510-2.  
 Storage away from dust and paint could be arranged for, 9244-51.  
 Would agree to wash them weekly, 9241-3.  
 Object to provision by employer, 9237-40.  
 Painting:  
 Architects responsible for specifications, 9393-5.  
 Ceiling, &c., could be done with leadless paints, 9446-50.  
 Painters: estimated number of, 9361-3.  
 Periodical medical examination: would agree to, 9290-3.  
 Prohibition of lead:  
 Effect on trade, 9453-5.  
 Only remedy if mask impracticable, 9276-80.  
 Practicable for inside, 9398-400, 9406-11.  
 Public would suffer if prohibited for outside, 9401.  
 Would agree to, if efficient substitute and not too costly, 9451-2, 9460.  
 Regulations:  
 As to washing, overalls, meal rooms, &c., could be carried out, 9253-5.  
 Necessary and not objected to, 9296.  
 Preferred to prohibition, 9297.  
 Should be made while tests of leadless paints are made, 9386-7.  
 Removal of old paint:  
 Mask suggested to avoid fumes, 9273-4.  
 Very little danger from fumes in burning off, 9377-9, 9390.  
 Rubbing down: moistening sandpaper to avoid dust might be tried, 9472-7, 9514, 9519-20.  
 Ship painting:  
 More dangerous than house painting, 9320-1.  
 Surprised that precautions taken by Admiralty have not prevented lead poisoning, 9322-4.  
 Washing:  
 Accommodation should be provided, 9228-9.  
 Hot water practicable to obtain, 9230-6.  
 Zinc paints:  
 Not so good as lead, 9281-3.  
 Use of, for ship painting, 9522-9.  
 White Lead:  
 Amount manufactured, exported, re-exported, and consumed in the United Kingdom: *Miller*, 17,065, 17,086-7, 17,090-3, 22,551-2, 22,556-71.  
 Amount used for painting purposes: *Miller*, 17,228-35, 22,553-5.  
 Amount used for purposes other than painting: *Miller*, 17,119-22, 22,576-82, 22,606-27.  
 Best paint pigment: *Higgs*, 8979-82, 8987-9; *Ander-son*, *R. L.*, 11,418-27, 11,433-9; *Leyendecker*, 16,465-80; *Klein*, 16,837; *Miller*, 17,110-1.  
 For outside work: *Garson*, 2549, 2553; *Chappell*, 6586; *Vaughan*, 13,759-66; *Nooijen*, 15,208, 15,212, 15,361; *Honeychurch*, 20,154-8.  
 Better paint pigment than zinc: *Holzappel*, 11,502-3.  
 For outside work: *Niederhäuser*, 16,272-3.  
 For priming: *Smith, J. C.*, 1661-5; *Barker*, 7089-91.  
 Capital invested: *Miller*, 17,066.  
 Compensation should be paid to corroders if lead prohibited: *Cookson*, 2256.  
 Dry white lead:  
 Nearly all sent to colour grinders: *Cookson*, 2306-9.  
 Sale should be prohibited: *Rivet*, 15,630-5; *Bettink*, 18,497-8.  
 Effect of prohibition on export trade: *Miller*, 22,596-605.  
 On market: *Miller*, 22,572-86.  
 Foreign competition: *Miller*, 22,587-95.  
 Guarantee given, *Niederhäuser*, 16,362.  
 Important industry in Austria: *Rambousek*, 14,598-617.  
 In Belgium: *Ricker-Devoe*, 14,972-4.  
 Men averse to giving it up: *Wallis*, 20,650-2.

**White Lead—continued.**

- Not dangerous enough to be prohibited: *Villemot*, 16,184-6.
- Sale should be prohibited for making paints: *Cunyng-hame*, 10,336.
- Smell dangerous: *Smith, A.*, 21,283-4.
- Still largely used in France: *Expert-Bezançon*, 15,108-12; *Villemot*, 16,208-9, 16,252-5.
- Trade dependent on foreign sources in some measure: *Miller*, 17,123-6.
- Use of, by Office of Works: *Patterson*, 12,989-3000, 13,025-36, 13,041-6, 22,899-915; *Tanner*, 22,767-86.
- In ship painting: *Plumb*, 18,328-37.
- WILKINSON, C. E.** (of the London Association of Master Decorators):  
Evidence, 19,894-20,016.  
Compensation for suspension: would agree to if law, 19,902-3.
- Dry rubbing-down:  
Dust does not float in air but falls to ground, 19,949-59.  
Moistening glass paper suggested to remove dust, 19,946-8.  
Very little dust created, 19,990-5.
- Dust: exhaust fans impracticable, 19,943-5.
- Lead poisoning:  
Education of painters in cleanliness the solution 19,987-8, 19,996-9.  
No cases known, 19,897-907.  
Some action necessary, 19,921.  
Surprised that properly trained men should contract lead poisoning, 20,007-9.  
Trade union statistics disputed, 19,982-6.  
Unaware of extent of evil, 19,908-20.  
Untrained men more liable, 20,013-4.
- Meals:  
Accommodation difficult in some cases, 19,926-7.  
Frequently taken in rooms where work is going on, 19,928-31.
- Overalls:  
Generally worn in good shops, 20,010-2.  
Provision by employer impracticable, 19,924-5.  
Storage away from dust and paint impracticable, 19,932-3.  
Washed at home, 19,942.
- Painters: should all be trained men, 20,015-6.
- Periodical medical examination: might be a good thing, 19,960-1.
- Regulations:  
Preferred to prohibition, 19,964.  
Some impracticable, 19,965-81.
- Wages: rates of, 20,002-6.
- Washing: regulations not necessary, as men provide their own towels, soap, &c., 19,934-41.
- WILLIS, A. W.** (of the London Colour, Paint, Oil, and Varnish Trades' Association).  
Evidence, 11,633-748.
- Dry rubbing-down: respirators should be worn, 11,706-8.
- Leadless paints:  
Strange that Office of Works should succeed where others have failed, 11,720-3.  
Zinc sulphide useless for exterior work, 11,660.
- Lead poisoning: reduction in paint and colour works following on regulations, 11,693-702.
- Office of Works: large users of paints, 11,661-4.
- Paint grinding:  
Industry should be considered in any action to reduce lead poisoning among house painters, 11,643-50.  
No difference to trade whether lead or zinc ground, 11,670-87.
- Prohibition:  
Effect on paint grinders, 11,642, 11,724-7.  
Would reduce range of colours, 11,640.
- Regulations: cost of, in paint-grinding works, 11,709-18.
- Zinc paints:  
Importance of medium, 11,739-48.  
Not as good as lead for outside even with varnish added, 11,729-33.  
Not so durable as lead for outside, 11,651-5.  
Only substitute for white colours, 11,639.

- WILSON, FREDERICK** (of the National Amalgamated Society of Operative House and Ship Painters and Decorators of England and Wales):  
Evidence, 3158-253.
- Dry rubbing-down:  
Indispensable in some cases, 3165-6.  
Principal danger, 3164, 3217-22.
- Dust and spray: danger from spray in stippling and painting ceilings, 3167.
- Leadless paints:  
As durable as lead, 3245-6.  
No objectionable smell, 3202-5.
- Lead poisoning: details of cases, 3195-201.
- Meals: where taken, 3239-42, 3250-3.
- Mixing: danger from fumes, 3174-84, 3193-4.
- Prohibition: only solution, 3187-92.
- Removal of old paint:  
Burning off dangerous, 3168-9.  
Rubbing down after the burning off dangerous, 3170-1.
- Turpentine: ill-effects from, 3225-8.
- Washing:  
Accommodation sometimes provided, 3229-38.  
Hot water desirable but not always obtainable, 3185-6, 3243-4.
- Zinc paints: enamels satisfactory for outside, 3206-10.
- WILTSHIER, ARCHIBALD** (of the National Association of Master House Painters and Decorators of England and Wales):  
Evidence, 6663-878.
- Compensation for suspension: would agree to, 6770-1.
- Dry rubbing-down:  
Amount of dust caused, 6850-2.  
Can suggest no remedy for dust created between coats, 6730-1.  
Dusty process, 6727.  
Exhaust fans impracticable, 6725-6.  
Indispensable in some cases, 6722-4.  
Should be prohibited on preparatory work, 6728-9.
- Dust and spray:  
Not dangerous if inhaled, 6720-1.  
No way of avoiding splashes in painting ceilings, 6732-7.  
Washing hands and face immediately after stippling suggested as remedy, 6738-45.
- Emanations: could be partially removed by ventilation, 6791-2.
- Filling: 75 per cent. leadless, 6849.
- Hours of employment:  
Painters not continually employed painting, 6839-42.  
Would agree to limitation of, 6762-4, 6804-6.
- Insurance: rates have recently increased, 6671-2.
- Lead paints: matured preferred to new as better, 6786, 6793, 6799-801.
- Leadless paints:  
Office of Works paint not satisfactory on Canterbury Post Office, 6756-8, 6823-35, 6863-75.  
Only way of removing dangers, 6752.  
Water distempers largely used for flitting and ceiling work, 6843-6.
- Lead poisoning:  
Cases of poisoning and sickness known of, 6669-70, 6673-7.  
Cleanliness does not give immunity from, 6787-90.  
Plumbers do not suffer because they are trained, 6818-9.  
Realises extent of, 6682-3, 6690.  
Untrained men more liable to poisoning as less cleanly, 6813-7.
- Master House Painters Association:  
Have made experiments with leadless paints, 6678-81.  
Untrained men taken on in busy season, 6820-2.
- Meals: accommodation away from paint and dust can be provided, 6709-15.
- Mixing:  
Done on job, 6749, 6784.  
Done with lead in paste form, 6785, 6847-8.
- Outdoor clothing: place away from lead paint and dust could be provided, 6708, 6717-9.
- Overalls:  
Ought to be worn, 6698.

**WILTSCHIER, ARCHIBALD—continued.****Overalls—continued.**

Should be cleaned weekly, 6699-701.

Sometimes kept in bags, 6702-3.

Sometimes kept in rooms where painting is in progress, 6704-7.

Paints: four years a good trial as to durability, 6876-7.

Periodical medical examination: would agree to, but not for employer to pay, 6765-9.

Prohibition of lead preferred to regulations, 6778-83.

**Regulations:**

Could not be enforced, 6772-5.

Difficulty with small jobs, 6776.

Removal of old paint: can suggest nothing to prevent fumes in burning off, 6746-8.

Wages: rates of, 6807-12.

**Washing:**

Accommodation essential, 6693-4.

Hot water essential but not always obtainable, 6695-7.

Zinc paints: durability not good, 6753-5.

WONNACOTT, W.: see MUNBY, A. E.

**Workmen's Compensation Act:**

Duties of certifying factory surgeons: *Legge*, 284-9.

Procedure in cases of poisoning: *Legge*, 228-33.

**Zinc:**

Dependent on foreign countries for supplies: *Holzappel*, 11,540; *Miller*, 17,161-2.

Dust not harmful: *Holzappel*, 11,468-73.

Price would rise with prohibition of lead: *Crow*, 12,135-6; *Expert-Bezançon*, 15,102.

Temporarily: *Pisart*, 18,905-18, 18,992-5.

Production in England: *Miller*, 17,152-8.

Shortage would occur if lead prohibited: *Lancaster*, 17,610-34.

Supply sufficient if lead prohibited: *Depierres*, 19,141-5.

**Zinc Oxide:**

Amount of lead present: *Holzappel*, 11,519-23.

Combine, Broken Hill Mines:

Connected: *Expert-Bezançon*, 15,188-91; *Rivet*, 15,566.

Not connected: *Crow*, 12,142-3.

Difficulties or failure of manufacture: *Expert-Bezançon*, 15,100; *Villemot*, 16,236-40; *Miller*, 17,198, 17,216-20; *Lancaster*, 17,582-669, 17,641-2; *Pisart*, 18,933-46, 18,984-7; *Johnson*, 22,461-4.

Direct process:

Better than indirect: *Lancaster*, 17,567, 17,577-81; *Depierres*, 19,016-31.

British ore unsuitable: *Lancaster*, 17,560-6, 17,569-76.

Cheaper than indirect: *Depierres*, 19,016-31.

Dust not dangerous: *Pisart*, 21,853-65.

Five per cent. lead necessary: *Lancaster*, 17,648-53.

Four per cent. lead:

Admitted by certain foreign governments: *Depierres*, 19,034.

Most suitable: *Pisart*, 18,893-902, 18,923-4; *Depierres*, 19,032-7.

History, capital invested, production, &c.: *Miller*, 17,076-7, 17,082.

Importation increasing: *Miller*, 17,198-40.

Increased demand:

Would lead to manufacture in England: *Line*, 9972.

Would not lead to increase in price: *Line*, 9973.

Would probably lead to increase in price: *Rivet*, 15,454-6; *Miller*, 17,173-83, 17,197; *Chancellor and Penwarden*, 21,423-8.

Indirect process:

Kind of zinc used: *Expert-Bezançon*, 15,178-87.

Most suitable: *Vickers*, 19,289-91.

Mainly foreign product: *Miller*, 17,194-6.

Methods of production: *Line*, 9954-5.

Monopoly:

Entire corner in zinc hardly possible: *Crow*, 12,133-46.

In France: *Expert-Bezançon*, 15,101, 15,173-7.

Only substitute for lead in any way efficient, *Miller*, 17,075.

Production of: *Lancaster*, 17,635-40.

**Zinc Oxide—continued.**

Pure zinc oxide:

Not satisfactory: *Pisart*, 18,948-9, 18,957-8, 21,838.

Superior to that containing small proportion of lead: *Rivet*, 15,457-61, 15,537-40, 15,548-55.

Recent improvements in: *Munby and Wonnacott*, 2401-9.

Standard of purity: *Cunynghame*, 10,331-4.

Supply:

Ample: *Chancellor and Penwarden*, 21,421.

Dependent on foreign sources: *Rivet*, 15,449-53, 15,563-5.

Not sufficient if lead prohibited: *Villemot*, 16,211-6; *Johnson*, 22,455.

Sufficient if lead prohibited: *Giraud and Petit*, 21,742-3.

Toxicity of: *Johnson*, 22,311-5.

Used for other purposes than painting: *Miller*, 17,223-6.

**Zinc Paints:**

Adopted for business, not humanitarian reasons: *Coysb*, 9592-5.

Adulteration of, with lead: *Plumb*, 18,124-32.

Application:

Different from lead: *Legge*, 166-7.

Difficult: *Miller*, 17,147-51, 17,202-6.

More difficult than lead: *Munby and Wonnacott*, 2338, 2429-30; *Ricker-Devroede*, 14,857-9, 15,048-61, 15,075-7; *De Morsier*, 16,646-9.

No real difficulty: *Wait*, 1532-4; *Bonner*, 4374;

*Tuke*, 10,409, 10,412-5; *Patterson*, 1123-5, 22,922; *Niederhäuser*, 16,370-1; *Silthorpe*, 17,996-9; *Vickers*, 19,426-32; *Devina*, 20,449-50; *Chancellor and Penwarden*, 21,474-9; *Mortley*, 23,066.

After a little experience: *Walsh*, 3139-48; *Lowe*, 3348, 3352-3.

But special knowledge required: *Depierres*, 19,048-50.

For competent painters: *Honeychurch*, 20,179-80; *McHugh*, 20,697-9.

No special training needed: *Nooijen*, 15,363-8.

As good as lead: *Wait*, 1509-10; *Garson*, 2495-500; *Walsh*, 3130-8, 3149-50; *Lowe*, 3286-7; *Ellson*, 10,463-7, 10,493-501; *Pisart*, 18,876-80; *Vickers*, 19,375-8.

For inside work: *Munby and Wonnacott*, 2329; *Pickles*, 3015, 3059-60.

Better than lead: *Bonner*, 4390-1; *Coysb*, 9577-87, 9623-9; *Giraud and Petit*, 21,762-70.

For inside work: *Smith, J. C.*, 1612-3.

For outside work with proper medium: *Smith, J. C.*, 1614.

For sea atmospheres: *Vickers*, 19,403-11.

With addition of varnish: *Patterson*, 12,909.

Can be used for filling, flatting, and enamelling: *Heydorn*, 543-55.

Climatic effect: *Cantrill*, 3945-6; *Nooijen*, 15,344-8:

Inferior to lead in humid atmospheres: *Nooijen*, 15,242-50; *Bettink*, 18,484-5.

Inferior to lead in sulphurous atmospheres: *Nooijen*, 15,213, 15,231-40; *Bettink*, 18,431-2, 18,474-9.

Suitable for sulphurous atmospheres: *Chancellor and Penwarden*, 21,431-4; *Giraud and Petit*, 21,784-8.

Unlikely to stand Scottish climate: *Guest*, 11,162-9.

Comparison with white lead, *Villemot*, 16,172-81.

Composition: *Wait*, 1493-4, 1499-501.

Composition, manufacture, medium, and use: *Giraud and Petit*, 21,696-708, 21,771-83, 21,789-819.

Cost:

Cheaper than lead: *Chancellor and Penwarden*, 21,374-9, 21,480-1.

Dearer by weight, but cheaper on work as its bulk is greater: *Garson*, 2501-3; *Holzappel*, 11,486-92, 11,608; *Smyth*, 13,402, 13,443-5; *Giraud and Petit*, 21,707-8.

Dearer than lead: *McDermid*, 7477-81; *Guest*, 11,170-3; *Expert-Bezançon*, 15,121-4; *Bettink*, 18,446; *Honeychurch*, 20,091-8, 20,134-6.

Because needing more oil: *Rivet*, 15,555-62.

For outside: *Tuke*, 10,390-1, 10,394; *Morton*, 13,967-71.

**Zinc Paints—continued.****Cost—continued.**

Dearer than lead—*continued.*

For re-painting, *Nooijen*, 15,251-7, 15,349-56.

Increased by addition of varnish: *Holzappel*, 11,504-6; *Smyth*, 13,504-6, 13,518-21.

No dearer than lead with addition of varnish: *Patterson*, 12,907-8.

Not increased by addition of varnish: *Morley*, 23,094-5.

Same as lead: *Heydorn*, 488; *Wait*, 1495-8; 1540-1; *Munby* and *Wonnacott*, 2330, 2333-4; *Meissl*, 14,797-801; *Depierres*, 19,051; *Vickers*, 19,297-308, 19,413-23; *McHugh*, 20,689-91.

For interior painting: *Take*, 10,375-6.

Would fall with increased demand: *Garson*, 2576.

Would rise if lead prohibited: *McHugh*, 20,692.

Could not replace lead paints at present: *Campbell*, 3623-4.

Could replace lead paints: *Depierres*, 19,073; *Pisart*, 18,871, 18,890-2, 18,929-33, 18,950.

For inside work: *Munby* and *Wonnacott*, 2335-6.

For inside and outside work: *Vickers*, 19,356-8.

For inside but not outside work: *Anderson, J.*, 19,701-2.

For outside work in Navy: *Philip*, 8665-8, 8705-9.

Without increase in cost: *Smith, J. C.*, 1623, 1639-40, 1658.

**Covering power:**

As great as lead: *Smith, A.*, 21,254-67.

Extra coats required: *Sibthorpe*, 17,891-3.

Good: *Smyth*, 13,416-9; *Vickers*, 19,296, 19,363-8.

Greater than lead: *Heydorn*, 490-2, 512, 517-9, 537-42; *Pisart*, 18,903-4, 18,959-61; *Depierres*, 19,060-1, 19,114-8; *Chancellor* and *Penwarden*, 21,373, 21,486-8; *Giraud* and *Petit*, 21,704-7, 21,798-800.

Increased by addition of basic sulphate of lead:

*Munby* and *Wonnacott*, 2479-88.

Not so great as lead: *Campbell*, 3625; *Puttrell*, 6324, 6427-9; *Higgs*, 8947-51; *Meissl*, 14,680-1; *Villamot*, 16,177; *Bellink*, 18,433, 18,481-2; *Honeychurch*, 20,082-90, 20,174-5; *Milton*, 20,272-3.

But spreading power greater: *Munby* and *Wonnacott*, 2331-2, 2427-8.

Of zinc sulphide double that of lead: *Line*, 9943-5.

Defects in Office of Works paints: *Dobie*, 11,036-9.

Do not chalk: *Heydorn*, 493-5, 520-3.

Dry rubbing-down dangerous: *Ricker-Devroede*, 14,886-95; *Klein*, 16,906-11; *Plumb*, 18,156-62, 18,268-81, 18,354-5.

Drying:

Difficult in outside work: *Ricker-Devroede*, 14,860-1.

Difficulties overcome: *Patterson*, 1063-71.

Facilitated by addition of varnish: *Holzappel*, 11,611-2.

Slower than lead: *Holzappel*, 11,586-7, 11,605-6, 11,609-10; *Nooijen*, 15,387-93.

Durability:

As good as lead: *Heydorn*, 489; *Wait*, 1509-10; *Mockford*, 8791-2; *Holzappel*, 11,585.

Except in sulphurous atmospheres: *Smith, A.*, 21,250-3.

If properly mixed: *Garson*, 2508-12.

Better than lead: *Giraud* and *Petit*, 21,712-24.

Good: *Wait*, 1484-7; *Smyth*, 13,404, 13,420-42, 13,446-53; *Pisart*, 18,880; *Vickers*, 19,310-2.

Increased by addition of varnish: *Garson*, 2564-5, 2571; *Holzappel*, 11,496-500; *Niederhäuser*, 16,347-8; *Morley*, 23,091.

No complaints: *Tanner*, 22,730-3.

Not good: *Wiltshier*, 6753-5; *Ricker-Devroede*, 15,016-20.

Not so good as lead: *Puttrell*, 6324; *Higgs*, 8952-3; *Willis*, 11,651-5; *Meissl*, 14,761-4; *Niederhäuser*, 16,344-6, 16,349-54; *Sibthorpe*, 17,804-9; *Plumb*, 18,133, 18,386-94; *Bellink*, 18,445; *Simpson*, 21,619-29.

Even with varnish added: *Villamot*, 16,242-4.

Of zinc sulphide better than lead for outside work: *Line*, 9993-10,022.

Very good: *Line*, 9958-69.

**Zinc Paints—continued.**

Dust harmful even if non-poisonous: *Plumb*, 18,156-62, 18,268-81, 18,354-5.

Experience of: *Webb*, 4245-52.

Extended use of, requisite to obviate danger: *Mockford*, 8741, 8764.

Failings of: *Munby* and *Wonnacott*, 2359-64.

Failures due to faulty mixing: *Walsh*, 3155-7.

Flat finish:

Cannot be obtained: *Dobie*, 11,032-5, 11,042-4, 11,064.

Practicable: *Patterson*, 12,916-7.

Found to stand well, but experience with limited: *Simpson*, 21,584-92, 21,596-618, 21,658-62.

Greens: difficult to get dark shades: *Patterson*, 1093-106.

Grey colours for outside of ships in Navy could be obtained: *Mockford*, 8839-51.

Guarantee:

Given: *Depierres*, 19,054, 19,059.

Would not give: *Niederhäuser*, 16,363.

Ill-effects from:

Less than from lead: *Webb*, 4244, 4253-5.

None: *Devine*, 20,446-8.

Improvements in: *Patterson*, 1128-30; *Crace*, 2013-4; *Garson*, 2530-1.

Increasing use of: *Miller*, 17,207-15.

Keeping:

Better than lead: *Depierres*, 19,052-9.

Good: *Giraud* and *Petit*, 21,817-9.

No sediment: *Cunnew*, 10,277-8.

Require thinning if exposed to air for a long time: *Wait*, 1535-9.

Tendency to settle if kept for a long time: *Meissl*, 14,749-53.

Of ready-mixed paints: *Wait*, 1531, 1550-2.

Largely used for interior work: *Ricker-Devroede*, 14,834.

Less coats required than with lead: *Patterson*, 1072.

Light colours not so durable as lead outside: *Munby* and *Wonnacott*, 2345.

Medium:

Important: *Patterson*, 1143-8, 1175; *Smyth*, 13,507-17; *Vickers*, 19,286, 19,424-5.

Kind recommended: *Line*, 10,042-4, 10,055-62.

Kind used: *Patterson*, 1107-12; *Coysk*, 9649-52.

More needed than with lead: *Johnson*, 22,305-10.

Treatment, special kinds required: *Munby* and *Wonnacott*, 2340-4, *Garson*, 2534-5; *Line*, 9934-41, 10,045-8; *Tanner*, 22,715-6.

Mix well with other pigments and ordinary vehicles: *Heydorn*, 498-9, 526, 534.

Not recommended for sign writing: *Heydorn*, 486, 535-6.

Not so good as lead: *Barker*, 7031-8; *Holliday*, 8510-1; *White*, 9281-3; *Guest*, 11,170-3.

For outside work: *Dobie*, 11,045; *Vaughan*, 13,802-8.

For outside work even with varnish added: *Willis*, 11,729-33.

Not so popular as lead: *Wait*, 1481-2.

Not used for outside work in the Navy: *Philip*, 8658, 8681-3.

Preferred to white lead for finishing coats: *Mockford*, 8736.

Prejudice against: *Patterson*, 1158-61; *Smith, J. C.*, 1590-600; *Vickers*, 19,379-402; *McKillop*, 20,901-3; *Tanner*, 22,668.

Proportion of total paints used in Navy: *Philip*, 8637-40, 8663-4.

Pure zinc oxide:

Next best to white lead: *Rivet*, 15,504-5.

Percentage of impurity which should be allowed: *Patterson*, 1134-41.

With varnish as good as lead: *McHugh*, 20,687-8.

Render bridges and structures unsafe: *Expert-Bezanson*, 15,125-8.

Repainting done at normal intervals: *Patterson*, 22,816-7.

Retention of colour:

As good as lead: *Depierres*, 19,119-27.

Better than lead: *Heydorn*, 496; *Garson*, 2504-5; *Philip*, 8714-20; *Mockford*, 8804; *Coysk*, 9653, *Willis*, 11,739-48; *Honeychurch*, 20,082-90; *Smith, A.*, 21,249; *Tanner*, 22,717-22.

**Zinc Paints—continued.****Satisfactory:**

For decorators: *Smyth*, 13,488-503.

For inside work: *Wait*, 1479-80; *Chappell*, 6555; *Philip*, 8648-50; *Mockford*, 8743-6; *Bellink*, 18,483.

For inside and outside work: *Patterson*, 1092, 1118-9, 1131.

For inside work but not for outside work: *Miller*, 17,077, 17,083.

For iron and steel: *Bonner*, 4413-5; *Giraud* and *Petit*, 21,734-41.

For outside work: *Wait*, 1479-80; *Pickles*, 3017-23; *Bonner*, 4394-5; *Cunnew*, 10,254-6; *Morton*, 13,963-6; *Morley*, 23,076-81.

With addition of varnish: *Lowe*, 3354; *Meissl*, 14,816-20.

For ships: *Tuke*, 10,374, 10,378, 10,388-9, 10,393; *Holzappel*, 11,464, 11,481-3, 11,616-8, 11,624-32.

Soften in water: *Simpson*, 21,640-2.

Special treatment required: *Garson*, 2534-5.

Specification, difficulties: *Patterson*, 1154-7; *Munby* and *Wonnacott*, 2440-50.

Spreading power greater than lead: *Heydorn*, 497, 511, 513-6.

Standardisation of: *Wait*, 1502-8; *Cantrill*, 3915-20.

Standard of purity: *Smith, J. C.*, 1641-51.

Tests or trials: *Wait*, 1483, 1518-23.

Details of: *Patterson*, 22,767-87.

Failures: *Miller*, 17,190-2.

Satisfactory: *Patterson*, 22,758-66.

Unsatisfactory: *Carfrae*, 10,866-75, 10,898-9; *Bennett*, 11,212-20; *Sibthorpe*, 18,033-43.

**Unsatisfactory:**

For iron work: *Munby* and *Wonnacott*, 2477-8.

For outside work: *Chappell*, 6555, 6639-49; *Villemot*, 16,171, 16,241.

**Use of:**

Increasing: *Smith, J. C.*, 1625; *Philip*, 8626-30; *White*, 9522-9; *Faughan*, 13,757-8; *Expert*.

**Zinc Paints—continued.****Use of—continued.****Increasing—continued.**

*Bezançon*, 15,169-71, 15,192-4; *Villemot*, 16,259-66; *McHugh*, 20,695-6; *Giraud* and *Petit*, 21,758-61.

In Norway and Sweden: *Pisart*, 18,872-5.

In Scotland very small: *Smith, A.*, 21,292-4, 21,300-2.

Instances: *Heydorn*, 500-4; *Lowe*, 3345-52, 3355-61; *Vickers*, 19,313-30; *Chancellor* and *Penwarden*, 21,380-418; *Giraud* and *Petit*, 21,725-33, 21,745-57.

On Belgian State Railways: *Ricker-Devroede*, 14,968-70, 15,009-15; *Pisart*, 18,951-3, 18,988-90, 21,820-35, 21,876-89.

On royal apartments on H.M. Yacht "Victoria and Albert," *Mockford*, 8747-52.

Used exclusively except for funnels and ventilators: *Tuke*, 10,367-73, 10,381.

Used exclusively for ordinary ship painting for 35 years: *Tuke*, 10,363-4.

Used for priming both on wood and metal: *Tuke*, 10,404-8.

Water paints satisfactory for undercoats: *Line*, 9946-50, 9986-92, 10,074-89.

Where applied: *Holzappel*, 11,576-84, 11,621-3.

Will be exclusively used in future: *Coysh*, 9574-5, 9587, 9634-5.

With 5 per cent. lead:

As good as lead paints: *Bonner*, 4419-20.

Gives stability and lessens cost: *Patterson*, 22,788-90.

Good substitute for white lead for interior work: *Patterson*, 1079-90.

With suitable medium satisfactory for inside and outside work, but still inferior to lead: *Nooijen*, 15,209-11, 15,327-31.



## PART II.—Coach Painting References.

[For Evidence dealing with House-Painting and General Questions, see PART I.]

### Agricultural Implements :

- American : *Crow*, 12,037, 12,161-2.
- Effect of prohibition of lead on foreign competition :  
*Crow*, 12,030-1, 12,036-7, 12,105-7.
- Extent of imports : *Crow*, 12,035.
- Importance of red colour for : *Crow*, 12,032-4.

### Alizarin Colour :

- Unaware that Midland Railway Company has given up : *Connell*, 21,935.

### ALLEN, HARRY (Painter, 106, Woodhall Road, Thornbury, Bradford):

- Evidence, 5014-89.
- Bedding of canvas :
  - Leadless material used, 5043.
  - Powders on exposure to weather, 5054.
- Body fitters :
  - Do not come in contact with lead, 5023-4.
  - Work of, 5022.
- Bodymakers : lead not handled, 5020.
- Enamel : used instead of varnish, 5041, 5073-6.
- Filling :
  - Dispensed with, 5030-2.
  - Number of coats applied, 5077-82.
- Jointing :
  - Composition of, 5019.
  - Tendency of leadless material to powder, 5056.
- Leadless paints :
  - Composition, 5048-9.
  - Covering power greater than lead, 5047, 5057, 5083-9.
- Durability :
  - As good as lead, 5069.
  - Due to varnish, 5046, 5062-4.
  - Easy to apply, 5060-1.
  - Health of men improved since using, 5050-2.
  - Length of experience with, 5044.
  - No cases of illness since adoption of, 5053.
  - Not more costly than lead, 5047.
  - Opacity same as with lead, 5057-60.
  - Satisfactory, 5045.
- Priming : leadless, 5026-7.
- Rubbing down :
  - Both methods used after stopping, 5034.
  - Dry method employed between :
    - Finishing coats, 5042.
    - Priming coats, 5028.
  - Not dangerous after filling and stopping, 5035.
- Stopping : leadless, 5033.
- Tramcars :
  - Kept in sheds at night, 5067-8.
  - Repainted every two years, 5065.
- Washing :
  - Done every night, 5072.
  - Special soap used, 5070.
- Wheels : purchased in finished state, 5036-8.
- White lead : unnecessary for body-fitting, 5024.

### Antimony Paints. (See evidence of *T. R. Atkins*.)

#### Aprons :

- Danger from dirty : *Cornett*, 12,834.
- Generally worn by painters : *Maythorn*, 5685-6; *Cornett*, 12,829.
- Provided : *Baker*, 9792.
- Seldom cleaned : *Cornett*, 12,830-3.

### ARNOLD, W. J. (representing the Institute of British Carriage Manufacturers):

- Evidence, 6098-164.
- Leadless paints :
  - No trials with, 6119.
  - Unaware that Midland Railway and Bradford Corporation use only, 6121-2.

### ARNOLD, W. J.—*continued*.

- Lead poisoning :
  - Case known of, 6103, 6113
  - Something should be done to remove evil, 6116
  - Surprised at official statistics, 6114-5, 6118.
- Meals : not eaten in paint shop, 6137.
- Motor cars :
  - Daimler :
    - Aware of use of leadless paint on, 6123.
    - Class of customers, 6127.
    - Class of finish, 6124-6.
    - Customers would demand highest finish, 6128.
    - Experience insufficient to judge durability of paint, 6129-32.
  - Outdoor clothing : cloak-room not provided, 6138-9.
  - Overalls : worn and supplied by workmen, 6139.
  - Painting : less care taken with than formerly, 6156.
  - Prohibition of lead :
    - Agreed to if efficient lead substitute found, 6120.
    - Preferred to regulations, 6142.
  - Rubbing down :
    - Dry method :
      - Can be dispensed with for wheels, 6146-7.
      - Dust contains lead, 6110-1.
      - Unable to suggest remedy for danger, 6112.
      - Used for stopping, 6160.
    - Wheels :
      - Both methods used, 6106-9, 6143-4.
      - Priming coats done wet, 6148-9, 6157-8.
      - Wet method satisfactory for, 6145-9.
- Washing :
  - Accommodation :
    - Painters prefer pail and horsehair to lavatory, 6136, 6161-3.
    - Provided, 6134.
    - Soap and nail-brushes provided, 6135.
    - Time allowed for, 6164.
  - Wheels :
    - Hard stopping not used, 6154-5.
    - Spokes waxed before they are received, 6151-3.
    - Stopping rarely used, 6159.
- Workmen :
  - Number employed, 6102.

### ATKINS, T. R. (Antimony Paint Manufacturer) :

- Evidence, 12,689-748.
- Antimony :
  - Not affected by sulphur fumes, 12,736.
  - Oxide : imported from Australia, 12,724.
- Paint :
  - Contains small percentage of lead, 12,703-5, 12,725-6.
  - Costs less than lead, 12,701, 12,737-9.
  - Covering power :
    - Greater than lead, 12,693-4, 12,737-9.
    - Not improved by adding lead, 12,730.
  - Makes a perfect white when mixed with zinc, 12,695-6, 12,745.
  - Manufactured in England, 12,715-6, 12,721-2.
  - Non-poisonous, 12,702, 12,747-8.
  - Possibility of adulteration, 12,741-2.
  - Substitute for lead paint, 12,692, 12,723, 12,743-4.
  - Supplied as raw material to grinders, 12,701, 12,740.
  - Testimonials, 12,708-16.
  - Tests with, 12,697-700, 12,705-7, 12,717-20
  - Sulphide, white in colour, 12,731-5.
- Zinc paint : more body obtained by adding lead, 12,728-9.

### AUSTIN, H. (Representing the Society of Motor Manufacturers and Traders):

- Evidence, 13,166-397.

AUSTIN, H. *continued.*

- Bodies :  
 Re-varnishing necessary every two years, 13,289-90.
- Turne plates :  
 Occasionally used, 13,293.  
 Painted with lead, 13,294-5.  
 Tin-coated steel used in place of, 13,293-9.
- Bodymakers : contact with lead, 13,280.
- Dust :  
 Arises from dried paint splashes, 13,333-5.  
 Exhaust ventilation :  
 Not costly, 13,277, 13,280-3.  
 Possible to apply to wheels, 13,278.  
 Practicable; 13,275-6, 13,332-6a.  
 The principal danger, 13,274.
- Filling : mixed with lead, 13,350.
- Hours of employment :  
 Number, 13,256.  
 Overtime :  
 Extent, 13,257.  
 Motor car industry responsible for, 13,258.
- Restriction :  
 Men would not agree to, 13,262-4.  
 Objected to, 13,259-68, 13,279.
- Jointing :  
 Lead used, 13,377.  
 Paste not tried, 13,378-9.
- Leadless paints :  
 Could be used for chassis, 13,194-6.  
 "Non-poisonous white lead" tried, 13,311-7.  
 No trials with, 13,182, 13,300.  
 Society has not tested merits of, 13,180.  
 Unaware of Midland Railway Co.'s, 13,189-92.
- Lead poisoning :  
 Attributed to carelessness, 13,224-31.  
 Cases known of, 13,173-9, 13,318-9, 13,337-9.  
 Compensation for suspension : not objected to if made general, 13,272.  
 Increase probably due to increase in carriage building, 13,176.  
 No knowledge of two cases reported from his works, 13,218-23, 13,303-10.  
 Notice only taken of serious cases, 13,323-31.  
 Regulations would eliminate, 13,217.  
 Society has not inquired as to precautions, 13,181.  
 Something should be done to remove evil, 13,177.  
 Unaware of official statistics, 13,178-9.
- Meals :  
 Messroom provided, 13,241-2  
 Provision made for storage, 13,243.
- Motor cars :  
 Daimler :  
 Aware that leadless paints are used, 13,193.  
 Class of customers, 13,204.  
 Class of work, 13,201-3.  
 'Two years' trial of paint insufficient, 13,205-16, 13,345-6, 13,364-71.  
 Require varnishing every two years, 13,373-5.  
 Subject to rougher usage than carriages, 13,372.
- Outdoor clothing : would agree to provide cupboard for, 13,249-50.
- Overalls :  
 Cupboard provided for storage, 13,248.  
 Not provided, 13,244.  
 Provision by employer objected to, 13,245-6  
 Would agree to regular washing, if regulation made, 13,247.
- Paint :  
 Difficulty in adhering to aluminium, 13,301-2  
 Good base important, 13,347-51.  
 Object of lead in, 13,352-63.
- Paint shop :  
 Impervious floors in : 13,251.  
 Cleaned down wet weekly, 13,252-3.  
 Would agree to daily washing, 13,254-5.
- Periodical medical examination : would agree to 13,269-71.
- Priming : contains lead, 13,350.
- Prohibition of lead :  
 Agreed to if substitute found, 13,188.  
 Effect on trade by foreign competition, 13,185-6, 13,340-4.

AUSTIN, H. *continued.*

- Prohibition of lead *continued.*  
 Preferred to regulations, 13,320-2, 13,396-7.  
 Would cause some difficulty, 13,183-9.  
 Would not increase cost of painting, 13,187.
- Regulations :  
 Not costly, 13,273, 13,279  
 Would eliminate dangers, 13,217.
- Rubbing down :  
 Dry : greatest danger 13,389-90.  
 Wet : practicable for wheels, 13,380-8.
- Varnish : more important than pigment, 13,291-2.
- Washing :  
 Accommodation : provision advocated, 13,233-4.  
 Facilities :  
 Hot water should be provided, 13,235-6.  
 Nail-brushes always available, 13,238.  
 Soap always available, 13,238.  
 Towels should be supplied regularly, 13,237.  
 Time for : would agree to allow, 13,239-40.
- White lead :  
 The most convenient substance for paint, 13,197-200.
- Workmen :  
 Careless and dirty, 13,339.  
 Health of, 13,287-8.  
 Number employed, 13,169.  
 Number in contact with lead, 13,170-2.

## AWCOCK, WILLIAM (representing the United Kingdom Society of Coachmakers):

- Evidence, 12,504-688.
- Bedding of canvas :  
 Leadless material could be used, 12,657-60.  
 Not particularly dangerous, 12,572.  
 Sometimes done with japan and white lead, 12,571.
- Bodymakers :  
 Exposed to danger, 12,523.  
 Exposed to dust from rubbing down, 12,531-2.
- Carriage-makers :  
 Contact with lead, 12,524.  
 Exposed to dust from rubbing down, 12,532.
- Filling :  
 Lead not necessary for, 12,540, 12,671-7.  
 Number of coats applied, 12,539.
- Hours of employment :  
 Number, 12,590, 12,593.  
 Overtime :  
 Motor car industry responsible for, 12,594.  
 Prevalence of, 12,595.  
 Restriction desirable in lead processes, 12,591-2.
- Lead poisoning :  
 Careful and careless men suffer from, 12,597-600.  
 Cases :  
 Known of, 12,507-11, 12,596, 12,661-6.  
 Not reported, 12,627-8, 12,661-6.  
 Due to lead dust, 12,629.  
 Extent of evil, 12,512-21.  
 Increase due to increased use of dry white lead, 12,630-7.  
 Slight illnesses attributable to, 12,521, 12,615-26, 12,647-51, 12,678.  
 Workmen should be educated as to danger of lead, 12,645.
- Meals :  
 Kept and eaten in workshop, 12,582.  
 Provision of mess-room not general, 12,583-5, 12,656.
- Motor-cars :  
 Dangers not affected by introduction of, 12,568-70.  
 Evidence applies to, 12,568.
- Outdoor clothing :  
 Cloakroom not provided, 12,586, 12,656.  
 Kept in workshop, 12,587.
- Overalls : not worn by painters, 12,588-9.
- Painters :  
 Habits cleaner than formerly, 12,679, 12,685-6.  
 Health of, 12,678-83.  
 Short-lived, 12,687.
- Priming :  
 Contains lead, 12,528.  
 Number of coats applied, 12,526-7.

**AWCOCK WILLIAM—continued.**

Prohibition of lead: the only remedy for dangers, 12,576.

**Rubbing down:**

Done by special class of men, 12,684.

**Dry method:**

Done in bodymakers' shop, 12,531-2.

Dust a serious danger, 12,533, 12,558-9.

Substitute for lead the only remedy, 12,537.

**Employed:**

Between filling coats, 12,541.

For priming coats, 12,529-30.

Exhaust ventilation impracticable, 12,536, 12,564.

**Indispensable for:**

Priming coats, 12,534-5.

Wheels and carriage underwork, 12,560-3.

**Wet method:**

Danger from dirty water, 12,548-52, 12,638-45.

Difficulty in obtaining clean water, 12,646.

Employed after filling coats, 12,546-7, 12,565

Impracticable for priming coats, 12,534-5.

Quantity of water necessary, 12,639-44.

Spray: not aware of any process causing, 12,574.

**Stopping:**

Composition, 12,543.

Mixed frequently by user, 12,544.

Mixing dangerous, 12,545.

**Washing:****Accommodation:**

Provided, 12,553, 12,577-8, 12,655.

Recent improvements in, 12,652-3.

Horsehair used instead of nail-brush, 12,580.

**Hot water:**

Not available, 12,579.

Provision important, 12,580.

Lead-contaminated water used for, 12,548-56, 12,655.

Pail used for, 12,654-5.

Soap and towels provided, 12,655.

Soiling of hands unavoidable, 12,576.

Time not allowed, 12,581.

Wheels and carriage underwork: method of treatment, 12,558-64.

White lead: object of its use, 12,670.

**Zinc paints:**

As durable as lead for lining, 12,610-2.

As good as lead, 12,604.

Better colour than lead, 12,603.

No difficulty in applying, 12,601-2, 12,605.

No difficulty in mixing, 12,606-7.

**BAILEY, ERNEST (Headmaster, Polytechnic, Regent Street, W.):**

Evidence, 5168-497.

**Bedding of canvas:**

Glue used for, 5301-4, 5441-5, 5476.

**White lead:**

Not generally used, 5301-4, 5441-5.

Sometimes used, 5477.

**Bodymakers:**

Contact with lead, 5463-4.

Number employed, 5172-3.

Use of jointing paste by, 5224.

**Carriage-makers:**

Contact with lead, 5248.

Work of, 5247.

**Dust:**

Formed by dried paint splashes, 5436-9.

From brushing workers' clothes, 5339-40.

In the atmosphere, 5372.

No danger of inhalation, 5185, 5374.

**Filling:**

Composition, 5259-60.

Contains lead, 5261.

Not much danger from, 5281, 5295.

**Hours of employment:**

Extent of overtime, 5346-7.

Number, 5345.

Reduction unnecessary, 5348-9.

**Jointing:**

Composition, 5225.

**BAILEY, ERNEST.—continued.****Jointing—continued.****Leadless paste:**

Not tried, 5240, 5452.

Should be tried, 5245.

Unsatisfactory, 5240-4, 5402-4.

**Lead paste:**

Firm who does not use, 5453-4.

No danger with, 5220, 5236-7.

The best material, 5226-8.

Wet lead compounds used in mixing, 5230-1.

Object of, 5239, 5465-72.

**Leadless paints:**

If finish as good, lead could be abandoned, 5218.

No trials with, 5184, 5397, 5403, 5451.

Unaware that some firms use only, 5193-7, 5205-7.

Unsatisfactory, 5403-4.

**Lead poisoning:**

Cases known of, 5174-7, 5351-5, 5400-1.

Caused chiefly by dry lead compounds, 5409.

Contracted through the skin, 5377-85, 5422-9.

Due to dirtiness and drink on part of workmen, 5186-91, 5373-85, 5440.

Examination of blood will indicate, 5413.

Impossible to protect coach makers against, 5430-2.

Increase probably due to greater number of men employed, 5450.

No knowledge of official statistics, 5175-83.

Regulations would eliminate, 5219.

Something should be done to mitigate evil, 5178.

Unaware that cases are as numerous as years ago, 5449.

Unknown amongst bodymakers, 5232-4.

**Meals:****Mess-room:**

Provided, 5328-9.

Tables and chairs provided, 5331.

Warmed in winter, 5330.

Taken in workroom, 5333-5.

**Motor cars:**

Amount of lead required for filling metal panels, 5294, 5494-7.

**Daimler:**

Customers same class as those of other makers, 5203-4.

Doubt expressed as to finish and durability of paint, 5208-11, 5214-5.

Good, but not of highest finish, 5200-2.

Surprised that company has received no complaints, 5205-11.

Finish not so good as those of horse carriages, 5371.

Hard stopping unnecessary for underwork, 5298-300.

Lead not much used for attaching metal underwork, 5297-8.

**Overalls:**

Not provided, 5336.

Unnecessary, 5337.

**Paint:****Lead emanations:**

Unaware of danger from, 5414-5.

Use of helmet or prohibition of lead the only safeguard, 5416-21.

Should be allowed to settle before use, 5410-2.

**Painters, class for:**

Lead paint not much used, 5391-5.

Number of pupils, 5386-90.

Same practice taught as in the shop, 5393.

**Paint shops:****Floors:**

Made of wood, 5341-3.

Sprinkled with damp sawdust before sweeping, 5344.

**Periodical medical examination:**

If necessary would welcome, 5356-60.

Not provided for, 5350.

**Priming:**

Contains lead, 5252.

Number of coats applied, 5260-1.

BAILEY, ERNEST—*continued.*

- Prohibition of lead :  
 The simplest precaution, 5220-2.  
 Would agree to, if satisfactory substitute found, 5192, 5218, 5368, 5462.
- Regulations :  
 Effect on industry, 5361-5.  
 Those under Factory Act already observed, 5366-7.
- Rubbing-down :  
 Dry method :  
 Causes much dust, 5229.  
 Dangerous, 5287, 5405, 5493.  
 No remedy known of, 5292-3, 5406-8.  
 Not done between priming coats on bodies, 5253, 5473-5, 5489.  
 Wheels and carriage underwork : 5277-87, 5479-80.  
 Dust contains lead, 5280-6.  
 Stopping, 5283-93, 5491-2.  
 Not done between filling coats, 5262.  
 Unnecessary between priming coats, 5254-5.  
 Wet method :  
 Employed :  
 After filling coats, 5256-8.  
 To remove staining, 5272-3.  
 Impossible for wheels and carriage underwork, 5288-91, 5487-8.  
 Staining : object of, 5270-1.
- Stopping :  
 Composition, 5264.  
 Mixing :  
 Danger from dry white lead powder, 5266-9.  
 Done by user, 5265.  
 No trials with substitute for lead, 5446-7.  
 Sometimes dangerous, 5263, 5274, 5295-6.  
 Where used, 5283-4.
- Washing :  
 Accommodation :  
 Necessary, 5238.  
 Provided, 5306.  
 Essential before meals, 5338.  
 Facilities :  
 Hot water always obtainable, 5309-14.  
 Soap and nail brushes provided, 5322-4.  
 Towels supplied and cleaned weekly, 5316-21.  
 Personal cleanliness important, 5305.  
 Time not allowed, 5325-7.
- White lead :  
 Gives best finish, 5216-7, 5457-8.  
 No trials made with substitute, 5184, 5397, 5403, 5451.  
 The most perfect substance for paint, 5108, 5459-60.  
 Used to obtain good groundwork, 5457-62.  
 Would agree to prohibition if satisfactory substitute found, 5192, 5462.
- Workmen :  
 Habits greatly improved, 5448, 5481.  
 Number of bodymakers, 5172-3.
- BAKER, H. B. (of Messrs. Rothschild & Baker, Perambulator Manufacturers) :  
 Evidence, 9744-849.  
 Aprons : provided, 9792.  
 Filling :  
 Composition, 9833.  
 Leadless, 9781.  
 No trouble with, 9782.
- Gimp pins :  
 Lead poisoning from, 9786-7, 9821.  
 Eliminated by use of electro-plated gimp pins, 9788.
- Japanning : no lead used, 9846-9.
- Leadless paints :  
 As durable as lead, 9768-70.  
 As good as lead for all purposes, 9763-4.  
 Colours : large variety used, 9828-31.  
 Cost the same as lead, 9765-7.  
 Exclusively used, 9758-60.  
 Manufacturer guarantees freedom from lead, 9776.  
 No complaints from customers, 9770-1, 9824-7.  
 Three or four years a substantial test, 9771-5.

BAKER, H. B.—*continued*

- Lead poisoning :  
 Cases :  
 Due to gimp pins, 9786-8, 9821.  
 Known of, 9789, 9839.  
 Lead abandoned because of, 9761-2.  
 None since abandonment of lead, 9780.  
 Occurred in spite of precautions, 9790-5.
- Meals : Not taken in workrooms, 9790.
- Perambulator making :  
 No foreign competition, 9838.  
 Painting similar to carriage painting, 9777-8.
- Perambulator Manufacturers' Association :  
 Proportion of firms in membership, 9748-51.  
 Would approve of his evidence, 9752-4.
- Priming :  
 Leadless, 9779, 9813-4.  
 Use of whitening possible for, 9815-9.
- Prohibition of lead : Perambulator Manufacturers should not object to, 9840-2.
- Rubbing-down :  
 Dry method :  
 Amount, 9822.  
 Dust arises chiefly from the filling, 9832.  
 Employed for priming coats, 9780.  
 Exhaust ventilation impracticable, 9798-812.  
 Wet method :  
 Employed for first coat and stopping, 9834-6.  
 Too expensive, 9823.
- Stopping :  
 Leadless, 9783-5, 9837.  
 Whitening not used for perambulators, 9820.
- Washing :  
 Accommodation :  
 Men indisposed to use, 9793.  
 Provided, 9790-1.  
 Time allowed for, 9794.
- Workmen :  
 Number employed, 9755.  
 Number in contact with paint, 9756.  
 Painters : class of, 9843-5.
- BALL, H. S. (Works Manager of Messrs. Chubb & Sons, Safe Manufacturers, Wolverhampton) :  
 Evidence, 9850-902.  
 Lead poisoning :  
 Cases, 9864.  
 Cases due to use of lead stopping and rubbing down, 9876-7.  
 Eliminated by using zinc stopping, 9865, 9891.
- Priming :  
 Lead, 9893.  
 Object of, 9897-900.
- Rubbing-down :  
 Dry method : the principal danger, 9862-3, 9877, 9892.
- Safe manufacture :  
 Evidence applicable to trade generally, 9854-7.  
 Firms engaged in, 9853.  
 No employers' association, 9852.
- Stopping : amount, 9896.  
 Done over priming coats, 9893-6.  
 White lead abandoned for, 9858, 9878-82.  
 Zinc white mixed and used like lead, 9859-61.
- White lead :  
 Basis for most paints, 9873-4, 9880.  
 No objection to restriction for stopping, 9872, 9881-9.  
 Unnecessary for unexposed surfaces, 9871.  
 Used in form of liquid paint for brush work, 9869, 9873-5.
- Zinc paint :  
 Cost rather less than lead, 9868.  
 Finish and durability better than lead, 9867.  
 Painters prefer to use, 9866.
- Bedding of Canvas :  
 Lead : *Readman*, 12,397.  
 Could be prohibited : *Goodman*, 8134-5.  
 Not generally used : *Bailey*, 5301-4, 5441-5 ; *Maythorn*, 5640-2 ; *Meier*, 5855 ; *Goodman*, 8132-3, 8333.  
 Sometimes used : *Bailey*, 5477 ; *Awcock*, 12,571.

**Bedding of Canvas—continued.**

Leadless material: *Jordan*, 1236-43; *Swain*, 4935, 4972-4; *Allen*, 5943; *Spencer*, 5126; "X," 7635-7; *Readman*, 12,440-3.  
 Could be used: *Awcock*, 12,657-70.  
 Does not powder: *Spencer*, 5127.  
 Glue: *Bailey*, 5301-4, 5441-5, 5476.  
 Gold size: *Meier*, 5853-4.  
 Powders on exposure to the weather: *Allen*, 5054.  
 Method: *Goodman*, 8130-1; *Readman*, 12,398.  
 Not particularly dangerous: *Awcock*, 12,572.

**Bedding of Lights :**

Lead not used: *Readman*, 12,444.  
 Method: *Jordan*, 1287-9; *Readman*, 12,445-7.

**Bituminous Paints :**

Colour: *Cail*, 19,278.  
 Durability at high temperatures: *Cail*, 19,277.  
 Not used for:  
 Motor cars: *Cail*, 19,279.  
 Woodwork: *Cail*, 19,276.  
 Used on tramcars: *Cail*, 19,274-5.

**Bodies :**

Primed before received for painting: *Swain*, 4957-8.  
 Re-varnishing necessary every two years: *Austen*, 13,289-90.  
 Terno plates:  
 Occasionally used: *Mulliner*, 7880-9; *Austin*, 13,293.  
 Painted with lead: *Austin*, 13,294-5.  
 Tin-coated steel used in place of: *Austin*, 13,293-9.

**Body Fitters :**

Do not come in contact with lead: *Allen*, 5023-4.  
 Work of: *Allen*, 5022.

**Bodymakers :**

Contact with lead: *Jordan*, 1256-7; *Steinitz*, 1440-1; *Kinggate*, 4446; *Willix*, 4609-13, 4628; *Daly*, 4771-2; *Bailey*, 5403-4; *Maythorn*, 5563; *Fuller*, 5945-6, 5963-5; *Mulliner*, 7936-7; *Goodman*, 8041-3, 8349-50; *Cornett*, 12,767-9; *Austin*, 13,280.  
 Exposed to dust made by painters: *Steinitz*, 1391-4, 1409-14; *Kinggate*, 4461; *Willix*, 4628; *Daly*, 4785; *Fuller*, 5962; *Awcock*, 12,531-2; *Cornett*, 12,777.  
 Exposed to risk: *Awcock*, 12,523.  
 Lead not handled by: *Swain*, 4896-8; *Allen*, 5020; *Goodman*, 8329-32.  
 Not exposed to danger: *Fuller*, 5938-9; "X," 7514; *Goodman*, 8057-9, 8308-11.  
 Number employed: *Bailey*, 5172-3.  
 Number in trade union: *Kinggate*, 4549.  
 Soiling of hands with lead avoidable: *Goodman*, 8046-7.  
 Time occupied in using lead: *Fuller*, 5941.  
 Use of jointing paste by: *Bailey*, 5224.  
 Work of: *Swain*, 4894-5.  
 Not so dangerous as painting: *Legge*, 114-20.

**Brush Hands :**

Class of work done by: *Daly*, 4881-2, 4855.  
 Not of such clean habits as painters: *Daly*, 4854.  
 Trade union excludes from membership: *Daly*, 4843-5.

**Burning-off :**

Blow lamp used: *Readman*, 12,482-3.  
 Danger from fumes: *Legge*, 98.  
 Respirators a complete protection: *Legge*, 147.  
 Not done: *Steinitz*, 1364-5.  
 Not very unhealthy: *Readman*, 12,484-6.  
 Seldom necessary: *Readman*, 12,462.  
 Some dust caused: *Readman*, 12,487-8.

**CAIL, WILLIAM** (of Cail's Bitmo Co., Ltd., Newcastle-upon-Tyne):

Evidence, 19,274-9.  
 Bituminous paints:  
 Colour, 19,278.  
 Durability at high temperatures, 19,277.  
 Not used for:  
 Motor cars, 19,279.  
 Woodwork, 19,276.  
 Used on tramcars, 19,274-5.

**Carriage-Makers :**

Contact with lead: *Kinggate*, 4453-5; *Willix*, 4617-9, 4628; *Daly*, 4776-8, 4857; *Bailey*, 5248; *Maythorn*, 5575; *Fuller*, 5935-6, 5963-5; *Croall*, 6086-7; "X," 7522, 7680-1, 7687-91; *Mulliner*, 7953-8; *Goodman*, 8062-7; *Awcock*, 12,524; *Cornett*, 12,768.  
 Exposed to dust made by painters: *Kinggate*, 4461; *Willix*, 4621; *Daly*, 4785; *Fuller*, 5953-7; *Mulliner*, 7955; *Awcock*, 12,532; *Cornett*, 12,777.  
 Few now employed, "X," 7518-9, 7677.  
 Lead not used by: *Swain*, 4896-8.  
 Time occupied in using lead: *Fuller*, 5950-2.  
 Work of: *Kinggate*, 4452, 4489-92; *Willix*, 4614-6, 4652-5; *Daly*, 4774-5; *Swain*, 4894-5; *Bailey*, 5247; *Maythorn*, 5574; "X," 7520-1.

**Coachbuilding :**

Application of French regulations to: *Cunynghame*, 10,345-6.  
 Definition: *Legge*, 16-9; *Fuller*, 5914-5.  
 Number of works: *Legge*, 37-44.  
 Use of white lead in: *Fuller*, 5927, 5932.

**CONNELL, A.** (representing Messrs. Moister, Lucius and Bruning):

Alizarin colour: unaware that Midland Railway Company has given up, 21,935.

**COOKSON, C.** (of Messrs. Cookson & Co., Ltd., White Lead Corrodors, Newcastle-on-Tyne):

Evidence, 2292-8.  
 Lead poisoning: susceptibility to, 2294-6.  
 Regulations:  
 Enforcement of, 2292.  
 Would render painting less dangerous than employment in lead works, 2293.

**CORNETT, R. J.** (representing the United Kingdom Society of Coach-makers):

Evidence, 12,749-901.  
 Aprons:  
 Danger from dirty, 12,833.  
 Generally worn by painters, 12,829.  
 Seldom cleaned, 12,830-3.  
 Body-makers:  
 Contact with lead, 12,767-9.  
 Exposed to dust made by painter, 12,777.  
 Carriage-makers:  
 Contact with lead, 12,768.  
 Exposed to dust made by painter, 12,777.  
 Dust:  
 Exhaust ventilation:  
 Impracticable in paint shop, 12,781-5.  
 Possible for removal of dust in mixing stopping, 12,794.  
 From dirty overalls dangerous, 12,833.  
 Emanations from lead paint:  
 Danger from, 12,809.  
 Illness due to, 12,810-4, 12,891.  
 Filling:  
 Lead, 12,788.  
 Number of coats applied, 12,787.  
 Hours of employment:  
 Number, 12,834.  
 Overtime:  
 Detrimental to health, 12,892.  
 Extent, 12,835-6.  
 Should be abolished, 12,893.  
 Lead colour: number of coats applied, 12,802.

CORNETT, R. J. *continued.*

- Leadless paints :  
 Durability satisfactory, 12,860-8.  
 Tests with, 12,846-60.  
 Zinc :  
   Powdering of, 12,848, 12,889.  
   Would stand without varnish, 12,890.
- Lead poisoning :  
 Cases known of, 12,752-9.  
 Cases of death partly attributable to, not certified as, 12,883-4.  
 Everyone working in lead more or less affected, 12,875-7.  
 Increase due to :  
   Less cubic air space for the men, 12,894.  
   Use of quick colours, 12,899-901.  
 Men have died or left the trade because of, 12,756-66, 12,871-4.
- Meals :  
 Kept and eaten in workshop, 12,824.  
 Messroom not generally provided, 12,825-6.
- Motor cars : evidence applies to, 12,805.
- Outdoor clothing :  
 Cloak-room sometimes provided, 12,827.  
 Sometimes placed in workshop, 12,828.
- Overalls : not generally worn by painters, 12,829.
- Periodical medical examination :  
 Not desirable, 12,837-8.  
 Unfair to workmen, 12,837-44, 12,895-8.  
 Workmen would object to, 12,878-82.
- Priming :  
 Contains lead, 12,772-3.  
 Number of coats applied 12,771-17.
- Prohibition of lead :  
 The only remedy for lead poisoning, 12,815.
- Rubbing down :  
 Dry method :  
   Done in paint or body-shop, 12,775-6.  
   Dust, a considerable danger, 12,775, 12,795, 12,800-2.  
   Employed :  
     Between priming coats, 12,774.  
     For wheels and carriage underwork, 12,790, 12,869-70.  
     Sometimes after filling coats, 12,796-7.  
   Not done between filling coats, 12,789.  
 Wet method :  
   Employed after filling coats, 12,795.  
   Impracticable for :  
     Priming coats, 12,779-80.  
     Wheels and carriage underwork, 12,801.
- Stopping :  
 Composition, 12,790.  
 Mixed by painter, 12,791.  
 Mixing dangerous, 12,792-3.
- Tramcar and railway work : dangerous because of inside painting, 12,807-8.
- Washing :  
 Accommodation frequently provided, 12,817-8.  
 Facilities :  
   Hot water not always available, 12,819-22.  
   Nail-brushes not always available, 12,819.  
   Soiling of hands unavoidable, 12,816.  
   Time generally allowed for, 12,823.

## CROALL, P. (representing the Institute of British Carriage Manufacturers) :

- Evidence, 5983-6097.
- Carriage-makers : contact with lead, 6086-7.
- Emanations : not aware that they arise from wet lead paint, 6036.
- Filling : object of, 6081.
- Leadless paint :  
 No trials with, 6001.  
 Unaware that Midland Railway and Bradford Corporation use only, 6018-9.
- Lead poisoning :  
 Compensation for : liability not insured, 5992-3.  
 Due to carelessness, 5996-9.  
 Importance of evil recognised, 6031.  
 No cases in his works, 5989-90, 6030, 6088-9.  
 Reason for immunity of his works from, 5990, 6037.  
 Something should be done to remove evil, 5998.

CROALL, P. *continued.*

- Lead poisoning - *continued.*
- Statistics :  
 Doubt expressed as to fatal cases included, 5995.  
 Unaware of official, 5994.
- Lining :  
 Difficult if lead prohibited, 6020-2, 6027, 6094.  
 No trials with zinc-white, 6095-7.
- Motor cars :  
 Could be cleaned with hose, sponge, and leather, 6090-4.
- Daimler :  
 Customers would demand high-class finish, 6007-8, 6017, 6062.  
 Finish of highest quality, 6004-5.  
 Instance of bad paint on, 6002, 6011, 6070-3.  
 Lead would not have been abandoned imprudently, 6011-3.  
 Method of painting not condemned because of one bad instance, 6070, 6074-7.  
 Paint work not so durable as lead, 6014-6.  
 Surprised that Company are satisfied with leadless paints, 6009-10.
- Painters :  
 Average age, 6047, 6055-60.  
 Continuity of employment, 6034.  
 Health, 6046.
- Priming :  
 Object of, 6081.  
 Rubbed off except in grain, 6078.
- Prohibition of lead :  
 Exemption :  
   Required for lining, 6020-2, 6027.  
   Suggested for higher class coach-builders, 6028-9.  
   For filling and priming, 6081-3.  
   Preferred to regulations, 6027, 6069.  
 Satisfactory lead substitute should first be found and tried, 6062-5.
- Regulations :  
 Effect on industry, 6026.  
 Objected to, for period pending prohibition, 6066-8.
- Washing of hands insisted on before men leave work, 5990.
- White lead :  
 Amount used in painting a motor car, 6032, 6038-41.  
 Not used dry, 6035.  
 Object of using, 6077-80.  
 The most perfect substance, 6003.
- Workmen :  
 Health, 6044-54, 6084-5.  
 Number employed, 5988.
- Workmen's Compensation Act : insurance of workmen under, 5993.
- CROW, J. K., D.Sc. (representing the London Colour, Paint, Oil, and Varnish Trades Association) :
- Evidence, 11,952-70, 12,028-37, 12,072-90, 12,105-7, 12,127, 12,147-62.
- Agricultural implements :  
 American, 12,037, 12,161-2.  
 Effect of prohibition of lead on foreign competition, 12,030-1, 12,036-7, 12,105-7.  
 Extent of imports, 12,035.  
 Importance of red colour for, 12,032-4.
- Lead colours :  
 Reds :  
   Cost of, on motor cars, 12,154-9.  
   Important, 12,028.  
   Lead indispensable, 12,029.  
 Yellows for lining, 11,952-3, 11,962, 12,072-8, 12,086-90, 12,127.
- Lining :  
 Comparative amount of paint used, 11,970.  
 No danger involved, 11,963-6, 12,083.
- Yellow colours :  
 Covering power of lead chromate of 50 per cent. strength, 11,962.  
 Exemption from 5 per cent. limitation of lead necessary, 12,086-90, 12,127.  
 Proportion of lead in, 11,952-3.

CROW, J. K., D.Sc. *continued.*

- Lining *continued.*
- Yellow colours *continued.*
- Strong colour impossible with 5 per cent. lead and remainder zinc chrome, 12,072-82.
- Zinc not as opaque as lead chrome, 11,954-61, 12,147-53.

CUNYNGHAME, SIR HENRY, K.C.B. (Legal Assistant Under Secretary of State for the Home Department):

- Evidence, 10,345-56.
- Coach-building: application of French Regulations to, 10,345-6.
- Foreign competition:
  - Prohibition of imported goods:
    - Difficult, 10,352-3.
    - Effect on motor car trade, 10,354-6.
- Painters: mixing of paints by, 10,348-51.

DALY, BERNARD (Coach-painters' brush hand, 7, Harper Street, Everton, Liverpool):

- Evidence, 4757-882.
- Body-makers:
  - Contact with lead, 4771-2.
  - Exposed to painter's dust, 4785.
- Brush-hands:
  - Class of work done by, 4881-2, 4855.
  - Not of such clean habits as painters, 4852-4.
  - Trade union excludes from membership, 4758-61, 4843-5.
- Carriage-makers:
  - Contact with lead, 4776-8, 4857.
  - Exposed to painters' dust, 4785.
  - Work of, 4774-5.
- Filling:
  - Contains lead, 4791.
  - Danger in applying, 4792.
- Flatting: not dangerous, 4807.
- Hours of employment:
  - Number, 4830-1.
  - One-break system advocated, 4834, 4851-2.
  - Prevalence of overtime, 4830-1.
  - Restriction desirable, 4834.
  - Vary according to season, 4831-3.
- Joining: lead used in, 4773.
- Lead paints:
  - Purox:
    - As easy to apply as white lead, 4849.
    - Durability not so good as white lead, 4849-50, 4867.
    - Effect on workers, 4879-82.
    - Not absolutely innocuous, 4847, 4867.
    - Substitute for white lead, 4847.
    - Unaware of any cases of lead poisoning from, 4848.
- Lead poisoning:
  - Concealment through fear of discharge, 4800.
  - Diseases induced by, 4766.
  - Extent among labourers, 4769.
  - Fatal cases, 4764-5.
  - Labourers and brush-hands suffer as much as painters, 4767-8.
  - Men refused employment if suffering from, 4859-60.
- Meals:
  - Danger of working in morning before taking food, 4835.
  - Eaten in workshop, 4822.
- Mess-room:
  - Rarely provided, 4823.
  - Should be provided, 4824.
- Motor car trade:
  - More dust created than in carriage work, 4808.
  - Piece work a special danger, 4809.
- Outdoor clothing:
  - Cloakroom not available, 4825.
  - Collects dust, 4828.
  - Kept in workshop, 4826-7.
- Overalls:
  - Become dirty quickly, 4868-9.
  - Rarely worn, 4829.
  - Should be worn and cleaned weekly, 4870.
- Painters: cleaner in habits than formerly, 4875-6.

DALY, BERNARD *continued.*

- Periodical medical examination:
  - Desirable, 4836.
  - Men would favour, 4858.
- Priming: contains lead, 4780-1.
- Rubbing-down:
  - Dry:
    - Abolition necessary to remove danger of dust, 4789.
    - Body-makers and carriage-makers exposed to dust, 4785.
    - Done between priming coats, 4782-4.
    - Exhaust ventilation difficult, 4788, 4805.
    - The principal danger, 4786.
    - Wheels and carriage underwork:
      - Dangerous, 4803.
      - Much dust caused, 4802.
    - Not done between filling coats, 4793.
  - Wet:
    - After filling coats: 4,799.
    - Danger from, 4800.
    - Impracticable for:
      - Priming coats, 4787.
      - Wheels, &c., 4804.
- Stopping:
  - Leadless: 4877.
  - Equal to lead but takes longer to apply, 4878.
  - Mixed by painter or brush-hand, 4796.
  - Mixing very dangerous, 4797-8.
  - White lead, 4795.
- Trade union: brush-hands excluded from membership, 4758-61, 4843-5.
- Tramcar and railway work:
  - Bad conditions in some factories, 4839-40.
  - More dangerous than carriage work, 4810.
- Varnishing:
  - Emanations dangerous, 4806, 4861-2.
  - Special room provided on account of dust, 4863.
- Washing:
  - Accommodation, inadequate, 4812-4.
  - Hot water and nail-brushes not always available, 4815, 4818.
  - Soiling of hands unavoidable, 4811.
  - Time not always allowed for, 4819-21.

DE MORSIER, M. (Reporter to the Swiss White Lead Commission):

- Evidence, 16,542, 16,604-6, 16,669-72.
- Foreign legislation: Regulation in Geneva referred only to the use of white lead powder, 16,672.
- Leadless paints:
  - Geneva Commission's evidence as to, 16,669-72.
  - Good results possible, but more coats required, 16,604-6.
- On railway rolling stock: report by Swiss Factory Inspectors, 16,542.

Driers:

- Contain lead: *Spencer*, 5164-7.

Dust. (See also **Rubbing-down: Dry.**)

- Amount: *Daly*, 4808; *Bailey*, 5229; "X," 7546; *Mulliner*, 7856-9.
- Amount of lead in the air important: *Kaup*, 14,485.
- Arisen from dried paint splashes: *Steinitz*, 1410-3; *Bailey*, 5436-9; *Maythorn*, 5687-8; *Austin*, 13,333-5.
- Caused in burning-off: *Readman*, 12,487-8.
- Danger from: *Maythorn*, 5734-40.
- Has not been considered: *Mulliner*, 7800.
- Exhaust ventilation:
  - Cost: *Austin*, 13,277, 13,280-3.
  - Difficult or impracticable: *Kinogate*, 4405, 4488; *Willis*, 4632, 4651; *Daly*, 4788, 4805; *Maythorn*, 5743-4; *Baker*, 9798-812; *Awcock*, 12,530, 12,564; *Cornett*, 12,781-5.
  - For large areas: *Legge*, 136-8.
  - For wheels, &c.: *Maythorn*, 5619-24; "X," 7564; *Goodman*, 8115, 8123-5, 8129.
  - To fix to the hand: *Legge*, 139.
- Does not remove all dust: *Edginton*, 13,097-100.
- Installation agreed to: *Goodman*, 8195.

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**Dust** *continued.*Exhaust ventilation *continued.*

- Practicable : *Austin*, 13,275-6, 13,332-6a.  
 For removing dust in mixing or rubbing stopping : *Goodman*, 8095, 8102-3, 8372; *Cornett*, 12,794.  
 For wheels, &c. : *Legge*, 64; *Austin*, 13,278.  
 From dirty overalls, dangerous : *Cornett*, 12,833.  
 From mixing stopping : *Kinggate*, 4475; *Maythorn*, 5592-4.  
 In the atmosphere : *Bailey*, 5372.  
 Method of estimating lead : *Legge*, 61.  
 Material used on floors to prevent : *Maythorn*, 5763-7, 5772.  
 No danger of inhalation : *Bailey*, 5185, 5374.  
 No more dangerous in evening than in morning : *Legge*, 131-3.  
 Not created in priming : *Goodman*, 8078-81.  
 On workmen's clothes : *Willix*, 4672; *Daly*, 4828; *Bailey*, 5339-40.  
 Ordinary ventilation insufficient to remove danger : *Maythorn*, 5745.  
 Principal danger : *Austin*, 13,274.  
 Use of helmet to prevent inhalation deprecated : *Maythorn*, 5515, 5544.  
 Workmen exposed to : *Goodman*, 8374-7.

## EDGINTON, R. W., M.D. (Certifying Factory Surgeon for North Birmingham):

- Evidence, 13,093-103, 13,121-2, 13,135-7, 13,157-8.  
 Lead paint : Abandoned because of lead poisoning 13,157-8.  
 Lead poisoning :  
 Cases known of, 13,093-4, 13,121-2.  
 Prevention possible only by use of substitute for lead, 13,101.  
 Regulations : difficult to apply, 13,103.  
 Rubbing-down :  
 Dry method :  
 Exhaust apparatus does not remove all dust, 13,097-100.  
 Largely replaced by wet process, 13,096, 13,135-7.

**Enamel :**

- Used instead of varnish, *Allen*, 5041, 5073-6.

**Exhaust Ventilation.** (See **Dust**.)

## EXPERT-BEZANÇON, EUGENE (of E. Expert-Bezanson &amp; Co., White Lead Manufacturers, Aubervilliers, France):

- Evidence, 15,106-7, 15,197-204.  
 Hours of employment : In white lead works in France, 15,201-4.  
 Prohibition of lead : French law does not apply to coach painting, 15,106-7, 15,197-200.

**Filling :**

- Composition : *Legge*, 52; *Kinggate*, 4468; *Bailey*, 5259-60; *Baker*, 9833; *Readman*, 12,388.  
 Contains lead : *Kinggate*, 4470; *Willix*, 4635; *Daly*, 4791; *Bailey*, 5261; *Maythorn*, 5584; "X," 7535-6; *Goodman*, 8085-8; *Cornett*, 12,788; *Austin*, 13,350.  
 Danger in applying : *Daly*, 4792.  
 Dispensed with : *Allen*, 5030-2.  
 Lead :  
 Best known substance : *Mulliner*, 7764-5, 7855.  
 Not necessary : *Kinggate*, 4538; *Maythorn*, 5585-7; *Awcock*, 12,540, 12,671-7.  
 Small amount necessary : *Meier*, 5845-7.  
 Leadless : *Legge*, 58-9, 127-30; *Swain*, 4909-13; *Spencer*, 5131; *Meier*, 5844; *Baker*, 9871; *Smyth*, 13,409.  
 No trouble with : *Baker*, 9872.  
 Satisfactory : *Jordan*, 1200-3, 1305-7; *Spencer*, 5132.  
 Not much danger from : *Bailey*, 5281, 5295.  
 Number of coats applied : *Kinggate*, 4467; *Allen*, 5077-82; *Maythorn*, 5595; "X," 7533-4; *Readman*, 12,387; *Awcock*, 12,539; *Cornett*, 12,789.  
 Object : *Kinggate*, 4469; *Croall*, 6081.

**Finishing :**

- Number of coats applied : "X," 7568 74; *Readman*, 12,390-3.

**Flatting :**

- Not dangerous : *Kinggate*, 4493-5; *Willix*, 4656; *Daly*, 4807.

**Floors :**

- Cleaned daily : *Steinitz*, 1390, 1418 21, 1426-30; *Readman*, 12,438.  
 Impervious :  
 An advantage for swilling down : *Maythorn*, 5768-8.  
 Cleaned down wet : *Mulliner* 7817-8; *Goodman*, 8161-3; *Austin*, 13,252-3.  
 By special man : *Mulliner*, 7819.  
 Cost : *Goodman*, 8188.  
 Exist in some works : *Maythorn*, 5770.  
 Provided in London : *Mulliner*, 7816.  
 Should be smooth : *Maythorn*, 5771.  
 Would agree to daily washing : *Austin*, 13,254-5.  
 Sprinkled with damp sawdust before sweeping : *Bailey*, 5344.  
 Swept with moist dust-preventing material : *Maythorn*, 5688, 5691, 5751-2, 5763-7, 5772.  
 Wooden : *Bailey*, 5341-3; *Maythorn*, 5691.  
 Cleaned weekly : *Goodman*, 8162-3.  
 Necessary for good painting : *Goodman*, 8158-60, 8188-90.

**Foreign Competition :**

- Belgians chief competitors : *Mulliner*, 7870-1.  
 Effect of prohibition of lead : *Kinggate*, 4524; *Mulliner*, 7751; *Goodman*, 8204; *Crow*, 12,030-1, 12,036-7, 12,105-7; *Austin*, 13,185-6, 13,340-4.  
 Prohibition of imported goods :  
 Difficult : *Cunynghame*, 10,352-3.  
 Effect on motor car trade : *Cunynghame*, 10,354-6

**Foreign Legislation :**

- French law : application of : *Cunynghame*, 10,345-6; *Expert-Bezanson*, 15,106-7, 15,197-200; *Villemot*, 16,234.  
 Geneva : *De Morsier*, 16,672.

## FULLER, S. C. L. (Representing Institute of British Carriage Manufacturers):

- Evidence : 5900-82.  
 Body-makers :  
 Contact with lead, 5945-6, 5963 5.  
 Not exposed to danger, 5938-9.  
 Time occupied in using lead, 5941.  
 Work in room where bodies are painted, 5962.  
 Carriage makers :  
 Contact with lead, 5935-6, 5963-5.  
 Time occupied in using lead, 5950-2.  
 Work in room while painting is being done, 5953 7.  
 Coach building :  
 Definition, 5914 5.  
 Use of white lead in, 5927, 5932.  
 Emanations from lead paints : no smell from pure white lead and oil, 5960-1, 5968.  
 Jointing :  
 Lead used in, 5920, 5941.  
 Leadless :  
 Not tried, 5942-3.  
 Would use, if men benefited, 5944.  
 Leadless paints :  
 Could not replace lead for lines, 5972, 5976, 5979-82.  
 Institute has not tested merits of, 5916.  
 Lead poisoning :  
 Attack rate not reduced in last eight years, 5910.  
 Compensation for : liability insured, 5907.  
 Extent :  
 Deplorable as shown by official statistics, 5926.  
 Not serious in coach-building industry, 5917-9, From drinking water, 5922, 5931.  
 Inquiry as to, in West of England, 5911, 5934.  
 Institute has made no efforts to combat, 5918-9.



FULLER, S. C. L.—*continued.*

- Lead poisoning—*continued.*  
 No cases known of, 5904-6.  
 Risk arises only in certain classes of works, 5913.  
 Something should be done to prevent, 5912.  
 Statistics:  
   Doubt expressed as to fatal cases included, 5909.  
   Not aware of official, 5908-9, 5922.  
   Surprised that works, previously free, unexpectedly have succession of cases, 5906.
- Lining:  
   Done with pencil, 5973.  
   Exemption required for, if lead prohibited, 5977-8.  
   Leadless paints could not replace tub-lead for, 5972, 5976, 5979-82.  
   Not sandpapered, 5974-5.
- Painting: sometimes done in carriage and body-shops, 5937, 5966-7.
- Priming: done in carriage shop, 5953-6.
- Prohibition of lead:  
   Exemption suggested for artistic work, 5977-8.  
   Preferred to regulations, 5925, 5927-30.
- Regulations:  
   Necessity for, not admitted, 5923-4.  
   Would apply equally to painters and carriage builders, 5958-9.
- Washing:  
   Accommodation:  
   Body-makers do not require and would not use, 5939-40.  
   Not specially provided for body-makers, 5947-9.
- Workmen:  
   Health of, 5970-1.  
   Number employed, 5903.

## GARSON, J. W. (of Messrs. Lewis Berger &amp; Sons, Ltd., Paint Manufacturers, Homerton, London):

- Evidence, 2554-6, 2566-7, 2577.  
 Zinc paint:  
   Difficulty as to drying, 2581.  
   Exported, 2554-6.  
   Hard undercoats cannot be obtained with, 2582-3.  
   Masury process not experimented with, 2577-80.  
   Used, after filling, 2584-6.  
   Used for motor and carriage work in form of enamel, 2566-7.

## Gimp Pins:

- Lead poisoning from: *Baker*, 9786-7, 9821.  
 Eliminated by use of electro-plated gimp pins:  
   *Baker*, 9788.

## GOODMAN, W. L. (Representing the Society of Motor Manufacturers and Traders):

- Evidence, 7995-8416.  
 Bedding of canvas:  
   Lead:  
   Could be prohibited, 8134-5.  
   Not used, 8132-3, 8333.  
   Method, 8130-1.
- Body-makers:  
   Can avoid soiling hands with lead, 8046-7.  
   Do not use lead in France and America, 8329-32.  
   Lead used by, 3041-3, 8349-50.  
   Not exposed to danger, 8057-9, 8308-11.
- Carriage-makers:  
   Lead used by, 8062-3.  
   Liable to get lead on the hands, 8064-7.
- Coach-painting: not a healthy occupation, 8378-9.
- Dust:  
   Exhaust ventilation:  
   Impracticable for wheels, &c., 8115, 8123-5, 8129.  
   Would agree to instal, 8195.  
   Not created in priming process, 8078-81.  
   Workers exposed to, 8374-7.
- Emanations of lead: question has not been considered, 8274-6.
- Filling: Lead used for, 8085-8.

GOODMAN, W. L.—*continued.*

- Floors:  
   Impervious:  
   Cleaned wet, 8161.  
   Too expensive, 8188.
- Wooden:  
   Necessary to good painting, 8158-60, 8188-90.  
   Would be cleaned weekly, 8162-3.
- Hours of employment:  
   Number, 8164-7.  
   Overtime: prevalence, 8165.  
   Restriction not desired, 8168-9.
- Jointing:  
   Glue not suitable for, 8334-40.  
   Leadless paste not known of, 8061.  
   Object of, 8060.  
   White lead paste, 8041-3.  
   Mixed with oil, 8045.  
   No danger from, 8044, 8047-51.  
   Workmen can avoid soiling hands, 8046.
- Leadless paints:  
   Examples of bad work with, 8279-86.  
   Midland Railway Company's experience not important, 8015, 8288-9.  
   No trials with, 8013, 8220-1, 8356.  
   Not prepared to experiment with, 8287-90, 8348.  
   Society has tested merits of, 8010.  
   Would adopt if as good as lead, 8292, 8357-8.
- Lead paint: French bodies painted with, 8280-2.
- Lead poisoning:  
   Can be contracted through cut finger, 8359-60.  
   Cases may not be reported, 8297-302.  
   Compensation for suspension: would lead to malingering, 8192-4.  
   Evils non-existent, 8012, 8040, 8296.  
   Factory Inspectors' instructions observed, 8011.  
   No cases known of, 8004-9, 8040.  
   No fear amongst men to attribute illness to, 8343-7.  
   Possible for men to suffer from, without being aware of it, 8303-7.  
   Statistics: doubt as to correctness, 8006, 8367-9.
- Meals:  
   Eaten at work bench, 8150-1.
- Messroom:  
   Available, but men will not always use, 8148-52, 8341-2.  
   Provision impossible in small works, 8181-4.  
   Should be eaten outside works, if room is not available, 8181-4.
- Motor cars: Daimler:  
   Durability and finish of paint, 8018-39.  
   Recent improvements in, 8351-5.  
   Repainting generally done by other firms, 8026, 8028-9.
- Outdoor clothing: Cloakroom tried and found impracticable, 8185-6.
- Overalls:  
   Not provided, 8153.  
   Painters should wear, 8156.  
   Unnecessary, 8154.  
   Would not agree to provide, 8157, 8187.
- Paint shops: sometimes unhealthy, 8380-5.
- Periodical medical examination:  
   Agreed to for painters, 8174, 8191, 8269-70.  
   Bad for workmen, 8171, 8261-7, 8271-2.  
   Not provided for, 8170.  
   Would not agree to for workmen other than painters, 8172-5.
- Priming:  
   Contains lead, 8070.  
   No dust created, 8078-81.  
   Number of coats applied, 8068-9.
- Prohibition of lead:  
   Agreed to if satisfactory lead substitute found, 8014, 8206.  
   Effect on foreign competition, 8204.  
   Urged for certain classes of workers, 8176-8.
- Regulations:  
   Effect on industry, 8179.  
   Enforcement:  
   Non-observance by workmen, 8196, 8201.  
   Onus should be on factory inspectors, 8197-200, 8202-3.  
   Preferred to prohibition, 8206.

GOODMAN, W. L.—*continued.*

## Rubbing-down:

## Dry method:

Can be dispensed with between priming coats, 8074, 8084.

Dust dangerous in small room, 8401-4, 8408-12.

Employed before body is painted, 8071-2.

Not done between priming coats, 8075-7.

Sometimes used in coarse filling, 8073.

## Stopping:

Dangerous, 8094, 8099-101, 8363-4, 8370-1.

Fan suggested to remove dust, 8095, 8102-3, 8372.

Place could be set apart for, 8407.

## Wheels and carriage underwork:

Always sandpapered, 8104-12.

Could be prohibited, 8126.

Exhaust ventilation impracticable, 8124-5, 8129.

Good general ventilation will overcome risk, 8113-4, 8295.

Much lead dust caused, 8106-12, 8116-22.

Priming coats, 8082-3.

Should be sandpapered in a place set apart, 8123, 8127-8, 8362-3.

Time occupied, 8120-1.

Not done between filling coats, 8089.

Wet method used after filling, 8097-9.

## Stopping:

Danger from handling dry white lead, 8094.

Not used on coach bodies and motors, 8090-4, 8323-8.

Prohibition of lead agreed to, 8096.

## Washing:

## Accommodation:

Amount, 8138-9.

Prepared to provide adequate, 8140-1.

Provided, 8137.

Hot water: willing to supply, 8142.

Nailbrushes and soap provided, 8144.

Personal cleanliness important, 8136.

Time allowed, 8145-7.

Towels supplied clean daily, 8143.

Wheels: could be painted in place set apart, 8123-8, 8293.

## White lead:

Best substance known, 8017, 8207-9, 8213-7.

Dangerous if put into mouth, 8054-6.

Not dangerous to use, 8052-3, 8361, 8373-4, 8398-406.

Object, 8312-22.

## Substitutes:

No trials with, 8013, 8220-1, 8277-8, 8356

Society has not tested merits, 8010.

## Workmen:

Health, 8222-56, 8291.

Number employed, 7999.

Number in contact with lead, 8000-3.

Painters of better habits than formerly, 8413-6.

## HARDWICK, W. R., B.Sc., F.I.C. (Consulting

Chemist to Purex, Ltd., Greenford):

Evidence, 1860-9.

Rubbing-down: not done with purex, 1860-9.

Spraying: especially dangerous with lead paint, 1862-4.

## Heating Apparatus:

Steinitz, 1422-4; Maythorn, 5760-2; Readman, 12,435-6.

## HEYDORN, A. F. (of Ragosino &amp; Co., Ltd.,

Bow):

Evidence, 561-7.

## Zinc Paint:

Suitability for sign-writing, 562-7.

Supplied to coach-builders, 561.

## HOLZAPFEL, M. (of the North-East Paint and Oil

Trades Association):

Evidence, 11,599-604.

## Leadless:

Colours: 11,602-4.

Enamels supplied for tramcars, 11,599-601.

## Hours of Employment:

In French white lead works: *Expert-Bezangon*, 15,201-4.

Long hours in lead processes dangerous, "X," 7598.

Number: *Jordan*, 1248-9; *Steinitz*, 1395-7; *Kinggate*, 4510, 4530; *Willix*, 4674; *Daly*, 4831; *Bailey*, 5345; *Maythorn*, 5692; "X," 7593, 7597; *Mulliner*, 7820; *Goodman*, 8164-7; *Awcock*, 12,590, 12,593; *Cornett*, 12,834; *Austin*, 13,256.

## One-break system:

Advocated: *Daly*, 4834, 4851-2.

Tried: *Kinggate*, 4570.

## Overtime:

Detrimental to health: *Cornett*, 12,892.

Extent: *Kinggate*, 4530-7; *Bailey*, 5346-7; *Mulliner*, 7821; *Cornett*, 12,835-6; *Austin*, 13,257.

Motor-car industry responsible for: *Kinggate*, 4514; *Awcock*, 12,596; *Austin*, 13,258.

Prevalence: *Kinggate*, 4511-8; *Willix*, 4675-9; *Daly*, 4830-1; *Maythorn*, 5693-4, 5717-9; *Mulliner*, 7822; *Goodman*, 8165; *Awcock*, 12,595.

Should be abolished: *Cornett*, 12,893.

## Restriction:

Desirable: *Willix*, 4680; *Daly*, 4834; *Awcock*, 12,591-2; *Kaup*, 14,506-12.

Men would not agree to: *Austin*, 13,262-4.

Objected to: *Austin*, 13,259-68, 13,279.

Unnecessary or undesirable: *Bailey*, 5348-9; *Maythorn*, 5695; "X," 7599; *Mulliner*, 7823-8; *Goodman*, 8168-9.

Would reduce wages: "X," 7600; *Mulliner*, 7824, 7828.

Vary according to season: *Daly*, 4831-3.

## IRELAND, W. E. (Rolling Stock Superintendent,

London County Council Tramways):

Zinc paints: tests, 19,455-60.

## Japanning:

No lead used: *Baker*, 9846-9.

## JOHNSON, EDWARD M. (of Messrs. Locko,

Lancaster & W. W. & R. Johnson & Sons, Ltd.,

Lead Desilverisers and White Lead Corroders,

Millwall, London):

Evidence, 22,264, 22,266.

Regulations: suggestions for, 22,264, 22,266.

## Jointing:

Composition: *Allen*, 5019; *Bailey*, 5225.

Glue unsuitable: *Goodman*, 8334-40.

Lead: *Legge*, 53; *Steinitz*, 1336-40; *Kinggate*, 4447-9; *Willix*, 4610-1; *Daly*, 4773; *Fuller*, 5920, 5941; "X," 7515, 7634; *Goodman*, 8041-3; *Readman*, 12,448-9; *Austin*, 13,377.

## Paste:

Mixed with oil: *Goodman*, 8045.

No danger with: *Bailey*, 5229, 5236-7; *Maythorn*, 5565-7, 5714-6; *Goodman*, 8044, 8047-51.

Not used: *Bailey*, 5453-4.

Soiling of hands avoidable: *Goodman*, 8046.

The best material: *Bailey*, 5226-8.

Used moist: *Maythorn*, 5563-6, 5713.

Wet lead compounds used in mixing: *Bailey*, 5230-1.

Leadless: *Legge*, 58-9, 127-30; *Steinitz*, 1415;

*Swain*, 4889-94, 4960-4; *Line*, 10,066-7;

*Readman*, 12,450-2.

Equal to lead: *Kinggate*, 4525-6, 4564-7;

*Willix*, 4620-2.

## Paste:

Not tried: *Bailey*, 5246, 5452; *Fuller*, 5942-4;

*Goodman*, 8061.

Satisfactory: *Jordan*, 1194-7; *Maythorn*,

5571-3.

Should be tried: *Bailey*, 5245.

Unsatisfactory: *Bailey*, 5240-4, 5402-4.

Practicable: *Kinggate*, 4450.

Tendency to powder: *Kinggate*, 4555-63; *Allen*,

5056.

**Jointing—continued.**

- Method for wood panels: "X," 7516-7.
- Object of: *Bailey*, 5239, 5465-72; *Maythorn*, 5570; *Goodman*, 8060.
- Paste not tried: *Austin*, 13,378-9.

**JORDAN, THOMAS** (Chief Foreman Painter, Midland Railway Carriage Works, Derby):

- Evidence, 1179-317.
- Body-makers:
  - Contact with lead, 1256-7.
  - Lead poisoning amongst, 1251-3.
  - Same washing facilities as painters, 1258.
- Colours: lead dispensed with, 1218-20.
- Filling: leadless, satisfactory, 1200-3, 1305-7.
- Finishing coats:
  - Leadless, 1208.
  - Varnish used to preserve paint, 1209-12.
  - Hours of employment, 1248-9.
- Jointing: leadless paste satisfactory, 1194-7.
- Lead paint:
  - Abolition has caused no practical inconvenience, 1225.
  - Replaced by zinc, 1182-5.
- Lead poisoning:
  - Amongst body-makers, 1251-3.
  - Less since adoption of zinc paint, 1187-93.
  - More amongst men working inside vehicles than outside, 1254-5, 1279-86.
  - Since lead dispensed with, 1187-93, 1267-78.
- Lining: vermilion used for, 1213.
- Meals: not taken in workshop, 1250.
- Overalls: supplied only to colour-mixers, 1259.
- Priming: zinc no different in behaviour from lead, 1198-9.
- Repainting: done every four years, 1312.
- Roofs:
  - Bedded with leadless jointing paste, 1236-42.
  - Lights bedded with felt soaked in oil, 1287-9.
- Rubbing-down: dry method used, 1207.
- Sign-writing:
  - Chalking due to turpentine, 1294-6.
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Number of coats applied : *Cornett*, 12,802.

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Important : *Crow*, 12,028.

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**Leadless Paints. (See also Antimony, Bituminous, Motor Cars : Daimler, Zinc.)**

Application : *Steinitz*, 1373-4; *Willix*, 4713, 4748-9; *Allen*, 5060-1.

Colours used : *Baker*, 9828-31.

Composition : *Steinitz*, 1323-6; *Allen*, 5048-9.

**Cost :**

Less than lead : *Steinitz*, 1448.

More than lead : *Willix*, 4747, 4755-6; *Smyth*, 13,402.

Same as lead : *Allen*, 5047; *Spencer*, 5106, 5109, 5133-4; *Baker*, 9765-7.

Could be used on chassis : *Austin*, 13,194-6.

Could not be used for all purposes : *Maythorn*, 5531; "X," 7613-27, 7643-55, 7699-701.

Covering power greater than lead : *Allen*, 5047, 5057, 5083-9; *Spencer*, 5106.

Demand has not increased : *Smyth*, 13,403.

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No complaints as to : *Baker*, 9770-1, 9824-7; *Smyth*, 13,404.

Satisfactory : *Swain*, 4890-2, 4995-6; *Cornett*, 12,860-8; *Morley*, 22,978.

Enamels for tramcars : *Holzapsfel*, 11,599-601.

Examples of bad work with : *Goodman*, 8279-86.

Exclusively used : *Baker*, 9758-60.

For inside work : *Willix*, 4732-5, 4740-3.

Freedom from lead guaranteed : *Baker*, 9776.

Geneva Commission's evidence as to : *De Morsier*, 16,669-72.

Health of men improved since using : *Jordan*, 1300-4; *Willix*, 4754; *Swain*, 4999-5000; *Allen*, 5050-2; *Readman*, 12,474.

Length of experience with : *Allen*, 5044; "X," 7603-4, 7607.

Materials obtainable in England : *Swain*, 5002.

More coats required than with lead : *De Morsier*, 16,604-6.

No trials with : *Bailey*, 5184, 5397, 5403, 5451; *Maythorn*, 5522-4; *Meier*, 5819, 5863, 5890;

*Croall*, 6001; *Arnold*, 6119; *Mulliner*, 7746-50; *Goodman*, 8013, 8220-1, 8356; *Austin*, 13,182, 13,300.

**Not tested by :**

Institute of British Carriage Manufacturers : *Maythorn*, 5561; *Fuller*, 5916.

Society of Motor Manufacturers : *Mulliner*, 7744; *Austin*, 13,180.

**Opacity :**

Not so good as lead : *Spencer*, 5106-7.

Same as lead : *Willix*, 4714, 4750; *Allen*, 5057-60.

Practicable for vehicles other than tramcars : *Spencer*, 5113-4.

Processes in which used : *Swain*, 4943-9, 5009-13.

Progress with : *Legge*, 78.

Report by Swiss Factory Inspectors as to : *De Morsier*, 16,542.

Satisfactory : *Steinitz*, 1321-2, 1371-2; *Willix*, 4685-7, 4744-6; *Allen*, 5045; *Spencer*, 5101;

"X," 7606; *Baker*, 9763-4.

For priming : *Smyth*, 13,465.

For wheels : *Schobert*, 9742-3.

Superior to lead : *Swain*, 4996.

Tests : *Willix*, 4688-90, 4715-6, 4736-9; *Spencer*, 5096, 5101-5, 5111; "X," 7607-10; *Goodman*, 8010; *Cornett*, 12,846-60.

Length of time necessary for : *Maythorn*, 5549-59; *Meier*, 5830-2, 5873-8; *Baker*, 9771-5.

**Trials by :**

Austrian State Railways : *Kaup*, 14,248, 14,500-2.

Prussian State Railways : *Leyendecker*, 16,467-71.

Unaware that Midland Railway and Bradford Corporation use : *Bailey*, 5193-7, 5205-7; *Maythorn*, 5527-30; *Croall*, 6018-9; *Arnold*, 6121-2;

*Mulliner*, 7761-3; *Goodman*, 8015, 8288-9; *Austin*, 13,189-92.

Unsatisfactory : *Bailey*, 5403-4.

**Used for :**

Motors, vans and locomotives : *Schobert*, 9737-41; *Smyth*, 13,406-8, 13,486-8; *Ricker-Devroede*, 15,067-72; *Morley*, 22,964.

Railway carriages : *Line*, 10,051-2.

Underwork of carriages and trucks : *Wait*, 1543-6.

Would adopt if as good as lead : *Bailey*, 5218; *Maythorn*, 5525-6; *Meier*, 5895-9; *Goodman*, 8292, 8357-8.

**Lead Paint :****Abandonment :**

By Belgian State Railways : *Pisart*, 18,900-1, 21,823-35, 21,879-80.

Has caused no practical inconvenience : *Jordan*, 1225.

**Lead Paint—continued.****Abandonment—continued.**

On account of lead poisoning: *Spencer*, 5095-7, 5112; *Baker*, 9761-2; *Readman*, 12,424, 12,428-9; *Edginton*, 13,157-8; *Smyth*, 13,476. Possible: *Swain*, 4936.

Dispensed with by Prussian State Railways for inside: *Kaup*, 14,453-6.

Easier to replace than in house-painting: *Kinggate*, 4543.

**Emanations:**

Danger from: *Cornett*, 12,809.

Illness due to: *Cornett*, 12,810-4, 12,891.

No smell from pure white lead and oil: *Fuller*, 5960-1, 5968.

Possible from tub-lead: *Maythorn*, 5728-33.

Question not considered: *Goodman*, 8273-6.

Unaware of danger from: *Bailey*, 5414-5.

Unaware that they arise: *Croall*, 6036.

Use of helmet or prohibition of lead the only safeguard: *Bailey*, 5416-21.

French bodies painted with: *Goodman*, 8280-2.

French railway carriages painted with: *Villemot*, 16,231-4.

**Necessary for:**

First two coats: "X," 7614-8.

Lining: *Fuller*, 5972, 5976, 5979-82.

Railway carriages: *Niederhäuser*, 16,273; *Leyen decker*, 16,391.

Opacity: *Maythorn*, 5546.

**Purex:**

Application: *Daly*, 4849.

Durability: *Daly*, 4849-50, 4867.

Effect on workers: *Daly*, 4879-82.

Not absolutely innocuous: *Daly*, 4847, 4867.

Substitute for white lead: *Daly*, 4847.

Trials with: *Spencer*, 5098-100.

Unaware of lead poisoning from: *Daly*, 4848.

**Reinstated after abandonment by:**

Belgian State Railways: *Ricker-Devroede*, 14,969.

German State Railways: *Meissl*, 14,779.

Replaced by leadless: *Jordan*, 1182-5; *Steinitz*, 1321.

Satisfactory substitute available: *Kinggate*, 4522-3.

Use of: unhealthy, *Mulliner*, 7988-91.

**Lead Poisoning:****Attributed to:**

Carelessness or drink: *Bailey*, 5186-91, 5373-85, 5440; *Croall*, 5996-9; "X," 7677-9; *Austin*, 13,224-31; *Niederhäuser*, 16,273.

Lead dust: *Legge*, 79-81; *Bailey*, 5409; *Ball*, 9876-7; *Awcock*, 12,629.

Blood-examination will disclose: *Bailey*, 5413.

Careful and careless men both suffer from: *Awcock*, 12,597-600.

**Cases:**

Known of: *Steinitz*, 1321, 1341, 1381-2; *Daly*, 4764-5; *Spencer*, 5124; *Bailey*, 5174-7, 5351-5, 5400-1; *Meier*, 5806, 5815; *Arnold*, 6103, 6113; "X," 7510-2, 7629-30; *Mulliner*, 7729, 7738, 7937, 7952-3; *Baker*, 9789, 9839; *Ball*, 9864; *Readman*, 12,424-32; *Awcock*, 12,507-11, 12,596, 12,661-6; *Cornett*, 12,752-9; *Edginton*, 13,093-4, 13,121-2; *Austin*, 13,173-9, 13,318-9, 13,337-9.

None known of: *Maythorn*, 5502-3, 5791-6; *Fuller*, 5904-6; *Goodman*, 8004-9, 8040.

Notification of: *Legge*, 2-9, 86.

Not reported: *Kinggate*, 4436-7, 4450; "X," 7656-8; *Goodman*, 8297-302; *Awcock*, 12,627-8, 12,661-6.

Number of: *Legge*, 10-11, 26-8, 44.

**Caused by:**

Chipping off paintwork of engines: *Sibthorpe*, 17,749-54.

Drinking-water: *Fuller*, 5922, 5931.

Gimp pins: *Baker*, 9786-8, 9821.

Sandpaper stopping in the nails; "X," 7611-2.

**Compensation for:**

Liability insured: *Meier*, 5810; *Fuller*, 5907.

Liability not insured: *Maythorn*, 5511; *Croall*, 5992-3.

**Lead Poisoning—continued.****Compensation for—continued.**

Not paid since abandonment of lead: *Spencer*, 5117.

Paid: *Spencer*, 5115-20.

**Compensation for suspension:**

Could not agree to: *Maythorn*, 5703-4; *Mulliner*, 7839.

Not objected to, if made general: *Austin*, 13,272.

Unnecessary: *Mulliner*, 7838.

Would lead to malingering: *Goodman*, 8192-4.

Concealment of symptoms by workmen: *Steinitz*, 1431-7; *Daly*, 4860.

Not probable: *Mulliner*, 7969; *Goodman*, 8343-7.

Contracted in previous work: *Mulliner*, 7970-4.

Contracted through the skin: *Bailey*, 5377-85, 5422-9; *Goodman*, 8359-60.

Unlikely: *Legge*, 79-81; *Kinggate*, 4599.

Deaths partly attributed to, not certified as: *Daly*, 4766; *Cornett*, 12,883-4.

**Decrease:**

General in factories: *Legge*, 12.

In Austria due to regulations: *Kaup*, 14,491-2.

Since using leadless paints: *Jordan*, 1187-93, 1267-78.

Difficulty of diagnosis: *Legge*, 85, 88-92, 99-102.

Eliminated by using zinc stopping: *Ball*, 9865, 9891.

Everyone working in lead more or less affected: *Cornett*, 12,875-7.

Extent of evil: *Kinggate*, 4438-9; *Daly*, 4767-9; *Maythorn*, 5515; *Fuller*, 5917-9, 5926; *Mulliner*, 7922-4; *Goodman*, 8012, 8296; *Awcock*, 12,512-21.

Factory inspectors' instructions observed: *Bailey*, 5366-7; *Mulliner*, 7807, 7890-4; *Goodman*, 8011.

Greater amongst men working inside vehicles: *Jordan*, 1254-5, 1279-86, 1316-7.

Illness due to lead not diagnosed as, or attributed to: *Legge*, 134-5; *Readman*, 12,471-3.

Impossible to protect coach-makers against: *Bailey*, 5430-2.

In Austria: *Kaup*, 14,479-81, 14,487-8.

**Incidence:**

Considerable in perambulator works: *Legge*, 16, 36.

Would be lessened by proper ventilation: *Legge*, 82-4.

**Increase:****Due to:**

Absence of remedial measures: *Legge*, 13.

Increased use of white lead: *Awcock*, 12,630-7.

Increase in coach-building: *Bailey*, 5450; *Mulliner*, 7789-90; *Austin*, 13,176.

Less cubic air space: *Cornett*, 12,894.

Long hours or pressure of work: *Legge*, 123-6; *Kinggate*, 4527-9; *Rambousek*, 14,662-3.

Use of quick colours: *Cornett*, 12,899-91.

Workmen's Compensation Act: *Legge*, 87.

Not aware of: *Bailey*, 5449; *Mulliner*, 7737-8.

Inquiry as to: *Fuller*, 5911, 5934.

By Austrian Commission: *Kaup*, 14,487-8, 14,494.

By factory inspectors: *Legge*, 37-45.

Lead abandoned because of: *Spencer*, 5095-7, 5112; *Baker*, 9761-2; *Readman*, 12,424, 12,428-9; *Edginton*, 13,157-8; *Smyth*, 13,476.

Liability of body-makers to: *Jordan*, 1251-3; *Steinitz*, 1388-9; *Kinggate*, 4445; *Willix*, 4609-13; *Bailey*, 5232-4; *Mulliner*, 7934-7.

Liability of carriage-makers to: *Kinggate*, 4551-3, 4568.

Men refused employment if suffering from, *Daly*, 4859-60.

**No inquiry as to precautions by:**

Institute of British Carriage Manufacturers:

*Maythorn*, 5562; *Meier*, 5820; *Fuller*, 5918-9.

Society of Motor Manufacturers: *Mulliner*, 7745; *Austin*, 13,181.

No knowledge of cases reported from his works: *Austin*, 13,218-23, 13,303-10.

Notice only taken of serious cases: *Austin*, 13,323-31.

Not prevalent among wheelwrights: *Legge*, 122-3.

**Lead Poisoning** *continued.*

- Occurred in spite of precautions: *Baker*, 9790-5.  
 Precautions for mitigating evil: *Legge*, 63-77, 82-4.  
 Prohibition of lead the only remedy: *Legge*, 63; *Kinggate*, 4500, 4521; *Willix*, 4636, 4684, 4689; "X," 7681-4; *Aweock*, 12,575; *Cornett*, 12,815; *Edginton*, 13,101.  
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 Regulations would eliminate: *Bailey*, 5219; *Maythorn*, 5560; *Meier*, 5834; *Austin*, 13,217.  
 Reliability of information obtained from workmen: *Mulliner*, 7733.  
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 Slight illness attributable to: *Meier*, 5891-4; *Readman*, 12,471-3; *Aweock*, 12,521, 12,615-26, 12,647-51, 12,678.  
 Something should be done to remove evil: *Bailey*, 5178; *Maythorn*, 5516; *Meier*, 5814, 5867; *Fuller*, 5912; *Croall*, 5998; *Arnold*, 6116; *Austin*, 13,177.  
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 For Bohemia: *Rambousek*, 14,660-1.  
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 • Body-makers included: *Legge*, 107, 113; *Mulliner*, 7735-6.  
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 Necessity for: *Legge*, 31-2.  
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 Surprised that works, previously free unexpectedly have succession of cases: *Meier* 5807-9; *Fuller*, 5906.  
 Susceptibility to: *Legge*, 103-6; *Cookson*, 2294-6; *Kaup*, 14,504-5.  
 Symptoms: *Legge*, 24-5, 105.  
 Workmen:  
 Have died or left the trade on account of: *Cornett*, 12,756-66, 12,871-4.  
 In painting department do not suffer more than others: *Mulliner*, 7831-5.  
 Might suffer and not go to a doctor: *Maythorn*, 5797-9.  
 Should be educated as to danger of lead: *Aweock*, 12,645.  
 Works immune from: *Swain*, 4949-56; *Maythorn*, 5503-4, 5508-10; *Croall*, 5989-90, 6030, 6037, 6088-9; *Readman* 12,470.

**LEGGIE, THOMAS MORISON, M.D.** (H.M. Senior Medical Inspector of Factories):

- Evidence, 1-147.  
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**LEGGIE, THOMAS MORISON, M.D.**—*continued.*

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**LEYENDECKER, HANS** (President of the German White Lead Manufacturers' Association):

Evidence: 16,391, 16,397.

LEYENDECKER, HANS—*continued.*

- Leadless paints:
  - Discontinued in Germany for railway carriages, 10,397.
  - Trials by Prussian State Railways, 10,467-71.
- Lead paints: necessary for railway carriages 10,391.

## LINE, CHARLES A. (Consultant on House Decoration):

- Evidence: 10,051-2, 10,066-7.
- Jointing: leadless, 10,066-7.
- Leadless paints: used for railway carriages, 10,051-2.

## Lining:

- Comparative amount of paint used: *Crow*, 11,970.
- Difficult if lead prohibited: *Croall*, 6020-2, 6027, 6084.
- Done with pencil: *Fuller*, 5973.
- Exemption required if lead prohibited: *Fuller*, 5977-8.
- Lead essential for: *Fuller*, 5972, 5976, 5979-82.
- No danger involved: *Crow*, 11,963-6, 12,083.
- No sandpapering: *Fuller*, 5974-5.
- No trials with zinc-white: *Croall*, 6095-7.
- Tests with zinc- and lead-paint: *Robins*, 12,355-67.
- Vermilion used for: *Jordan*, 1213.
- Yellow colours:
  - Covering power of lead chromate of 50 per cent. strength: *Crow*, 11,962.
  - Exemption from 5 per cent. limitation of lead necessary: *Crow*, 12,086-90, 12,127.
  - Proportion of lead in: *Crow*, 11,952-3.
  - Strong colour impossible with 5 per cent. lead and remainder zinc chrome: *Crow*, 12,072-82.
  - Zinc not so opaque as lead chrome: *Crow*, 11,954-61, 12,147-53.
- Zinc white satisfactory for: *Robins*, 12,357; *Readman*, 12,496-8.

## MAYTHORN, F. A. (President of Institute of British Carriage Manufacturers):

- Evidence, 5498-800.
- Aprons: worn by painters instead of overalls, 5085-6.
- Bedding of canvas: lead not used, 5640-2.
- Body-makers: contact with lead, 5563.
- Carriage-makers:
  - Contact with lead, 5575.
  - Work of, 5574.
- Compensation:
  - For lead poisoning: liability not specially insured, 5511.
  - For suspension: could not agree to, 5703-4.
- Dust:
  - Dangers from, 5734-40.
  - Material used on floors to prevent:
    - Applied every two or three months, 5764.
    - Satisfactory, 5763-7, 5772.
  - Not much arises from paint which falls on floor, 5687-8.
  - Ordinary ventilation not sufficient to remove danger, 5745.
  - Use of helmet to prevent inhalation deprecated, 5515, 5544.
- Emanations: possible from tub-lead, 5728-33.
- Filling:
  - Contains small proportion of lead, 5584.
  - Lead in:
    - Might be abandoned, 5587.
    - Not absolutely essential, 5586.
    - Object of, 5585.
  - Number of coats applied, 5595.
- Heating apparatus: hot water, 5760-2.
- Hours of employment:
  - Number for coach painters, 5692.
  - Prevalence of overtime, 5693-4, 5717-9.
  - Restriction not desired, 5695.
- Jointing:
  - Leadless: Yellow ochre and oil satisfactory, 5571-3,

MAYTHORN, F. A.—*continued.*

- Jointing—*continued.*
  - Lead paste:
    - No dust caused by mixing or after drying, 5567, 5714-6.
    - Unaware of any danger with, 5565.
    - Used moist, 5563-6, 5713.
    - Workers' hands soiled with, 5568-9.
  - Object of, 5570.
- Leadless paints:
  - Could not be used for some purposes, 5531.
  - Durability not tested, 5523-4.
  - If as good as lead, would prefer to use, 5525-6.
  - Instituto has not taken steps to test merits of, 5561.
  - Length of time necessary for proper test, 5549-59.
  - Not tried, 5522.
  - Unaware that Midland Railway and Bradford Corporation use only, 5527-30.
- Lead paints: more opaque than any other, 5546.
- Lead poisoning:
  - Extent, as indicated by statistics, very serious, 5515.
  - Immunity due to cleanliness and system of painting employed, 5503-4, 5508-10.
  - Instituto has not inquired as to precautions against, 5562.
  - No cases known of, by:
    - Doctors, 5795-6.
    - Members of Instituto, 5791-2.
    - Witness, 5502-3.
  - Risk arises chiefly in certain classes of work, 5517-21.
  - Something must be done to remove evil, 5516.
  - Unaware of official statistics, 5512-4.
  - Workers might suffer and not go to a doctor, 5797-9.
- Meals:
  - Messroom not provided, 5661.
  - No provision made for storage, 5663.
  - Not eaten in paint shop, 5661-2, 5669.
  - Sometimes eaten in places where lead is used, 5664-9.
- Motor-cars:
  - Daimler:
    - Experience of leadless paints insufficient, 5549-54.
    - Quality and finish of high class, 5533-40.
    - Views as to leadless paints not modified on account of, 5543.
  - Lead not used on metal underwork, 5631-3.
  - Life of paint depends on its treatment, 5773-80.
  - Require varnishing once or twice a year, 5551.
- Outdoor clothing: cupboard provided for, 5689-90.
- Overalls:
  - Kept on benches when not in use, 5677-9.
  - Not contaminated with lead dust, 5680-4.
  - Not worn by painters, 5672, 5685-6.
  - Place for storage not provided, 5676.
  - Provided by men, 5670.
  - Washed weekly, 5671, 5675.
- Paint shop:
  - Floors:
    - Impervious:
      - An advantage for swilling down, 5768-9.
      - Exist in some works, 5770.
      - Should be smooth, 5771.
    - Not impervious and washable, 5691.
    - Swept with moist dust-preventing material, 5688, 5691, 5751-2, 5763-7, 5772.
- Periodical medical examination:
  - If useful, would welcome, 5698-702.
  - Not provided for, 5696-7.
- Priming:
  - Contains lead, 5505, 5579.
  - Work first prepared with leadless wood-filler, 5577.
- Prohibition of lead:
  - Effect on white motor cars, 5712.
  - Possible without inflicting hardship on industry, 5523.
  - Preferred to regulations, 5709-11.
- Regulations:
  - Cost would kill the industry, 5705-8.
  - Would eliminate danger, 5560.

MAYTHORN, F. A.—*continued.*

- Rubbing-down:  
 Dry method:  
   Could be dispensed with for finishing coats, 5629.  
   Danger from dust, 5734-40.  
   Exhaust ventilation difficult to apply, 5743-4.  
   Prepared to prohibit it for stopping of curved surfaces and underwork of motors, 5639.  
   Time occupied in, 5741-2.  
   Wheels and carriage underwork:  
     Exhaust ventilation practicable, but cost prohibitive, 5619-24.  
     No remedy for danger, if any exists, 5617.  
     Pigment not hard enough to create dust, 5600-5, 5781-90.  
     Stopping not dangerous, 5606-14, 5734-6.  
 Not done between:  
   Filling coats, 5588.  
   Priming coats, 5507, 5580-2.  
 Wet method:  
   Employed after:  
     Filling coats, 5596-7.  
     Finishing coats, 5625-9.  
     Priming coats, 5506.  
   Impossible for wheels and underwork, 5615-8.  
   Possible for hard stopping, 5635-6.  
 Stopping:  
   Composition, 5590.  
   Hard stopping not much used on:  
     Underwork and curved surfaces of motors, 5634.  
     Wheels and carriage underwork, 5606-7.  
   Lead generally used, 5589.  
   Mixed by user, 5591.  
   No dust from mixing dry white lead, 5592-4.  
 Stove enamelling: could not be used instead of stopping, 5637-8.  
 Ventilation: system installed, 5754-9.  
 Washing:  
   Accommodation:  
     Amount, 5646.  
     Not provided for all men in body shop, 5746-9.  
     Provided, 5645, 5746-7.  
   Facilities:  
     Hot water:  
       Available but not laid on, 5647.  
       Important, 5648-9.  
     Soap and nail brushes:  
       Available, 5653-7.  
       Man employed to look after, 5655.  
     Towels:  
       Important to have clean, 5652.  
       Supplied twice weekly, 5650-1.  
     Personal cleanliness important, 5644.  
     Time allowed for, 5659-60.  
 White lead:  
   Age specified for, 5726-7.  
   Purchased as "tub-lead," 5723-5.  
   Substitutes:  
     Durability not tested, 5523-4.  
     Not tried, 5522.  
 Workmen:  
   Difficulty in obtaining, 5695, 5720-2.  
   Number employed, 5501.

**Meals:**

- Danger of working in morning before taking food:  
*Daly*, 4835.  
 Eaten in workshop: *Steinitz*, 1307-9; *Kinggate*, 4506, 4572; *Willix*, 4666-7; *Daly*, 4822; *Maythorn*, 5664-9; "X," 7589; *Goodman*, 8150-1; *Awcock*, 12,582; *Cornett*, 12,824.  
 Kept in workshop: *Bailey*, 5333-5; "X," 7589; *Awcock*, 12,582; *Cornett*, 12,824.  
 Mess-room:  
   Advocated: *Legge*, 76-7; *Willix*, 4669; *Daly*, 4824.  
   Impossible in small works: *Goodman*, 8181-4.  
   Men will not always use: *Goodman*, 8341-2.  
   Not general: *Kinggate*, 4507; *Daly*, 4823; "X," 7590; *Awcock*, 12,583-5, 12,656; *Cornett*, 12,825-6.

**Meals—continued.**

- Mess-room—*continued.*  
 Not provided: *Steinitz*, 1366; *Willix*, 4668; *Maythorn*, 5661; *Mulliner*, 7810.  
 Provided: *Bailey*, 5328-31; *Goodman*, 8148-52, 8341-2; *Austin*, 13,241-2.  
 Warmed in winter: *Bailey*, 5330.  
 Not taken or eaten in workshop: *Jordan*, 1250; *Maythorn*, 5661-2, 5669; *Arnold*, 6137; *Mulliner*, 7811; *Baker*, 9790.  
 Storage room:  
   Not provided: *Maythorn*, 5663.  
   Provided: *Austin*, 13,243.

## MEIER, ABRAHAM (Representing the Institute of British Carriage Manufacturers):

- Evidence, 5801-99.  
 Bedding of canvas:  
   Gold size used for, 5853-4.  
   White lead not often used, 5855.  
 Filling:  
   Leadless used, 5844.  
   Small amount of lead necessary for good work, 5845-7.  
 Leadless paints:  
   If as good as lead, would be anxious to use, 5895-9.  
   Length of time necessary to test, 5832, 5873-8.  
   No knowledge of, 5863.  
   No trials with, 5819, 5890.  
   Two years not a sufficient test, 5830, 5861.  
 Lead poisoning:  
   Case known of, 5806, 5815.  
   Compensation for: liability insured, 5810.  
   Evil should be rectified, 5814, 5867.  
   Institute has made no efforts to combat, 5820.  
   Men away occasionally from work may be suffering from, 5891-4.  
   Regulations would eliminate evil, 5834.  
   Statistics: unaware of official, 5811-3, 5817-9.  
 Surprised that works, previously free, unexpectedly have succession of cases, 5807-9.  
 Motor cars:  
   Daimler:  
     Class of customers, 5826.  
     Finish demanded by customers, 5827.  
     Leadless paint on:  
       Durability, 5828-33.  
       Looks of highest finish, 5822-5.  
       Probably used for economical reasons, 5833.  
       Two years an insufficient test, 5830-2.  
       Unaware that it is leadless, 5821.

- Priming:  
   Contains lead, 5839.  
   Number of coats applied, 5837-8.  
 Prohibition of lead:  
   Preferred to Regulations, 5868-72.  
   Quality of work would suffer by, 5859-60.  
 Regulations:  
   Inevitable if lead continues in use, 5836-8.  
   Would eliminate lead poisoning, 5834.  
 Rubbing-down:  
   Dry method unnecessary for priming coats, 5840-2.  
   Wet method used for bodies, 5852.  
 Stopping:  
   Contains lead, 5848.  
   Mixed by head painter, 5849.  
   No danger from mixing dry white lead, 5850-1.  
 White lead: the most perfect substance for paint, 5821-2, 5890.  
 Workmen: number employed, 5805.  
 Workmen's Compensation: insurance rate same for all workers, 5879-89.

## MEISSL, ODO MARIA (Master Painter, of Vienna):

- Evidence: 14,775-6, 14,779.  
 Lead paint: reinstated, after being abandoned, by German State Railways, 14,779.  
 Paint: varnish not used for highest class work, 14,775-6.



- MORLEY, B. J.** (Foreman Painter, of Messrs Cadbury, Ltd., Bournville):  
 Evidence, 22,964, 22,978.  
 Leadless paints:  
 Durability, 22,978.  
 Used on motor vans and locomotives, 22,964.
- Motor Cars** (See also evidence of *Austin, Goodman, and Mulliner*):  
 Amount of lead required for filling metal panels:  
*Bailey*, 5294, 5494-7.  
 Amount of stopping required: "X," 7697 8, 7720.  
 Cleaning of: *Croall*, 6090-4.  
 Daimler:  
 Class of customers: *Bailey*, 5203-4; *Meier*, 5826-7; *Arnold*, 6127; *Austin*, 13,204.  
 Leadless paint on:  
 Aware of: *Arnold*, 6123; *Austin*, 13,193.  
 Better results obtainable with lead: *Mulliner*, 7851-5.  
 Class of finish: *Bailey*, 5200-2, 5208-11, 5214-5; *Maythorn*, 5533-40; *Meier*, 5822 5; *Croall*, 6004-5; *Arnold*, 6124-6; *Mulliner*, 7763, 7766 77; *Goodman*, 8018 39; *Austin*, 13,201-3.  
 Demanded by customers: *Meier*, 5827.  
*Croall*, 6007-8, 6017, 6062; *Arnold*, 6128.  
 Durability: *Bailey*, 5208-11, 5214-5; *Meier*, 5828-33; *Croall*, 6014-6; *Goodman*, 8018-39.  
 Formula might not be satisfactory: *Mulliner*, 7781-2.  
 Instances of bad results: *Croall*, 6002, 6011, 6070-3; *Mulliner*, 7783-5, 7851 5, 7871-6.  
 Lead would not have been abandoned imprudently: *Croall*, 6011-3.  
 Probably used for economical reasons: *Meier*, 5833.  
 Recent improvements: *Goodman*, 8351 5.  
 Surprised that Company are satisfied with: *Croall*, 6009-10.  
 Surprised that Company have received no complaints: *Bailey*, 5205-11.  
 Two years' trial insufficient: *Maythorn*, 5549-54; *Meier*, 5830-2; *Arnold*, 6129-32; *Austin*, 13,205-16, 13,345-6, 13,364-71.  
 Unaware of: *Meier*, 5821.  
 Worth a trial: *Mulliner*, 7786-8, 7844-50.  
 Repainted by other firms: *Goodman*, 8026, 8028-9.  
 Dangers:  
 Increased by introduction of: "X," 7575-9, 7629-31.  
 Not affected by introduction of: *Avcock*, 12,568-70.  
 Same as with ordinary coach work: *Willix*, 4657.  
 Finish not so good as that of horse carriages: *Bailey*, 5371.  
 General evidence applicable to: *Kinggate*, 4496; *Willix*, 4657; *Cornett*, 12,805.  
 Industry increasing: *Mulliner*, 7740 2.  
 Lead not used for attaching metal underwork: *Bailey*, 5297-8; *Maythorn*, 5631-3.  
 Less filling used than for carriages: "X," 7692-3.  
 More dust created than in carriage-work, *Daly*, 4808.  
 More lead used than for carriages: "X," 7694-6, 7719-22.  
 Painting processes: *Legge*, 54.  
 Piece-work a special danger: *Daly*, 4809.  
 Require varnishing:  
 Every two years: *Austin*, 13,373-5.  
 Once or twice a year: *Maythorn*, 5551.  
 Should not be classed with railway carriages: *Mulliner*, 7739.  
 Subject to rougher usage than carriages: *Austin*, 13,372.
- Mouldings**:  
 Fixed with lead: *Readman*, 12,467-8.
- MULLINER, A. F.** (representing the Society of Motor Manufacturers and Traders):  
 Evidence, 7723-994.  
 Body-makers:  
 Contact with lead, 7936-7.  
 Not so liable to lead poisoning as painters, 7934-5.  
 Carriage-makers:  
 Contact with lead, 7953-8.  
 Work in same place as painters, 7955.  
 Dust:  
 Danger has not been considered, 7860.  
 Very little produced, 7856-9.  
 Filling: white lead the best known substance, 7764 5, 7855.  
 Floors:  
 Impervious:  
 Cleaned down wet every morning, 7817-8.  
 Labourers specially employed to clean, 7819.  
 Provided in London, 7816.  
 Foreign competition:  
 Belgians the chief competitors, 7870-1.  
 Effect of prohibition of lead, 7751.  
 Hours of employment:  
 Number, 7820.  
 Overtime:  
 Extent, 7821.  
 Prevalence, 7822.  
 Restriction:  
 Unnecessary, 7823 8.  
 Would reduce wages, 7824, 7828.  
 Leadless paints:  
 No trials with, 7746-50.  
 Society has not tested merits, 7744.  
 Unaware that Midland Railway and Bradford Corporation use only, 7761-3.  
 Lead paints: use of, unhealthy, 7988-91.  
 Lead poisoning:  
 Cases:  
 Increase with number of men employed, 7789-90.  
 Known of, by inquiring amongst workmen, 7729, 7738, 7937, 7952-3.  
 Compensation for suspension:  
 Unnecessary, 7838.  
 Would rather cease to use lead, 7839.  
 Contracted in previous work, 7970-4.  
 Evil somewhat magnified, 7922-4.  
 Factory inspectors' instructions always observed, 7807, 7890-4.  
 Fear of men to attribute illness to lead, not heard of, 7969.  
 Liability of body-makers to, 7934-7.  
 Men do not suffer from the more insidious forms of, 7831-5.  
 Not increasing, 7737-8.  
 Proportion of cases to number of men employed important, 7743.  
 Reliability of information obtained by employers from workmen, 7733.  
 Society has not considered precautions necessary, 7745.  
 Specially prepared drink to ward off, not known of, 7967-8.  
 Statistics, 7735-6.  
 Meals:  
 Mess-room not provided, 7810.  
 Not taken in factory, 7811.  
 Motor cars:  
 Bodies: use of Terne plates, 7880-9.  
 Daimler:  
 Leadless paint:  
 Better results with lead, 7851-5.  
 Formula might not be satisfactory, 7781-2.  
 Instances of bad results, 7783-5, 7581-3, 7871-6.  
 Prepared to use, 7844-50.  
 Quality of work, 7763, 7766-77.  
 Worth a trial, 7786-8.  
 Industry increasing, 7740-2.  
 Should not be classed with railway carriages, 7739.  
 Outdoor clothing: room provided for storage, 7815.

**MULLINER, A. F.—continued.****Overalls :**

- Not provided, 7812
- Storage room :
  - Not provided, 7813.
  - Should be insisted on if lead used, 7814.
- Painters :**
  - Constantly changing employment, 7976-8.
  - Number employed, 7728, 7976.
  - Occupation unhealthy, 7982-9.
- Periodical medical examination :**
  - If necessary, would welcome, 7836-7.
  - In lead industries, 7829-30.
- Priming : lead used for, 7948-51.**
- Prohibition of lead :**
  - Effect on foreign competition, 7751.
  - Experience of Daimler Co. does not justify, 7940.
  - Inferior work would result, 7753-4, 7943-7.
  - May not necessarily increase cost, 7752.
  - Preferred to Regulations, 7843-4.
  - Would agree to conditionally, 7755-60, 7778-80, 7991-4.
- Regulations : would be expensive, 7840-2.**
- Rubbing-down :**
  - Dry method :**
    - Amount of lead dust caused, 7916-21.
    - Very little done, 7858, 7902-3, 7910-5.
    - Wheels sandpapered between each coat, 7959-60, 7964.
  - Wet method used for chassis and metal work, 7904-7, 7961-4.**

**Washing :**

- Accommodation :**
  - Amount, 7797-9.
  - Provided for all workers in lead, 7796, 7938-9
- Facilities :**
  - Soap and nail-brushes provided, 7808.
  - Towels supplied regularly, 7805-7.

**Hot water :**

- Not laid on, 7800.
- Use of, not imperative, 7801-4, 7980-1.

**Personal cleanliness important, 7795.****Time allowed for, 7794, 7809.****Workmen :**

- Cleaner in habits than formerly, 7975.
- Health, 7895-901, 7925-33, 7965-6.
- Number employed, 7728, 7731.
- Number in contact with lead, 7729-32, 7976.
- Workmen's Compensation Act: insurance rate, 7861-8, 7877-9.

**NIEDERHAÜSER, EMIL (Master Painter, of Cologne) :**

- Evidence, 16,273, 16,336-40, 16,357-8.
- Carriage-painting: cannot be compared with house-painting, 16,357-8.
- Leadless paints: success due to use of varnish, 16,336-40.
- Lead poisoning: uncleanness the chief cause, 16,273.
- White lead: necessary for railway carriages, 16,273.

**NOOLJEN, M. (of the Guild of Dutch Master Painters) :**

- Evidence, 15,235, 15,398-9.
- White lead: no trials with substitutes, 15,398-9.
- Zinc paint: cannot be used for locomotives, 15,235.

**Outdoor Clothing :**

- Cloak room or cupboard :**
  - Not provided: *Kinggate*, 4508; *Willix*, 4670-2; *Daly*, 4825; *Arnold*, 6138-9; "X," 7591; *Awcock*, 12,586, 12,656.
  - Provided: *Maythorn*, 5689-90; *Mulliner*, 7815.
  - Sometimes provided: *Cornett*, 12,827.
  - Tried and found impracticable: *Goodman*, 8185-6.
  - Would agree to provide: *Austin*, 13,249-50.
- Kept in workshop: *Willix*, 4672; *Daly*, 4826-7; *Awcock*, 12,587; *Cornett*, 12,828.

**Overalls :**

- Become dirty quickly: *Daly*, 4868-9.
- Kept on work-benches: *Maythorn*, 5677-84.
- Necessary: *Daly*, 4870.
- Not provided by employer: *Bailey*, 5336; *Mulliner*, 7812; *Goodman*, 8153; *Austin*, 13,244.
- Not worn by painters: *Kinggate*, 4509; *Maythorn*, 5672, 5685-6; "X," 7592; *Awcock*, 12,588-9; *Cornett*, 12,829.
- Painters should wear: *Goodman*, 8156.
- Provision by employer:
  - Objected to: *Goodman*, 8157, 8187; *Austin*, 13,245-6.
  - Urged: *Kinggate*, 4509.
- Provision for storage:
  - Made: *Austin*, 13,248.
  - Not made: *Maythorn*, 5676; *Mulliner*, 7813.
  - Should be insisted on: *Mulliner*, 7814.
- Rarely worn: *Willix*, 4673; *Daly*, 4829.
- Supplied only to colour-mixers: *Jordan*, 1259.
- Unnecessary: *Bailey*, 5337; *Goodman*, 8154.
- Washing :**
  - Should be done weekly: *Daly*, 4870; *Maythorn*, 5671, 5675.
  - Would agree to if regulation made: *Austin*, 13,248.
- Workmen not compelled to wear: *Steinitz*, 1350-2, 1407-8.
- Worn and supplied by workmen: *Maythorn*, 5670; *Arnold*, 6139.

**Paint :**

- All colours obtainable with 5 per cent. of soluble lead: *Smyth*, 13,476-85.
- Cracking, causes of: *Kinggate*, 4544-8, 4600-3.
- Difficulty in adhering to aluminium: *Austin*, 13,301-2.
- Good base important: *Austin*, 13,347-51.
- Industries in which used: *Legge*, 14-15.
- Life of, depends on its treatment: *Maythorn*, 5773-80.
- Mixing of: *Cunynghame*, 10,348-51; *Readman*, 12,410.
- Now paint stands satisfactorily on old: *Readman*, 12,463, 12,478-81.
- Object of lead in: *Austin*, 13,352-63.
- Pigment sometimes destroyed down to wood: *Readman*, 12,494-5.
- Should be allowed to settle before use: *Bailey*, 5410-2.

**Painters :**

- Average age: *Croall*, 6047, 6055-60.
- Class for:
  - Lead paint not much used: *Bailey*, 5391-5.
  - Number of pupils: *Bailey*, 5386-90.
  - Same practice taught as in the shop: *Bailey*, 5393.
- Class of: *Baker*, 9843-5.
- Habits cleaner than formerly: *Daly*, 4875-6; *Spencer*, 5159; *Goodman*, 8413-6; *Awcock*, 12,670, 12,685-6.
- Health of: *Croall*, 6046; *Awcock*, 12,678-83.
- Mixing of paints by: *Cunynghame*, 10,348-51.
- Number employed: *Swain*, 5003; *Mulliner*, 7729, 7976.
- At State Railway Works, Malines: *Riesker-Devroede*, 14,970.
- Number in trade union: *Kinggate*, 4549.
- Regularity of employment: *Kinggate*, 4573-5; *Croall*, 6034; *Mulliner*, 7976-8.
- Short-lived: *Awcock*, 12,687.

**Painting, Coach :**

- American process: *Swain*, 4937-42, 4971-2, 4997-8.
- Cannot be compared with house-painting: *Niederhäuser*, 16,357-8; *Plumb*, 18,356-7.
- Cost of labour compared with cost of material: *Spencer*, 5138-9.
- Done chiefly in paint shop: *Spencer*, 5123.
- Sometimes in carriage and body-shops: *Fuller*, 5937, 5953-6, 5966-7; *Mulliner*, 7956.

**Painting, Coach -continued.**

Inquiry by factory inspectors as to dangers: *Legge*, 37-45.  
 Less care taken with than formerly: *Arnold*, 6156.  
 Method for framears: *Readman*, 12,385-409.  
 Not a healthy occupation: *Mulliner*, 7982-9; *Goodman*, 8378-85.  
 Processes: *Legge*, 51, 54.  
 With leadless materials: "X," 7702-10.

**Perambulators.** (See evidence of *Mr. H. B. Baker*.)

Works: lead poisoning in: *Legge*, 16, 36.

**Perambulator Manufacturers' Association:**

Proportion of firms in membership: *Baker*, 9748-51.  
 Would approve of his evidence: *Baker*, 9752-4.

**Periodical Medical Examination:**

Agreed to: *Austin*, 13,269-71.  
 For painters: *Goodman*, 8174, 8191, 8269-70.  
 Desirable: *Willie*, 4681; *Daly*, 4836; "X," 7601-2.  
 Hardship on workmen: *Goodman*, 8171, 8261-7, 8271-2; *Cornett*, 12,837-44, 12,895-8.  
 If necessary, would welcome: *Bailey*, 5356-60; *Maythorn*, 5698-702; *Mulliner*, 7836-7.  
 In lead industries: *Mulliner*, 7829-30.  
 Not desirable: *Kinggate*, 4519; *Cornett*, 12,837-8.  
 Not provided for: *Bailey*, 5350; *Maythorn*, 5696-7; *Goodman*, 8170.  
 Of lead workers and young persons: *Steinitz*, 1367-8.  
 Workmen would favour: *Daly*, 4858.  
 Workmen would object to: *Kinggate*, 4520; *Cornett*, 12,878-82.

**PISART, F.** (Managing Director of the Maastricht Zinc White Co.):

Evidence, 18,900-1, 21,823-35, 21,879, 21,887.  
 Lead paints: abandoned by Belgian State Railways, 18,900-1, 21,823-35, 21,879.  
 Zinc oxide: amount used by Belgian State Railways, 21,887.

**PLUMB, GEORGE** (Foreman Painter, of G. Trollope Ltd.):

Evidence, 18,356-8.  
 Coach-painting: conditions different from house-painting, 18,356-7.  
 Zinc paints: if varnished could be used for vehicles, 18,358.

**Priming:**

Lead: *Kinggate*, 4458; *Willie*, 4623-5, 4684, 4742-3; *Daly*, 4780-1; *Bailey*, 5252; *Maythorn*, 5505, 5579; *Meier*, 5839; "X," 7529-30; *Mulliner*, 7948-51; *Goodman*, 8070; *Ball*, 9893; *Readman*, 12,386; *Awcock*, 12,528; *Cornett*, 12,772-3; *Austin*, 13,350.  
 Leadless: *Swain*, 4900-4, 4959, 4965-7, 4984-91; *Allen*, 5026-7; *Baker*, 9779, 9813-4; *Smyth*, 13,465-6, 13,524-6.  
 Wood-filler, *Maythorn*, 5577.  
 No dust created: *Goodman*, 8078-81.  
 Number of coats applied: *Kinggate*, 4457; *Bailey*, 5250-1; *Meier*, 5837-8; "X," 7525-8; *Goodman*, 8068-9; *Awcock*, 12,526-7; *Cornett*, 12,771-1a.  
 Object, *Croall*, 6081; *Ball*, 9897-900.  
 Rubbed off except in the grain, *Croall*, 6078.  
 Whitening possible for: *Baker*, 9815-9.  
 Zinc no different from lead in its behaviour: *Jordan*, 1198-9.

**Prohibition of Lead:**

Advocated: *Kinggate*, 4466; "X," 7659, 7685-6, 7712-3.  
 Agreed to:  
 If efficient substitute found: *Willie*, 4691-3; *Bailey*, 5192, 5218, 5368, 5462; *Croall*, 6062-5; *Arnold*, 6120; *Mulliner*, 7755-60, 7778-80, 7991-4; *Goodman*, 8014, 8206; *Austin*, 13,188.  
 For filling and priming: *Croall*, 6081-3.  
 For stopping: *Goodman*, 8096.

**Prohibition of Lead -continued.**

Effect on:

Cost of painting: *Mulliner*, 7752; *Austin*, 13,187.  
 Industry: *Maythorn*, 5523; *Austin*, 13,183-9.  
 By foreign competition: *Kinggate*, 4524; *Mulliner*, 7751; *Goodman*, 8204; *Crow*, 12,030-1, 12,036-7, 12,105-7; *Austin*, 13,185-6, 13,340-4.

Quality of work: *Meier*, 5859-60; *Mulliner*, 7753-4, 7943-7.

White motor cars: *Maythorn*, 5712.

Exemption:

Required for lining and artistic work: *Fuller*, 5977-8; *Croall*, 6020-2, 6027; *Crow*, 12,086-90, 12,127.

Suggested for higher-class coach-builders: *Croall*, 6028-9.

French law as to: *Expert-Bezançon*, 15,106-7, 15,197-200.

Not affected by: *Swain*, 5005.

Not justified by Daimler Co.'s experience: *Mulliner*, 7940.

Perambulator manufacturers should not object to: *Baker*, 9840-2.

Possible for bedding canvas: *Goodman*, 8134-5.

Preferred to regulations: *Maythorn*, 5709-11; *Meier*, 5868-72; *Fuller*, 5925, 5927-30; *Croall*, 6027, 6069; *Arnold*, 6142; *Mulliner*, 7843-4; *Austin*, 13,320-2, 13,396-7.

The only remedy for dangers: *Legge*, 63; *Kinggate*, 4500, 4521; *Willie*, 4636, 4684, 4689; "X," 7581-4; *Awcock*, 12,575; *Cornett*, 12,815; *Edginton*, 13,101.

The simplest precaution: *Bailey*, 5220-2.

Unnecessary if dry rubbing-down stopped: *Kaup*, 14,489-90.

Urged for certain classes of workers: *Goodman*, 8176-8.

Welcomed: *Steinitz*, 1449.

**Railway Work.** (See also evidence of *Jordan* and *Kaup*.)

Bad conditions in some factories: *Daly*, 4830-40.  
 Leadless paints supplied to foreign railways: *Wait*, 1544.

Lead used on French railway carriages: *Villemot*, 16,231-4.

More dangerous than carriage work: *Willie*, 4658, 4701; *Daly*, 4810.

Repainting done every four years: *Jordan*, 1312.

Report of Swiss Factory Inspectors as to leadless paints for: *De Morsier*, 16,542.

**RAMBOUSEK, DR. JOSEF** (Official of the Government of the Kingdom of Bohemia):

Evidence, 14,460-3.

Lead-poisoning:

Overwork conducive to, 14,662-3.

Statistics for Bohemia: 14,660-1.

**READMAN, WILFRED** (Foreman Painter at the London County Council Tramways Car Repair Depot, Charlton):

Evidence, 12,368-503, 19,433-54.

Bedding of canvas:

Leadless, 12,440-3.

Lead used, 12,397.

Method of, 12,398.

Bedding of lights:

Lead not used, 12,444.

Method, 12,445-7.

Burning-off:

Blow-lamp used for perished paint, 12,482-3.

Not very unhealthy, 12,484-6.

Seldom necessary, 12,462.

Some dust caused, 12,487-8.

Filling:

Composition, 12,388.

Number of coats applied, 12,387.

Finishing:

Number of coats applied:

Inside, 12,392.

Outside, 12,390, 12,393.

**READMAN, WILFRED—continued.****Jointing:**

- Leadless, 12,450 2.
- Lead used, 12,448 9.
- Leadless colour: lemon yellow difficult to obtain, 12,412 6, 12,420 1, 12,458-9.
- Lead poisoning:
  - Cases known of, 12,424 32.
  - Illness due to lead not attributed to, 12,471-3.
  - Immunity due to cleanliness and good ventilation, 12,470.
  - Zinc paints adopted on account of, 12,424, 12,428-9.

**Lining:**

- Zinc-white satisfactory, 12,496-8.
- No different from lead in application, 12,497-8.

Mouldings: fixed with lead, 12,467-8.

**Paint:**

- Mixed by colourman, 12,410.
- New paint stands satisfactorily on old, 12,463, 12,478 9.
- Old paint not always removed, 12,478-81.
- Pigment sometimes destroyed down to wood, 12,494 5.

**Painting:**

- Method of, for:
  - Car-floors, &c. 12,395.
  - Dashes and staircases, 12,394.
  - Light colours, 12,393.
  - New work, 12,385-409.

**Paint shop:**

- Floors swilled down daily, 12,438.
- Heating and ventilation of, 12,435-6.

Priming: composition, 12,386.

**Rubbing-down:**

- Dry method:
  - Employed for second coat of lead colour, 12,404-5.
  - Seldom employed, 12,381.

**Not done on:**

- Midland Red coats, 12,406.
- Priming coats, 12,399.
- Wet method employed for:
  - Filling, 12,389, 12,400, 12,402.
  - First coat of lead colour, 12,403.
  - Stopping, 12,375.

**Sign-writing:**

- Zinc-white satisfactory, 12,496-8.
- No different from lead in application, 12,497-8.

**Stopping:**

- Composition, 12,374.
- Zinc-white used for, 12,384.

Tramcars: renovated annually, 12,373-81, 12,464-6, 12,480, 12,489-91.

**Varnish:**

- Method of using, 12,407-9.
- More important than pigment, 12,454-5, 12,476-7, 12,491.

**Washing:**

- Accommodation provided, 12,437.
- Nailbrushes supplied, 12,437.
- Towels renewed daily, 12,437.

**White lead:**

- Abolition beneficial to health, 12,474.
- Could be dispensed with, 12,418-9, 12,456-7, 12,475, 12,499-502.

Window-frames: treatment of, 12,391.

Workmen: number in contact with lead, 12,433-4.

**Zinc paints:**

- Adopted because of lead poisoning, 12,424.
- Experiments with, 12,382, 19,433-54.
- No different from lead in application, 12,497-8.
- No different from lead in preparation, 12,503.
- Satisfactory, 12,383, 12,422-3, 12,496-8.

**Regulations:**

- Application of: *Fuller*, 5958-9.
- Cost of: *Mulliner*, 7840-2; *Austin*, 13,273, 13,279.
- Effect on industry: *Bailey*, 5361-5; *Maythorn*, 5705-8; *Croall*, 6026; *Goodman*, 8179.
- Enforcement: *Cookson*, 2292-3; *Edginton*, 13,103.
- Non-observance by workmen: *Goodman*, 8196, 8201.
- Onus should be on factory inspectors: *Goodman*, 8197-200, 8202-3.

**Regulations—continued.**

- Exemption from, would mean a saving in cost: *Swain*, 5004-6.
- Inevitable if lead continues in use: *Meier*, 5836 8.
- Necessity for, not admitted: *Fuller*, 5923-4.
- Objected to, for period pending prohibition of lead: *Croall*, 6006-8.
- Preferred to prohibition of lead: *Goodman*, 8206.
- Suggestions for: *Johnson*, 22,264, 22,266.
- Would eliminate dangers: *Bailey*, 5219; *Maythorn*, 5560; *Meier*, 5834-8; *Austin*, 13,217.
- Would not completely remove dangers: *Legge*, 63; *Kinggate*, 4521; *Willix*, 4682.

**Respirators:**

*Legge*: 65-9, 140 7.

**RICKER-DEVROEDE, CHARLES (Master Painter, of Brussels):**

- Evidence, 14,969-70, 15,009-10, 15,066-72.
- Leadless paint: used on motor cars in Brussels, 15,067-72.
- Painters: number employed at State Railway Works, Malines, 14,970.
- White lead: Belgian State Railways returned to, through trouble with zinc, 14,969.
- Zinc paint: not entirely abandoned by Belgian State Railways, 15,009-10.

**ROBINS, W. (a Member of the Committee):**

Evidence, 12,355-67.

**Lining:**

- Comparative tests with zinc and lead, 12,355-67.
- Zinc paint:
  - Better than lead, 12,357.
  - Easier to apply than lead, 12,357, 12,366.
  - Keeps colour better than lead, 12,358, 12,364-5.

**Rubbing down:**

- Both methods used:
  - After stopping: *Allen*, 5034; *Arnold*, 6106-9, 6143-4.
  - For wheels: *Arnold*, 6106-9, 6143-4.
- Done by special class of men: *Awcock*, 12,684.

**Dry:**

- Abolition necessary to remove danger of dust: *Daly*, 4789.
- After filling coats: *Cornett*, 12,796-7.
- Impossible: "X," 7551.
- Amount: *Legge*, 56; *Mulliner*, 7858, 7902-3, 7910-5; *Baker*, 9822.
- Before painting bodies: *Goodman*, 8071-2.
- Between filling coats: *Goodman*, 8073; *Awcock*, 12,541.
- Between finishing coats: *Allen*, 5042; *Readman*, 12,404-5.
- Can be dispensed with: *Maythorn*, 5629.
- Between priming coats: *Legge*, 93; *Kinggate*, 4459-60; *Willix*, 4626-7; *Daly*, 4782-4; *Allen*, 5028; "X," 7531-2; *Baker*, 9780; *Awcock*, 12,529-30; *Cornett*, 12,774.
- Can be dispensed with: *Swain*, 4905-8, 4923, 4983; *Meier*, 5840-2; *Goodman*, 8074, 8084.
- Dispensed with:
  - For railway trucks: *Legge*, 46-8.
  - In Austria: *Kaup*, 14,201, 14,230, 14,479-84, 14,495-9.

**Dust from:**

- Amount: *Bailey*: 5229; *Mulliner*, 7916-21.
- Arises chiefly from filling: *Baker*, 9832.
- Body-makers and carriage-makers exposed to: *Steinitz*, 1391-4, 1409-14; *Kinggate*, 4461; *Willix*, 4628; *Daly*, 4785; *Fuller*, 5953-7, 5962; *Mulliner*, 7955; *Awcock*, 12,531-2; *Cornett*, 12,775-7.
- Contains lead: *Bailey*, 5280-6; *Arnold*, 6110-1.
- Dangerous in small room: *Goodman*, 8401-4, 8408-12.
- The principal danger: *Legge*, 60, 79-81; *Kinggate*, 4462, 4485-6; *Willix*, 4629, 4648; *Daly*, 4786; *Bailey*, 5287, 5405, 5493; *Maythorn*, 5734-40; "X," 7553, 7558-60, 7578-9, 7682-4; *Ball*, 9862-3, 9877, 9892; *Awcock*, 12,533, 12,558-9; *Cornett*, 12,775, 12,795, 12,800-2; *Austin*, 13,389-90.

**Rubbing down—continued.****Dry—continued.**

- Employed : *Jordan*, 1207.  
 Exhaust ventilation : see under "Dust."  
 Indispensable for :  
   Priming coats : *Awcock*, 12,534-5.  
   Some processes : *Willix*, 4709.  
   Wheels and carriage underwork : *Awcock*, 12,560 3.  
 Largely replaced by wet method : *Readman*, 12,381 ; *Edginton*, 13,096, 13,135 7.  
 No remedy for danger : *Bailey*, 5292-3, 5406-8 ; *Maythorn*, 5617 ; *Arnold*, 6112  
 Not done on priming coats : *Goodman*, 8075 7.  
 On curved surfaces and mouldings : *Steinitz*, 1346-7.  
 On stopping : *Arnold*, 6160.  
   Dangerous : *Goodman*, 8094, 8099 101, 8363-4, 8370-1.  
   Fan suggested to remove dust : *Goodman*, 8095, 8102-3, 8372.  
   Place could be set apart for : *Goodman*, 8407.  
 On wheels and carriage underwork : *Kinggate*, 4484 ; *Willix*, 4647 ; *Bailey*, 5277-87, 5479-80 ; *Mulliner*, 7959-60, 7964 ; *Goodman*, 8104 12 ; *Cornett*, 12,799, 12,869-70.  
 Amount of dust caused : *Daly*, 4802 ; *Maythorn*, 5600-1, 5781-90 ; *Goodman*, 8106-12, 8116-22.  
 Can be dispensed with : *Arnold*, 6145-7 ; *Goodman*, 8126.  
 Dangerous : *Daly*, 4863 ; "X," 7555-60.  
 Good ventilation will overcome risk : *Goodman*, 8113-4, 8295.  
 Indispensable : *Awcock*, 12,560-3.  
 Place set apart suggested : *Goodman*, 8123, 8127 8, 8362-3.  
 Priming : *Goodman*, 8082-3.  
 Stopping : *Bailey*, 5283-93, 5491-2 ; *Maythorn*, 5606 14, 5734 6.  
 Time occupied : *Goodman*, 8120 1.  
 Prohibition of lead the only remedy for danger : *Kinggate*, 4466 ; *Willix*, 4633.  
 Quicker and less expensive than wet method : *Legge*, 50.  
 Time occupied : *Willix*, 4721-31 ; *Maythorn*, 5741-2.  
 Works in which it is the only method : *Legge*, 16, 49.  
 Not dangerous :  
   After filling and stopping : *Allen*, 5035.  
   If leadless filling and stopping used : *Swain*, 4924-5.  
 Not done between :  
   Filling coats : *Kinggate*, 4471 ; *Daly*, 4793 ; *Swain*, 4914 ; *Bailey*, 5262 ; *Maythorn*, 5588 ; "X," 7537 8 ; *Goodman*, 8089 ; *Cornett*, 12,789.  
   Finishing coats : *Swain*, 4931-4.  
   Priming coats : *Bailey*, 5253, 5473-5, 5489 ; *Maythorn*, 5507, 5580-2 ; *Readman*, 12,399.  
 Not done with Purex : *Hardwick*, 1860 9.  
 Unnecessary between filling coats : *Bailey*, 5254 5.  
 Wet :  
   Amount of water necessary : *Awcock*, 12,639-44.  
   Danger in : *Legge*, 82 ; *Willix*, 4644-5 ; *Daly*, 4800 ; *Awcock*, 12,548-52, 12,638-45.  
   Difficulty in obtaining clean water : *Awcock*, 12,646.  
   Impracticable : *Kinggate*, 4463 4, 4487 ; *Willix* 4630-1.  
   For priming coats : *Legge*, 97 ; *Daly*, 4787 ; *Awcock*, 12,534-5 ; *Cornett*, 12,779-80.  
   For wheels and carriage underwork : *Legge*, 56 7 ; *Willix*, 4649 ; *Daly*, 4804 ; *Bailey*, 5288-91, 5487 8 ; "X," 7561 3 ; *Cornett*, 12,801.  
 Method generally employed : *Steinitz*, 1349.  
 On chassis and metal work : *Mulliner*, 7904-7, 7961-4.  
 On filling coats : *Kinggate*, 4480 3 ; *Daly*, 4799 800 ; *Bailey*, 5256-8 ; *Maythorn*, 5596-7 ; "X," 7550-1 ; *Goodman*, 8097-9 ; *Readman*, 12,389, 12,400, 12,402 ; *Awcock*, 12,546-7, 12,565 ; *Cornett*, 12,795.

**Rubbing down—continued.****Wet—continued.**

- On finishing coats : *Maythorn* 5625-9 ; *Readman*, 12,403.  
 On priming coats : *Steinitz*, 1443-7 ; *Maythorn*, 5506.  
 On staining coats : *Willix*, 4642-3 ; *Bailey*, 5272-3 ; "X," 7550 1.  
 On stopping : *Maythorn*, 5635-6 ; *Baker*, 9834-6 ; *Readman*, 12,375.  
 On wheels and carriage underwork : *Arnold*, 6106-9, 6143-4.  
   After filling in tramcar work : *Willix*, 4702 4.  
   Impracticable : *Daly*, 4804 ; *Bailey*, 5288 91, 5487-8 ; *Maythorn*, 5615 8 ; *Cornett*, 12,801.  
   Practicable : *Austin*, 13,380-8.  
   Priming coats : *Arnold*, 6148 9, 6157-8.  
   Satisfactory : *Arnold*, 6145-9.  
 Prevalence : *Legge*, 94-7.  
 Too expensive : *Baker*, 9823.  
 Works in which it is the only method : *Legge*, 46-7, 67 ; *Swain*, 4921-2, 4969-70 ; *Spencer*, 5125.  
**Safe Manufacture.** (See evidence of *Mr. H. S. Ball*.)  
 SCHOBERT, G. (of Messrs. Schobert's Ltd., Paint Manufacturers, London):  
 Evidence, 9737 43.  
 Leadless paints :  
   Schobert's :  
     Satisfactory for wheel work, 9742 3.  
     Used on motors and carriages, 9737-41.  
 SIBTHORPE, JOHN (Master House Painter, of Dublin):  
 Evidence, 17,749-54, 17,975-7.  
 Coach-painting : no practical experience of, 17,975-7.  
 Lead poisoning : surprised that cases have been caused by chipping off old paintwork on engines, 17,749-54.  
**Sign-writing :**  
 Chalking due to turpentine : *Jordan*, 1294-6.  
 Leadless paints used : *Jordan*, 1214-5.  
 Suitability of zinc paints : *Heydorn*, 562-7 ; *Readman*, 12,496-8.  
 SMYTH, C. J. (of Messrs. Mauder Bros., Ltd., Wolverhampton):  
 Evidence, 13,400-9, 13,455-6, 13,476-8, 13,522-6.  
 Filling, leadless, 13,409.  
 Leadless paint :  
   Adopted on account of lead poisoning, 13,476.  
   Costs slightly more than lead, 13,402.  
   Demand has not increased, 13,403.  
   Has proved satisfactory for priming, 13,465.  
   No complaints received as to durability, 13,404.  
   Supplied for coach-painting, 13,399-401.  
   Used by one motor-car firm for five years, 13,406-8, 13,486-8.  
 Paint, all colours obtainable with 5 per cent. of soluble lead, 13,476 85.  
 Priming :  
   Leadless :  
     Composition, 13,524-6.  
     Satisfactory, 13,465-6.  
 SPENCER, C. J. (General Manager, Bradford Corporation Tramways):  
 Evidence, 5090-167.  
 Bedding of canvas :  
   Leadless material used, 5126.  
   Does not powder, 5127.  
 Driers : contain slight amount of lead, 5164-7.  
 Filling :  
   Leadless material used, 5131.  
   No complaints as to, 5132.  
 Leadless paints :  
   Cost of painting approximately equal to lead, 5106, 5109, 5133-4.  
   Covering power greater than lead, 5106.

SPENCER, C. J. *continued.*

- Leadless paints- *continued.*  
 Durability dependent on varnish, 5108, 5111, 5140.  
 Opacity not so good as lead, 5106-7.  
 Practicable for vehicles other than tramcars, 5113-4.  
 Satisfactory, 5101.  
 Trials or tests, 5096, 5101-5, 5111.
- Lead paints :  
 Abandoned because of fatal case of lead poisoning, 5095-7, 5112.  
 Purex : trials unsatisfactory, 5098-100.
- Lead poisoning :  
 Case in paint shop, 5124.  
 Compensation for :  
 Nothing paid since abandonment of lead, 5117.  
 Paid for fatal case, 5115-20.
- Painters : cleaner in habits than formerly, 5159.
- Painting :  
 Cost of labour compared with that of material, 5138-9.  
 Done chiefly in paint shop, 5123.
- Rubbing-down : wet method employed, 5125.
- Stopping :  
 Leadless, 5128.  
 Does not crack, 5128-30.
- Thinners : Raw linseed oil the best, 5149-53.
- Tramcars :  
 Cleaning of : neutral soap used, 5141-4.  
 Repainting :  
 Cost not increased by use of leadless paints, 5139.  
 Done every two years, 5135-7.
- Varnish :  
 Life of the paint depends on, 5154-7.  
 Two coats applied, 5158.
- Washing :  
 Accommodation :  
 Amount, 5162.  
 Good in tramway shops, 5122, 5145-6.  
 Difficulty in getting men to wash, 5147.  
 Facilities (nail brushes, soap, towels, hot water) :  
 Good, 5121.  
 Provided, 5160-1.

## Spray :

- Especially dangerous with lead paint : *Hardwick*, 1862-4.  
 Not aware of any process causing : *Awecock*, 12,574.

## Staining :

- Composition of : *Kinggate*, 4476-7 ; " X," 7548.  
 No danger involved : *Kinggate*, 4479 ; *Willix*, 4641.  
 Object of : *Kinggate*, 4478 ; *Bailey*, 5270-1 ; " X," 7549.  
 When applied : " X," 7547.

## STEINITZ, JOHN (Manager, Brush Electrical Engineering Co., Falcon Works, Loughborough) :

- Evidence, 1318-451.  
 Aerograph : no experience with, 1345.
- Body-makers :  
 Contact with lead, 1440-1.  
 Dust in shop, 1301-4, 1409-14.  
 Shop swept every evening, 1300, 1418-21, 1426-30.  
 Washing as necessary as for painters, 1442.
- Burning-off, not done, 1364-5.
- Dust :  
 Arises from dried paint splashes on floor, 1410-3.  
 In body-makers' shop, 1301-4.
- Hours of employment, 1395-7.
- Joining :  
 Lead, 1336-40.  
 Leadless, 1415.
- Leadless paint :  
 Cheaper than lead paint, 1448.  
 Composition of, 1323-6.  
 No practical difficulties in applying, 1373-4.  
 Satisfactory, 1321-2, 1371-2.
- Lead paint : replaced by leadless, 1321.

STEINITZ, JOHN- *continued.*

- Lead poisoning :  
 Concealment through fear of discharge, 1431-7  
 Confined to body-makers, 1388-9.  
 No cases amongst painters, 1400-4.  
 Number of cases, 1321, 1341, 1381-2.  
 Since using leadless paint, 1327-32, 1375-80.
- Meals :  
 Eaten in workshop, 1397-9.  
 Mess-room not provided, 1366.
- Overalls : workers not compelled to wear, 1350-2, 1407-8.
- Paint shop :  
 Heated by steam pipes, 1422-4.  
 Swept down every evening, 1390, 1418-21, 1426-30.
- Periodical medical examination : of lead workers and young persons, 1367-8.
- Prohibition of lead : welcomed, 1449.
- Rubbing-down :  
 Dry method :  
 Dust arising from, 1413-4.  
 On curved surfaces, 1346-7.  
 Wet method :  
 Generally employed, 1349.  
 Used on priming coats, 1443-7.
- Stopping : sandpaper not used, 1425.
- Washing :  
 Accommodation :  
 Enforced use of, 1362-3.  
 Provided, 1353-9, 1405-6, 1437.
- Facilities :  
 Hot and cold water provided, 1353.  
 Nail brushes provided, 1355.  
 Soap provided, 1354.  
 Towels supplied clean daily, 1355-6.  
 Necessary for body-makers, 1442.  
 Time allowed for, 1359-61, 1438, 1450-1.
- Workmen : number in contact with lead, 1343-4, 1409.
- Workmen's compensation : insurance rate same for painters as for other workers, 1369-70, 1383-5.
- Stopping :  
 Amount : *Ball*, 9896.  
 Composition : *Legge*, 53 ; *Kinggate*, 4473 ; *Willix*, 4637 ; *Bailey*, 5264 ; *Maythorn*, 5590 ; *Readman*, 12,374 ; *Awecock*, 12,543 ; *Cornett*, 12,790.
- Hard stopping :  
 Not much used on underwork : *Maythorn*, 5606-7, 5634.  
 Unnecessary on underwork : *Bailey*, 5298-300.
- Lead : *Daly*, 4795.  
 Abandoned for : *Ball*, 9858, 9878-82  
 Can be dispensed with : *Kinggate*, 4538.  
 Generally used : *Maythorn*, 5589 ; *Meier*, 5848 ; " X," 7541.  
 Prohibition agreed to : *Goodman*, 8096.
- Leadless : *Jordan*, 1204-6 ; *Daly*, 4877 ; *Swain*, 4916-20, 4925, 4968 ; *Allen*, 5033 ; *Spencer*, 5128 ; *Baker*, 9783-5, 9837.  
 Does not crack : *Spencer*, 5129-30.  
 Zinc-white : *Ball*, 9859-61 ; *Readman*, 12,384.
- Mixing :  
 Dangerous : *Kinggate*, 4475 ; *Willix*, 4639-40 ; *Daly*, 4797-8 ; *Bailey*, 5266-9 ; *Awecock*, 12,545 ; *Cornett*, 12,792-3.  
 Done by usor : *Kinggate*, 4474 ; *Willix*, 4638 ; *Daly*, 4796 ; *Bailey*, 5265 ; *Maythorn*, 5591 ; *Meier*, 5849 ; " X," 7542-3 ; *Awecock*, 12,544 ; *Cornett*, 12,791.  
 Not dangerous : *Meier*, 5850-1.
- No trials with lead substitutes : *Bailey*, 5446-7.
- Not used on coach bodies and motors : *Goodman*, 8090-4, 8323-8.
- Sometimes dangerous : *Bailey*, 5263, 5274, 5295-6 ; *Goodman*, 8094.
- When used : *Willix*, 4636 ; *Bailey*, 5283-4 ; " X," 7539-40 ; *Ball*, 9893-6.
- Whiting not used for perambulators : *Baker*, 9820.
- Stove Enamelling :  
 Could not be used instead of stopping : *Maythorn*, 5637-8.

- SWAIN, J. T.** (Foreman Painter, The Daimler Motor Co., Coventry):  
 Evidence, 4883-5013.  
 Bedding of canvas: Non-poisonous lead and varnish used, 4935, 4972-4.  
 Bodies: primed before received for painting, 4957-8.  
 Body-makers:  
 White lead not used by, 4896-8.  
 Work of, 4894-5.  
 Carriage-makers:  
 White lead not used by, 4896-8.  
 Work of, 4894-5.  
 Filling: leadless, 4909-13.  
 Jointing:  
 Leadless material used: 4889, 4960.  
 Cracking between bedding less than with lead, 4963-4.  
 No complaints as to durability, 4891-2.  
 Satisfactory, 4890, 4961-2.  
 The only material used by body-makers, 4894.  
 Leadless paints or materials:  
 Adopted because of cheapness, 4952-3, 4975-6.  
 Durability satisfactory, 4890-2, 4995-6.  
 Health of workmen improved since adoption of, 4999-5000.  
 Immunity from lead poisoning due to, 4949-56.  
 Materials obtainable in England, 5002.  
 Processes in which used, 4943-9, 5009-13.  
 Superior to white lead, 4996.  
 Lead paints: possible to abandon use of, 4936.  
 Lead poisoning: immunity due to use of leadless paints, 4949-56.  
 Painting:  
 American process:  
 Cost not dependent on use of waste varnish, 4975-8.  
 Could be applied to trams and railway carriages, 4941, 4981-2.  
 Description of, 4971.  
 Introduced in view of danger from lead, 4942.  
 Material costs less, but labour more than with lead, 4939-40.  
 No lead used in, 4937-8.  
 Perishing starts from the top and not from the base, as with lead, 4997-8.  
 Priming:  
 Leadless: 4900-4, 4959.  
 Composition, 4965-7.  
 More elastic and less liable to crack than lead, 4988-91.  
 One coat only used, 4984-6.  
 Prohibition of lead, firm not affected by, 5005.  
 Regulations, exemption would mean saving in cost, 5004-6.  
 Rubbing-down:  
 Dry method unnecessary between priming coats, 4905-8, 4923, 4983.  
 No danger if leadless stopping and filling used, 4924-5.  
 Not done between:  
 Filling coats, 4914.  
 Finishing coats, 4931-4.  
 Wet method only employed, 4921-2, 4960-70.  
 Stopping:  
 Leadless:  
 Composition, 4968.  
 Equal to lead, 4916-8.  
 No complaints as to, 4919-20.  
 No danger with, 4925.  
 Turpentine:  
 Trouble caused by use of substitute, 4993.  
 Used with filling, 4992.  
 Varnish: waste could be used for inferior railway work, 4975-80.  
 Wheels and underwork: leadless enamel used on, 4926-30.  
 Workmen:  
 Health improved since adopting leadless paints, 4999-5000.  
 Number of painters employed, 5003.  
 x 7700
- Teeth, Cleaning of:**  
 Facilities not provided: *Willix*, 4665.  
 Men might not use tooth brushes, if provided: *Willix*, 4719-20.
- Thinners:**  
 Raw linseed oil the best: *Spencer*, 5149-53.  
 Turpentine: *Jordan*, 1216.
- Trade Union:**  
 Brush hands excluded: *Daly*, 4758-61, 4843-5.  
 Membership fee: *Kinggate*, 4590-2.  
 Mortality records of members: *Kinggate*, 4441-4.  
 Number of members: *Kinggate*, 4440, 4549.  
 Sick pay to members small: *Kinggate*, 4593-6.
- Trams** (See also evidence of *Ireland*, *Readman*, *Spencer*, and *Steinitz*):  
 Bad conditions in some factories: *Daly*, 4839-40.  
 Kept in sheds at night: *Allen*, 5067-8.  
 Lead used for: *Kinggate*, 4497-9.  
 Painting dangerous: *Willix*, 4658, 4701.  
 Because of inside work: *Daly*, 4810; *Cornett*, 12,807-8.  
 Repainting:  
 Annually: *Readman*, 12,373-81, 12,464-6, 12,480, 12,489-91.  
 Cost not increased by use of leadless paints: *Spencer*, 5139.  
 Every two years: *Allen*, 5065; *Spencer*, 5135-7.  
 Substitute for lead available for certain work, *Willix*, 4705-7, 4710-1.  
 Washing:  
 Done every night. *Allen*, 5072.  
 Special or neutral soap used: *Allen*, 5070; *Spencer*, 5141-4.  
 Window panes, treatment of: *Readman*, 12,391.
- Turpentine:**  
 Trouble caused by use of substitute: *Swain*, 4992-3.
- Varnish:**  
 Emanations dangerous: *Daly*, 4806, 4861-2.  
 Method of using: *Readman*, 12,407-9.  
 More important than pigment: *Readman*, 12,454-5, 12,476-7, 12,491; *Austin*, 13,291-2.  
 Not used for highest-class work: *Meissl*, 14,775-6.  
 Number of coats: *Jordan*, 1209-12; *Kinggate*, 4539-42; *Spencer*, 5154-7.  
 Object of: *Jordan*, 1209-12.  
 Special room for work with: *Daly*, 4863.  
 Success of paint due to: *Allen*, 5046, 5062-4; *Spencer*, 5154-7; *Niederhäuser* 16,336-40.  
 Vehicles re-varnished annually: *Jordan*, 1243-7, 1290-2.  
 Waste could be used for inferior railway work: *Swain*, 4975-80.
- Ventilation:**  
 System installed: *Maythorn*, 5754-9; *Readman*, 12,435-6.
- Vermilion:**  
 Harmless: *Jordan*, 1232-5.  
 Used for lining: *Jordan*, 1213.
- VILLEMOT, A** (President of the Colour and Varnish Manufacturers' Association, Paris):  
 Evidence, 16,231-4.  
 Coach-painting: French law does not apply to, 16,234.  
 Lead paint: French railway carriages painted with, 16,231-4.
- WAIT, D.** (Works Chemist of Messrs. R. Gay & Co., Ltd., Paint Manufacturers):  
 Evidence, 1542-9.  
 Leadless paint:  
 Durability, 1547-9.  
 Used for underwork of carriages and trucks, 1543-6.

**Washing :****Accommodation :**

Amount : *Spencer*, 5162; *Maythorn*, 5046; *Mulliner*, 7797 9; *Goodman*, 8138 9.

Good in tramway shops : *Spencer*, 5122, 5145-6.

Inadequate : *Daly*, 4812 4; "X," 7586.

Men indisposed to use : *Spencer*, 5147; *Fuller*, 5939 40; *Baker*, 9793.

Necessary or desirable : *Kinggate*, 4583 9; *Bailey*, 5238.

Not specially provided for body-makers : *Jordan*, 1256 8; *Maythorn*, 5746 9; *Fuller*, 5947-9.

Painters prefer pail and horschair to lavatory : *Arnold*, 6136, 6161 3.

**Provision of :**

Advocated : *Legge*, 72; *Austin*, 13,233 4.

Made : *Jordan*, 1261; *Steinitz*, 1353-9, 1405-6, 1437; *Bailey*, 5306; *Maythorn*, 5645, 5746-7; *Arnold*, 6134; *Mulliner*, 7796, 7938-9; *Goodman*, 8137; *Baker*, 9790 1; *Readman*, 12,437; *Awcock*, 12,553, 12,577 8, 12,655; *Cornett*, 12,817 8.

Not general : *Kinggate*, 4502-5, 4569, 4576; *Willix*, 4661.

Recent improvements in : *Awcock*, 12,652 3.

Compulsory : *Steinitz*, 1362 3.

**Facilities :**

Advocated : *Legge*, 72-4.

**Hot water :**

Agreed to provide : *Goodman*, 8142.

Available : *Steinitz*, 1353; *Spencer*, 5160-1; *Bailey*, 5309-14; *Maythorn*, 5647.

Important : *Legge*, 73-4; *Maythorn*, 5648-9; *Awcock*, 12,580.

Not available : *Willix*, 4662-3; *Daly*, 4815, 4818; "X," 7587; *Mulliner*, 7800; *Awcock*, 12,579; *Cornett*, 12,819-22.

Not imperative : *Mulliner*, 7801-4, 7880-1.

Should be provided : *Austin*, 13,235-6.

**Nail brushes :**

Available : *Steinitz*, 1355; *Spencer*, 5160 1; *Bailey*, 5322-4; *Maythorn*, 5653-7; *Arnold*, 6135; *Mulliner*, 7808; *Goodman*, 8144; *Readman*, 12,437; *Austin*, 13,238.

Horschair used instead of : *Awcock*, 12,580.

Not always available : *Willix*, 4662-3; *Daly*, 4815, 4818; "X," 7587; *Cornett*, 12,819.

Person employed to look after : *Maythorn*, 5655.

**Soap :**

Available : *Steinitz*, 1354; *Spencer*, 5160-1; *Bailey*, 5322-4; *Maythorn*, 5653-7; *Arnold*, 6135; *Mulliner*, 7808; *Goodman*, 8144; *Awcock*, 12,655; *Austin*, 13,238.

**Towels :**

Frequency of renewal : *Steinitz*, 1356; *Bailey*, 5315-21; *Goodman*, 8143; *Readman*, 12,437.

Provided : *Steinitz*, 1355-6; *Spencer*, 5160-1; *Bailey*, 5315-21; *Maythorn*, 5650-2; *Mulliner*, 7805-7; *Goodman*, 8143; *Readman*, 12,437; *Awcock*, 12,655.

Should be supplied regularly : *Austin*, 13,237.

Insisted on before men leave work : *Croall*, 5990.

Lead-contaminated water used : *Awcock*, 12,548-56, 12,655.

Necessary before meals : *Bailey*, 5338.

Necessary for body-makers : *Steinitz*, 1442.

No difficulty in obtaining clean water : *Kinggate*, 4582.

Personal cleanliness important : *Legge*, 71; *Bailey*, 5305; *Maythorn*, 5644; *Mulliner*, 7795; *Goodman*, 8136.

Soiling of hands unavoidable : *Willix*, 4660; *Daly*, 4811; "X," 7585, 7679; *Awcock*, 12,576; *Cornett*, 12,816.

**Time for :**

Allowed : *Steinitz*, 1359-61, 1438, 1450-1; *Maythorn*, 5659-60; *Arnold*, 6164; *Mulliner*, 7794, 7809; *Goodman*, 8145-7; *Baker*, 9794; *Cornett*, 12,823.

Not allowed : *Kinggate*, 4504; *Willix*, 4664; *Daly*, 4819-21; *Bailey*, 5325-7; "X," 7588; *Awcock*, 12,581.

Would agree to allow : *Austin*, 13,239-40.

**Washing—continued.**

Use of dirty pails : *Kinggate*, 4569, 4577 81, 4597-8; *Awcock*, 12,654-5.

**Wheels and Carriage Underwork (See also Rubbing-down):**

Could be painted in place set apart : *Goodman*, 8123 8, 8293.

Hard stopping, little or none used : *Maythorn*, 5606 7, 5634; *Arnold*, 6154-5.

Leadless enamel used on : *Swain*, 4926-30.

Method of treatment : *Awcock*, 12,558-64.

Purchased in finished state : *Allen*, 5036-8.

Spokes waxed before they are received : *Arnold*, 6151 3.

Stopping rarely used : *Arnold*, 6159.

**White Lead :**

Abolition beneficial to health : *Jordan*, 1300-4; *Swain*, 4999-5000; *Allen*, 5050-2; *Readman*, 12,474.

Age specified for : *Maythorn*, 5726-7.

Amount used in painting a motor car : *Croall*, 6032, 6038-41.

Basis for most paints : *Ball*, 9873-4, 9880.

Best finish obtained with : *Bailey*, 5216-7, 5457-8.

Can be dispensed with : *Readman*, 12,418-9, 12,456-7, 12,475, 12,499-502.

For body fitting : *Allen*, 5024.

For exposed surfaces : *Ball*, 9871.

Dangerous if put into mouth : *Goodman*, 8054-6.

Mixing not dangerous if done carefully : "X," 7544-5.

Not dangerous to use : *Goodman*, 8052-3, 8361, 8365-6, 8373-4, 8398-406.

Not used dry : *Croall*, 6035; *Ball*, 9869, 9873-5.

Object of its use : *Bailey*, 5457-62; *Croall*, 6077-80; "X," 7671-6; *Goodman*, 8312-22; *Awcock*, 12,670; *Austin*, 13,352-63.

Purchased as "tub-lead" : *Maythorn*, 5723-5.

Restriction not objected to for stopping : *Goodman*, 8096; *Ball*, 9872, 9881-9.

Substitutes : (See also Leadless paints.)

No trials with : *Bailey*, 5184, 5397, 5403, 5451; *Maythorn*, 5522-4; *Goodman*, 8013, 8220-1, 8277-8, 8359; *Nooijen*, 15,398-9.

Possible for tramcar and railway work : *Willix*, 4705-7, 4710-1.

Progress with : *Legge*, 78.

Tried for filling and jointing : *Legge*, 58-9, 127-30.

The most perfect substance for paint : *Bailey*, 5198 5459-60; *Meier*, 5821-2, 5890; *Croall*, 6003; *Goodman*, 8017, 8207-9, 8213-7; *Austin*, 13,197-200.

For filling : *Mulliner*, 7764-5, 7855.

**WILLIX, DAVID** (Operative Coach painter, 59, Hatfield Street, Belfast) :

Evidence, 4605-756.

Body-makers : contact with lead, 4609-13, 4628.

Carriage makers :

Contact with lead, 4617-9, 4628.

Work of, 4614-6, 4652-5.

Colours : leadless, 4683.

Filling : contains lead, 4635.

Flattening : not dangerous, 4656.

Hours of employment :

Number, 4674.

Overtime not prevalent, 4675-9.

Restriction in lead processes beneficial, 4680.

Jointing :

Lead for, 4610-1.

Leadless substitute equal to lead, 4620-2.

Leadless paint :

Costs more than lead, 4747, 4755-6.

Effect on health, 4754.

For inside work, 4732-5, 4740-3.

Opacity same as lead, 4714, 4750.

Satisfactory, 4685-7, 4744-6.

Spreads more easily than lead, 4713, 4748-9.

Tests of, 4688-90, 4715-6, 4736-9.

Lead poisoning :

Body-making involves great risk of, 4609-13.

Impossible to remove danger except by prohibition, 4659.



WILLIX DAVID—*continued.*

- Meals :**  
 Eaten in workshop, 4666-7.  
 Mess-room :  
   Not provided, 4668.  
   Should be provided, 4669.
- Motor car work :** as dangerous as ordinary coach work, 4657.
- Outdoor clothing :**  
 Cloakroom not provided, 4670.  
 Collects dust, 4672.  
 Kept in workshop, 4671.
- Overalls :** seldom worn by coach painters, 4673.
- Periodical medical examination :** necessary, 4681.
- Priming :** contains lead, 4623-5, 4684, 4742-3.
- Prohibition :**  
 Necessary for removal of danger, 4633.  
 Possible if satisfactory leadless paint found, 4691-3.
- Regulations :** would reduce, but not remove the danger, 4682.
- Rubbing-down :**  
 Dry method :  
   Body-makers and carriage-makers exposed to dust, 4628.  
   Dust, the principal danger, 4629, 4648.  
   Exhaust ventilation impracticable, 4632, 4651.  
   Indispensable for some processes, 4709.  
   Prohibition of lead the only remedy for danger, 4633.  
   Time necessary to rub down a railway carriage, 4721-31.  
 Used :  
   Between priming coats, 4626-7.  
   For wheels and carriage underwork, 4647.
- Wet method :**  
 Danger to pumicer, 4644-5.  
 Impracticable, 4630-1, 4649.  
 Possible in tramcar work after filling, 4702-4.  
 Used :  
   After staining coat, 4642-3.  
   For body work, 4642-6.
- Staining :** not dangerous, 4641.
- Stopping :**  
 Applied after priming, 4636.  
 Composition, 4637.  
 Mixed by painters, 4638.  
 Mixing dangerous, 4639-40.
- Teeth, cleaning of :**  
 Facilities not provided, 4665.  
 Men might not use tooth-brushes if provided, 4719-20.
- Tramcar and railway work :**  
 Dangerous, 4658, 4701.  
 Substitute for lead possible in certain processes, 4705-7, 4710-1.
- Washing :**  
 Accommodation not provided, 4661.  
 Facilities not provided, 4662-3.  
 Soiling of hands unavoidable, 4660.  
 Time not allowed, 4664.

**Workmen :**

- Careless and dirty : *Austin*, 13,339.
- Difficulty in obtaining : *Maythorn*, 5695, 5720-2.
- Habits greatly improved : *Bailey*, 5448, 5481; *Mulliner*, 7975.
- Health : *Fuller*, 5970-1; *Croall*, 6044-54, 6084-5; *Mulliner*, 7895-901, 7925-33, 7965-6; *Goodman*, 8222-56, 8291; *Austin*, 13,287-8.
- Careless as to : "X," 7716-8.
- Improved since using leadless paints : *Jordan*, 1300-4; *Swain*, 4999-5000, 5003; *Allen*, 5050-2; *Readman*, 12,474.
- Number employed : *Maythorn*, 5501; *Meier*, 5805; *Fuller*, 5903; *Croall*, 5988; *Arnold*, 6102; *Mulliner*, 7728, 7731; *Goodman*, 7999; *Baker*, 9755; *Austin*, 13,169.
- Number in contact with lead : *Legge*, 29-30, 36, 43-5; *Steinitz*, 1343-4, 1409; *Kinggate*, 4440-1; *Mulliner*, 7729-32, 7976; *Goodman*, 8000-3; *Readman*, 12,433-4; *Austin*, 13,170-2.
- Number in contact with paint : *Baker*, 9756.

**Workmen's Compensation Act :**

Insurance rate : *Steinitz*, 1369-70, 1383-5; *Meier*, 5879-89; *Croall*, 5993; *Mulliner*, 7861-8, 7877-9.

**"X," Mr. (Operative Coach Painter) :**

- Evidence, 7507-722.
- Bedding of canvas : leadless material for, 7635-7.
- Body-makers : exposed to very little risk, 7514.
- Carriage-makers :  
 Contact with lead, 7522, 7680-1, 7687-91.  
 Few now employed, 7518-9, 7677.  
 Work of, 7520-1.
- Dust :**  
 Does not arise from wet lead, 7523-4.  
 Very little caused by handling dry white lead, 7546.
- Filling :**  
 Contains some lead, 7535-6.  
 Number of coats applied, 7533-4.  
 Object of using lead, 7671-6.
- Finishing :** number of coats, 7568-74.
- Hours of employment :**  
 Long hours in lead processes very dangerous, 7598.  
 Number, 7593, 7597.
- Overtime :**  
 Restriction would affect wages, 7600.  
 Undesirable, 7599.
- Jointing :**  
 Lead used, 7515, 7634.  
 Method employed for wood panels, 7516-7.
- Leadless paint :**  
 Cannot replace lead for all purposes, 7613-22, 7643-55, 7699-701.  
 Finish of Midland Railway carriages, 7661-7.  
 Invented for his health's sake, 7711.  
 Length of experience with, 7603-4, 7607.  
 Satisfactory, 7606.  
 Should be used in place of lead if good one be found, 7659, 7685-6, 7712-3.  
 Trials with, 7607-10.  
 Used by Bradford Corporation, 7668-70.
- Lead paints :**  
 Entire replacement by leadless paints impossible, 7623-7.  
 Necessary for first two coats, 7614-8.
- Lead poisoning :**  
 Cases known of, 7510-2, 7629-30.  
 Cases not reported, 7656-8.  
 Caused by sandpaper stopping in the nails, 7611-2.  
 Due to carelessness, 7677-9.  
 Use of lead substitute the only way to remove danger, 7581-4.
- Meals :**  
 Mess-room seldom provided, 7590.  
 Often kept and eaten in workshop, 7589.
- Motor cars :**  
 Introduction has increased dangers, 7575-9, 7629-31.  
 Less filling used than for carriages, 7692-3.  
 More lead used than on carriages, 7694-6, 7719-22.  
 Some do not require a great deal of stopping, 7697-8, 7720.
- Outdoor clothing :** cloak room not provided, 7591.
- Overalls :** coach-painters do not wear, 7592.
- Painting :** sequence of processes with leadless material, 7702-10.
- Periodical medical examination :**  
 Desirable, 7601.  
 Suspension from work in lead processes desirable, 7602.
- Priming :**  
 Number of coats applied to carriages, 7525-8.  
 Practically all lead, 7529-30.
- Prohibition of lead :** advocated, if possible, 7659, 7685-6, 7712-3.
- Rubbing-down :**  
 Dry method :  
   Impossible after filling coats, 7551.  
   Occasionally employed between priming coats, 7531-2.

"X," Mr.—*continued.*Rubbing-down—*continued.*Dry method—*continued.*

Principal danger, 7553, 7558-60, 7578-9, 7682-4.

Wheels and carriage underwork:

Exhaust ventilation hardly practicable, 7664.

Extremely dangerous process, 7555-60.

Not done between filling coats, 7537-8.

Wet method:

Employed after filling and staining, 7550-1.

Impossible on wheels, etc., 7561-3.

Staining:

Applied on the stopping, 7547.

Composition, 7548.

Object, 7549.

Stopping:

Lead, 7541.

Mixed by painter, 7542-3.

When applied, 7539-40.

Washing:

Accommodation: generally inadequate, 7586.

Facilities rarely available, 7587.

Time not allowed, 7588.

Unavoidable soiling of hands, 7585, 7679.

White lead: mixing not dangerous if done carefully, 7544-5.

Workmen: careless as to health, 7716-8.

Zinc paints:

Insufficient body, 7641-2.

Not used unless mixed with other compounds, 7638-40.

## Zinc Oxide:

Amount used by Belgian State Railways: *Pisart*, 21,887.

## Zinc Paints:

Adopted because of lead poisoning: *Readman*, 12,424.As good as lead: *Jordan*, 1180, 1221-4; *Awcock*, 12,604.Better colour than lead: *Awcock*, 12,603.Cannot be used for locomotives: *Nooijen*, 15,235.Cost less than lead: *Jordan*, 1262-6; *Ball*, 9868.Could be used for vehicles if varnished: *Plumb*, 18,358.Difficulty as to drying: *Garson*, 2581.

Durability:

Better than lead: *Ball*, 9867.For lining: *Awcock*, 12,610-2.Experiments with: *Readman*, 12,382, 19,433-54;*Ireland*, 19,455-60.Exported: *Garson*, 2554-6.Finish better than lead: *Ball*, 9867.Hard undercoats impossible with: *Garson*, 2582-3.

Insufficient body: "X," 7641-2.

Masury process not tried: *Garson*, 2577-80.No difficulty in applying: *Jordan*, 1228-9, 1308-11;*Readman*, 12,497-8; *Awcock*, 12,601-2, 12,605.No difficulty in mixing: *Readman*, 12,503; *Awcock*, 12,606-7.

Not entirely abandoned by Belgian State Railways:

*Ricker-Devroede*, 15,009-10.Painters prefer to use: *Ball*, 9866.Powdoring of: *Cornett*, 12,848, 12,889.Require no more varnish than lead: *Jordan*, 1293.Satisfactory: *Readman*, 12,383, 12,422-3, 12,496-8.Six years' trial sufficient: *Jordan*, 1226-7, 1313-5.Suitability for sign-writing: *Heydorn*, 562-7;*Readman*, 12,496-8.Supplied to coach-builders: *Heydorn*, 561; *Smyth*, 13,399-401.Used after filling: *Garson*, 2584-6.Used in form of enamel: *Garson*, 2566-7.Would stand without varnish, *Cornett*, 12,891.