Colonial Office Conference, 1927.

APPENDICES

TO THE

SUMMARY OF PROCEEDINGS

(In continuation of Cmd. 2883).

Presented by the Secretary of State for the Colonies to Parliament by Command of His Majesty, June, 1927.

LONDON:
PRINTED AND PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.
To be purchased directly from H.M. STATIONERY OFFICE at the following addresses:
Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh;
York Street, Manchester; 1, St. Andrew's Crescent, Cardiff;
15, Donegall Square West, Belfast;
or through any Bookseller.

1927

Price 4s. 6d. net.

Cmd. 2884.

LIST OF APPENDICES.

(For full List of the Members of the Conference see pages 5–6 of Cmd. 2883.)

COLONIAL OFFICE CONFERENCE, 1927.

APPENDICES TO THE SUMMARY OF PROCEEDINGS.

(In continuation of Cmd. 2883.)

APPENDIX I.

OPENING SPEECH BY THE SECRETARY OF STATE FOR THE COLONIES, 10TH MAY, 1927.

Welcome to Delegates. Nature of Colonial Empire.

Mr. AMERY: It is my privilege to welcome you to the first Conference representative of the Governments of the British Colonial Empire. The conception of the Colonial Empire as an entity of its own—an important constituent element—in the wider framework of the British Empire, with characteristics and problems which differentiate it on the one hand from the Commonwealth of equal self-governing Nations of which Great Britain is the senior member, and from the great Empire of India on the other, is one which is only gradually dawning upon the mind of the general public, and indeed even on the minds of those who, like ourselves, are directly connected with the conduct of Imperial affairs. It is a conception which will, I believe, emerge clearer and stronger in our own mind as well as in that of the public outside as the result of our meeting here and of our deliberations, and, if so, that will in itself constitute a justification of the experiment of summoning you here.

On the occasion of the Imperial Conference last autumn, I took the opportunity, as Colonial Secretary, of setting forth to our colleagues from the Dominions something of the immense extent and resources of this undeveloped estate, as Mr. Joseph Chamberlain once called it, which comprises over 2 million square miles, with a population of 50 million people, with a trade already exceeding £500 million a year and doubling itself every few years but capable of infinitely greater and far more rapid expansion. In a brief survey I attempted to give them some idea of the endless diversity of its problems, constitutional, economic, cultural, and of the interest of every part of the Empire in the solution of these problems. I endeavoured to indicate to them that under all that almost bewildering diversity there lies a large measure of unity arising not merely from the facts of the situation—I mean that the Colonial Empire is almost wholly a tropical and sub-tropical Empire, interested in all economic and health problems of the Tropics, that it is an Empire of mixed and, in the main, non-European and largely primitive populations, and that the ultimate responsibility for the general governance of its affairs must, at any rate for any future that

we need take into consideration here, rest with this country—but arising also from the community of ideals and purpose which animate that devoted and splendid Colonial Service of which you are representatives here to-day and which is embodied in the traditions of the great Office in which we meet.

Its lack of Administrative Unity and Co-ordination.

I need not go over that ground again, but there is one thing which I did not say to the Imperial Conference which does concern us here very closely, and that is that, while there is this large measure of unity in the problems of the Colonial Empire and of the spirit in which we approach them, there is very little of what I might call structural or administrative unity. Strictly speaking, there is, of course, no Colonial Empire and no such thing as the Colonial Service. I deal in this Office with some 36 different Governments, each entirely separate from the rest, each administratively, financially, legislatively self-contained. Each, whether it deals with nearly 20 million people over an area as large as Central Europe or with 20,000 people on a scattered handful of islands, has its own Administrative Service, its own Medical Service, its own Agricultural, Public Works, and other technical Services, its own scale of pay, its own pensions.

The whole system, with its haphazard complexity and lack of co-ordination on any structural basis, would, I fancy, not be tolerated for a moment by our more logical neighbours across the Channel. For all that, I believe that our system, or lack of system, has certain great advantages. Each Colonial Government and each Colonial Service has grown up on the spot by a continuous process of local evolution from the days of our first historical connection with the Colony, the days of the first treaty cession, the first conquest, the original peaceful trading penetration, as the case may be. Each Government and each Service, therefore, is autochthonous, racy of the soil, adapted to local conditions and instinctive in its understanding of those conditions and in its sympathy with the population it administers. It would, in my opinion, be a profound mistake to scrap the essentially local and individual basis of our system, with the local pride and patriotism which go with it, in favour of some uniform logical scheme devised in this Office and then imposed from without by a Service more interested in its individual careers than inspired by local sentiment and attachment. On the other hand, there is no doubt that the principle of autonomy and self-sufficiency can be carried too far. Watertight compartments, especially if they are small ones, inevitably lead to stagnation. Even on the purely administrative side local knowledge and interest may be bought too dearly by the lack of opportunities for contact with fresh ideas, or by limitations to promotion which may deaden initiative and ambition. The disadvantages are even greater when we come to deal with

all those varied aspects of administration which have bulked so increasingly in our work in recent years, and will continue to develop on an ever larger scale—I mean those aspects of administration into which scientific method and scientific research enter, problems of agriculture, of veterinary science, of health, of transport, all of which figure very prominently on our Agenda. In all these matters we do need much closer co-operation and a much more effective interchange, both of information and ideas, and of the trained and skilled personnel who can embody information, ideas, and method and convey them far more effectively than any bulletin or memorandum ever can. In some matters such a system of interchange and co-operation may be most effectively developed in groups of Colonies which geographically or otherwise are close to each other and have kindred problems. In many other respects it is over the whole field of the Colonial Empire that co-operation and interchange are required. I do not believe, however, that the problem is one to be solved by administrative reconstruction either of the Colonial Empire as a whole or, except in particular local circumstances which may justify it, in the shape of larger federal schemes. The solution, to my mind, in our time at any rate, is to be found rather in the development of that system of consultation by Conference which has been found so effective in promoting unity of thought and action in the relationship between Great Britain and the Dominions, and which ought certainly to be not less effective in achieving the results we desire to bring about in the development of the Colonial Empire.

Growth of the System of Consultation by Conference.

It is perhaps interesting to recall the fact that the first Colonial Conference, using the words " Colonial Conference " in their old sense, which met in 1887, was representative not only of the self-governing Colonies but also of 23 non-self-governing Colonies who met for discussion of affairs of common interest to the whole Empire.

When the Ottawa Conference took place in 1894, representatives from the non-self-governing Colonies were not invited as that Conference met mainly to discuss the problem of the Pacific Cable and the question of Imperial Preference, and was largely due to the initiative of certain of the self-governing Colonies themselves. When it came to the Conference of 1897, Mr. Chamberlain decided, and I think decided rightly, that really fruitful results could not be expected from a discussion between representatives who, as between themselves, stood on a very different footing of responsibility and authority, some speaking in the name of their own Parliaments and of Governments of which they were the head, others in the last resort speaking subject to the control and overriding authority of the Colonial Secretary. He therefore confined what was then still known as the " Colonial Conference " to the Prime Ministers of the self-governing Colonies, considering that the interests and point

of view of the non-self-governing Colonies would be most effectively represented at such a Conference by himself. That continued to be the case when the old Colonial Conference merged into the Imperial Conference, and from that time on the interests and point of view of the Colonies have been represented at the Imperial Conference in the person of the Colonial Secretary. It is interesting, however, to note that this representation collectively by the Colonial Secretary has been increasingly supplemented in recent years by direct representation, wherever more technical matters have been considered. For instance, the Colonies were represented directly at the Imperial Economic Conference of 1923, and to some extent at Sub-Committees of the last Imperial Conference, and they have been represented on such specialist Conferences as the Imperial Entomological and Mycological Conferences of 1925, the Empire Forestry Conferences—of which the next is to be held in Melbourne in 1928—and they will also be represented directly at the Imperial Education Conference this June, and at the first Imperial Agricultural Research Conference next October.

Meanwhile, within our own more limited Colonial sphere, the habit of conference has been steadily growing. We have had a number of specialist Conferences between technical officers and representatives in groups of adjacent Colonies. We have had in the West Indies, for instance, a Customs Conference, an Agricultural Conference in Jamaica in 1924, and the Conferences with Canada in 1920 and 1925, dealing with questions of trade and shipping. In West Africa we have had a Senior Medical Officers' Conference in 1925, a Railway Conference last year, and an Agricultural Research Conference at Ibadan which has met this year. In East Africa we have had a Law Officers' and an Agricultural Conference. Besides that, there have been one or two examples of Conferences of a more general character between groups of adjoining Colonies and Territories. We had last year the East African Governors' Conference, the first of its kind, held at Nairobi, while there have been unofficial conferences of settlers from the same East African territories, which have been held in various parts of East Africa. Last year, too, we had an unofficial Conference here in London of the West Indian and Atlantic Colonies and Colonies in the Caribbean region, the prelude to a regular series of similar Conferences to be held in future alternately in London and the West Indies.

Nature of Colonial Office Conference and Results to be expected from it.

And now we are met here for the first, though I think I may say with some confidence not the last, general Conference of the whole Colonial Empire. It is a great satisfaction to me that, in spite of the very short notice which it was possible to give, so many Governors have managed to come themselves, and that those who have not been able to come have arranged for

so strong a representation of the interests of their Colonies. Not a few of those who are here have served in several Colonies, and I think therefore we can say that we have here a body of men of very ripe and wide experience who can by mutual discussion arrive at results of real value to every Government and individually gain real value for themselves in their work when they go back to their respective duties. That so strong a representation has been secured at short notice is, I think, a sign of the genuine interest with which this experiment has been regarded by all the Colonial Governments. I think no less a sign of that interest has been shown in the wealth of interesting and valuable material which the various Governments have contributed. A good many of the memoranda sent in have been circulated in their original form. In the case of a great many other suggestions and propositions put before us the Colonial Office has endeavoured for convenience sake to embody them in memoranda drafted here, concentrating subjects as far as possible, and endeavouring to lay before you all that has been most important in the suggestions made, without absolutely overburdening the Conference. Even so there is a great deal which we cannot really hope completely to deal with at this Conference. Some of the suggestions we may be able to take action upon in the Office, even if they have not been fully dealt with at the Conference; others possibly may have to wait for a later session of the Colonial Conference. I think that even if we went no further the material which has been elicited and brought together by the suggestion that a Conference should be held would almost of itself have justified the holding of the Conference.

Naturally, this our first meeting must be to a large extent tentative. We shall find by experience what methods of discussion are best suited to our own conditions and our own problems. As regards the composition of the Conference, we did at one time contemplate the possibility of associating with the official element, at any rate in the case of certain Colonies, an unofficial element. But, following the principle which Mr. Chamberlain adopted in 1897 of confining discussions to those who could speak on the same footing of authority and responsibility, we came to the conclusion that, in the first instance at any rate, it would be best to confine our deliberations to those who could speak in an official capacity, and to deal mainly with administrative questions. We shall find that, quite apart from other wider discussions which we may perhaps enter upon at another Conference, the field of our administrative problems will be more than sufficient to occupy all our time, and that we shall certainly make only a certain amount of progress towards the solution of the many problems that are indicated on the Agenda.

Apart from any specific solutions we may arrive at, I feel confident that we shall gain enormously by the exchange of ideas between ourselves. I think all the representatives from the different Colonies will find that they will gain, but I am inclined to think that we in the Colonial Office itself may gain

even more from the first-hand experience that you gentlemen bring to us. From that point of view alone, if from no other, I think we shall be convinced, not only that it was worth while summoning this Conference as an individual experiment, but that it will be worth while, and indeed almost necessary, to hold similar Conferences in future, and to hold them, I believe, at not too infrequent intervals. It may be that intervals of three years intervening between the Imperial Conferences and perhaps linking up with their work may be found most convenient. However, that is a matter which we can discuss later. But I am already, as I said just now, convinced, by the interest taken and by the material which has come in, that this has been an experiment worth trying, and that we are not likely to go back on it.

Scientific Research and Organisation.

I do not think I need attempt to go into the wide range of subjects which are before us. There is, however, one of outstanding importance to which I should like briefly to refer. That is the question of science and of scientific research in all its forms. The importance of scientific research and organisation is being recognised increasingly every year in this country, and I think the general movement of thought is one in which we are certainly not being left behind in this Office or, I think, in the Colonial Empire generally. There is a real consciousness of the fact that we have immense undeveloped resources which science, and science alone, can bring to rapid development. Now it is just here where our system of watertight compartments fails most strikingly. It is of the very essence of scientific research that you must offer to the scientific worker free movement, determined according to the needs of study or research and not limited by any local hierarchical system or by the administrative limitations of what may perhaps be a very small Colony with limited problems. You must give the scientist a career. I am thinking not so much necessarily of a career in terms of salary, though there too if you want to get good men you must pay reasonable rates, but I mean more particularly a career in the sense of a field of work wide enough and varied enough to call the best out of each man. Now our present system does not offer such a career. In many cases the Colonies that offer the greatest opportunity for some particular form of research, the Colonies whose existence is most vitally dependent on the solution of some research problem, are the ones which can least afford to offer, either temporarily or permanently, the salary or the career which will attract the best men. Nor again is the problem one which can be solved in any one Colony alone. Scientific research work is essentially of the nature of team work, and the team for this purpose is not always most effective when concentrated in one spot. A problem of research has different aspects not necessarily best dealt with in one place. There is the economic aspect where

research can perhaps be best made here. There are local points of view where the research is best made on the spot. There are again more abstract sides of scientific research where one of our Universities or research institutions at this end may contribute most effectively to the problem. Nor is the interest in the results confined to any one Colony. Anything that solves the problem of animal disease or plant disease in Trinidad is of immense value not only to the rest of the West Indies, but to the whole of Africa, to Ceylon and the Eastern Colonies.

It is obvious that in this field of science and research we need a wider outlook and some more effective system of interchange and intercourse than we have at present. I have been very much struck by the fact that we have had so many papers from different sources which deal with this problem. We have had, of course, from the point of view of this Office, the very valuable Report* of Lord Lovat's Committee, and I might also congratulate my colleague, Mr. Ormsby Gore, on the really admirable and lucid survey he has made for our meeting of the whole question of agricultural research.† I notice also that in papers from Sierra Leone, British Honduras, Kenya (not to speak of an older paper, 25 years old, from the Federated Malay States, which Dr. Stanton has quoted in his own memorandum‡), suggestions have been made that it ought to be possible in some way or another to create a scientific service for the whole Colonial Empire. I am sure that the case for pooling our resources sufficiently to create some sort of unified service, at any rate in the higher research grades of scientific and technical work, is one to which we ought to give the fullest and the most earnest consideration at this Conference. I know very well that there are many difficulties and that we shall be confronted by a considerable range of alternative proposals. All the same I am so convinced of the importance of this subject that I believe that it would be a pity if we separated without finding at any rate some solution, not necessarily a final solution, but some solution of that problem which would enable us to create a more effective instrument for the scientific development of our almost unlimited resources.

---

* Cmd. 2825. † See Appendix V. ‡ See Appendix XVI. (A).

APPENDIX II.

Recruitment and Training of Colonial Civil Servants.

MEMORANDUM BY THE PRIVATE SECRETARY FOR APPOINTMENTS.

Section I.—Introduction: Scope of Memorandum and point of view from which it is written.

This Memorandum deals with recruitment since the Armistice for those branches of the Colonial Service for which men are selected by the Secretary of State personally with the assistance of his Private Secretary (Appointments). A table of these services, showing the number of appointments made annually in each, is given in the Annex. From this it will be seen that—broadly speaking—the memorandum covers initial recruitment for all services except (*a*) Eastern Cadetships, which are filled by competitive examination, and (*b*) appointments filled on the recommendation of the Crown Agents for the Colonies. These two groups are dealt with in separate memoranda* which have been prepared by those concerned Minor appointments and educational appointments open to ladies, for which the Board of Education recommend candidates, are not included.

The Private Secretary is responsible only for recruitment from outside the Colonial Services. He therefore does not deal directly with questions of promotion and transfer and although he has been called upon to recruit for a number of senior appointments—especially in Education and in Scientific Departments—he is mainly concerned with recruitment for the junior grades.

2. The main object of this Conference, as I understand it, is to promote co-operation between Colonial Governments and the Colonial Office by the interchange of opinions and of information. The majority of its members represent individual Colonial Governments. The natural tendency of these Governments must be to look on recruitment mainly from the standpoint of their own Colony. It is probable, too, that the pressing needs of the moment may often bulk most largely in their eyes. I have therefore thought it would prove the most helpful course if I drafted this memorandum quite frankly from the standpoint that comes natural to me; that is, from the point of view of those who are responsible for supplying the needs not of one Colony or branch of the Service but of many; who have opportunities of applying to one Colony or Department experience gained in connection with others. and

* Not printed here.

who are increasingly coming into touch with the various sources of supply and with the factors, favourable and unfavourable, which affect it. The nature of our work, in fact, demands a comprehensive view, so far as recruitment is concerned, of the Services as a whole.

3. Further, as I have been responsible for recruitment under successive Secretaries of State since February, 1919, as well as having shared in that responsibility between 1910 and the outbreak of war, I have thought it advisable to put this memorandum in the form of a personal statement; and more particularly so because some of the opinions expressed are my own and must not necessarily be taken to commit anyone else.

Section II.—Recruitment since the War and consideration of factors which have affected it.

4. The period since the Armistice has confronted us with certain exceptional difficulties. For our purposes it falls into three main divisions. The first covers the years 1919-21, and was marked by heavy and often urgent demands for men, to make up for lack of recruitment during the war and to meet the needs of the mandated territories. As against 248 appointments made in 1913, 295 were made in 1919, 551* in 1920, and 387 in 1921; or an annual average of 411. To meet these demands we had to rely almost wholly on the abnormal sources provided by demobilisation and subsequent retrenchments in the fighting Services. The ordinary peace-time sources of supply were practically unproductive, because the Universities, Agricultural Colleges, and so on, required three years or more from the end of the war before they could resume their normal output. As a consequence, although there were very large numbers of ex-service men clamouring for posts, there was a serious and unavoidable shortage of properly trained candidates for all technical and specialised services. Our work in this period mainly consisted in a rather desperate effort to sift out the heterogeneous mass of ex-service candidates and to meet, as rapidly as possible, the urgent demands with which we were bombarded from practically every Colony and Department. It was complicated by the lack of trained material for technical services, such as agriculture; by the fact that the age of so many ex-service candidates was necessarily greater than is normally preferred; and by the difficulty, in many cases, of deciding whether the strain, to which the man had been subjected in the war, rendered the danger of selecting him for tropical service too great. These complications were aggravated by shortage of staff at this end and by the pressure under which the work had to be done.

---

* But for the delay occasioned by having to organise recruiting machinery, etc., a number of these would probably have been made in 1919.

5. The second period—1922—was marked by a heavy slump in recruitment caused by widespread financial depression. The number of appointments fell in that year to 174; and in some Colonies, such as Kenya, retrenchment of existing staff was carried out. The effect of this slump was very bad. Not only were better men turned away than some of those selected both before and since, but the confidence of some of the training centres was shaken.* In the highly specialised department of Forestry, for example, our recruitment has not yet recovered from this blow.

6. The third period runs from the end of 1922 to the present time. Recovery began in the autumn of 1922, but was only gradual. 233 appointments were filled in 1923, 352 in 1924, 406† in 1925 and 424† last year. Demand, therefore, has shown a steady rise up to a figure greatly in excess of the immediate pre-war period. Special features of the last year or two have been (i) increases in the administrative staff in Tropical Africa; (ii) a large increase in the demand for Educational officers [76 Educational appointments were made in 1926 as against 46 in 1925, and we have 55 such vacancies on hand at the moment]; and (iii) the creation of a number of scientific posts mainly in connection with agriculture.

During this period the abnormal war-sources of supply have practically dried up. On the other hand, the Universities and training Colleges have resumed their full annual output.

7. It has therefore become possible during the last two or three years to take stock of the position and to get a better idea of the relation between supply and demand, under conditions which might be expected to be fairly permanent. It became clear that definite measures would be needed if the increased demand in regard to both quantity and quality was to be met, and if the higher training required to cope with recent developments was to be provided. I will deal with these measures later, but, before doing so, I should like to invite attention to certain factors which have considerably influenced recruitment, and which had therefore to be taken into account in considering measures for its improvement.

8. There seems to be a lack of enterprise and a tendency to stay at home amongst the post-war generation. This has been commented on at the Headmasters' Conference and elsewhere, and has, I believe, been noticed by the Civil Service Commissioners, who recruit for different groups of services. This tendency may be largely due to a temperamental reaction from the war, but there appear to be other factors at work; though in discussing them I know that I am on difficult and, possibly, controversial ground, and can only give my opinions for what they are worth. The kind of man who usually proves most fitted

---

* See paragraph 32 f. of Report of Lovat Committee (Cmd. 2825).

† In addition, 16 Agricultural scholars were selected in 1925, and 17 in 1926.

for the Services under discussion needs certain personal qualities and an educational background mainly to be found in the type of family which has been most severely hit by the war. The loss of his father or elder brother may strengthen the desire to keep a boy at home. Beyond this we have the undoubted fact of the limitation of families; and it was generally the younger sons of large families who went overseas in the past. Economic pressure has also made it harder for such families to send their sons to a University. Fewer of them, therefore, get the type of education we prefer, and, as, for climatic reasons, we cannot usually send a man out till he is 21½, those who cannot go to a University tend to drift into other employment before we can take them. It must also not be forgotten that we lost 30,000 officers killed in the war. The effect of such a wholesale destruction of leaders cannot be made good in a short time, and it is men with the qualities of leadership whom we especially need. Finally, it is, I think, generally accepted that business firms are far more alive than they used to be to the value of the type of man we seek to attract. We have therefore to face a far stiffer competition from this quarter than in pre-war days, and the greater financial rewards, which a business career offers, are doubly attractive in these times of economic stringency.

9. In the second place, a higher general standard of quality is demanded; and here I may perhaps be permitted to say that the utmost importance has always been attached to obtaining men of the highest quality that circumstances allowed. In pursuance of this policy it has quite often been decided to leave vacancies unfilled for some time, if the available material was unsatisfactory and there was reason to hope that better candidates could be secured by waiting. This has been the principal cause of the delay which has not infrequently taken place in filling vacancies; but I hope that, in view of the interests at stake, the Conference will endorse the policy which has been followed.

The demand for a higher standard has been shown principally in three ways:—

(*a*) As development progresses there is a growing need for high intellectual ability among recruits for the African Administrative Services, without any relaxation of the necessity for insistence on those qualities of personality and character which are essential to the proper handling of natives.

(*b*) Whereas in pre-war times the other departments had, on the whole, to be content with a somewhat lower personal standard, it is now recognised that many of them, for example, the Educational, Agricultural, Forestry, and Veterinary Services, need men of similar standing in this respect to the Administrative staff, with the addition of professional qualifications.

(*c*) It is clear to anyone looking at the whole field that recruitment for scientific departments has entered on a new phase. In a number of important Colonies, particularly in Tropical Africa, Agriculture and the kindred arts of Forestry and Animal Husbandry have reached a stage where their problems call more and more for the application of a higher degree of scientific knowledge and skill. This entails a higher standard of scientific attainment in all officers entering the Service and creates a greatly increased demand for the specialist and the research worker. It is also providing openings for workers in certain specialised branches of science, for which we have hitherto hardly recruited at all; as, for example, bio-chemistry, soil-science, genetics, and various branches of forestry research.

10. As against this increase and intensification of demand, we have to compete with the adverse general factors which I have tried to outline. Above all we must face the fact that the development of the non-self-governing Dependencies is advancing much faster than is realised by public opinion at home. Neither the young men, who should be our recruits, nor their parents or teachers—perhaps not even we ourselves—yet realise the important part which these Dependencies as a whole already play in the economy of the Empire; still less the far greater part which they are destined to play, if properly developed, even within the official lifetime of any one now entering the Service.* The rapidly expanding range of opportunity for responsible and interesting work, which these Services will offer, are by no means fully grasped.† Equally apparent is the failure to appreciate the vital part which science and scientific research must play if these territories are to be fully developed.†

11. We have had accordingly to face a demand for:—

(*a*) About 60 per cent. more men per annum than in pre-war days;

(*b*) A higher standard of quality;

(*c*) More, and better, training.

It therefore became progressively clearer:—

(1) That special steps must be taken to stimulate recruitment, and to make the fullest possible use of the material available.

(2) That in regard, at any rate, to certain scientific departments there were not enough young men of the right personal stamp and general education who were undergoing appropriate training to fit themselves for these services and had the intention of competing for them. In summing up

* This aspect of the question is fully dealt with in paragraphs 12–23 of the Lovat Committee's Report.

† See paragraph 25 of the Report of the Research Special Sub-Committee of the Imperial Conference, 1926. (Cmd. 2769).

their conclusions on this point, in connection with agricultural recruitment, the Lovat Committee ended by saying :—

> " In short, the supply from which to select does not exist, and must be created." *

(3) That in certain directions the normal curricula of the training institutions did not fully provide for our requirements. Consequently, that, until our annual demand was sufficiently stable and sufficiently well known to make it worth the while of these institutions to modify their systems of training in the required directions, it would frequently be necessary to supplement such training by providing special post-graduate instruction for our probationers.

(4) That, in recruiting for such a service as Education, it would no longer be possible to rely on the candidate with professional experience, but that we should have in the main to recruit the " raw material " as it left the Universities, and train it ourselves.

In the next section I propose to outline the principal steps which have, so far, been taken to make good these deficiencies. It will be seen that, as experience was gained, various schemes have been devised to stimulate recruitment, to encourage men to take up appropriate lines of study in the training centres, and to fill gaps in their training by post-graduate instruction.

Section III.—Steps taken since the Armistice to improve Recruitment and Training.

12. I will deal first with measures of general application, and then with special steps designed to help particular branches of the Service. The former can be conveniently grouped under two heads :—

(*a*) Steps taken to attract recruits, and

(*b*) Those designed to make the best use of the men who apply.

13. Under (*a*) the following points may be noted. The salary scales of many departments have been raised. The information provided with regard to the Services has been greatly improved. The pamphlets dealing with appointments and conditions of service have been largely rewritten, and in some cases considerably expanded. They are frequently revised and reprinted in order to keep them up to date. In addition, much fuller information in regard to particular vacancies is now prepared for circulation to recruiting centres and to individual inquirers.

We have gradually built up a widely extended system of liaison with the University Appointments Boards and with educational authorities at the Universities, Agricultural Colleges,

---

* Paragraph 38 of the Committee's Report.

Medical Schools, and similar institutions, who may be in a position to recommend suitable candidates. Our list of such correspondents covers several institutions in the Dominions as well as those in the British Isles. It is being continually extended, and we now have well over 100 correspondents on our standing list for the distribution of pamphlets or the notification of vacancies as they occur. We also communicate with the headmasters of over 100 of the leading schools with regard to vacancies in the police forces of the Eastern and West Indian Colonies, whose minimum age limit permits us to consider applications from boys of 19.

In addition, we have made extensive use of advertisement in the Press in respect of particular vacancies. Here, however, it is necessary to use discretion, for experience has shown that in regard to some classes of appointments advertisement merely leads to a large number of applications which on investigation turn out to be worthless. Much time is thereby wasted, and this method should only be resorted to, in such cases, if all others fail.

14. (b) *Use of available material.*—The vital importance of securing the best men that circumstances permit has been clearly recognised; and it is obvious that the greater the difficulties of recruitment the more important it is to make the best use of the material available. No pains have therefore been spared to obtain trustworthy information as to the record and qualifications of those who apply, and to judge of their suitability on grounds of personality and temperament. This is done by personal interview and confidential enquiry. I do not propose to go into details; but I doubt if the time-honoured phrase still used in our despatches to the effect that the candidate's personal referees have been communicated with gives an adequate idea of the thoroughness of the methods now used, or of the labour which they imply.

Apart from this investigation, which we conduct ourselves, very complete arrangements have been made for obtaining expert advice on the professional suitability of candidates for technical services. Arrangements now exist whereby the opinion of a recognised expert, or of an expert committee, is obtained in the case of every candidate who seems worthy of serious consideration, for all scientific services; medical, agricultural, entomological, forestry, and so on. In all such cases the candidate, if in this country, is interviewed either by a committee, at which experts are present, or by an expert and ourselves independently, the two results being afterwards compared. We also obtain valuable assistance from these advisers as to where best to look for candidates for specialised vacancies. Similar assistance is given us in respect of many educational vacancies by the Secretary of the Advisory Committee on Native Education, himself an ex-Director of Education in Africa, or by members of the Committee. Much valuable assistance is also

obtained by consultation with heads of Colonial departments, and other experienced officers, when on leave. Their advice is sought as to filling vacancies which exist, or are expected, in their departments; we arrange for them to interview the most promising candidates and examine their papers; in some cases also they are good enough to visit the Appointments Boards, &c., at the Universities and talk to men who are making enquiries about the Service and who may often be turned into definite applicants by getting first-hand information from someone with local experience.

As it has become possible to do so, we have concentrated in our hands recruitment for a number of appointments which were formerly undertaken mainly by others. The advantages of such concentration are twofold. Those who have a large field of opportunities before them can often make use of a candidate in a department other than that for which he first applies. They can also frequently apply the lessons gained in connection with one Colony or department to the problems presented by others.

Finally, we do what we can to check the results of our recommendations, as a guide to future selections. We examine all the confidential reports on officers in the Service. Should an officer selected prove unsuitable, the case is carefully gone into, in order to try to discover where the mistake in selecting him was made. Every opportunity is also taken, so far as circumstances permit, to consult experienced officers in the Service as to how the men sent to their departments have turned out, and as to the type of man they will require in future.

In these and other ways, which it would take too long to enumerate, our general machinery has been continually improved, as experience has been gained; but no one realises more clearly than we do the need for further improvement.

15. Certain other definite steps have, however, been taken to stimulate recruitment and to improve training in connection with particular branches of the Service, and I will deal with these roughly in chronological order.

16. *Forestry.*—Forestry was taken up first because its position was in many respects the most unsatisfactory. Previous to the war there had been no common standard of recruitment, and a number of officers had been selected whose scientific training on entering the Service was not up to the standard required by present day conditions.

In 1919 there were a number of vacancies for which practically no trained candidates were immediately available. To encourage applications a training grant was made to assist students in the last year of their forestry course at approved Universities, the men being selected as probationers for our Forest Departments, subject to their completing their University course satisfactorily. From 1920 onwards this has enabled us to insist on the possession of a degree or diploma at a recognised University school of

forestry, a standard not previously attained by several men who had entered the Service.

In 1921 an interdepartmental committee, representing the Forestry Commission, the India Office, and the Colonial Office, reported that the courses provided by the Universities were not in themselves sufficient for forest officers in Government departments, and should be supplemented by special post-graduate training. They recommended that a central training institution should be set up for this purpose. The proposal was temporarily dropped owing to the need for economy. It was revived at the Empire Forestry Conference of 1923, and endorsed by the Imperial Economic Conference of that year. As a result the Imperial Forestry Institute was set up in 1924 at Oxford on an experimental basis for five years, and placed under the control of Professor R. S. Troup, C.I.E., F.R.S., Professor of Forestry at Oxford, and formerly of the Indian Forest Service. At this Institute our officers receive valuable post-graduate training either before taking up their duties or on their first leave. Courses are also attended by officers, who were selected since the war but before the founding of the Institute, as they come on leave. The Institute further provides for special or "refresher" courses for officers who have been for some years in the Service and arranges for the training of specialist forest officers. Facilities for such training did not exist before in this country, and the Malay States, when they required a research officer in 1921, had to secure the services of an American, because it was impossible to find a candidate in the British Empire qualified to hold the appointment.

It was foreseen, when the Institute was started, that the need for trained specialists would shortly be felt. This has already begun to be the case. The Institute has lately been asked to train two specialists for Nigeria, and more posts of this nature are now to be created.

Much more, of course, needs to be done, but in regard to Forestry it is possible to say that a higher standard of scientific knowledge is now required of all our junior forest officers than was attained before the war by any of them, save in exceptional cases.

Facilities have thus been provided for the common training of our forest officers, and for bringing them into touch with each other; for the provision of "refresher" and special courses, and for the training of specialists. None of these advantages existed before 1924.

17. *Agriculture, and Scientific Services connected with it.*—The case of the Agricultural Departments was next taken up.

In 1920, on the recommendation of the Committees appointed for the purpose, considerable improvements had been effected in the salaries of agricultural officers and information with regard to the improved careers offered had been widely broadcast in the training centres. By these means it was hoped that satis-

factory recruitment would be ensured as soon as these institutions had had time to resume their normal output of graduates. An improvement did certainly take place, but it was insufficient to meet the growing demand. An authoritative committee was therefore set up in 1924 under the chairmanship of Viscount Milner, who was succeeded on his death by Lord Lovat. This Committee produced an interim Report in 1925 with special application to recruitment and training. Its full Report, which embraces wide questions affecting Research and the organisation of Agricultural Departments, has lately been published,* and has been circulated to members of the Conference.

As a result of the interim Report, a system of Agricultural Scholarships was instituted, and the first selection took place in 1925. There are from sixteen to eighteen scholarships a year. They are normally held for two years, the first being spent in this country, and the second usually at the Imperial College of Tropical Agriculture, Trinidad. The scholars form a pool, from which vacancies can be filled in the year their scholarships end. Men are selected and trained with an eye both to specialist appointments and to appointments in general agriculture, and the training is varied to suit each case on the advice of the expert committee which interviews the candidates. In general the scholars destined for specialist appointments do one year's work under an expert in their own line; the men for administrative posts normally take a year's course at the Agricultural Economics Research Institute at Oxford, together with certain instruction in genetics, practical plant-breeding, statistical methods, and both seed and crop testing at Oxford and Cambridge. During their second year both classes obtain, in Trinidad, an introduction to agriculture under tropical conditions.

This scheme is still at an experimental stage, but the reports received on the progress of the men selected are encouraging, and I think it may safely be said that it is already attracting to the Agricultural Services men of a higher standard than the average obtained in the past. Moreover, they will have had two years' training in subjects chosen to fit them for their work, over and above the qualifications usually held by candidates for these Departments.

It will, too, be possible in future to vary the training in particular cases to suit the requirements of any highly specialised appointments, which it may be desired to create and which it would be difficult to fill satisfactorily from the open market. This can, however, only be done if the Colonial Government concerned gives at least two years' notice of its desire to create such a post.

18. *Survey.*—The standard of recruitment for Survey has not been satisfactory. As an experiment, a course of one academic year under the School of Geodesy at Cambridge, followed by

* Cmd. 2825.

three months' practical work under the Ordnance Survey at Southampton, was instituted in October, 1925, for probationers selected for Ceylon. Only two or three men have so far attended this course; but it appears to have attracted some attention in the University and has led to inquiries with regard to our survey appointments from a few Cambridge men, who appear to be of a calibre much above the average of previous candidates.

Should this course prove satisfactory the question of its extension to other Colonial Survey Departments will be considered. In the meanwhile the existing short course at Southampton, which has been proved insufficient, is being expanded to one of six, or, in certain cases, eight, months. To enable the training to be done at the right time of year only one examination will in future be held per annum. To bridge the temporary gap in recruitment which this change will entail an extra examination is now proceding. This was widely advertised and has attracted a fairly numerous field.

19. *Administrative Services in Tropical Africa.*—As far back as 1920 we had considered how best to ensure a good supply of candidates for these Services when the abnormal source provided by demobilisation should have dried up and peace conditions should have again reasserted themselves.

The policy here has always been to select the best material available wherever it may be found, and the administrative staffs have in practice been drawn from a great variety of sources. At the same time it was clear from our records that the Universities of Oxford and Cambridge had for several years before the war supplied a very considerable proportion of these st ". Experience had also shown that the life and education that these residential Universities provide produce a considerable number of men fitted for successful work among native races; provided that their attention, and that of their advisers at the Universities, can be sufficiently drawn to the openings for such work which the Colonial Services offer.

A training course for candidates selected for the administrative services was previously held at the Imperial Institute in London, where the selected probationers were out of touch with any important source of recruitment. It was thought possible that, if this course could be held at Oxford and Cambridge, the presence in the Universities of men selected for these Services, and the fact that various faculties of the University would be definitely responsible for their training, would have the effect of attracting the attention of the University authorities, and of the older undergraduates, more and more to the careers offered by the Colonial Service. It was hoped that in this way recruitment would in course of time be permanently improved.

The possibility of the Universities undertaking this training was accordingly discussed with both Oxford and Cambridge, but before a decision could be reached the slump of 1922 intervened. Administrative vacancies in that year fell to 18, and it was

decided to shelve a scheme which was designed to increase recruitment, and which must necessarily prove more expensive than the existing arrangements. When, however, recruitment revived and steadily increased through 1923 and 1924, it was decided to reintroduce these proposals. The Universities agreed to undertake the training, and the scheme was unanimously approved by all the Colonial Governments concerned.

The new courses started at Oxford and Cambridge in October last. The syllabus was framed generally on the lines of that previously in force at the Imperial Institute. Two subjects, tropical medicine and accounts, are still taught in London by the previous lecturers. The remaining subjects are taken at the Universities.

To make these arrangements possible, two selections are held a year instead of three; the selection in the spring, which under peace conditions was never likely to produce many candidates, being dropped. A large selection is held at the end of the summer, when most of the men who have graduated at the Universities in that year are available. A smaller selection is held at Christmas. Men selected in the summer take the Michaelmas and Lent terms at the University, and those selected at Christmas the Lent and Summer terms. The lectures in the Lent term are common to both groups. The two reserved subjects are taken in London by both groups during the Easter vacation. The men of the first group are therefore available to proceed to duty in May, and those of the second group about July.

As I have said above, the syllabus followed is, in general, that previously in force. It is possible, however, to give more time to certain subjects, particularly anthropology. In addition, two experiments have been tried at Oxford. A series of lectures on Colonial history, with special reference to the treatment of dependent races, has been given by the Beit Professor of Colonial History, Professor Coupland. In addition, Mr. K. N. Bell, M.C., the Beit Lecturer in Colonial History, who has done invaluable voluntary work in connection with the social welfare of the probationers, has conducted a series of discussions on matters of Imperial interest. The Colonial Agricultural scholars in residence at Oxford, and the Forestry probationers, take part, as well as the Administrative cadets. Much keenness has been displayed at these discussions, and they have formed a useful, informal meeting ground at which cadets can get to know each other and their future colleagues in other departments.

The second experiment has been an attempt to see whether training could not be given during this course which would assist the Administrative officers in their subsequent relations with the more technical departments. So far this has only been attempted in connection with Forestry and at Oxford, where the presence of Professor Troup and the fact that he was training the Colonial Forestry probationers lent itself to the experiment. Professor Troup has delivered a series of lectures to

the Administrative probationers. In these he has made no attempt to train them as pseudo-Forest officers, but has endeavoured to give them some information as to the main principles on which the Forest Departments work; the reasons why forest conservation is important, the utility of forests, their principal produce, and the main lines of Forest policy and administration. In brief, the intention of this course is to give the junior administrative officer an idea of what his colleagues in the Forest Departments are "up to"; the reasons why they may ask him for leave to do things the object of which may not be apparent to him; and, in general, to show him how he can best co-operate with them.

Professor Troup has reported that he considers this instruction likely to be of definite use, that the men have shown intelligence and keenness, and that he believes that as a result of the course they will be in a much better position to appreciate the Forest officers' point of view. He recommends that these lectures be continued each year. If this experiment proves successful, it might be possible to extend it in other directions as opportunity offers. The fact that we now have at Oxford men in training for Administrative, Forestry, and Agricultural Services, and at Cambridge for Administrative, Agricultural, and Survey Services, may lend itself to useful developments in cross-training of this kind, as the whole scheme develops.

Apart from the regular instruction, arrangements have been made for Governors and experienced officers to visit the course while on leave and to hold informal talks with the probationers; giving them first-hand information as to the kind of life and the nature of the work which lies ahead of them, and answering their questions. At these meetings it is often possible to arrange for University dons and for undergraduates, who may be thinking of entering the Colonial Service later on, to be present. By these means interest is aroused and recruitment may be stimulated, at the same time that instruction is given to the probationers. Mr. Ormsby Gore has visited both Universities. Mr. Alexander, of the Southern Nigeria Administration, has visited Cambridge; and Sir Herbert Stanley, Mr. Lethem, of the Northern Nigeria Administrative Service, and Mr. Dundas, Secretary for Native Affairs in Tanganyika, have visited Oxford.

It will be appreciated that these Administrative courses are still at a very early stage at the Universities, and are in many respects experimental. Considerable improvements can probably be effected as experience is gained, and there are several difficulties in regard to both accommodation and training which must be overcome. I venture to suggest that, if they can spare the time, a small conference should be arranged between the representatives of the Tropical African Governments now in this country and representatives of the two University Committees, at which such questions might be profitably discussed.

It is too early to tell what effect these courses may have on

recruitment in Oxford and Cambridge, but there is evidence that other steps which have been taken to stimulate interest have had a definite effect. From 1925 onwards recruitment from these Universities has definitely improved. The intellectual standard is appreciably higher. The majority of University candidates possess honours degrees and, apart from a number who have been taken for Educational posts, between thirty and forty men who possessed a first or second class honours degree entered the Administrative Services in 1925 and 1926.

20. *Medical Services.*—Recruiting for the Colonial Medical Services in the years immediately after the war was in a highly unsatisfactory state. Consequent upon the losses in killed and disabled, and the lack of new entrants at the medical schools, there was a shortage in the supply of qualified doctors and, on account of the longer time required for qualification, the effect of this shortage was felt over a longer period than in other technical services.

On the other hand, the demand for doctors at home was greatly increased, mainly owing to the expansion of various social services. New territories were added as a result of the war and the medical services of some of the older Colonies underwent rapid development. In addition to these unfavourable conditions another factor has adversely affected recruitment, for, while home conditions of service, especially in the matter of salaries, were quickly adjusted to the law of supply and demand, many Colonial Governments lagged behind in this matter. For some years, therefore, prospects in the Colonial Medical Services generally were relatively unattractive, and in some of them they remain so.

The conditions of recruitment are now easier. The supply is greater and the demand for the home services is less. The following table shows the numbers added to the Medical Register during each of the past ten years :—

Year.	*Number added.*	*Year.*	*Number added.*
1917 ...	1,134	1922 ...	1,983
1918 ...	1,077	1923 ...	2,482
1919 ...	1,322	1924 ...	2,796
1920 ...	1,457	1925 ...	2,570
1921 ...	1,760	1926 ...	2,120

The total number of names on the Register on 31st December, 1917, was 43,819; on the same date in 1926 the number was 52,614.

The quality of the applicants now coming forward for the Colonial Medical Services has sensibly improved. Active measures have lately been taken to bring the attractions of these services more prominently to the notice of recent medical graduates and it is hoped that it will soon be possible to exercise a greater freedom of choice in the selection of candidates and so to raise the standard of qualifications, personal and professional, required for entry.

21. *Educational Services.*—The active policy now being followed in regard to the education of Africans has led to a sharp rise in recruitment. The Advisory Committee on Native Education has endorsed the policy, which so far as possible had been pursued since the war, of recruiting men whose education and outlook are similar to that desired in Administrative candidates. It is, of course, unavoidable that this should impose an added strain on recruitment for both services, especially at a time when both are expanding.

The Committee has also accepted the view that it will be necessary to recruit largely from untrained candidates, as soon as they leave the Universities and before they have become committed to a teaching career at home. They have recommended that such candidates should be given special instruction before taking up their duties, and the possibility of organising probationary courses of instruction is being explored.

22. *Veterinary Services.*—The position is not satisfactory. The question of taking steps to improve recruitment and training, on somewhat similar lines to those recently adopted for agriculture, is now under consideration.

23. *Eastern and West Indian Police.*—Steps have been taken each year to bring the careers offered by these Services to the notice of the principal public schools. The field for the annual selection this summer is considerably larger than before; but it has been decided to arrange for more intensive propaganda in the autumn and winter. A despatch has recently been sent to the Governor of the Straits Settlements, asking that fuller information with regard to conditions of life and service in Malaya should be prepared. It is probable that the other Governments concerned will be approached in a similar sense, and we hope that it may be possible to supplement this written information by arranging for officers on leave to give lectures in, at any rate, a certain number of schools.

Section IV.—Future Progress.

24. It would be premature to discuss in detail schemes for future development; but perhaps I may be allowed to suggest certain general lines on which progress might be made and in which we need the co-operation of Colonial Governments.

(a) *Training Schemes.*

25. A great deal more work is required before the various schemes for probationary training, outlined in Section III, can be made fully efficient. Some of these have not yet been started and none of them is more than three years old. Time will in any case be needed before the full effect either of the training which they give or of the influence which they may have on recruitment can be properly gauged. It will be of great assistance if Colonial Governments will from time to time report on the general efficiency of the men they receive, and on the

value—or otherwise—of the various kinds of training which they have been given. It is to be hoped, too, that they will give as much encouragement and opportunity as possible to men like the Agricultural Scholars, when they join the Service; for the success of such a scheme will largely depend on the accounts of life in the Colonial Services sent back to the training centres by the men who are selected during its early years.

The question whether any of these training courses should be supplemented by short courses after arrival in the Colony has also to be considered. The Gold Coast Government is organising such a course for its administrative officers. The ideal would seem to be that subjects of general application and those which can be best taught at a University should be taken beforehand, and the more practical subjects and those of local application after arrival in the Colony. In any case it must be realised that there are limits to what can be taught before the man reaches the Colony, and time must be given him to " find his feet."

In connection with training a word should be said on the subject of study leave. The need for such leave has been a good deal emphasised recently, particularly in connection with technical services, and arrangements have just recently been made with, for example, the Commonwealth Fund, to enable Colonial officers to compete for their valuable travelling scholarships. Full advantage cannot, however, be taken of such opportunities, unless Colonial Governments can see their way to recommend specially suitable officers from time to time, and to give those selected sufficiently generous conditions in regard to leave and similar matters.

(b) *Propaganda.*

26. Full recruitment will not, I think, be secured until the prevailing ignorance with regard to the Colonies and their services has been overcome. For this we need a sustained educational campaign. Two methods can be used. The best results will, I believe, in the long run be achieved by what I may call the indirect method; that is to say, by the influence of good books and articles dealing with matters of general interest. For I think that these have a greater and more lasting influence on the thoughtful type of candidate and on the people who train and influence him.

We cannot, however, wait for the results of this method, though I hope it will be employed. It will also be necessary to make a more direct attack. This can best be done by lectures and informal addresses delivered in the training centres. The best men to deliver them are our own officers when on leave, for they can speak with up-to-date and first-hand knowledge. I hope it may be possible before long to make arrangements whereby Colonial Governments will notify us periodically of officers who are coming on leave and whom they think suitable

for the purpose. It is obviously desirable that they should be carefully selected. I hope too that it may be possible to grant them a certain amount of extra leave and adequate lodging and travelling allowances.

Owing to the need of meeting immediate demands, such work of this kind as has so far been done has been mainly confined to the Universities, and efforts in these quarters need extending. I feel, however, that, with an eye to the future, we should do similar work in the more important schools.

A word of warning is necessary. Anything in the nature of a recruiting appeal or of " touting " for men must be avoided. The aim should be to educate, to lay stress on the importance and interest of the work to be done by officers in the Service, on the fact that only the best men are needed and that it is an honour to be chosen. Secondly, it is very important to guard against any temptation to represent conditions of service as in any way better than they are, or to minimise the risks or disadvantages of tropical life. Any attempt to do either—whatever temporary advantage it might bring—would ultimately recoil on our heads with double force. Thirdly, I think that missionary work of this kind should be done under the general direction of those responsible for recruitment. Only in this way will it be possible to avoid the risk of too many fishermen " flogging " the same water, possibly on behalf of rival services; and even of contradictory statements, misunderstandings, and possible friction. A good deal of mischief has before now been done by well-meant efforts of the kind, where this precaution has not been taken.

(c) *Conditions of Service and Regulation of Demand.*

27. Responsibility for work under (*a*) and (*b*) must mainly rest with us at home. But I think it is fair to say that the success of recruitment ultimately depends on the Colonies themselves. In the long run they will get the recruits they deserve. They must rely on the inherent attractions which their services offer to the type of man they need, and on their capacity so to frame their policy that demand does not outrun supply.

28. It would be impossible here to discuss the adequacy or otherwise of the very varied conditions of service now in force. Considerable improvements have been effected in many directions since the war. There is undoubtedly room for more; and of some appointments it may truthfully be said that the less they are advertised the better for the Service as a whole.

29. On the other hand, it may be worth while to emphasise the need for regulating demand. For good recruitment it is of prime importance that a definite policy should be laid down and adhered to. Only on this basis can demand be kept even from year to year and due notice of special requirements be given. This gives confidence to boys, parents, and teachers that an

adequate number of posts will be forthcoming if the necessary training is undertaken. Recruitment has been greatly hampered in recent years by uneven demand, and delay and disappointment caused by failure to give sufficient notice.

The following examples of what is required may help. If you want to get men as they leave the Universities, it is clear that the majority will be forthcoming after the degree examinations in the summer and very few between January and July. Schoolmasters, again, are usually available in August on the conclusion of the school year. If secured at any other time, they almost always have to give at least one term's notice to their headmasters, and are therefore not available for some months after selection. If these and similar factors are remembered by Colonial Governments, they will be saved much disappointment at delay in getting what they ask for. In general it will be of the most assistance if we can be given as long notice as possible and as much latitude as possible to secure the best man when he is available.

30. In the case of specialised Services long notice is particularly necessary. The Forest Service, an important one in itself, is a good example. The training of a Forest officer is highly specialised. Very few good openings for him exist outside Government service. Consequently the number of men who take up such training is mainly regulated by the number of Government appointments likely to be available when the training is finished. Under present conditions our Forest officers do three years at a University school and one year at the Imperial Forestry Institute. In consequence it is practically impossible to meet a sudden extra demand, such as was made shortly before the last annual selection by one Colonial Government, unless there has been an unexpected slump elsewhere. I do not believe (and I am supported by the conclusions of a recent conference with the Forestry professors) that recruitment for this service will ever be fully satisfactory until Colonial Governments can put us in a position to tell the Forestry schools of our probable needs three, and preferably four, years before the men are wanted. The Colonial Governments concerned were asked to give us an annual estimate of this kind in 1923, but, except in one or two cases, the response has not been sufficient.

31. I must, however, gratefully acknowledge that in general the Colonial Governments have shown great readiness to meet us over matters affecting recruitment. If co-operation is still imperfect, it may largely be due to our not having yet brought the facts sufficiently home to them.

R. D. FURSE.

April, 1927.

NOTE.—Many of the points touched on in this Memorandum are more fully dealt with in the Report* of Lord Lovat's Committee on Agricultural Services, which has been circulated to

* Cmd. 2825.

members of the Conference, and in the Report of Lord Balfour's Research Special Sub-Committee of the Imperial Conference (1926), "Part II—Man-Power." * Though both these Reports are specifically concerned with Scientific services, much of what they say applies to recruitment and training generally.

ANNEX.

Statement showing the number of Candidates appointed by the Secretary of State with the assistance of the Private Secretary (Appointments) in the years 1913 and 1919-1926.

——	1913.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.
Legal	10	11	21	10	3	8	11	12	7
Administrative ...	82	108	179	90	18	67	72	85	103
Police	13	44	45	32	17	14	32	19	30
Educational	19	13	37	43	39	30	43	46	76
Financial	15	27	31	21	4	12	9	10	20
Marine	4	8	10	4	4	2	8	8	7
Medical	67	44	73	63	41	49	84	129	97
Veterinary	7	4	23	10	7	7	5	8	16
Agricultural	11	9	25	29	10	12	17	27	23
Scientific Specialists (e.g. Botanical, Entomological, Analytical)	9	9	26	18	9	6	25	14	9
Forestry	1	4	33	26	3	11	20	16	13
Survey and Geological	2	0†	30	32	9	5	12	15	15
Miscellaneous (e.g. Game Wardenships, Secretarial posts)	8	14	18	9	10	10	14	17	8
	248	295	551	387	174	233	352	406	424
Agricultural Scholarships	—	—	—	—	—	—	—	16	17
	248	295	551	387	174	233	352	422	441
The figures in brackets give the number of candidates selected in addition to the above, who either withdrew or were found medically unfit.	(111)	(152)	(93)	(39)	(41)	(59)	(93)	(86)	

* Cmd. 2769 (page 307).

† The Private Secretary was not concerned with the selection of Surveyors in 1919.

APPENDIX III.

Colonial Pension Legislation.

(A.) MEMORANDUM PREPARED IN THE COLONIAL OFFICE.

1. Several Colonial Governments have suggested the discussion of this question under the heading "General Conditions of Service"—A (2) of the Agenda—with a view to consideration of the problem of enabling an officer with service under several Administrations to earn "continuous service pensions," i.e., to be pensioned approximately as if all his service had been under one Administration.

2. It may be convenient to set out the general position in connection with the Pensions Report of the Committee on Pensions and Passage Expenses of Colonial Officers, 1922-24.*

The Report dealt with :—

A.—*Pensions for Mixed Service.*

B.—*Gratuity and Reduced Pension.*

C.—*Death Gratuity.*

A.—Pensions for Mixed Service.

3. The Committee advised that "It is possible to introduce a simple and adequate system for mixed service pensions based on final pensionable emoluments which can be adopted, where it seems desirable, irrespective of any climatic differences in ordinary pension scales."

4. Dealing in a Circular despatch of the 19th March, 1925, with "the principles which should govern the application of the system of basing pension for service under more than one Government on the officer's final salary and total service," the Secretary of State wrote as follows :—

> "In paragraph 24 of their Report, the Committee pointed out, without making any recommendation, that their proposals would enable a Colony to schedule another Colony without reciprocal legislation on the part of the other Colony if it was desired to do so. I have, however, after consideration come to the conclusion that it is not desirable that a Colony should assume the financial burden of such a non-reciprocal arrangement.

* Non-Parliamentary Publication, Colonial No. 1, 1924.

"In paragraph 7 of their Report, the Committee pointed out that the general level of salaries in a Colony had an important bearing on the adoption of the principle of continuous service pension as between two Colonies; and that, where the salary scales were markedly dissimilar, this alone was a reason for not adopting that principle. I agree with this view; but there may be cases in which special reasons in favour of two Colonies scheduling each other outweigh that objection. The general level of salaries in a Colony should, of course, be judged by the salary scales of the ordinary grades of the Service rather than by the salaries of the highest posts, which largely depend on the size or importance of the Colony and therefore on the calibre and responsibilities of the holders.

"The most convenient course for those Colonial Governments which are prepared to adopt the scheduling system in the form recommended by the Committee will be that each Government should furnish me with a list of other Colonial Governments which it is prepared, subject to reciprocity, to schedule. In framing this list, regard would be had to the relative salary scales, but I do not suggest that any Colonies now scheduled should be omitted."

5. In reply to this despatch most Colonial Governments have forwarded lists of Colonial Governments which they would be prepared to schedule. The replies are not quite complete, no answers having been received from the following:—

Northern Rhodesia,
Ceylon,
Malta,
Barbados,
British Guiana,
Jamaica,
Turks and Caicos Islands,

while the Fiji reply merely stated that the question would be referred to a local Committee.

6. Although the replies are not yet complete, it seems undesirable to delay further the introduction of the Committee's scheme, to which with few exceptions the Colonies which have replied are favourable. Some of those which are most favourable to the scheme have taken exception to the principle of reciprocity, but no express objection has been made to the Secretary of State's view that the application of the scheme should in ordinary cases depend on similarity of the general level of salaries.

7. It seems desirable therefore to set out definitely the effect of the view which the Secretary of State expressed in general terms, and for this purpose the following table has been drawn

up dividing the Colonies into three classes according to the general level of salaries therein.

Class A.	*Class B.*	*Class C.*
Ceylon.	Cyprus.	Malta.
Straits Settlements.	Gibraltar.	Seychelles.
Federated Malay States.	Palestine.	Falklands.
	Jamaica.	St. Helena.
Hong Kong.	British Guiana.	Leeward Islands.
Weihaiwei.	Fiji.	Windward Islands.
Mauritius.	Western Pacific	British Honduras.
Trinidad.		Bermuda.
Nigeria.		Barbados.
Gold Coast.		Bahamas.
Sierra Leone.		Turks and Caicos Islands.
Gambia.		
Kenya.		
Uganda.		
Tanganyika Territory.		
Nyasaland.		
Zanzibar.		
Somaliland.		
Northern Rhodesia.		

8. It is suggested that the disparity between the general levels of salaries of Colonies in Class A and Class C is so great that a Colony belonging to one of these two Classes should not, in the absence of special reasons, schedule the Government of a Colony belonging to the other Class; but that a Colony in one Class should not be debarred, on the ground of difference in general levels of salaries, from scheduling the Government of a Colony in an adjacent Class. If this rule is adopted, there would be no Colonial Governments which Colonies of Class B would be debarred from scheduling.

9. On this basis, and having regard also to the principle of reciprocity laid down by the Secretary of State, the table annexed has been drawn up to show in Column 2 which Colonial Governments each Colony could schedule. Where a Colony is given in italics a scheduling arrangement already exists.

10. When a Colony already schedules other Colonial Governments, which could not have been scheduled under the conditions of reciprocity and similarity of general levels of salaries, these have been shown in Column 3. The Secretary of State, in his Circular despatch of 19th March, 1925, said that he did not suggest that any Colonies now scheduled should be omitted.

B.—Gratuity and Reduced Pension.

11. In sending out the Report, the then Secretary of State (the Right Honourable J. H. Thomas), stated :—

> "When, in 1909, the Imperial Superannuation Act of that year made provision for the award, in lieu of full

pension, of a gratuity and a reduced pension, some Colonial Governments desired to enact legislation on similar lines. The proposal was discountenanced at the time, but more recently the Governments of British Guiana and of the West African Colonies have passed Pensions Ordinances which in the former Colony provide for the award of gratuity and reduced pension without allowing the exercise of an option in favour of unreduced pension, and in the latter case allow an officer on his retirement to elect for a gratuity and reduced pension if he so wishes. Should any Colony wish to proceed in this direction, the method advocated by the Committee, which is based upon actuarial advice, should be adopted."

12. Legislation adopting the scheme for gratuity and reduced pension has been passed, or is in process of being passed, in Basutoland, the Bechuanaland Protectorate, British Honduras, Cyprus, the East Africa group, Falkland Islands, Federated Malay States, Gibraltar, Grenada, Leeward Islands, Mauritius, Palestine, Seychelles, St. Lucia, St. Vincent, Straits Settlements, and Swaziland.

C.—Death Gratuity.

13. Practically all the Colonies which are adopting the scheme for gratuity and reduced pension are also making provision for the payment of a gratuity of one year's pensionable emoluments to the estate of a confirmed officer who dies while in the Service. In some Colonies a minimum service of five years is required.

DOWNING STREET,
30th April, 1927.

TABLE.

Preliminary Note.

Column 2 contains the Colonies which the Colony in Column 1 is prepared to schedule and which, under the conditions of reciprocity and similarity of general levels of salaries, it may be allowed to schedule.

Those which it already schedules are shewn in italics.

Column 3 contains the Colonies which it already schedules but which under the operation of the above conditions it would not be able to schedule.

Ceylon and Jamaica have not replied to the Circular. They already extend the benefits of scheduling to all Colonies, and the table is drawn up on the assumption that they will continue to do so.

Other Colonies which have not replied (Northern Rhodesia, Malta, Fiji, Barbados, British Guiana, and Turks and Caicos Islands) are omitted from the table, except that they appear in

Column 3 aaginst the names of Colonies which already schedule them.

St. Helena is not prepared to schedule other Colonies, and therefore does not appear in Column 1.

CLASS A.

(1)	(2)	(3)
East African: (Kenya, Uganda, Tanganyika, Nyasaland, Zanzibar.)	West African. Ceylon. Cyprus. Jamaica. Mauritius. Palestine. Trinidad. *Other East African.*	
Somaliland.	West African. *Other East African.*	
West African. *Nigeria only. †Not Gold Coast.	East African. Ceylon. *Cyprus. †Jamaica. †Mauritius. *Palestine. Straits. Malay States. †Trinidad. *Other West African.*	
Ceylon.	*East African.* *West African.* *Hong Kong.* *Jamaica.* *Mauritius.* *Palestine.* *Straits.* *Malay States.* *Cyprus.* *Trinidad.*	*Bahamas.* *Barbados.* *Bermuda.* *British Guiana.* *British Honduras.* *Falklands.* *Fiji.* *Gibraltar.* *Grenada.* *Leewards.* *Seychelles.* *St. Helena.* *St. Lucia.* *St. Vincent.* *Turks and Caicos Islands.*

CLASS A—*(cont.)*

(1)	(2)	(3)
Hong Kong.	*Ceylon.* *Straits.* *Malay States.*	
Mauritius.	East African (except Somaliland). West African (except Gold Coast). Cyprus. Palestine. *Ceylon.* *Jamaica.* *Trinidad.*	*British Honduras.* *Falklands.* *Fiji.* *Grenada.* *Leewards.* *Seychelles.* *St. Lucia.* *St. Vincent.* *Turks and Caicos Islands.*
Straits and Malay States. *Except Gambia.	*West African. *Ceylon.* *Hong Kong.*	
Trinidad.	East African (except Somaliland). West African (except Gold Coast). Cyprus. Palestine. *Ceylon.* *Jamaica.* *Mauritius.*	*British Honduras.* *Falklands.* *Fiji.* *Grenada.* *Leewards.* *Seychelles.* *St. Lucia.* *St. Vincent.* *Turks and Caicos Islands.*

CLASS B.

(1)	(2)	(3)
Cyprus.	East African (except Somaliland). Nigeria. Ceylon. Falklands. Gibraltar. Grenada. Jamaica. Leewards. Mauritius. Palestine. Seychelles. St. Lucia. St. Vincent. Trinidad.	

CLASS B—*(cont.)*

(1)	(2)	(3)
Gibraltar.	Cyprus. Falklands. Grenada. Jamaica. Leewards. Palestine. St. Lucia. St. Vincent. Trinidad.	
Jamaica.	*E. African* (except Somaliland). *W. African* (except Gold Coast). *B. Honduras.* *Ceylon.* *Falklands.* *Grenada.* *Leewards.* *Mauritius.* *Palestine.* *Cyprus.* *Gibraltar.* *Seychelles.* *St. Lucia.* *St. Vincent.* *Trinidad.*	*Bahamas.* *Barbados.* *Bermuda.* *B. Guiana.* *Fiji.* *Hong Kong.* *Straits.* *Malay States.* *St. Helena.* *Turks and Caicos Islands.*
Palestine.	East African (except Somaliland). Nigeria. Ceylon. Cyprus. Falklands Gibraltar. Jamaica. Leewards. Mauritius. Trinidad.	

CLASS C.

(1)	(2)	(3)
British Honduras.	*Grenada.* *St. Vincent.* *Falklands.*	*Ceylon.* *Mauritius.* *Trinidad.*

CLASS C—*(cont.)*

(1) British Honduras —*(cont.)*	(2) *Jamaica.* *Seychelles.* *Leewards.* *St. Lucia.*	(3) *Fiji.* *Turks and Caicos Islands.*
Falklands.	Cyprus. Gibraltar. Palestine. *B. Honduras.* *Grenada.* *Jamaica.* *Leewards.* *Seychelles.* *St. Lucia.* *St. Vincent.*	*Ceylon.* *Fiji.* *Mauritius.* *Trinidad.* *Turks and Caicos Islands.*
Grenada.	Cyprus. Gibraltar. *B. Honduras.* *Falklands.* *Jamaica.* *Leewards.* *Seychelles.* *St. Lucia.* *St. Vincent.*	*Ceylon.* *Fiji.* *Mauritius.* *Trinidad.* *Turks and Caicos Islands.*
Leewards.	Cyprus. Gibraltar. Palestine. *B. Honduras.* *Falklands.* *Grenada.* *Jamaica.* *Seychelles.* *St. Lucia.* *St. Vincent.*	*Ceylon.* *Fiji.* *Mauritius.* *Trinidad.* *Turks and Caicos Islands.*
Seychelles.	Cyprus. *B. Honduras.* *Falklands.* *Fiji.* *Grenada.* *Jamaica.* *Leewards.* *St. Lucia.* *St. Vincent.*	*Ceylon.* *Mauritius.* *Trinidad.* *Turks and Caicos Islands.*

CLASS C—*(cont.)*

(1)	(2)	(3)
St. Lucia.	Cyprus. Gibraltar. *B. Honduras.* *Falklands.* *Grenada.* *Jamaica.* *Leewards.* *Seychelles.* *St. Vincent.*	*Ceylon.* *Fiji.* *Mauritius.* *Trinidad.* *Turks and Caicos Islands.*
St. Vincent.	Cyprus. Gibraltar. *B. Honduras.* *Falklands.* *Grenada.* *Jamaica.* *Leewards.* *Seychelles.* *St Lucia.*	*Ceylon.* *Fiji.* *Mauritius.* *Trinidad.* *Turks and Caicos Islands.*

(B).—REPORT OF COMMITTEE ON PENSION LEGISLATION.

1. In accordance with a decision of the Conference the Committee were appointed :—

> " To consider the proposals in the Conference Paper C.O.42* in regard to pensions for mixed service, and to recommend whether these proposals should be adopted or modified, and if modified in what manner."

2. The Committee was constituted as follows :—

Sir Donald Cameron, K.C.M.G., K.B.E. (*Chairman*).
Mr. W. C. F. Robertson, C.M.G.
Mr. W. W. Woods, C.M.G.
Mr. A. J. Harding, O.B.E.
Mr. H. R. Cowell.
with Mr. J. J. Paskin, M.C., as *Secretary*.

3. The Committee, after full discussion, agree with the suggestions in paragraph 8 of Conference Paper C.O.42, and do not wish to suggest any modifications in the classification of Colonies proposed in paragraph 7.

* See Appendix III (A).

4. The Committee consider, however, that, provided the principle of the non-inter-scheduling of Colonies with a marked disparity of general salary levels is maintained, the stipulation as to reciprocity might be waived where Colonies wish to schedule without reciprocity.

5. While agreeing as to the undesirability of a general inter-scheduling of Class A and Class C Colonies, the Committee consider that some alleviation by other means might properly be made, if a Colony is prepared to do so, of the pension position of an officer in regard to any other public service which he may have had under a Government not scheduled by the Colony whose pension is in question.

6. After discussion as to the best method to adopt, they recommend that a Colony which wishes to give some additional pension to officers with other public service under certain Governments which it does not schedule (including the Government of Great Britain) should be allowed to add to the Regulations proposed in Appendix 5 of the Report of the 1922-24 Committee* a provision which would enable it to grant to such an officer a pension of an amount equal to the arithmetic mean between the pension that he could have received if the other Government had been scheduled, and the pension which he would receive in the absence of this provision, subject to the proviso that the pension to be granted may not exceed the latter amount by more than one-third.

A Colony which adopts this provision would normally as a corollary repeal any clause which it may have in its pension regulations at present giving a special addition to pension if the officer with mixed service retires on pension when in the service of that Colony, unless special circumstances justify the retention of an existing provision.

7. The Committee do not consider it necessary that this provision should be dependent on reciprocity if a Colony is prepared to adopt it without reciprocity; but they consider that the provision should not necessarily be extended to officers of all Governments, the service under which is regarded as "other public service." The Governments to whose officers the provision is to be applied should be specified in a separate schedule in the Regulations.

8. The Committee consider that the new provision recommended in paragraph 6 would be suitable to be applied to officers with service under the Government in Great Britain.

---

* Non-Parliamentary Publication, Colonial No. 1, 1924.

9. The Committee desire to express their thanks to Mr. J. J. Paskin, M.C., for the manner in which he has carried out the duties of Secretary to the Committee.

DONALD CAMERON.
W. C. F. ROBERTSON.
W. W. WOODS.
A. J. HARDING.
H. R. COWELL.

J. J. PASKIN, *Secretary.*

23*rd May*, 1927.

(C).—CONFERENCE CONCLUSIONS WITH REGARD TO THE REPORT OF THE COMMITTEE ON PENSION LEGISLATION.

At a meeting on the 24th of May, 1927, the Conference adopted the Report of the Committee on Pension Legislation, subject to the substitution for the second part of paragraph 6 of the following :—

> " This provision is to be regarded as a minimum, and is not intended to bring about the repeal by any Colony of any clause which it may have in its pension regulations at present giving a special addition to pension if an officer with mixed service retires on pension when in the service of that Colony, or to prevent the adoption of any such clause by other Colonies in the future."

E. B. BOYD,

Secretary to the Conference.

24*th May*, 1927.

APPENDIX IV.

Scheme for the Grant of Retiring Allowances to Nursing Sisters.

MEMORANDUM PREPARED IN THE COLONIAL OFFICE.

---

1. In 1922 the Overseas Nursing Association raised the question of providing some sort of pensions scheme which could apply to Nursing Sisters, engaged through that Association, who had served in various Colonies and who, by the terms of their engagement or by reason of their short service in any one place, would be ineligible for pension under the existing local pensions laws.

2. The scheme was not intended to apply to Nursing Sisters who were already in pensionable appointments, but only to nurses who had served various Colonial Governments abroad for a considerable period and who, in the absence of a scheme of this kind, might find themselves without means of support and without prospect of further Colonial employment.

3. The main points of the scheme may be summarised as follows :—

(i) Nurses who have received through the Overseas Nursing Association an appointment in the Public Service or in a public hospital are to become eligible for retiring allowances on the following terms :—

(ii) Service need not be continuous.

(iii) Retiring allowances to be granted after not less than three years' service in any individual Colony and not less than fifteen years' public service in all. (*N.B.*—Such qualifying service might include service in public hospitals outside the Empire, e.g., hospitals maintained for the benefit of British communities in such places as Shanghai.)

(iv) No retiring allowance to be granted until the nurse had reached the age of 50 years, except in cases of physical incapacity for work.

(v) The allowance granted by a Colonial Government to be at the rate of 8*s*. 4*d*. for each month's service in the Colony provided that the nurse is qualified under the terms of the scheme.

(vi) In the case of a nurse who is compelled by ill-health to relinquish her appointment before completing the minimum aggregate of fifteen years, not only the age limit of 50 years to be dispensed with, but the fifteen years' service to be reduced to ten years.

4. The Governments of Trinidad, St. Vincent, and the Falkland Islands have now passed legislation giving effect to the scheme without alteration or amendment.

The Governments of Cyprus, Gambia, St. Helena, Palestine, British Guiana, the Leeward Islands, the Bahamas, and Basutoland have submitted draft Bills embodying the scheme without alteration.

The Government of Ceylon concurs in the draft amendment to the Ceylon Pensions Minute, but the Governor recommends than ten years' be substituted for fifteen years' aggregate service. The ten years' aggregate service has also been inserted in the draft Bill for Basutoland.

The following Colonies submitted suggested modifications to the scheme :—

(a) *Gold Coast.*—The Government submitted a draft Bill embodying the scheme but substituted 12*s.* 6*d.* for 8*s.* 4*d.* as the rate of retiring allowance for each month's service in that Colony.

(b) *Nigeria.*—The Governor suggested that the higher rate of 12*s.* 6*d.*, as inserted in the Gold Coast Bill, should be adopted for each month's service in a West African Colony.

(c) *Gibraltar.*—This Government, on the other hand, considered the rate of 8*s.* 4*d.* excessive for service in a healthy Colony like Gibraltar and suggested that the rate should be 3*s.*4*d.* ir respect of service in that Colony or, if that was considered too low in view of the fact that English nurses in Gibraltar received free quarters and a board allowance, that the rate should be fixed at 5*s.*

(d) *Malaya.*—The Officer Administering the Government of the Straits Settlements suggested that the qualifying age for pension should be 45 instead of 50 in view of the fact that the former was the normal retiring age for Nursing Sisters in Malaya. He further suggested that the difficulty felt in Malaya as regards that point might be met if the dispensation referred to in paragraph 3 (vi) above could be extended to the case of any Nursing Sister called upon to retire at the age of 45 from service in Malaya.

(e) *Sierra Leone.*—This Government also suggested that the age limit should be reduced to 45 years.

COLONIAL OFFICE,
April, 1927.

APPENDIX V.

Agricultural and Veterinary Research in the Colonies, Protectorates, and Mandated Territories.

MEMORANDUM BY THE PARLIAMENTARY UNDER-SECRETARY OF STATE FOR THE COLONIES.

In the absence of an Agricultural Adviser at the Colonial Office I have endeavoured to compile a memorandum on the work of the Agricultural and Veterinary Departments of the principal Colonial Governments represented at this Conference.

I must mention at the outset the important Report,* recently published, of a Committee which has been sitting under the Chairmanship of Lord Lovat. This Committee was appointed to consider the recruitment and training of officers and to make suggestions for improving the supply of candidates and in regard to the efficiency of agricultural research and administration, and, apart from its practical recommendations, it provides an excellent review of the general situation. It also presents a considered scheme for dealing with the problems before us, and it should be most carefully studied. (Copies are being circulated separately to members of the Conference.) I am only concerned to point out in this memorandum what seem to me to be the main issues.

I am fully conscious that any lay memorandum must leave a great deal to be desired from the scientific point of view, but my main object in drawing it up has been to provide Governors and senior administrative officers, who are, for the most part, in the same position as I am as regards technical knowledge, with such data as I have been able to collect, in order that they may have a more comprehensive view of the subject than can be obtained in any single Colony. The problems will receive more expert consideration at the forthcoming Empire-wide Agricultural Research Conference to be held in London in October next, with their own delegates.

I do not pretend that the memorandum is exhaustive, and indeed I have had to omit reference to much excellent work already in progress. I have merely attempted to give a general view.

The welfare and progress of agriculture is now-a-days the most vital concern of every Colonial Administration. The prosperity of the people, the trade, and, not least, the revenue, of each dependency is mainly dependent upon its agricultural production.

---

* Cmd. 2825.

Apart from mineral and timber resources, rich though they may be, agriculture may be said to be *the* main industry of our Colonial Empire. On the efficiency of agriculture depends therefore not only the food supply of the population but indeed all economic and social progress.

In England itself we have been slow in realising to what degree it is in the highest interests of the State to encourage and find money for the prosecution of agricultural research and the application of the results of that research to increased production. Until recent years such efforts, as far as Great Britain was concerned, were left largely to private enterprise and private endowment. The Development Commission was created in 1909, but it was not until after the war that its activities had any considerable scope. It now makes comparatively large grants to research institutions, to individual research workers, and to the training of such workers.

In many ways the self-governing Dominions and India were ahead of us in this matter, but even there I doubt whether there has been anything comparable to the tremendous efforts that have been made by the Department of Agriculture at Washington or by Germany.

As far as Colonial powers are concerned, the outstanding example of scientific effort in the agricultural field is seen in the work of the Dutch in the Island of Java. Buitenzorg in Java is the central station of activities which, both for scale and quality, are yet unmatched in the British tropical Empire. I am, of course, writing here of our Colonial Empire as distinct from India and the self-governing Dominions. The work at Pusa, in Bengal, for example, is of the highest order.

The task which lies before us, namely, the development of 2,000,000 square miles (approximately forty times the size of England) and the agricultural activities of 50,000,000 people, is immense. I do not think I need stress any further the paramount importance of the development of more scientific methods of agriculture, not only to the Colonies themselves, but to the Empire as a whole.

What are we doing in the way of organising these great resources?

First and foremost must always come the question of the supply of properly trained and qualified staff. Our Colonial Agricultural Departments have been very largely expanded since the war—for example, the European staff of the Agricultural Department of Nigeria numbered 20 in 1922, and 44 in 1926, while in Uganda the figures are 17 in 1923, and 34 in 1926. This expansion, in some cases long overdue, faced the Secretary of State for the Colonies with the very greatest difficulty in obtaining expert staff with the necessary qualifications. The two principal steps taken by Lord Milner and his successors have been the initiation of the Imperial College of Tropical Agriculture in Trinidad, and the introduction of a system of agricultural

scholarships, to which twenty-one Colonies were invited to contribute and sixteen do actually contribute. These scholarships provide for the post-gradute training, in this country and at the Imperial College in Trinidad, of agricultural officers, both for administrative and research posts, who have obtained a degree or agricultural diploma in one of the Universities or recognised agricultural colleges.

I have on two recent occasions addressed our agricultural scholars now undergoing a year's course at Oxford. This year's entry, which will be going on to the Imperial College in Trinidad, is of exceptionally high quality. The men struck me as being above the average not only in scientific training but in general capacity and usefulness. I am fully satisfied that their year at Oxford has been most profitably spent. Both the number and the quality of new entrants are steadily rising, but even so it would appear that the supply coming forward is not yet equal to the demand.

Happily our cadre is growing. We have at this moment serving in the following seventeen principal dependencies a European staff on the strength of the Agricultural Departments of 300, of whom 91 are research officers, the remainder being administrative. In the same seventeen dependencies we now have 100 veterinary officers, of whom 20 may be said to occupy research posts. The seventeen dependencies I refer to are :—

(*a*) Jamaica, Trinidad, British Guiana, Barbados;
(*b*) Nigeria, Gold Coast, Sierra Leone;
(*c*) Kenya, Uganda, Tanganyika, Nyasaland;
(*d*) Mauritius, Ceylon, British Malaya, Fiji;
(*e*) Cyprus, Palestine.

Of the 91 research officers, 26 are chemists, 26 entomologists, 19 mycologists, 18 botanists and plant breeders, 1 soil bacteriologist, and 1 microbiologist.

Our only adequately equipped training centre and our principal research institution in the Colonial Empire is the Imperial College of Tropical Agriculture in Trinidad, which was opened in October, 1922. Its professorial staff consists of a Principal with eight Professors and nine Lecturers.

The total capital expenditure, including payments to which the Governing Body is committed, stands at £147,750. Towards this amount upwards of £87,000 was received as a result of Lord Milner's Special Appeal, and contributions from the Imperial Government, the Empire Marketing Board, and the Lancashire Cotton Industry. The Rhodes Trustees contributed the sum of £5,000 towards this Fund, whilst £15,000 has been granted by the Imperial Government towards the erection and equipment of the Hostel, and the Empire Marketing Board contributed £21,000 for various purposes contingent on a similar grant of £21,000 being given by the Lancashire Cotton Industry, largely through the Empire Cotton Growing Corporation, who in this

as in all other matters, have been of great help not only to the Colonies but also in scientific investigation of many important problems. But by far the largest individual contributor to the funds of the College has been the planting community of Trinidad and Tobago, which provided through the Government of the Colony, by means of a special export tax imposed by their special request, £50,000 for building purposes.

Apart from capital expenditure the annual cost of maintaining the College is approximately £25,000 a year. Towards defraying this approximately half of the total amount is provided by a contribution of one-half of one per cent. of their revenues made by Trinidad and Tobago, Barbados, the Windward Islands, and the Leeward Islands. The following Colonies also contribute towards the cost of maintenance: British Guiana £1,000, and British Honduras £50, annually; Nigeria £1,200 annually for five years; Gold Coast £500 annually; the Anglo-Egyptian Sudan £500 annually for five years; Sierra Leone £250 annually; and Southern Rhodesia £100. Other annual contributions include £1,000, expiring in 1929, from the Rockefeller Foundation for a Chair of Tropical Sanitation and Hygiene, and £1,000 from the Carnegie Corporation for the Library, while in addition to making capital grants the Empire Cotton Growing Corporation and the British Cotton Growing Association subscribe £500 and £200 a year respectively.

The College provides a three-years' course for its diploma and a one-year course which is largely followed by the students passing on to the Agricultural Departments in various Colonies. As I have already said, the College was opened in 1922; in 1923 four students completed the one-year course, six in 1924, thirteen in 1925, and sixteen in 1926. Diplomas at the end of three-year courses were granted to five students in 1925, and three in 1926. There are now forty-two students in residence at the College.

The College has issued a monthly journal since 1st January, 1924, entitled *Tropical Agriculture*, a valuable production the scope of which could, I think, with advantage be extended, if funds and staff permit. In addition to teaching, research work has been commenced on such subjects as the breeding of a variety of bananas immune from Panama disease, the problem of Frog-hopper blight in sugar-cane, Withertip disease in limes, and the study of colloidal soils.

The only other research station of an Imperial or inter-Colonial character, apart from those maintained for purely local purposes, is the Amani Institute in Tanganyika Territory. This Institute, as is well known, was established by the Imperial German Government and had already made considerable contributions to the science of tropical agriculture before the war. The work of this Institute is now about to be restarted and has been rendered possible by the co-operation of the six Governments of Tanganyika, Kenya, Uganda, Zanzibar, Northern

Rhodesia, and Nyasaland, in providing between them annual contributions amounting to £8,000 a year.

In addition to this sum the Empire Marketing Board have decided to make a maintenance grant up to one-third of the total running costs of the Institute not exceeding £6,000 in any one year. The capital expenditure necessary for the rehabilitation and re-equipment of the station, which is being advanced by the Government of Tanganyika, will eventually be charged to East African Guaranteed Loan funds.

The new Director of the Institute is Mr. W. Nowell, D.I.C., appointed to this post from the Directorship of Science and Agriculture in British Guiana. He is now in East Africa; part of the necessary staff to work under him is being appointed and on receipt of his report it is proposed to proceed with the selection of the remainder. The object of this research station will be to undertake projects of long range research to supplement more particularly the research activities of the East African dependencies, and the work there should also throw an important light on cognate problems both in West Africa and in other tropical dependencies. It will form one of a chain of Imperial research stations in the tropical and sub-tropical Empire.

It is obvious that Trinidad and Amani are two of the links in any such chain. The establishment of further links will require discussion. The establishment of a new station in North Queensland is already under discussion with the Government of the Commonwealth of Australia. It would seem clear that three further links will be required, one in West Africa, one in the Middle East, and one in the Far East. I tentatively suggest that Nigeria, Palestine, and Ceylon might be considered as the most suitable *loci*. These research stations need not necessarily be entirely new institutions but could be built up on the basis of existing institutions. One advantage of such a chain is that certain problems of a long range character could be tried out at the same time in different parts of the Empire and the results compared. The Empire Marketing Board is engaged at this moment in making a preliminary survey of the field.

As will be seen from the above summary of the categories of research officers, agricultural research largely depends on the co-operative efforts of botanists, chemists, entomologists, and mycologists, and an important part of our material machinery in connection with the two latter categories is the existence of the two Imperial Bureaux of Entomology and Mycology.

The Imperial Bureau of Entomology was founded in 1913, for the purpose of encouraging and co-ordinating entomological work throughout the Empire in relation to both human and animal diseases and to agriculture. The head office is at the Natural History Museum in South Kensington, and the Bureau is in the charge of Dr. G. A. K. Marshall, F.R.S. Contributions for the upkeep of this Bureau amount approximately to

£12,500 per annum, and are obtained from different Governments of the Empire.

The Bureau publishes a quarterly journal entitled *The Bulletin of Entomological Research* and a monthly journal entitled *The Review of Applied Entomology* in two parts, (*a*) medical and veterinary, and (*b*) agricultural, summarising and reviewing all current entomological literature. Quinquennial conferences of entomologists working in different parts of the Empire are held under the auspices of the Bureau.

The Imperial Bureau of Mycology, which is conducted on similar lines to the older Bureau of Entomology, and is financed in the same way, was founded in 1920. The Bureau is situated at Kew under the charge of Dr. E. J. Butler, F.R.S., late Director of the Research Institute at Pusa in Bengal. It publishes a monthly review and also organises quinquennial conferences.

There are at present no corresponding bureaux dealing with the other two main categories into which agricultural research falls, namely, plant genetics and agricultural chemistry, and the need for such institutions was indicated by Lord Lovat's Committee. Botany is to a certain extent covered by the activities of the Royal Botanic Gardens, Kew. The Director of Kew is Botanical Adviser to the Secretary of State for the Colonies, and Kew has been responsible for the gradual preparation of scientific publications dealing with the flora of different parts of the Empire. The primary function of Kew is systematic and economic botany; and, though Kew has been able to offer advice on matters relating to plant breeding and the economic improvement of types, it is beyond its province to take an active part in researches of this character.

I might add that the Empire Marketing Board are giving assistance to Kew in order to enable some of the staff to travel, and an Economic Botanist has now been appointed on the Director's Staff, who has held an important agricultural position in India. This should prove of value.

The work of the chemist enters in at practically every form of investigation and is in many ways the most fundamental of all. Soil science, both chemical and physical, is really the basic factor in all advance. I shall have occasion to refer to this later in the memorandum. The outstanding contributions to world knowledge in this field are made by the Rothamsted Experimental Station at Harpenden, in Herts., and are well known, and the Rothamsted publications are of vital importance to every agricultural research worker throughout the Empire.

In another sphere of activity, namely, the examination of agricultural and other products with a view to their use in industry, the Imperial Institute, which is supported by contributions from the Imperial and oversea Governments, has done a great deal of valuable work for the Colonies and other dependencies. As a result of the recommendations of the Imperial Economic Conference of 1923, the organisation and functions of

the Imperial Institute have undergone considerable change, and subsequent to its amalgamation with the Imperial Mineral Resources Bureau its investigations are carried on by a mineral resources department and a plant and animal products department. The latter is under the Chairmanship of Sir David Prain, a former Director of Kew, who is assisted by an Advisory Council. In order to facilitate its work the Council has formed a number of advisory committees to deal with special subjects. The following committees, which include scientific and technical authorities, together with representatives of the trades and industries concerned, have been constituted :—

(1) Silk.
(2) Timber.
(3) Vegetable fibres.
(4) Oils and oilseeds.
(5) Essential oils and resin.
(6) Tanning materials.

The Department has an Intelligence Section which provides technical and commercial information relating to the production, utilisation, and marketing of Empire raw materials of plant and animal origin; and from time to time the Bulletin of the Imperial Institute reviews the production and marketing of Colonial agricultural products such as groundnuts, flax, palm oil, sugar, &c.

I have dealt with the existing organisations. I now turn to the important question of the arrangements for the collection and dissemination of information and experience gained in these fields.

Lord Lovat's Committee have pointed out that the existing arrangements for collecting and disseminating reports on agricultural work carried out in the non-self-governing Colonies are at present entirely inadequate and, further, that Colonial Governments do not in general possess an adequate system of preserving and indexing the information which they receive. They observe that the results of investigations are wasted if they are not made readily available to all concerned, and that cases have come to light of researches in one Colony being conducted over again in ignorance of the fact that the work had already been done.

They point out that the great exception to this criticism is in the field of entomological and mycological effort. That this is so is due entirely to the operation and guidance of the two Imperial Bureaux and their publications, and to the fact that workers in these subjects all over the Empire are kept in close touch with the work and activities of their colleagues through the machinery of the Bureaux.

I have had ample evidence in touring the Colonies to confirm the Committee's view of the present lack of an effective system of interchange of the knowledge acquired by the work of the different Agricultural Departments. The present system of dis-

tribution of Annual Agricultural Reports and Bulletins and other publications is inadequate and should be reviewed by all Colonial Governments.

Dependencies vary a great deal in the quality of the libraries which they maintain and in their accessibility to all members of the staff of the Agricultural Departments. Lord Lovat's Committee have indicated the need for the publication of information by a central authority. I am convinced that some steps should be taken to summarise and review reports of the work that is going on in all the different parts of the Empire, together with the ordinary printed publications received both from within the Empire and from places like the Dutch East Indies, French West Africa, and the United States of America.

It is, of course, to the Annual Reports of the Agricultural and Veterinary Departments that one looks in the main for some indication of the work that is being conducted in the different Colonies and it would certainly help if these reports could be made as full as possible, and if they could be produced with the least possible delay at the conclusion of each financial year. I will give an example of our present difficulties. The most recent report available in the Colonial Office regarding agricultural activities in Tanganyika Territory which I have been able to obtain (in March, 1927) is the Annual Report for the year ending 31st December, 1924. The very full and well-arranged report of the Kenya Department for 1925 was available at the Colonial Office more than six months ago.

It is a matter for consideration whether Colonial Governments could not arrange for these annual departmental reports to be framed for the financial year and to ensure that they are printed and published within six months from the end of the financial year in question, if this is not already done. Copies of these reports should be sent direct by the Directors of Agriculture concerned in their production to each and every other Director of Agriculture throughout the Colonial Empire as well as to central institutions like the College in Trinidad and the Amani Institute. It would be a help to all libraries if the form, i.e., quarto, octavo, &c., of these reports could be assimilated.

In addition to the Annual Reports there are varying practices regarding the publication of activities and results. To mention only a few; excellent bulletins are published for example in Ceylon, Mauritius, Nigeria, and Bermuda. Most of these special bulletins are of a highly technical character and are compiled more for the specialist than the layman. I think it is important that the reports of work contained in them should be summarised in the ordinary Annual Reports of departments. The Department of Agriculture in Ceylon issues a useful " Year Book," the Federated Malay States publish a Malayan Agricultural Journal, but the Director of Agriculture notes that the number of subscribers is " very low." Two years ago the Department of Agriculture in Trinidad published an extremely valuable monograph

entitled *Gardening in the Tropics* with special reference to the needs of schools. There was a wide demand for this publication not only within but outside the Colony and the edition was soon sold out. I am not yet aware whether it has been reprinted or whether use has been made of it by the Education as well as the Agricultural Departments of other tropical dependencies. I observe that in 1925 the Gold Coast Department issued pamphlet No. 5, being notes on the cultivation of European vegetables in the tropics. The total number printed was 750. Here again how far this publication is known outside the Gold Coast I have been unable to ascertain.

I think I am right in saying that in only one field of tropical and sub-tropical agriculture, namely, cotton growing, is there an annual publication collecting reports received from the experiment stations maintained or assisted by the Empire Cotton Growing Corporation throughout the Empire. Such a comprehensive review forms a most valuable comparative study of all the most recent work and data available.

I think I have said enough to show that while there is already much material of value there is a need for—I cannot avoid the word—co-ordination. Here again Lord Lovat's Committee have made important recommendations.

Next in importance to the adequate production and interchange of published information is the periodical opportunity given by Colonial Governments to officers in their Agricultural Departments to visit other territories. This can be effected in two ways. First by the holding of periodical conferences in groups of Colonies. These are of exceptional value not only in themselves but also by reason of the facilities they provide for workers in similar fields to meet and discuss common problems informally, and to see how those problems are being tackled under varying conditions. Such conferences have already taken place in the West Indies; there was also a South and East Africa cotton conference at Nairobi last year; and a West African agricultural conference at Ibadan in Nigeria in the spring of this year.

In addition to these conferences valuable knowledge may be obtained by the visits of suitable officers to other countries with similar problems. The Governments of Nigeria and the Gold Coast have in my opinion been very wise in sending members of their staffs to pay a combined visit to Java, Sumatra, and Malaya. This visit was made primarily in connection with the investigation of the development of oil-palm plantations in the Far East. But quite apart from its value for this purpose it must have given the officers concerned an opportunity of effecting a personal liaison with workers in tropical agriculture in another area and enabled them to see what was being done in that area over the whole field of agricultural endeavour. I hope it may be possible for other Colonial Governments to arrange for their officers to make similar tours.

I now venture to touch on some of the specific problems of tropical agriculture which are engaging the attention of the Dependencies at the present time. My object in doing so is to bring out the point that although widely scattered in area so many of the problems are common to several Colonies. One has only to consider for a moment the fact that individual tropical products have been so frequently transferred from one part of the tropics to another. Cocoa—indigenous in South America—is being produced in Trinidad, Grenada, Jamaica, Gold Coast, Nigeria, and Ceylon. Para rubber was introduced by Sir H. Wickham from the forests of the Amazon via Kew to Malaya and Ceylon, which are now the principal world producers of such rubber. Sisal is a Mexican aloe. Groundnuts are among the principal crops of India, Tanganyika, Nigeria, and the Gambia. The oil-palm of West Africa is just now being developed in the Dutch East Indies and Malaya. The coconut palm of the South Pacific has become almost universal along the coasts of the tropics. One can multiply examples.

Tropical agriculture may be broadly divided into two main divisions: (*a*) the growth of permanent crops, or semi-permanent, such as tea, coffee, cocoa, cinchona, the palms, rubber, sisal, and fruits such as grape fruit, bananas, oranges, &c., and (*b*) annual or short rotation crops, such as cotton, maize, rice, simsim, cassava, yams, sorghum, millets, groundnuts, peas, beans, and fodder crops, sugar, &c.

In regard to the former—the plantation or semi-plantation crops—there are certain common problems. The same type of plant of this nature is usually subject to very much the same dangers from insect and fungoid pests the world over. The climatic, including altitude, conditions favourable to the successful production of these crops are strictly comparable. The soil conditions and the response to manuring for the purpose of making up soil deficiencies are equally comparable. I note such statements as the following taken from a Trinidad report on their cocoa research: " Recording the annual pod yield of individual trees has shown that there are individual trees which are naturally heavy, medium, or poor bearers. These characteristics are not fundamentally affected by manurial treatment or alteration in conditions—but destruction of shade will make good bearers, temporarily at any rate, bad bearers."

From this one deduces that, given the necessary climatic conditions as to rainfall, &c., and in the absence of any special soil types or drainage difficulties, the selection of the plant—i.e., a high-yielding strain—is much more important than soil conditions. Just as we now breed cattle from high milk-yielding strains, so in cocoa the thing to try to establish is a plantation of good bearers, and keep on cutting out the bad bearers. The oil-palm problem is clearly very similar. There are extreme variations between varieties of oil-palm and between individual palms of the same variety, not only in the annual yield of bunches but also with regard to the oil content of the pericarp

and of the kernels. Similar problems arise with para rubber, camphor, and indeed almost every economic crop of importance. Scientific selection is therefore the problem of first importance.

Or again in the case of cocoa. We know now that in the Eastern Province of the Gold Coast, where the industry has been established longest, there is a definite sign of a falling-off in yield. Apart from more obvious causes such as close planting, is this due to change in the soil or change in the plant due to senility or to weakness from accumulation of disease? If the former, of what plant food is the soil becoming exhausted; if the latter, at what stage should cutting out and replanting take place?

The Dutch investigations into the oil-palm would tend to show that the oil-palm reaches its full yield under cultivation conditions at eleven years, and continues at this full yield till thirty years, after which there is a rapid decline. Similarly I gather that experiments of manuring the oil-palm show that, from the point of view of its food, phosphorus or potash are not factors of any account, but that nitrogen is.

Research in the Federated Malay States shows the very wide variation in the yield of coconut palms on similar land, and a special coconut selection experiment station has been established at Klang. The selection of coconuts, as of other palms, is clearly of wide importance, as is shown by the considerable variation in yield observable in trees in really well-managed plantations.

The more I read about permanent crops the more it would appear that the most important factor is selection—the geneticist and plant breeder's job. I have heard of a case, however, of interest on the chemical side, and that in connection with tea. I was shown at Rothamsted the other day a detailed map of a private tea estate in Ceylon on which the yield of the same variety varied very considerably. Samples of soil from different parts of the estate were sent, and it was found that the low yields ran parallel with the phosphoric content of the soil, and the exact quantities of superphosphate necessary to level up the poorest land to the best on the estate were ascertained with complete success. This is yet another side of a many-sided problem.

Camphor is another instance of a plantation crop of growing commercial importance, that stands in urgent need of scientific investigation. Our knowledge of it at present is most limited.

There is, however, one almost universal factor in the proper cultivation of most of these permanent crops—especially tea, rubber, and oil-palms—and that is soil erosion. Soil erosion in the tropics—the effect of very heavy rains and burning sun—is a universal and fundamental problem. I may instance the difficulties which have been experienced in Jamaica, or again in the Gold Coast in this regard. The best method of tackling it is the growth of a cover crop that will grow under and between

the trees and will preserve the humus and tilth of the soil and at the same time act as an effective green manure. A lot of experimental work has been undertaken on this, chiefly in Ceylon, as far as the Empire is concerned, and again by the Dutch in the East Indies. Both for rubber and oil-palm the most successful green dressings of this type that have been established are (1) Dolichos Hosei (*Vigna Oligosperma*) and (2) *Calopogonium macunoides*. The first of these is coming into use in Ceylon also—but there the most widely introduced green manure cover crop is *Gliricidia maculata*, and on tea estates *Indigofera endecaphylla*.

There is yet another side to the problem of permanent crops. What crops are suitable for introduction into new territory being opened up or in substitution for crops which are no longer economical?

The introduction of a new crop always presents difficulties. I may quote the case of coffee. When in Sierra Leone last spring, the local Chamber of Commerce urged upon me the establishment of coffee growing in that country on a large scale. As I read the reports of the East African Dependencies there seems to be general agreement there that Arabica coffee cannot in Equatorial Africa be grown successfully below 4,500 feet altitude, and that the range of Robusta coffee is between 3,000 and 4,500. Personally I doubt whether even Liberica or Stenophylla coffee will thrive in the climatic conditions of Sierra Leone. But, apart altogether from the limited range within which coffee can be successfully grown, coffee is one of those delicate and continually threatened crops which will always require the closest supervision by scientists, whether official or planters, and it is perhaps not surprising that coffee can and has become " controversial ". The Director of Agriculture in Tanganyika has recently laid down the proposition—one coffee one area. This would seem to be the only safe guide, whether from a production or marketing point of view.

I may, in passing, refer to the great losses caused by plant diseases. There are four main methods of dealing with such losses which are at present under investigation. First, natural control by parasites is being examined and there have been successful experiments in Hawaii in this method. Secondly, it is possible to secure direct control by spraying, baits, or steeping the seeds in certain solutions, or by other poison treatment. There is the physiological method of altering the method of cultivation to enable the plant to resist the attack or to grow rapidly through the susceptible stage. Fourthly, there is the possibility of breeding new varieties of plants immune from the disease.

An important field of research in connection with permanent crops is the breeding of varieties immune to special diseases. One example of this kind of problem is the production of a variety of banana resistant to Panama disease. Special work on this is in progress at the Imperial College in Trinidad and is yielding

interesting results. Such research should prove of great importance not only to the West Indies but to West Africa as well. Its economic value is obvious.

I have in the few preceding paragraphs only skimmed the surface of the many problems affecting permanent crops.

Turning to annual crops it would seem that what is chiefly required is a greater effort at the fundamental study of soil science in the tropics. Cereal crops, especially maize and wheat, are absolutely dependent on adequate supplies of nitrogen, potash, phosphorus, and in some cases lime, for continuous cropping. Even the so-called virgin soils may rapidly become deficient in essential plant foods. The native agriculturist usually gets over this difficulty by what is known as shifting cultivation, but scientific agriculture knows two better methods of tackling the problem, viz., rotation of crops and manuring. Both of these sooner or later involve mixed farming, i.e., the use of domestic stock in agriculture.

Mixed farming is in its infancy in the tropics, but that it is bound to develop I make no doubt. The cultivator must keep stock if only for the manure. The Hausas in Northern Nigeria, who are good and prosperous farmers, compete with one another to get the nomad Fulani with their cattle to come on to their land in the dry season simply on account of the manure so obtained. In the long run mixed farming means fodder crops, and in the tropics too little attention has been given to the establishment of fodder crops for the double purposes of rotation with cereals and food for cattle and sheep. It follows from this that the agricultural and veterinary departments throughout the Colonies must work in the closest possible intimacy.

Our ignorance about the soils of the tropical Empire is profound. The only book on the soils of Tropical Africa is the work of an American. I think it is fair to say that this is an indication that we are behindhand in the acquisition of scientific knowledge of our resources. Sooner or later we must embark on a systematic soil survey of the tropical dependencies on a comparable basis, when comparison is possible. Only thus can we get any guides as how best to make up the deficiencies in plant food that all our new developments are fast creating. A little is being done. Sierra Leone is doing more than most dependencies, and in 1925 six hundred and thirty-nine samples from different parts of the Protectorate were collected and are being systematically analysed and classified. The Ceylon report for 1925 refers to forty-eight soil samples analysed, the Gold Coast to sixteen. The report of the Agricultural Chemist in Kenya for the same year laments that " no routine analysis of soils has been possible." The most serious deficiency from the agricultural point of view in the majority of them is the lack of lime. The importance of lime for neutralizing excessive acidity in soils and maintaining plant life has long been recognised.

In some respects the deterioration of soil seems to take place more rapidly in the tropics than in temperate climates. Nitrogen

seems to be lost more easily, but I think it is clear that the study of soils in the tropics with a view to increasing the often low yields per acre of many crops is by no means a straightforward chemical problem. Soils, especially fertile soils, are fertile not merely because they are so chemically and physically constituted that they contain the food requirements of economic plants but because they are inhabited by teeming millions of micro-organisms—bacteria, amoebae, algae, etc.—and the biochemistry of soils is now seen to be probably the basic factor in food production.

Why do soils tend to become lateritized nearly everywhere in the tropics and not in temperate climates? I have been told that there is laterite under our feet in London formed at the time when the vegetation and climate of London was similar to that of Lagos! The answer may perhaps be in the field of micro-biology. It has been held, perhaps wrongly, that living organisms that flourish in appropriate types of soil in tropical climates make laterite, and so alter the whole physical character of the soil. I am not defending this view; I am only anxious to point out the wide field for investigation.

One very important problem in soil science of Imperial significance is the salting of soils as a result of irrigation. This has been observed in India, 'Iraq, Australia, and elsewhere. The old designers of irrigation systems both in Egypt and in India knew the necessity of combining drainage with irrigation in order to obviate salting, but the knowledge had to be rediscovered in America. in Australia, and elsewhere at the cost of the destruction and salting of much good land. The effects of perennial irrigation are manifold, and their study is in its infancy. Again, the study of dry farming demands serious attention.

Another important and similar problem is that of the mineral deficiencies of natural pastures. The great pioneer work on this subject was done by Sir Arnold Theiler and Dr. Green in South Africa. Their investigations into the effect of phosphate deficiency on the mortality and health of domestic stock is world famous. That "mineral deficiency" is not merely an African problem is now fully recognised. Sheep were found to be dying in the Falkland Islands although there was plenty of grass. Similar phenomena were noted from the Western Hebrides of Scotland. The Rowett Institute at Aberdeen has now taken up the main work on this problem. Animals, as well as human beings, require salt, and not only common salt, but sometimes almost infinitesimal traces of other elements, for resistance to disease and physical efficiency.

Thanks to the Empire Marketing Board, an Empire-wide investigation has now been organised on this particular question and work is proceeding on parallel lines in Scotland, Palestine, Kenya, South Africa, South Australia, and New Zealand. What has to be established is: what are the soil deficiencies, what is the conveying capacity of the different pasture grasses and

fodder crops under different conditions, and how can the deficiencies be most cheaply and effectively made up? The answers to these questions will have a tremendous influence on the future of meat and milk production throughout the world. Dr. Orr of the Rowett Institute, Aberdeen, visited Kenya last year to initiate this research there, and out of that visit—primarily in connection with the animal industry of the Colony—has arisen the cognate study of mineral deficiencies in native foods—an important field of medical research arising out of a problem in soil science and veterinary research.

In connection with this research it became possible last year to arrange for Dr. P. J. du Toit, the new Director of the Government of the Union of South Africa's Veterinary Research Station at Onderstepoort, to pay a short visit to Nigeria. Dr. du Toit's report not only on the mineral deficiency problem but on veterinary policy generally in Nigeria is of great interest and value. I think, therefore, that the need for an Imperial bureau of soil science, to which I have already alluded, is urgent, and that its desirability will be seen even more clearly in the near future.

I have already referred to plant genetics in connection with the permanent crops. Plant genetics are almost equally important to the annual crops. In wheat, for example, we owe much to the work of Farrer of Australia, of Saunders in Canada, and the Howards in India, while at the present time the work of Sir R. Biffen and Dr. Engledow at Cambridge on that crop is an indication of the lines on which we may have to proceed in many other food crops. A lot of work of this kind has been going on in the Colonies—chiefly in connection with cotton. Sir R. Biffen, for example, has recently visited Kenya and valuable work has been initiated there. The attempt now being tried out to improve the staple and quality of selected strains of native cotton in Nigeria for growth in areas where American types do not succeed is an excellent example. If Mr. Faulkner and his staff really succeed with their " Improved Ishan " cotton, it will mean literally millions of pounds a year to Nigeria. Our chief difficulty in this field is men. There is only a very small pool of adequately trained plant geneticists in the Empire. The whole science represents practically the newest aspect of economic botany, and one of the chief arguments for the proposed bureau is to secure the enlargement of this pool.

For the proper collection of data and the due examination of these problems, it is essential that research in each Colony should be properly organised. The success of an agricultural research station depends on the effective co-operation of chemists, entomologists, mycologists, and botanists, each contributing a share to what is very often a single problem with four different aspects. I think that wherever it is possible to arrange it the principal research station in each Colony, where the specialist research staff is posted, should be under the personal direction of the Director of Agriculture. Where the Director has to live in the capital city and the central laboratories are some distance

off it will probably be found convenient for the second man in the Department to live at the research station and become responsible for the direction of the necessary co-operative work.

It is further a good thing if the research laboratories, library, &c., are situated at the principal experimental station where not only are the most important field trials conducted but also the training of subordinate native personnel for future service in the departments is carried on. The research staff should assist in the work of such training, but they should not be asked to become wholly responsible for it. Their job is first and foremost research and investigation rather than teaching. The latter should be in the charge of a whole-time officer or officers in close personal touch with both research and administrative officers of the department.

I may mention in passing a scheme which has recently been set on foot in Mauritius for the establishment of a farm school where boys from the higher classes of the primary schools are to receive a theoretical and practical training in farming and elementary agriculture. They would pass on from this to become cadets in agricultural and forestry departments and possibly in private employment.

Colonies vary very much in the degree to which they have advanced in the training of native agricultural assistants. Ceylon has done more than any other dependency in this direction, primarily no doubt because the central station at Peradeniya has been longer equipped and established than similar centres in other Colonies. I understand there are thirty-five students taking a two-year course there—while a similar school has been recently established at Jaffna in the Tamil area. There are few more important aspects of the duty of all Agricultural Departments than this training of native personnel.

The Department of Agriculture in Ceylon has also done outstanding work in the development of school gardens attached to the ordinary schools throughout the country; and in forming local co-operative societies among native farmers. According to the last report there are no less than 33,630 members of producers' co-operative societies in Ceylon. This figure is of course over and above members of associations of European planters.

Another interesting example of the development of the co-operative movement is the cacao fermenting scheme organised by the Nigerian Department of Agriculture among the native cacao growers in south-western Nigeria. Not only has the working of this scheme resulted in good premiums over ordinary prices being obtained by growers but the educational value of the scheme has resulted in improving the quality of native production and of preparation for market. The success of what is called "native production", which it is generally agreed is all important from the point of view of the social and economic advance of native races, depends in the long run on the efforts

of the Agricultural Departments in improving and maintaining the standards of quality in any particular line of produce. This applies to crops like groundnuts, maize, and rice, quite as much as to cacao, coffee, palm oil. The preparation of such crops for market and transport requires almost as much research as the growing of the crops. Such economic research is actively engaging the attention of the Agricultural Departments of the self-governing Dominions, and of the Empire Marketing Board in the case of the products of European-run farms. It is a subject of no less importance to native crops. There are many peculiar and unexplained problems under this head, not the least being the wide disparity in value for market purposes between the similar products of different Colonies. The difference in the value of Sierra Leone and West Indian gingers, Ceylon and West African cocoas, are examples which occur to me.

While the development and improvement of economic crops for sale is rightly regarded as important, we cannot afford to neglect the improvement of local food crops. The costs of production of economic crops are inevitably increased if there is not an adequate supply of cheap locally-grown food, and it is the duty of Agricultural Departments to keep a watchful eye on the maintenance of food supplies for internal markets.

Turning to veterinary research, I should like to re-emphasise the growing interdependence of veterinary and agricultural work. This is daily becoming more apparent, as is the importance of veterinary to medical science. The latter can in all probability only make advances in proportion as veterinary science advances. The whole problem of virus-borne disease—whether of man, domestic animals, or plants—turns very largely on the work that the veterinary officers can do for us. Virus-borne diseases like influenza, encephalitis-lethargica in man; foot-and-mouth disease and distemper in animals; mosaic diseases in maize, sugar-cane, and potatoes, and rosette disease in groundnuts, have this in common. They are spread by ultra-microscopical filter-passing viruses. The study of such organisms—if indeed they are invariably living organisms at all—is baffling compared to the study of things which you can isolate and see under a microscope. The research required is more like the games the physicists play with the structure of the atom. The whole science of immunology in connection with these virus diseases may be said to be still in its infancy. We are still waiting for someone to achieve in this field what was achieved by Pasteur in the field of bacteriology.

But our somewhat meagre veterinary research staff in the tropical dependencies has a gigantic field quite apart from such a problem in fundamental science.

In Africa, especially, we have rinderpest and the tsetse fly, the tick-borne fevers, helminthic (worm) diseases, and a whole range of problems at which we are only at the commencement of the work. In some veterinary fields we are still in the stage

at which medical science was before Sir Patrick Manson and Sir Ronald Ross, i.e., when the curative treatment of the stricken is regarded as more urgent than the development of preventive measures and the increase of physical efficiency in health. Epidemic outbreaks of rinderpest in East and West Africa have absorbed and directed the energies of veterinarians and left them little time to launch out on to the wider problems of animal husbandry and animal genetics. The discovery and application of double inoculation for rinderpest would seem to encourage us to believe that we are now masters of the situation as far as this plague is concerned; and soon we may begin the attack on trypanosomiasis on a more effective scale. We know that the larger antelope are apparently immune though infected; that some cattle and goats—also apparently immune—survive in Southern Nigeria; that tartar emetic and injections of antimony potassium tartarate compounds, so effective in the treatment of yaws in man, are effective in treating cattle infected with some kinds of trypanosome, but not others. We have scraps of knowledge awaiting investigation by men who will work at the research aspects of the problem which in the judgment of many is a veterinary problem of first-class importance throughout Africa from the Gambia to Zululand.

Kenya has at the moment by far the largest veterinary staff of any dependency. In fact, approximately one-quarter of our whole veterinary cadre in the Colonial Empire is in Kenya; and the East African Governors Conference suggested that veterinary research in Tropical Africa might as far as possible be centralised at their very well equipped veterinary laboratories at Kabete near Nairobi. Over a great part of the field this is probably the best and most economical arrangement, but trypanosomiasis research will have to be done very largely in Nigeria, and possibly also in Tanganyika where there seems to be an undue variety of both flies and trypanosomes. The research will involve the study of game animals as well as domestic stock of all kinds, sheep and goats as well as cattle. In Northern Rhodesia we are confronted not only with pleuro-pneumonia and trypanosomiasis, but with a new and hitherto unknown cattle disease called " veldt poisoning." We have at present neither the staff nor the equipment for studying this new danger to Africa.

We are, I think, singularly badly off in regard to veterinary publications, though I must call attention to the valuable periodical published by the Bureau of Hygiene and Tropical Diseases, entitled the *Tropical Veterinary Bulletin*. I hope it may be possible to extend Dr. Leiper's work at the London School in agricultural and animal parasitology.

Veterinary research generally on sheep and goats is of great importance in tropical countries—especially to Northern Nigeria, the Gold Coast, East Africa, Palestine, and Cyprus as well. If we are to have these animals at all we may as well have good ones. Most of those we have are—with the exception of a few

European-owned flocks in the Kenya highlands—poor and apt to be regarded as unmitigated nuisances. No doubt this is the reason why they have been somewhat neglected from a scientific and economic point of view

It is not only in the Colonies that veterinary science is rather backward in the Empire. Some hard things are said about us in England in this respect. It is a fact that all too little has been done until quite recently. We now have several research institutions in this country which are engaged in breaking new ground in this important field. To name a few—there is the Institute of Animal Pathology at Cambridge, under Professor J. B. Buxton, the Animal Breeding Research Department, under Dr. F. A. Crew, at Edinburgh University, the Rowett Research Institute, under Dr. Orr, at Aberdeen, the Institute of Research in Dairying at Reading, under Dr. Stenhouse Williams, and the Ministry of Agriculture's Veterinary Research Laboratory at Weybridge.

Germany, Switzerland, America, the Union of South Africa, and Australia seem now more fully alive to the special significance of veterinary science, both for its own sake and in relation to cultivation on the one hand and human medicine on the other. It is probably premature to think of forming an Imperial bureau of veterinary research—though I understand the question may be mooted at the forthcoming Imperial Agricultural Conference. In any case, all I have said about the interchange of knowledge, visits of officers from one Colony to others, in connection with agricultural staff applies equally to veterinarians. As in agriculture so in animal husbandry we have in the tropics our own peculiar field. Experience and research in the temperate zones may help and guide us, but most of the problems we shall have to work out for ourselves under tropical conditions. Africa provides the greatest field for further veterinary investigation, and I hope it may be possible to undertake at Kabete and elsewhere not only research into the urgent problems that face veterinary treatment and administration, but also those projects of long range research into veterinary science in its widest aspects. We want to attract into the Colonial veterinary services some of the best scientific brains that the Empire can produce. Advances in medical science can often only be made if the scientific veterinarian leads the way.

The conquest of the tropics—the most bountiful areas of all the earth's surface—can only be achieved with the assistance of science. In the tropics nature has been so bountiful in her gifts, both good and evil, that man—and especially the white man—has not yet harnessed one tithe to his use. Britain has, next to France, the largest area of tropical possessions, and if we take the Colonial Empire alone and leave out India we have a tropical population larger than that of the French Colonial Empire, and equal to that of the Dutch. In the exercise of our trust there is no more important field of endeavour than the application of

modern science to agriculture I can only conclude by reiterating what I have written at the beginning of the paper—the first need is the supply of trained and qualified staff. I am convinced that there is no investment more certain of an economic return than in securing a steadily increasing supply of really first-class workers in the fields of both agricultural and veterinary science, and it is to the direct interest of each and every Colonial Government to co-operate fully and generously to this end.

W. O. G.

COLONIAL OFFICE,
April, 1927.

APPENDIX VI.

The Mauritius Agricultural College.

MEMORANDUM PREPARED IN THE COLONIAL OFFICE.

The foundation-stone of the Mauritius Agricultural College was laid by Sir Hesketh Bell in July, 1923, and the inaugural ceremony was performed by Sir Herbert Read on the 12th March, 1925. The College took its origin in the training of students in the Station Agronomique, which was to form the School of Agriculture when the Department of Agriculture was constituted in 1913. The College itself forms part of the Department of Agriculture, but is maintained by means of the proceeds of a special tax on sugar. The Director of Agriculture is the Principal, and is assisted in the administration by an Advisory Board, nominated partly by Government and partly by the Chamber of Agriculture and the Société des Chimistes. The College is situated at Réduit in large and commodious buildings, and attached to it for the purposes of training are experimental fields and the stock farm. The accommodation includes large and well-lighted laboratories provided with up-to-date equipment for the teaching of chemistry, physics, botany, entomology, and sugar technology. There are also a manual workshop, drawing office, lecture and class rooms, library, museum, and students' common-room and office.

The full ordinary course of instruction leads to the Diploma of the College, and covers a period of three years. Under certain

conditions, however, students are admitted to certain lecture courses which are so arranged as to constitute special shorter courses with a view to affording general training in agricultural sciences to those already employed in agriculture on estates, or to persons desiring to obtain the instruction necessary to qualify as registered Agricultural Chemists, or for the preliminary examination for registration as Veterinary Surgeons, or for the examinations in sugar technology of the City and Guilds of London Institute. The courses of instruction in general aim at combining a grounding in the sciences which underlie agriculture with practical training in agriculture, horticulture, surveying, animal husbandry, carpentry, engineering, and the technology of sugar manufacture. The first-year course is designed to provide a grounding in those portions of the sciences of chemistry, physics, botany, and zoology on which scientific agriculture depends. In addition it comprises a general survey of tropical agriculture, together with practical work in the laboratory, workshop, and field. The second-year course is devoted to the study of agriculture, chemistry, botany and entomology, the culture of the sugar-cane, animal husbandry, including the technical handling of farm animals, veterinary sciences, surveying and book-keeping, Sugar-House control, and practical work in workshops and fields. The third-year course consists principally of the study of sugar manufacture, agricultural chemistry of a more advanced character, including the chemistry of fermentation, agricultural law, agricultural economics, agricultural engineering, and building construction.

It is hoped in the future to enlarge the curriculum so as to include teaching in the elements of handling and treatment of crops other than sugar-cane, e.g., the preparation of tea, coffee, cocoa, tobacco, rubber, fibres, essential oils, and other crops which offer possibility of development in Mauritius. Further, it is hoped that ultimately means may be found to include in the course for the final year instruction in sanitation as applied to estate conditions, the elements of law and its application to agricultural conditions, and the outlines of forestry.

The Director of Agriculture and the Agricultural College Board are particularly anxious that it should not be supposed that the usefulness of the College is confined to students from French-speaking British Dependencies. It has been pointed out that all the students of the College speak English fluently as well as French, and that most of the courses at the College are conducted in English; and the Director of Agriculture has stated that, if a number of Englishmen were to become students of the College, there would be little difficulty in arranging for the whole of the instruction to be given in that language. The College Committee wish it to be known that the existence of the College offers considerable advantages for training students from abroad in tropical agriculture, and especially in the cultivation and manufacture of sugar.

The following is an extract from a despatch recently addressed by the Secretary of State to the Governor of Mauritius :—

> " I am, of course, well aware that the Mauritius Agricultural College and its students are not uni-lingual, and that the fact that French is spoken in Mauritius does not prevent College graduates being available for service in Colonies in which English only is spoken.
>
> " The whole question of education in tropical agriculture is now receiving much attention, and I will not fail to see that the advantages offered by the Mauritius College are brought to the notice of all who are concerned in preparing detailed plans for improving the facilities offered within the Empire."

DOWNING STREET,
20th May, 1927.

APPENDIX VII.

The Relation of Technical to Administrative Services.

MEMORANDUM BY THE PARLIAMENTARY UNDER-SECRETARY OF STATE FOR THE COLONIES.

The subject mainly concerns the larger Colonies and Dependencies. In fact it hardly arises in the West Indian islands or those territories where the area is small and the staff comparatively few. It arises in its most difficult form in those Dependencies where the technical and specialist staff is undergoing rapid expansion. It also presents particularly difficult problems in territories such as Nigeria, Tanganyika, and Malaya where in addition to British administrative staff there are various types of indigenous native administrations.

The Colonial Office has received a good deal of interesting material under this heading of the Agenda and it is the aim of this memorandum to indicate the chief points raised.

I am afraid that I have been unable to avoid the words " decentralization " and " co-operation." Decentralization is so often talked about and is as often difficult to achieve, while co-operation between the officers of different departments is the theme of many official pronouncements, Gazette notices, and

circulars, but it too is as difficult to achieve in practice, at any rate to the degree desired.

It is not easy, for example, to lay down a hard and fast definition of the proper functions of a Colonial Secretariat in its relation to Heads of departments and provincial staffs which will suit every Colony. In these relations as in all else in Colonial administration the personal equation is of major importance.

It is perhaps desirable to emphasise the view at the outset that the origin of these difficulties is due to the force of historical circumstances. In order to illustrate this it is desirable to take some concrete example such as Nigeria, which is one of the largest and easily the most populous of the Colonies. It is in its present dimensions, for the most part, the creation—as a British Dependency—of the last thirty years.

In the early days of this century the main efforts of Government were to ensure the effective co-operation between military and political officers in establishing the foundations of British administration in the Moslem Emirates and pagan tribes of the vast and populous new territories that were acquired. We must remember that even in South-Eastern Nigeria the extension of British administration over hostile and warlike tribes has been made effective in some places only since the Great War. Following the establishment of the Pax Britannica by military and political officers, the engineers of the Public Works Department, and the Railway Department, were brought in to open the arteries of internal communications.

Following upon roads and railways came the introduction of technical services—the medical and veterinary departments, agricultural and forestry, the topographical and geological surveys, and finally the schools and the educational department.

The development of trade necessitated, apart from the administration of justice by the native tribunals, the creation of special areas administered under English law.

It must be remembered that Nigeria is a country seven times the size of England, with nearly twenty million inhabitants of almost unimaginable variety as regards tradition, belief, custom, and capacity. Year by year the revenue has been growing and correspondingly the numbers of the staff of each and every department have increased.

The rapid expansion of Government activities in a territory of so great a size inevitably leads to the straining of the administrative machine. There has been, to an extent, political decentralization by the creation of two Provinces, Northern and Southern, but the Government of Nigeria is still in the process of decentralizing its technical services, which are, as I have explained, historically later in development.

When a new policy is introduced, for example, in regard to forest preservation, it is inevitable that on its technical side it must be closely directed from headquarters. The result has

been, as might have been expected, a tendency to over-centralization in the technical departments.

It is perhaps inevitable that at an early stage in the development a political officer in the province or district with his mind chiefly set on securing peace and order should be embarrassed by the demands and activities of technical officers which complicate the already often delicate relations with the indigenous population. On the other hand, technical officers may overlook political considerations.

There are thus on the one hand the difficulties of the central Government, i.e., the adjustment of the relations of the central with the provincial administrations and of the central secretariat with the heads of the several technical departments. On the other, there are the local problems which confront the administrative officer in the province or district in his relations with technical officers.

While all may be peace at headquarters, a district officer may, though with the best possible intentions, seriously impede the work of either the agricultural or the forestry officer in the field. It is equally perfectly possible for the peace of a station where there is a happy family of two or three officers of various departments to be disturbed by the eddies of a departmental conflict at headquarters.

I have heard of one case (I do not say that it occurred in recent years) where a junior Public Works Department officer got into hot water with the head of his department for discussing the plans of certain projected buildings with the chief administrative officer in the Province in which he was stationed.

I could quote other examples, but I think the existence of the Gazette notices and circulars to which I have alluded prove that these difficulties are not imaginary. The chief element in the solution of these difficulties is the personal equation. Everything depends on the existence of a proper spirit both at headquarters and in the field, though as I have tried to explain there have been inevitable conflicts in the past owing to expansion and development. I am not speaking here of Africa alone. The same problems arise in Malaya and elsewhere.

The memoranda submitted show that various modifications of the central administrative machine have been made to meet the difficulties which I have outlined. Sir Hugh Clifford's memorandum, which is printed as the first Annex to this, presents the issue very clearly.

It has been held, for example, that it is an advantage to have administrative officers in charge of technical departments, and the advantages of this have been pressed in some of the documents prepared for the Conference. In Malaya, for example, the Posts and Telegraphs, the Education and the Agricultural Departments are under the control of non-technical administrative officers. The General Manager of the Railways, too, is not a railwayman. I do not wish here to discuss the merits or demerits of this scheme. I am merely concerned to point out

that it is one way of obtaining better liaison between the different branches of Government activity.

Another method which has been suggested for obtaining better relations between secretariats and the central departments is that secretariat officers should be seconded for considerable periods to work in the headquarter offices of the several departments in order to obtain first-hand knowledge from inside of the working of the department, while at the same time their attachment should be useful to the technical officers as it should give them assistance and relief in dealing with the correspondence side of their work—particularly in the presentation of their case to Government.

It seems to me that this idea is worthy of consideration and might even be extended by the permanent attachment of secretariat officers to technical departments where these are large enough to warrant full-time employment.

For example, I have noticed that the heads of big departments, like the Medical, have too much of their time occupied by purely routine matters of much of which they could be relieved if they had a properly trained secretariat officer to assist them.

Similarly, by organising the central secretariat so as to ensure that a particular secretariat officer deals with all correspondence coming from a particular department, misunderstanding can be avoided. I think, however, that it is indisputable that a secretariat officer would obtain a better working knowledge of a department from working actually inside it than merely from receiving correspondence from it.

Several Dependencies have reported on the continuous increase of interdepartmental correspondence, and one is left with the impression that a great many matters are dealt with in this laborious manner which would better be settled by personal intercourse and friendly discussion. Secretariats breed paper—to their own undoing.

As I have indicated, however, it is not only the machinery of Government at the centre which requires attention, but also that in the province and the district. I may call attention to the second and third Annexes to this memorandum, which are typical of the instructions issued by Colonial Governments in Tropical Africa. The administrative staff in the provinces are the principal executive officers of Government, and the technical departments should in no case take executive action without acquainting the principal administrative officer in the province or the district, as the case may be, of their intended action; for in this area the administrative officer is, though to a necessarily limited extent, the representative of the Governor. Such a position makes it essential that the attitude of the administrative officer to his technical colleagues should correspond to the attitude of the Governor to heads of departments. Too often in the past the administrative officer has regarded himself as a departmental officer whose duties are confined to a strictly

limited sphere, namely, the preservation of peace and order. Where development is taking place the sphere of his duties is automatically enlarged and it becomes essential for him to have some knowledge of, and, what is more important, sympathy with, the work of the various technical departments.

For example, it is, I think, indisputable that in the past there have been considerable difficulties with the administration of forest policy by forest officers owing to the ignorance on the part of the administrative staff of the importance of the subject.

I have alluded to the importance of personal intercourse at the headquarters of Government. It is even more important in the districts. If effective co-operation between all departments is to be assured, it will be the duty of the administrative officers to promote friendly relations between the departments in their area.

It is with the intention of endeavouring to eliminate such difficulties that we are trying to instil into the probationers now undergoing special courses at Oxford and Cambridge the urgent importance of attaching proper weight to the activities of the technical departments. Though little can be done in the short time available such instruction will, at any rate, implant that idea at the beginning of their careers. In any case it is bound to be of advantage for every administrative officer to have at the outset even an inkling of the aims of tropical agriculture, of the education policies of Government, of the importance of forestry, &c.

This memorandum has been written mainly from the point of view of general administration. The need for securing more effective co-operation between the various technical services must also not be ignored. It is becoming more and more apparent that problems arise which necessitate the combined activities of more than one department. The fight against trypanosomiasis, for example, requires the several activities of the medical, veterinary, agricultural, forestry, administrative, and, where they exist, the game departments. Another example which occurs to me is the co-operation required between different departments in connection with any new railway construction. The first stage of any such project requires close liaison between the survey staff and the officers of agricultural, and possibly forestry, departments. In some cases the geological department may also be concerned. Later, in the actual process of construction there are the very important questions of the provision of labour and its medical care to be considered. In short, the construction of a railway involves practically every department. I should not call attention to this unless I had seen examples where more effective co-operation would have produced more satisfactory results.

Finally, the recent expansion in Africa of the educational facilities made by Government brings in the share which each

department is required to contribute to the development of educational policy.

In the Gold Coast it is the practice of the Education Department to receive reports regarding the progress of schools from administrative officers in those cases where the inspectorate staff of the Education Department has been insufficient to visit all schools in an area. In most Dependencies it is becoming regarded as of increasing importance that the Agricultural Departments and the Public Works Departments should co-operate with Education officers in making the curricula of schools more in accordance with the practical needs of the vast majority of the pupils.

It is fully recognised at the Colonial Office that in endeavouring to meet the demand of Colonial Governments for the rapidly expanding European staffs of the Education Departments it is essential to obtain men of the same type and education as those who enter the administrative services. The qualities that make for successful leadership in the administrative service are just those which are now required in the schools and the inspectorate. The success of our present efforts in this direction will, however, depend very largely on the degree of assistance given by the administrative to the education services.

In general it may be said that the greatest danger to progressive administration in any form is the growth of interdepartmental isolation or jealousy. One may go even further and say that any tendency to regard departments as "superior" or "inferior," or to the creation of departmental "castes", is fatal to good government. In the conflict of loyalties, loyalty to the Colony and its people as a whole must come first.

W. C. G.

April, 1927.

ANNEX I.

Reconstruction of administrative machinery, originally designed for the Government of Crown Colonies, in order to adapt it to modern requirements and especially to prevent excessive centralisation and congestion of work in the Secretariat.

MEMORANDUM BY SIR HUGH CLIFFORD, G.C.M.G., G.B.E., GOVERNOR OF CEYLON.

Under the Crown Colony system, the Governor for the time being is personally and directly responsible to the Secretary of State for the Colonies for the good government of the territory under his administration; and, though he is assisted by an Executive Council, is under statutory obligation to act with its

concurrence in a large number of instances, and is required to report to the Secretary of State any case in which he has decided to reject the advice tendered to him by a majority of its members, he, as His Majesty's Representative in the Colony, is the Chief Executive, all orders being issued and all public acts done by him or in his name. The responsibilities thus laid upon the Governor being of so direct and personal a character, it became necessary in the Crown Colonies to devise administrative machinery that should enable him to exercise direct control and supervision over every Public Department; and to this end the Colonial Secretariat was brought into being. This Office is presided over by the Colonial Secretary, who occupies, *vis-à-vis* the Governor, very much the position of the Commander of a battleship in relation to her Captain. Thus it is to the Colonial Secretary, rather than to the Governor, that Heads of Departments and prominent members of the local public go in the first instance for assistance, direction, or advice in matters of difficulty or emergency; and, where the system is working as it was designed to work, the Colonial Secretary is in such close touch with the Governor, so completely in his confidence, and so intimately acquainted with his wishes and opinions regarding public affairs that, in the majority of cases, he can deal on his own responsibility with questions brought before him which demand prompt action or decision, merely reporting to the Governor what he has done for covering sanction. None the less, it was an essential feature of the Crown Colony system that the Colonial Secretary should not himself be vested with any executive authority. He is the Governor's principal adviser; his mouthpiece, through whom all his orders are issued; the official channel of communication with him, alike for the members of the public service and for the general public of the Colony; and the principal spokesman of the Government in the Legislative Council. He has no power, however, to give any instructions to any public servant, with the exception of those serving as his immediate subordinates in the Secretariat, save in the Governor's name or by his direction; but he is the pivotal part of the administrative machine by means of which the work of all the Public Departments is co-ordinated, supervised, and controlled. Through his agency also the Governor is kept fully informed of all that is going on in the Colony, and is enabled to exercise his authority and to discharge his responsibilities.

2. When I first saw this system in operation, now more than 40 years ago, when the late Sir Cecil Clementi Smith was Colonial Secretary of the Straits Settlements, and later when I filled the corresponding post, first in Trinidad and subsequently in Ceylon, from 1903 to 1912, it perfectly fulfilled the objects for which it was designed. It was true, of course, that in all these Crown Colonies the expansion of work had compelled the Colonial Secretary to delegate the bulk of his routine duties to his Assistants in the Secretariat; but it was still possible for him to maintain very close touch with the personnel

and with the activities of every Government Department, with the unofficial members of the Legislative Council, with unofficial public bodies, and with the leading representatives of the general public throughout the Colony. For one and all of these he acted as liaison officer between them and the Governor, and he was in a position to afford the latter all the information needed by him to enable him to deal with confidence with any matter submitted for his orders.

3. During the last decade and a half, however, the volume and the complexity of Government activities in some of the larger Crown Colonies have increased so enormously that the amount of work developing upon the Colonial Secretary personally has become too great for any single individual, no matter how able and energetic, efficiently to discharge. This means that the close supervision and control, which formerly were exercised over the affairs of every Public Department by the Governor, through the Colonial Secretary, have little by little become relaxed; that matters referred to the Secretariat by Heads of Departments, by members of the Public Service, and by representatives of the general public are no longer subjected to the close scrutiny, which of old did so much to insure co-ordination and efficiency; that the personnel of the Secretariat, and especially the Colonial Secretary and his principal Assistants, are habitually and severely overworked; and that, even so, the choice is presented to them of accepting stifling congestion of business, with its consequent delays and exacerbations, as a chronic condition of the Department, or of subjecting the work passing through their hands to less thorough treatment than was formerly regarded as essential. In a Colony such as Ceylon, where, in addition to his other work, extensive encroachments upon the time of the Colonial Secretary are made by duties connected with the Legislative Council, by attending debates and by according interviews to unofficial members, the intolerable burden of labour and responsibility now laid upon him is far greater than any public servant, in the Tropics or out of it, should be allowed to assume.

4. Though, owing to local circumstances, the situation in Ceylon is probably, in this respect, more acute than it has yet become elsewhere, I have reason to believe that in some other Crown Colonies the very highly centralised system, originally devised for their Government, and the congestion of work and business which, under it, is caused by the " bottle-neck " represented by the Secretariat, are proving to be ill-suited to modern conditions. In countries where developments and complexities have not yet out-grown the system, I believe it to be the one best calculated to enable the Governor to discharge the responsibilities required of him; and, in such cases, any change is, I think, to be deprecated. Where, however, the old system is showing signs of becoming unworkable, or is no longer functioning with its former efficiency and despatch, I suggest that some

radical reforms are called for; and it is the nature of these reforms which I propose as a subject for discussion at the forthcoming Conference.

5. As a possible solution of the problem, I would invite attention to the system in force in the Provincial Governments of British India where, instead of concentration of all public business upon a single Secretariat, Public Departments are grouped under a number of Secretaries to Government, the task of co-ordinating the work of all of them being performed by the Governor in Council. It is possible that an adaptation of this system may provide a remedy for the evils to which I have drawn attention in this Memorandum as resulting in some of the larger and more advanced Crown Colonies from government through a single Secretariat.

HUGH CLIFFORD,
Governor of Ceylon.

15*th February*, 1927.

ANNEX II.

Extract from Memorandum on Native Administration in Tanganyika Territory.

"The channel of communication between a Native Administration and the Government is the Provincial Commissioner and the District Officer, and it is through this channel that Departments should as a rule communicate, but in purely technical matters the representatives of technical Departments may directly advise the Native Administrations, just as the Administrative Officer advises them on matters of administration. In its own area the Native Administration represents the executive Government, and all executive action which may be required will be carried out through it. If for the purpose of such executive action—e.g., to enforce a quarantine on people or stock or to ensure that outbreaks of disease are reported or that cotton is uprooted at the proper time—it is necessary for native subordinates to be employed, they should, unless they are accompanying a European officer, be placed under the orders of the Native Authority, to whom the purpose of their employment should be made clear through the District Officer, and who should be held responsible by the District Officer for the proper carrying out of that purpose. Under no circumstances may native subordinates charged with executive func-

tions be despatched independently into the area of a Native Administration. If they are accompanied by a European officer, he should work in collaboration with the Administrative Officer and not independently of him."

ANNEX III.

Colony and Protectorate of Kenya.

THE SECRETARIAT,
NAIROBI,
11*th October*, 1926.

POSITION AND RESPONSIBILITIES OF ADMINISTRATIVE OFFICERS IN NATIVE AREAS AND THEIR RELATIONSHIP WITH DEPARTMENTAL OFFICERS.

In reference to Secretariat Circulars No. 88 of 1912 and No. 61 of the 11th July, 1919, I am directed by His Excellency the Governor to issue the following instructions:—

In order to avoid division of authority in the control of native populations and action by departmental officers not in conformity with the general policy of the district, it is essential that departmental officers should act not only in close consultation with but under the general direction of the District Commissioner.

2. The Senior Commissioner is, within the limits of his Province, the principal executive officer of Government, and is personally and directly responsible to the Governor for the peace and good order of his Province and for the efficient conduct of all public business therein. It is his duty to supervise not only the work of his administrative staff, but that which is done in his Province by all departmental officers.

3. Any matters which are susceptible of settlement by direct communication between the Senior Commissioner and local departmental officers should be so adjusted without prior reference to headquarters. The Senior Commissioner should likewise direct the attention of any officer serving in his Province, preferably by word of mouth, to any apparent failure of efficiency and should afford the latter all possible assistance and support. He is similarly entitled to

receive from departmental officers all the information and assistance he may need for the better conduct of public business in his office.

4. The Senior Commissioner will not interfere actively in any departmental or technical question but in matters of detail and routine any reasonable request addressed by him to local departmental officers should as a matter of course be honoured. Moreover, in cases of emergency, of which he must be accepted as the sole judge, the Senior Commissioner is empowered on his own responsibility to issue orders designed to meet the local situation, and these orders must be carried out by the recipient without delay. Action of this sort will at once be reported to headquarters by the parties affected. It would of course be of very rare occurrence.

5. As regards the general public, they should realise that the attention of Government should be directed to personal grievances or matters of local importance through the administrative staff or the representative of the department concerned. There is always an appeal to headquarters if satisfactory redress is not obtainable in that way. Even where the local authorities are not competent to make a final settlement, only confusion and delay will ordinarily arise from addressing headquarters direct in the first instance, as in most cases the report of local officers has to be sought before any decision can be recorded.

6. The principal executive officer of Government in a district (i.e., the District Commissioner) is, *mutatis mutandis*, in the same relation to his district as is the Commissioner to his Province and, subject to the limitations of outstanding Agreements or of special or general instructions by the Senior Commissioner to whom he is directly responsible, will exercise therein a similar authority and control.

G. A. S. NORTHCOTE,
Acting Colonial Secretary.

To

All Heads of Departments,
Administrative Officers,
Officer Commanding Troops.

APPENDIX VIII.

The Form and Material of Colonial Annual Reports.

REPORT OF A COMMITTEE APPOINTED BY THE SECRETARY OF STATE FOR THE COLONIES.

We were appointed by the Secretary of State for the Colonies to examine the contents and form of the Colonial Annual Reports, and to make recommendations to him on possible improvements.

The Colonial Annual Reports were originally called the Blue Book Reports, and were published in the form of a commentary on the annual statistical and other returns sent by the Colonies. The Marquess of Ripon's Circular of the 11th May, 1894, laid down that they were prepared for the purpose of laying before Parliament " in succinct and readable shape such material and information regarding the financial position of the Colony, its industries and commerce, and the condition of the people, as would be likely to interest the large and increasing number of persons in this country who desired to inform themselves on Colonial questions."

The form of these reports was modified as a result of the Report* of a Sub-Committee of the Committee on Colonial Blue Books and Blue Book Reports, which sat under the chairmanship of Sir Arthur Steel-Maitland in 1917-18, with the object of making them of more general interest to the increasing number of persons desirous of informing themselves on Colonial questions.

We have considered how far the reports as at present issued carry out the purpose for which they are intended. We understand that the average circulation amounts to about 450 to 500 copies in all, 300 of which are disposed of by the official circulation list, and the remainder to private individuals. It is, of course, not possible to trace the destination of the copies sold. There are, however, about forty or fifty standing orders for copies of all the reports, and of these orders approximately half are given by foreign individuals or institutions.

We discussed the desirability of continuing the annual publication of the reports, or the possible alternative of making a triennial or quinquennial issue. We are, however, agreed that it is necessary, if only in order that information may be available in a handy form for Members of Parliament, to continue the practice of producing an issue annually.

We discussed the question whether it was desirable that the printing of such reports as Command Papers, which was suspended six years ago, should be resumed in order to bring Colonial affairs more closely to the notice of Members of Parlia-

* See Annex.

ment, but we are agreed that in view of the necessity for economy it is not practicable at the present moment to press this proposal, however desirable.

We examined the Colonial Annual Reports generally and came to the conclusion that, while in some cases the reports were presented in a readable form and contained most of the information required for the general reader, in certain cases greater attention might with advantage be given to style and presentation.

On the other hand, we noted certain deficiencies, particularly the absence of information as to the general tendency of trade. When the Sub-Committee had reported in 1918, the appointment of Trade Commissioners in the Colonies, under the Department of Overseas Trade, had been contemplated, but in only two cases had these materialised. As a result, while trade statistics were generally available either in the Trade and Statistical Reports, in the Blue Books, or in the Colonial Government Gazettes, there was, generally speaking, no annual publication giving an indication of general conditions of trade, e.g., the trend of development in imports and exports, the sources of supply and destination, possible openings for British trade, competitive conditions, &c.

We understand that the reports are of value to Government Departments in this country in so far as they are available in advance of the Blue Books, or trade reports, or in so far as they contain information not published in the Blue Book or elsewhere. It is therefore important that they should be compiled and issued as soon as possible after the close of the year with which they deal.

We agreed that, as pointed out in the Sub-Committee's report, it is undesirable to prepare a detailed outline of a model report since such an outline tends to fetter too closely the discretion of the Colonial authorities. We considered, however, that the reports should generally take the form indicated in the following paragraphs.

The report should commence with a table of contents, followed by a prefatory note entitled " History and Geography," which should be for the most part constant, as it deals with past history, though amendments may from time to time be necessary. It should include a note of the principal languages, the currency and any changes in currency, monetary units, and of weights and measures.

The first section of the report should be entitled " General " and should include any events of a general political nature and any constitutional changes. It might, for example, include any general statement on policy made by the Governor in his speech on introducing the Estimates or on opening the Session of the Legislative Council. Changes of personnel, unless of special importance, should be excluded, as well as other matters of

detail which, if necessary, could be included in a miscellaneous section at the end of the report.

The second section should be devoted to "Finance." The revenue and expenditure totals for five years at least should be given in tabular form. Particular note should be given to any changes in the method of raising revenue, or alteration in the rates of taxation. A full statement of the loan position of the Colony should also be included, showing the operation of sinking funds, &c.

The next chapter should be entitled "Production" and should cover agriculture, forestry, fisheries (when necessary), and mining. It should give the general position under each of these heads, showing any tendency towards increased or decreased production. It should also give figures to show the comparative amount of the annual exports of the principal commodities during the last five years. Quantities as well as values should be stated.

Under the fourth heading, which should be entitled "Trade and Economics," information should be given as to the state of trade, including the trend of development in imports as well as exports as shown by statistics. The character and size of the import and export trade in the principal commodities, with the sources of supply and destination, should also be given. Particular attention should be called to the progress of trade with the United Kingdom and other parts of the British Empire, and also to any possible opening for British products.

Competitive conditions, method of conducting import business, and distributive machinery might also be dealt with in so far as these subjects are appropriate.

The fifth heading should be "Communications," viz., shipping, railways, roads, postal—including cables, wireless, inland telegraphs, telephones.

The sixth heading should be "Justice, Police, and Prisons."

The seventh heading should be "Public Works," avoiding reference to small public works of no great interest other than purely local.

The eighth heading should be "Public Health," the ninth should be "Education," and the tenth should be "Lands and Survey," including geological survey.

The eleventh heading should be "Labour," which heading would be of particular application to Colonies where there is plantation labour or any immigrant labour. In other cases a brief account of labour conditions should be given.

Lastly, there should be a miscellaneous chapter which should include reference to any important legislation which does not fall under any of the preceding heads.

In indicating the form and material required for these reports in the future, we would remark that those Colonial reports which

we considered satisfactory followed the lines indicated in the report of the 1918 Sub-Committee. We think therefore that that report might with advantage be read in conjunction with this, with a view to levelling up the standard to that already achieved by a few.

W. ORMSBY GORE.
G GRINDLE.
A. J. HARDING.
G. I. H. LLOYD.
W. FERGUSON.
O. G. R. WILLIAMS.

ANTHONY BEVIR,
Secretary.

2nd May, 1927.

ANNEX.

APPENDIX II OF THE REPORT OF THE COMMITTEE ON COLONIAL BLUE BOOKS AND BLUE BOOK REPORTS.

Report on Blue Book Reports and other Colonial Statistical Publications of the Sub-Committee on Blue Books and Blue Book Reports.

1. We have the honour to submit our Report on Blue Book Reports and other Colonial statistical publications.

2. Colonial Regulation No. 189, which deals with Blue Book Reports, runs as follows :—

> " The Blue Book shall be accompanied by a report containing a brief account of the financial position of the Colony, its industries and commerce, the condition of its inhabitants, and other matters of interest to persons outside the Colony, with a summary of the more important occurrences of the past year. Opinions, forecasts, controversial matter, details of merely local interest, and tabular statements other than those required for the elucidation of the text should be excluded."

3. Blue Book Reports have also been dealt with by successive Secretaries of State in a series of Circular despatches. We invite special attention to the Marquess of Ripon's Circular of the 11th of May, 1894, and to Mr. Chamberlain's Circular of the 31st of January, 1899.

4. In a subsequent Circular, dated the 30th of April, 1908, the Earl (now the Marquess) of Crewe intimated that, since the issue of the Circular of the 31st of January, 1899 (which suggested in considerable detail the outlines on which annual Blue Book Reports should be prepared), a tendency had grown up to revert to the practice of giving in the Reports unnecessary and uninteresting details, and he suggested that the Governor should be responsible for securing that the Reports, while following in a general way the principal headings suggested in the Circular of the 31st of January, 1899, should not be absolutely bound by them.

5. We are fully in agreement with the above-quoted instructions, but, as we indicate in subsequent paragraphs of this Report, we recommend that further measures should be taken with a view to checking the tendency, which still exists, to prepare the Reports upon stereotyped lines.

6. In the past it has been the practice, as is shown by Colonial Regulation 189, that the Reports now under consideration should be in the nature of a commentary upon the contents of the annual Blue Books. In our opinion this is no longer desirable and we suggest that the Reports, while they will no doubt be founded to some extent upon the returns and other material contained in the Blue Books, should not be regarded as dependent upon or allied to the Blue Books but should stand by themselves. We suggest that their title should be changed and that they should in future be called "Annual General Reports."

7. The Reports are primarily prepared for the purpose of laying before Parliament (we quote the Circular of the 11th of May, 1894) "in succinct and readable shape such material information regarding the financial position of the Colony, its industries and commerce, and the condition of the people, as would be likely to interest the large and increasing number of persons in this country who desire to inform themselves on Colonial questions." Our object in the various changes which we suggest is to make the Reports, as far as possible, a vivid and interesting record for presentation to Parliament, and attractive to other persons in this country who are interested in the progress of His Majesty's Oversea Possessions and Protectorates.

8. In considering the lines upon which the Annual General Reports should in future be prepared, we have thought it desirable to examine the outlines suggested in Mr. Chamberlain's Circular of the 31st of January, 1899, and we now proceed to submit our views as to the alterations which appear to us to be advisable in the light of subsequent experience.

9. We feel, however, that any of our recommendations which may be accepted by the Secretary of State should be communi-

cated to the Colonial Governments in the nature of suggestions rather than as instructions. We think it undesirable to prepare a detailed outline of a model report, since past experience has shown that such an outline tends to fetter too closely the discretion of the Colonial Authorities. The object to be aimed at is the production of a useful and readable report in respect of each territory, and we believe that this end is more likely to be achieved if the writers of the reports are encouraged to rely on their own discretion in matters of detail, subject to the general warning that they are not to burden the reports with details which are of no interest outside the Colony nor with statistics which are only of value for local departmental purposes.

10. We suggest that each Report should be prefaced by a *brief geographical and historical note* on the lines of the introductory remarks which preface the accounts of the various Colonies, &c., in the Colonial Office List.

11. The report itself should begin with the "*General Observations,*" which at present are usually, if not invariably, inserted at the end of the Blue Book Reports. These observations should include a review of the social and general conditions of the territory in the year in question, and of any important events which had marked the year, such, e.g., as changes in the Constitution.

12. We note, in this connection, that the instructions contained in the Circular of 1899 indicated that the General Observations should include remarks on future prospects of trade and on openings for investment of capital. We agree, but we suggest that it should be left to the discretion of the writers of the Reports whether these matters should be dealt with under the heading "General Observations" or under the heading (*vide infra*) "Annual Progress of Trade, Agriculture, and Industry," or under both these headings. Special attention should also be drawn to those industries or forms of agriculture which are of real importance to the progress or development of the territory which is being reported upon. For example, special attention should be drawn to the sponge industry in the case of the Bahamas, and in the case of the Falkland Islands to the whaling industry, and it should be emphasised that the crews of the floating factories and whale catchers and the staff of the land stations are almost entirely foreign, and that the greater part of the capital employed in the industry is also foreign.

13. Some difficulty will no doubt be experienced as the years go on in avoiding reiteration in dealing annually with the same subject, but if the various subjects dealt with are reviewed intelligently and are constantly approached from different standpoints it should not be difficult to infuse new life and interest into each succeeding Report.

14. In making the above recommendations regarding future prospects of trade and openings for capital and development generally, we are fully alive to the fact that, as these Reports are and will continue to be of a strictly official character, it is essential to avoid the inclusion in them of any matter which may lend itself to misunderstanding or misrepresentation in connection either with private enterprise or with the formation and operations of public companies. It is not necessary to write in a manner calculated to discourage enterprise nor to withhold established facts calculated to promote enterprise, but it is essential to avoid publication under Government authority of expressions of opinion of a kind which might mislead the sanguine or give opportunity to the unscrupulous.

15. The General Observations should be followed by a section dealing with *Government finance*. This section should give totals of revenue and expenditure for each of the last five years, and should, of course, also draw attention to any features of special interest. Any important changes in taxation and currency should be referred to. A statement of the Public Debt and the totals of the Assets and Liabilities at the end of the year under review, with the amount of the balance of that account, should be given.

16. Except in special circumstances and for special reasons it does not appear to us necessary to deal with the finances of local municipalities, &c., in the Annual General Reports.

17. The Reports should then deal with trade, agriculture, and industry and their future prospects in a section headed "*Annual progress of Trade, Agriculture, and Industry.*" Under this heading a brief review should be given of the import and export trade, and mention should be made of any noteworthy changes as regards the import or export of special articles or in the direction of trade to or from other countries.

18. No attempt should, however, be made in these Reports to give a detailed analysis of trade returns or to deal as fully with the trade of the Colony as would be desirable if the Reports were being prepared primarily for the information of manufacturers or merchants. This will be done in the Annual Reports of the Trade Commissioners in the case of those Colonies to which these officers are appointed: and we suggest that in the case of other Colonies the official Trade Correspondents should be asked to furnish Annual Reports on the trade of their Colonies, which could be published in this country in a separate series.

19. This section of the Report should also deal with land, including information as to important grants of land, land tenure, and the general value of land.

20. Progress in *the investigation and development of natural resources*, including forests, mines, fisheries, and water-power,

and of manufactures, should be referred to, but it is obvious that these will be of very varying importance in the different territories covered by the Reports.

21. Brief particulars in regard to *banks*, including Savings Banks, *and banking facilities* should be given in the Report.

22. *Legislation.*—In the outline of the model Report drawn up in 1899 a special heading was reserved for legislation, and instructions were issued that "only the principal measures passed during the year should be mentioned, and a brief summary of their object and scope should be given." In spite of this, long lists of legislation, often extending to several pages, have been included in certain Blue Book Reports, much of the legislation thus enumerated being only of local interest, while the particulars given have not infrequently been insufficient to indicate its true purpose. We are clearly of opinion that in future such particulars in regard to legislation as it may be deemed advisable to furnish should contain only a summary of the principal measures which are likely to be of interest outside the territory to which they apply, together with a brief explanation of their object.

23. The Reports should continue to deal, and should deal adequately, with *educational progress* during the year, prominence being given to secondary, industrial, and technical education and the results achieved thereby.

24. Detailed particulars regarding hospitals, asylums, reformatories, and criminal statistics, &c., should in future be omitted from the Annual General Reports. The number of persons admitted to hospital, the number of criminal prosecutions, &c., will be ascertainable from the Blue Books and Administrative Reports, and should only be referred to in the Annual General Reports if it is desired to call attention to some matter of general interest to persons outside the territory dealt with in the Report, e.g., a serious epidemic, a marked increase or decrease of crime or of some particular form of crime.

25. A review of *vital statistics* should still be given, but this, as well as any reference to the important questions of *public health and sanitation*, and also to *immigration* and *emigration*, might be included in the General Observations at the beginning of the Report.

26. A separate statement dealing with *climate*, &c., is required. This statement should pay special attention to seasonal, and, where necessary, regional, variations.

27. There should be a general heading dealing with *communications*, including particulars respecting the working and development of railways, shipping, roads, canals, and postal, telegraph, telephone, and aerial services.

28. Any reference to *public works* undertaken during the year under review should be restricted to such works as are likely to be of interest to persons outside the territory in which they have been carried out.

29. It is not desirable to include in the Annual General Reports information respecting the strength and armament of the military and police forces or details of the expenditure incurred on such forces.

30. In submitting these observations as to the contents of the Annual General Reports we desire again to point out that our recommendations should be regarded in the light of suggestions for the guidance of Colonial Officers rather than as binding instructions which must be adhered to for each territory and in each Annual Report.

31. Blue Book Reports are frequently prefaced by formal covering despatches to the Secretary of State. We consider that such despatches should not in future be printed with the Reports.

32. We have considered the question how far it would be possible to make *Colonial administrative reports and statistical publications* more accessible to persons in this country than they are at present. This question was considered by a Departmental Committee at the Colonial Office in the year 1910, who pointed out that Messrs. Wyman & Sons had since 1904 undertaken the sale of Colonial official publications as well as Imperial Blue Books and other Government publications, but that the arrangement did not appear to have worked satisfactorily, that the demand for Colonial publications was (as it still is) small, and that it was doubtful to what extent it could be increased. We suggest, however, that the Annual General Reports should contain, preferably at the end of each Report, a list of any official publications relating to the Colony which are likely to be of general interest. Such publications would presumably include annual reports on agriculture, mines, trade statistics, &c., and special reports, such, e.g., as those on bauxite-bearing land, the sponge industry in the Bahamas, the rubber industry in any particular territory, &c. The list should indicate where the reports referred to may be obtained, and at what price, and where they may be consulted in this country. We are in some doubt whether reference should be specifically made to the Colonial Office Library, which is not a public library. It appears to us possible that some of the institutions in this country which concern themselves with the Colonies generally, as, e.g., the Imperial Institute and the Royal Colonial Institute, or which concern themselves with certain groups of Colonies, as, e.g., the West India Committee, would be willing to undertake the sale of the publications in question.

33. In this connection we suggest that if Colonial Governments introduced a system of numbering their official publications reference to them would be facilitated.

34. We are greatly indebted to Mr. J. Rushmer for his service as our secretary.

T. C. MACNAGHTEN (*Chairman*).
ALGERNON E. ASPINALL.
W. C. BOTTOMLEY.
W. J. GLENNY.
ALFRED J. HARDING.

J. RUSHMER,
Secretary,

31*st December*, 1917.

APPENDIX IX.

The Procedure and Conduct of Business in Colonial Legislatures.

MEMORANDUM BY MR. BRYAN FELL, SENIOR CLERK IN THE HOUSE OF COMMONS.

The purpose of the suggestions put forward in this memorandum is to invite discussion of the question how far it is desirable and possible to obtain similarity in the principles and practice governing the conduct of public business in Colonial Assemblies. The importance of the subject is often obscured owing to the fact that its problems are relegated to the expert, and it is submitted that their proper consideration from a wider point of view would be of real advantage.

In framing these suggestions care has been taken to avoid trenching on matters which are really constitutional; but, in the full sense of the word, procedure covers much more than appears in the Standing Orders of any House and includes not only the whole organisation of the Chamber but also the spirit in which its business is conducted.

While it is true that differences in procedure must be dependent upon constitutional differences, arising from variations in the extent of powers, the number of members, and so on, it is also true that procedure in its broad sense exerts a reciprocal influence on constitutional development. The principles of British parliamentary practice, which carefully balance the rights of majorities and minorities, secure the forwarding of business

and the preservation of free speech, and thereby help the organisation of both government and opposition, exemplify this truth in a striking degree; consequently they are generally recognised to be the best training known for the gradual development of self-government.

It is fully realised that any attempt to force uniformity on Colonial Assemblies would be disastrous. Each of the many Colonies involved has its individual problems, and is populated in varying proportions by widely divergent peoples, in different stages of racial development, with different political and moral standards, developing at very different rates and under different environmental conditions; each in short is separate, individual, and alive.

The British House of Commons has survived because it is a living organism, capable of adaptation and evolution. Colonial Legislatures must be allowed similar scope for development; but nevertheless it is for this country to see that her Colonies develop under the best conditions and in accordance with the traditions of their race.

Throughout the history of the world, the possession of common political institutions and the use of a common tongue have always proved a strong cohesive force. Many of the Assemblies have definitely laid down that English speaking should be compulsory in the conduct of their business. With the two-fold object of avoiding bilingual Legislatures, and encouraging the use of English as a lingua franca, a similar standing order might be adopted, though local conditions may render its immediate introduction inexpedient.

It is now generally recognised that the outstanding bond of Empire is the Crown, which has ceased to be the symbol of personal government and has become the emblem of Imperial strength and unity. The nearer the Colony or group of Colonies approach self-government, the greater becomes the significance of that link. In England the first official act of the new member of Parliament is publicly to swear allegiance to the Sovereign; and his other points of contact with the Crown—the State opening of the Session, the formal communication of Messages, the Royal Assent to Acts, the Prorogation—are invested with a ceremonial dignity, which undoubtedly tends to impress upon him the great importance of his duties and responsibilities. It is surely reasonable to argue that the stress laid on this side of Parliamentary life should if anything become more marked as the distance from the Sovereign and the impressionability of the people become greater. But, if Colonial Assemblies in general are somewhat lacking in ceremonial in connection with the Crown, they have in the presidency of the Governor a more direct contact with it than is enjoyed by the British House of Commons. The relationship is indeed close enough to be pregnant with future danger. At the moment the Governor's

position as President may seem indispensable and the danger, if any, sufficiently remote. But, as the advancement and the political education of the non-European races of the Empire and their inter-relationship with the Colonial communities living among them proceed, they will inevitably carry in their train the need of a perhaps slow, but steady, increase in the responsibility of Colonial Assemblies for the conduct of their own public business. Simultaneously the position of the Governor will be enhanced. In such circumstances suspicion is easily generated : House of Commons procedure still bears traces of it, and it is easy to imagine incidents arising, which, occurring to the representative of the Sovereign, would render his position difficult. It is not suggested that the time is ripe for a universal separation of the offices of Governor and Speaker or President, and it may be that the intermediate stage of an appointed official (such as the Chief Justice) is necessary, but the position in every Colony might well be reviewed and a general scheme agreed upon whereby, in due course, a transition from the present system to that of the freely elected Speaker can be achieved.

Even the first step would increase the prestige of an Assembly and the grant of some regal emblem such as the mace would fittingly mark the importance of the event.

Although emancipation from the direct tutelage of the Crown is a decided step forward, the ultimate success of a Legislature depends on the efficiency of its internal mechanism. The procedure of a Colonial Assembly has to be examined not only with a view to assimilating it more closely, due regard being paid to local conditions, to its original model, the House of Commons, but also with a view to co-ordinating it with the procedure of other Assemblies. A number of the Standing Orders of the House of Commons, drafted to meet conditions which may never arise in other Legislatures, are obviously inapplicable to the Colonies. The adoption of others might be positively injurious. Pressure of time has compelled the House of Commons to grant to the Government of the day wide powers as to the arrangement of business at the expense of unofficial members. In Assemblies where the necessity for legislation is not so pressing the reverse procedure might be adopted and the unofficial member encouraged by Motions being given precedence over Orders of the Day. Provision, however, should be made for the suspension of the Standing Order if urgent Government business has to be considered. Thus while the rights of the Government are safeguarded the Assembly would be enabled to fulfil its primary function, that of the ventilation of grievances. This procedure is a reversion to the *practice* of the House of Commons which, in general, may be said to be a safer guide for young Assemblies than are the Standing Orders. Many Legislatures have laid down that reference should be made to the practice of the House of Commons in cases not provided

for by thir own Standing Orders: others might follow this example.

The manner of recording votes on a division taken in the House of Commons is also clearly unsuitable for smaller bodies, but that employed in Standing Committees at Westminster seems easier and quicker than the alternatives adopted in some Colonies. The method of making each side in turn stand up and have their names taken is rather clumsy, and, although the practice of first calling on the junior member to record his vote, for which obvious reasons can be assigned on a Court Martial, may have advantages, they are not immediately apparent. Variety of usage is also noticeable with regard to allowing the President or Chairman an original as well as a casting vote. The double vote, where allowed, is presumably based on the practice of a Select Committee of the House of Commons, but it should be made clear that the latter body is not capable of any ultimate decision, and an inquiry might be held on the desirability of dispensing with the original vote either prior to or contemporaneously with any change that may be made in the position of the President. There are three further matters in regard to voting upon which uniformity of practice would seem desirable :—

1. The question as to whether voting should be compulsory on all members; (e.g., Northern Rhodesia makes voting compulsory, Kenya allows a member to say "decline to vote").

2. The question as to whether minority voters should be entitled to record the reasons for their dissent, either verbally or in writing. (Are the Division Lists, recording the names of members voting, published?)

3. The drafting of an Order preventing members from voting on any question in which they have a direct pecuniary interest. There are many arguments in favour of such an Order, the timely adoption of which, by all Legislatures, is strongly advocated.

House of Commons procedure in regard to Bills is often criticised as redundant. This may be true of financial measures, the procedure on which is historic, but the Report stage of the ordinary Bill, usually singled out for attack, is often extremely useful to the ministerial draftsmen. In the majority of Colonial Assemblies there would as yet seem to be no necessity for the inclusion of this stage as part of the ordinary routine. But, especially in the absence of any revisory chamber, some procedure might be devised whereby errors, minor inconsistencies, &c., which may either not have been noticed during the Committee stage or have crept in on amendment, can be corrected. The simplest procedure, and one not open to objection on the score of redundancy, is recommittal for a specified portion of the Bill. Two other matters on which Colonial procedure in

general differs from that of the House of Commons, seemingly without very good reason, are too small to merit detailed consideration, but they appear in the summary of points for discussion at the end of this memorandum.

House of Commons procedure is thus only applicable to Colonial Assemblies on very general lines. The cognate problem as to how far inter-Colonial uniformity can be carried presents far greater difficulties. Apart from those of language, environment, and temperament already mentioned, the data on which to base a considered judgment are rather scanty. It would be unwise to dogmatise after a study of a by no means exhaustive collection of Colonial Standing Orders, for the little evidence that can be collected on the point seems to indicate that there are differences between Standing Order and Practice. At the moment it is doubtful if any collated knowledge as to this divergence is obtainable; the Conference could probably supply a good deal, but, until a study of the Orders can be supplemented by experience of the practice of the various Assemblies, the suggestion on this head put forward in the summary cannot be brought to a satisfactory issue.

The following list summarises the matters which the Conference is asked to discuss in the light of the above memorandum :—

1. The advisability of making English the official language of all Colonial Assemblies.

2. The importance of the taking of the Oath of Allegiance in the House, as his first official act, by every member of a Colonial Legislature.

3. The possibility of a gradual transition from the presidency of a Governor to that of a freely elected Speaker.

4. The advisability of a greater use of Ceremonial.*

5. The desirability of the general adoption of a Rule or Order referring to the *practice* (rather than to the Standing Orders) of the House of Commons in cases of doubt, and the general applicability of this practice to the arrangement of business, particularly in its encouragement of the unofficial member.

6. The importance of standardising the methods of voting, with particular reference to the way in which a division is taken; to the original vote of a president or chairman; to the question whether a member should be compelled to vote, and, if so, whether he should be entitled to record a protest (as was formerly the practice in the House of Lords); and especially to the voting of members with a direct pecuniary interest in a question.

---

* The holding of prayers before the opening of an Assembly probably presents difficulties, seeing that prayers are only mentioned in the Standing Rules and Orders of a small minority of the Legislatures, but the question may be worth consideration.

7. Certain matters of less importance: namely, the necessity for some sort of revisory stage upon a measure, such as a recommittal stage; the possibility of dispensing with confirmation of the minutes of proceedings in cases where these have already been printed and circulated to members before the next meeting of the Assembly; the merging, in the third reading stage of a Bill, of the Question, "That the Bill do now pass", as has long been the practice at Westminster.

The difficulties and the lack of evidence in regard to inter-Colonial uniformity have already been pointed out. A possible solution might be found in the grouping of Colonies into four main areas, (1) East Africa, (2) West Africa, (3) Eastern and Pacific, (4) West Indies. The Standing Orders of each could then be considered in relation to those of their geographical neighbours and a set of model Standing Orders drafted for each group.

It may not be superfluous, in conclusion, to reiterate that the hypothesis on which the argument has been based is that ultimately, at however distant a date, Great Britain's Colonies will be transformed into self-governing Dominions. If this hypothesis be sound, sometime or other changes in procedure will have to be made and their efficacy will depend on the foresight displayed in the work of preparation and in the moment of their introduction.

BRYAN FELL.

13*th April*, 1927.

APPENDIX X.

Colonial Trade Agencies in London.

MEMORANDUM PREPARED IN THE COLONIAL OFFICE.

Trade Agencies are at present maintained in London by the Governments of the Gold Coast, British Guiana, the Malay States, and Cyprus, and jointly by the Governments of the East African Dependencies. Particulars regarding these Agencies are set out in the Annex.

The Government of Nigeria has considered the question of opening an Agency either for Nigeria alone or in conjunction with the Gold Coast, but no definite decision has been reached pending further information as to the value of the existing Agencies.

A proposal has also recently been made for the establishment of a " Palestine Government Commercial Bureau " in London. The High Commissioner for Palestine, to whom this proposal was referred, has expressed the view that the establishment of such a Bureau now would be premature. He has stated, however, that he would be disposed favourably to view a project for the representation of Palestine in a Bureau which would serve the needs of a group of territories possessing affinities, geographical and/or commercial, to Palestine.

The representatives of the East African Dependencies, the Malay States, British Guiana, and Cyprus will no doubt be ready to give the Conference some information as to the value of their respective Agencies and the results of their work, and other Colonial Governments may like to consider, in the light of this information, the desirability of establishing similar Agencies in London. In this connection it is relevant to recall the valuable services already rendered by such unofficial bodies as the West India Committee, the Ceylon Association, and the Association of British Malaya, and reference should also be made to the work carried out by the Imperial Institute.

A proposal has been put forward recently for the consolidation and centralisation of existing and future Colonial Agencies in London, and the opportunity might be taken to discuss this suggestion.

COLONIAL OFFICE,
April, 1927.

ANNEX.

Gold Coast.

Situation.—The Gold Coast Commercial Intelligence Bureau, established in 1926, is situated at Abbey House, Victoria Street, S.W.1.

Annual Cost.—The sum of £4,620 was provided in the Gold Coast Estimates for 1926-1927 for the maintenance of the Bureau.

Constitution.—The Bureau is under the control of a Director, who receives a salary of £1,000 per annum. There is also an

Assistant Director, who is a Gold Coast pensioner, who receives a salary of £400 per annum.

Functions.—The objects of the Bureau are :—

(1) To provide a centre in London at which inquirers can be given reliable and up-to-date information on all subjects—commercial, agricultural, mining, etc.—connected with the development of the country; at which the official publications of the Government—ordinances, gazettes, maps, departmental reports, etc.—can be consulted and purchased; and where selected specimens of the products of the Colony can be inspected.

(2) To advise manufacturers what prospects there are of the classes of goods they manufacture obtaining a sale in the Colony and both manufacturers and merchants what means they should adopt to place goods.

(3) To furnish general information as to the procedure to be followed in obtaining land for either commercial or agricultural purposes.

British Guiana.

Situation.—In 1924, the Government of British Guiana appointed a Government Trade Commissioner in London with an office at Abbey House, Tothill Street, S.W.1.

Annual Cost.—The annual cost of the Office is £3,000.

Constitution.—The establishment of the Office consists of the Trade Commissioner and a Secretary, with subordinate clerical assistants; there is also an Advisory Board, which consists at present of Sir Edward Davson, Mr. G. Ball-Greene, C.B.E., and Mr. G. Russell Garnett.

Functions.—The functions of the Office are :—

(1) To advertise British Guiana and its potentialities, and to interest capitalists and pioneers in the possibilities of its development.

(2) To furnish general information about climate, conditions, etc., in the Colony to intending visitors, emigrants, etc.

(3) To afford assistance to residents in the Colony, temporarily in England.

Malay States.

Situation.—The Malay States Information Agency is situated at 88, Cannon Street, E.C.4.

Annual Cost.—The sum of £5,000 is provided annually in the Federated Malay States Estimates for the maintenance of the Agency.

Constitution.—The Agency is under the direction of a Board, consisting of an Agent, a Deputy Agent, a representative of mining interests, a representative of planting interests, and a

senior member of the Federated Malay States Government Service on leave in this country.

Functions.—The objects of the Agency are :—

(1)—(*a*) To advertise the productions and attractions of the Malay States;

(*b*) to furnish to enquirers information as to the opportunities which those States give for investment and the facilities they offer for travel and exploration;

(*c*) to supply (on payment) publications and maps.

(2) To bring into touch with one another persons desirous of obtaining employment in the Malay Peninsula and would-be employers, and to afford general information regarding employment and prospects of employment to those desiring it.

The Agency undertakes for the Federated Malay States Government work that does not fall within the scope of the Crown Agents.

Cyprus.

Situation.—The Government of Cyprus has established a temporary Trade Agency in London, with an Office in Avenue House, Northumberland Avenue, W.C.2. It is, however, anticipated that this will be replaced about July next by an agency on a permanent basis. The offices for the permanent agency have not yet been selected.

Constitution and Annual Cost.—A Trade Commissioner is to be appointed with a salary of £1,000 per annum, and a further £1,000 per annum is being provided for office rent, clerical assistance, and working expenses, making a total annual cost of £2,000.

Functions.—The functions of the Trade Commissioner will be, briefly :—

(1) To continue and consolidate the work started at the British Empire Exhibition of making Cyprus products better known in this country.

(2) To educate the Cyprus producer as to the requirements of buyers in this country with respect to marketing, grading, packing, etc.

(3) To advertise Cyprus as a tourist resort.

East African Dependencies.

Situation.—His Majesty's East African Trade and Information Office is situated in the Royal Mail Building, Cockspur Street, S.W.1. It was established in the latter part of 1925, with the approval of the Secretary of State for the Colonies, by the Governments of Kenya, Uganda, Tanganyika Territory, Nyasaland, Zanzibar, and Northern Rhodesia and by the Kenya-Uganda Transport Administration.

Annual Cost.—The total annual cost of the Office is £10,000, which is defrayed by contributions from the Governments concerned (with the exception of Northern Rhodesia, which at present makes no contribution) and from the Kenya-Uganda Transport Administration.

Constitution.—The Office is under the control of Colonel W. H. Franklin, C.B.E., D.S.O., who is also His Majesty's Trade Commissioner in East Africa. An Advisory Committee has been formed under the Chairmanship of Lord Cranworth to assist in the direction of the Office. This Committee works mainly through three Sub-Committees dealing with matters relating to (1) Kenya, (2) Uganda, (3) the other Dependencies concerned.

Functions.—The following are the functions performed by the Office :—

(1) Advertising and supplying information to the Press.
(2) Keeping in touch with and reporting on markets.
(3) Investigating complaints as to produce and trade generally.
(4) Reporting on new avenues for East African trade.
(5) Maintaining and displaying exhibits of produce.
(6) Affording information to prospective settlers and commercial interests, and encouraging private enterprise generally in East Africa.
(7) Working for the reduction and stability of freight, and for a regular shipping service.

(The Government of Somaliland makes no contribution to the expenses of the Office, but the Office acts, as far as possible, as a source of information in this country for enquiries relative to Somaliland.)

APPENDIX XI.

Civil Air Development in the Colonies, &c.

(A).—STATEMENT BY THE SECRETARY OF STATE FOR AIR, 19th MAY, 1927.

Sir SAMUEL HOARE: Mr. Amery and Gentlemen, six months ago I had the pleasure of discussing with the representatives of the Dominions many questions connected with Imperial aviation. I am no less glad to have the chance of meeting the members of the Colonial Office Conference and of exchanging

with them views on possible developments in the field of flying that may directly concern the territories that they represent. For more reasons than one I will not attempt to repeat what I said on the subject at the Imperial Conference. You have not the time to listen to long speeches; moreover I have circulated to your Conference a volume entitled " The Approach towards a System of Imperial Air Communications "* in which the wide question of civil aviation is exhaustively treated in its bearings upon Imperial needs. I hope, therefore, that you will take this publication as the textbook for your discussions and treat my remarks as comments upon those portions of it that particularly affect the Crown Colonies and Dependencies.

Conclusions of Imperial Conference, 1926.

Let me then in a sentence or two summarize the conclusions that we reached at the Imperial Conference and suggest certain applications of them to the territories that you represent.

The main conclusions reached by the Imperial Conference were three in number; it was agreed, in the first place, that " the speeding up of Imperial communications by air is a great benefit, both political and commercial, to the Empire "; in the second place, that long-distance aeroplane routes must be built up upon a co-operative system with each part of the Empire concerned taking its share in their organization; and, thirdly, that the development of airships has great potentialities for the long-distance and non-stop flights and air services.

I hope that I may assume that your Conference accepts these conclusions as fully as they were accepted by the Dominion representatives.

From the British point of view I cannot emphasize too strongly the fact that a successful flying policy must be drawn upon a large-scale map. If we are to succeed in the attempt to build Empire airways and to eliminate the time and distance that now separate us, we need the help of the Colonies and Dependencies as much as we need the co-operation of the Dominions. Our flying policy must in a sentence be an Imperial policy and an Imperial policy based upon the combined efforts of the Mother Country, the Dominions, and the Dependencies.

Cost of Air Services.

I suppose that you, Gentlemen, the representatives of many Imperial territories, have principally to consider two questions in this connection. First, how far will the development of aviation benefit your respective countries? Secondly, to what extent can your revenues stand the charge that such a development is bound to impose upon them? Whilst it is for us to give you from our own experience a description of the uses to which civil aviation can be put, it is for you to judge of the

* Non-Parliamentary Publication, December, 1926.

possibilities in the countries that you represent. I do not wish to pretend to a detailed knowledge of your conditions nor should I dream of dictating in any way the manner in which you should spend your revenues. Whilst the Imperial Government has shown itself ready to give financial support to long-distance Imperial lines, it cannot undertake the regular subsidy of internal services in either Colonies or Dominions and on this account it has no right to dictate a flying policy to their Governments. Naturally, however, we are most anxious that any policy that you adopt should, if possible, fit in to the Imperial mosaic that we are attempting to design.

As to the question of cost, a very important one at a time of financial pressure, I cannot disguise from you the fact that regular air services still require substantial subsidies for their support. British policy is intended to make civil aviation self-supporting at the earliest possible moment and to give the Imperial Airways Company every incentive to free itself from dependence upon Government subsidies. Whilst I do not wish to make any sanguine claim, I can at least point to the progress that has been made in this direction during the last few years. If a comparison is made between the running expenses of the new types of machine employed by Imperial Airways with the types of five years ago, it will be found that the running cost per ton-mile has been reduced from 4*s*. 2*d*. per ton-mile to 1*s*. 10*d*. It is also interesting to note that a definite advance has been made in the development of what I will call an "air tramp," that is to say, a heavy draught and comparatively slow machine for the economic transport of freight rather than passengers.

Uses of Aeroplanes.

Examples of this kind make me hope that running costs will be gradually reduced. I suggest, however, that you should look for economies not only in the field of technical development but also in the various uses to which you may put your machines. Could you not reduce running expenses by making your aeroplanes instruments of many kinds of work? The aeroplane has already proved an effective and economical instrument for forest survey; it has already proved useful in spraying insecticides over diseased crops; it has already conferred humanizing benefits upon remote settlements by bringing doctors and teachers within the reach of scattered families. It is an instrument that may be used in light aeroplane clubs to provide sport for young men and training in air defence. Only yesterday it was suggested to me that it might prove a quick and economical means of locating the oyster beds in the pearl fisheries of Ceylon. Could you not combine with air transport certain of these other services of the aeroplane? Its speed and mobility adapt the machine for many purposes and there is no reason why an air transport enterprise should not combine with the carriage of mails and passengers some of these other flying operations. I suggest, therefore, that

whilst you are in London you should go further into the details of this aspect of the question with the Director of Civil Aviation and that, when you come to make up the balance sheet, you should take into account not only the actual expenditure and revenue of a flying service, but also the value of the various uses to which the aeroplane may be put and of the general benefits that quicker communication may confer upon a Colony or group of Colonies.

In making your decision you will have, of course, to choose between the many calls that are being made upon your revenues—the call for roads, the call for railways, the call for economic development of various kinds. It is not for me to suggest to you the order of priority. What I can say is that I know no better instrument than the aeroplane for eliminating time and distance. Examples in support of this view will occur readily to the mind of everyone in this room. There is the very important case of the communications between London and the African Colonies. As things are, it takes from three to four weeks to travel from London to Nairobi. An aeroplane service between Cairo and Nairobi would cut off half of this time and, when once an air service is in existence between England and Egypt, should reduce it to less than a week.

In another part of the British Empire there is the case of British Guiana, where, in addition to its use as an instrument of forest survey, the aeroplane could save an almost incredible amount of time as a means of transport. I am informed, for instance, that the total average time to reach the Mazaruni diamond area from Georgetown may be put at three to four weeks, and that the journey by air would take not more than 1½ hours. I have myself had some experience of the delays and difficulties of travel by existing means of transport in another West Indian Colony, British Honduras. There I remember making a long and uncomfortable journey over tortuous rivers that took 48 hours by a noisy motor-boat instead of 48 minutes by aeroplane. I suppose there is hardly a Colony or Dependency represented in this room where further instances may not be found of tedious and tiring days spent upon journeys that by modern methods of transport could be made amazingly swifter and more convenient. Indeed, this side of the question, being self-evident, needs no argument in support of it. Foreign countries are already realising its reactions, and it is worth noting the fact that the Belgian Government appears to be embarking upon an ambitious scheme of air transport in the Congo. Hitherto very few flying experiments have been made in the Crown Colonies. I hope, however, that the flights between Khartoum and Kisumu, although for the moment they have encountered bad luck, will mark the beginning of a new movement in a field of development that may prove extremely valuable to Africa as a whole and to the British African Colonies in particular.

In Asia, no less than in Africa, there is wide scope for a development of Colonial aviation. You will have noticed the

beginnings that we have made with the Imperial air route to India. Already machines are running punctually and regularly over the section between Egypt and the Persian Gulf. For the time being an unforeseen obstacle has blocked the continuance of the route to India, but sooner or later this obstacle will be surmounted or circumvented and the line will reach its original destination. In India, moreover, most important flying developments are already taking place and there is a prospect of an air service being started between Calcutta and Rangoon. I much hope that the Government of the Straits Settlements, a Government that is already showing its interest in aviation by the proposal to start the first Crown Colony Light Aeroplane Club, will watch carefully and sympathetically these developments and consider whether it could not utilise the cardinal position of Singapore as an air junction between Europe, India, and Australia.

To-day I cannot do more than make a passing allusion to possible developments of this kind. If the representatives of the various Governments desire further details, I need not say that we shall be most happy to provide them.

Before, however, I finish my remarks, I must refer in a sentence or two to three most important aspects of the question.

Provision of Landing Grounds.

First, there is the question of landing grounds. I need say no more upon the need for landing grounds than that every progressive country will need, in the future, landing grounds in addition to its harbours and railway stations. I suggest that the sooner landing grounds can be obtained and prepared the cheaper it will eventually prove for the Governments concerned.

Meteorological Organisation.

Secondly, there is the question of meteorology. Until the advent of aviation British meteorology was directed largely to the task of helping British navigation at sea; in India, on the other hand, it was virtually a section of the Department of Agriculture; over great tracts of the Empire it has never been applied and scarcely studied. The fact that the British Meteorological Department is a part of the Air Ministry shows in a conspicuous manner the inseparable connection between aviation and meteorology. If you want safe and regular air services, you must have accurate weather reports. I know from my own experience the value of weather forecasts, and I am, therefore, particularly interested in the move that is being made by certain of the African Governments for forming a common meteorological service. I much hope that other Colonial Governments will give further attention to meteorological organisation. Whilst weather forecasting is essential to safe flying, it will surely prove useful to them in the field of agriculture and in the exploitation of their natural resources.

Wireless Communications.

As to wireless, there are at present no stations in Uganda, Tanganyika, and Northern Rhodesia, whilst in other Colonies and Dependencies the system is often antiquated or inadequate. Upon many grounds, strategic as well as economic, an adequate system of wireless is essential to our system of Imperial communications. From the point of view of Imperial aviation, any improvement or extension that can be made in our present inadequate system will be of particular value.

Summary.

I will now with your permission summarise the suggestions that I am venturing to make. I am suggesting, in the first place, that whilst you are in London you should investigate in detail the possibility of using aeroplanes not only for transport but for survey and other purposes. Amongst these various uses of aviation I have purposely included the air training that may be obtained in light aeroplane clubs. The light aeroplane club, in its origin a British creation of the last two years, is enabling many citizens, women as well as men, to learn to fly and to avail themselves of the uses of aviation. Is it not worth the while of certain of the Governments whose representatives I see before me to follow the lead of the Straits Settlements Government and to form clubs of this kind?

Secondly, I would ask you to consider seriously the urgent need for providing and maintaining landing grounds in the territories that you represent.

Thirdly, I desire to emphasise the great importance to aviation of adequate systems of meteorology and wireless. I cannot help thinking that a development of both these services will benefit your countries in many more ways than the ways of the air.

Upon all these questions we have a mass of material at the Air Ministry. We shall be most happy to place it at your disposal and to discuss with you any questions that emerge from its study. If you have the time or the desire to visit the Croydon Aerodrome and to see for yourself the activities of European air services, if you wish to see something of a light aeroplane club, if you wish to inspect any of the new types of machines, we will willingly make what arrangements you desire.

I hope in any case that I have said enough to convince you of the importance that we in London attach to flying development in the Colonies and Dependencies. We believe that it is essential that Imperial communications should be quickened and that the modern aeroplane and eventually the modern airship will prove potent instruments in any farsighted policy of improvement. The Secretary of State for the Colonies and I have already made a personal trial of the aeroplane as an instrument for eliminating time and distance in the roadless and railwayless

territories of 'Iraq and Trans-Jordan. Only within the last three months I have returned from an even more extended trial of this new means of transport, and I need only say that in the face of the worst possible weather and in mid-winter I was able to travel between England and India to a meticulously fixed schedule of time and without the need of a single spare part or repair to the machine and the three engines that were transporting me. Do not these experiences show that the aeroplane has now become a swift and reliable means of transport, and that its future uses are many and varied over the wide spaces of which so great a part of the British Empire is composed?

(B).—Civil Aviation as a means of furthering the development of Colonial Territories.

MEMORANDUM PREPARED IN THE AIR MINISTRY.

General Considerations.

It has been rightly said in the past that no country can afford to neglect its communications. This truism was never more important than in this present age of scientific discovery which is having such a profound effect on commerce and industry.

One of the biggest tasks facing the British Empire is that of redistributing the population and developing Empire trading to the point where it becomes virtually independent of outside resources.

Thus the question of emigration is one of profound importance. Emigration on an adequate scale is dependent on three factors :—

(1) The supply of capital necessary for development.
(2) Provision of communications.
(3) The will of the masses to emigrate.

As regards (1), the supply of capital is controlled to a great extent by the ability of the capitalist to make personal investigation on the spot in order to appreciate the possibilities of successful development. Under normal conditions the capitalist is often prohibited from making these investigations through lack of rapid travel facilities.

Importance of Communications.

The opening up and development of new lands is dependent on both external and internal communications, especially the

latter. The possibilities which air transport offers in this respect are now only beginning to be realised. In most countries it is possible to establish the necessary ground organisation essential for an efficient air route, dealing with a large volume of traffic, at considerably less than a one-hundredth part of the cost required to lay a single railway track. It follows, therefore, that aviation provides the cheapest known method of opening up new territory. An excellent example of this fact is found in Canada where aviation is playing a greater part each year in exploration and development, and the forester, mining engineer, prospector, surveyor, and explorer now use aircraft naturally as an economical means of transport and observation where there are no roads or railways.

Inadequacy of Existing Railways.

When the present situation of railway transport in the Colonies is examined it will be observed that the area served by railways is very small indeed, and is small even in comparison with the population. For example (figures approx.) :—

——	*Population.*	*Area sq. miles.*	*Railway mileage.*	*Population per sq. mile.*	*Area in sq. miles per mile of Railway.*
Kenya ...	2,603,000	208,000	1,069	13	195
Rhodesia ...	1,883,000	440,000	2,462	4	179
Tanganyika ...	4,110,000	365,000	1,155	11	316
British Guiana	304,000	89,000	98	3	908

Mapping by Air Photography.

Lack of good maps has been a serious factor in checking exploration and development work, but, with the aid of air survey, conditions in this respect are improving.

Large areas are being surveyed and mapped by air in regions that are practically inaccessible to the ground surveyor. Already large surveys have been completed or are in progress in Canada, India, Burmah, Sarawak, Rhodesia, and other places.

The reports on civil aviation in Canada emphasise very strongly the practicability and utility of air surveying. It is stated that the Survey Services are now certain that with the use of aerial photography they can reduce the necessary ground work by more than half, and with much less time they can produce maps which are infinitely more complete and accurate than by older methods. In addition, a mass of useful information is immediately available from air photographs, which cannot be obtained by the ordinary survey methods except by laborious and expensive field work.

Removing Deterrents to Emigration.

The main deterrent of the masses to emigrate is the feeling of separation in the sense of time which is conjured up in the

imagination of the prospective settler. The establishment of rapid communications which will bridge the gap of separation will do more than anything else to remove distaste from the idea of setting out for unknown far distant lands.

This is borne out very strikingly in Australia where air transport companies are using aircraft to link up various towns and communities which heretofore have been at a disadvantage owing to the lack of railway communications. For instance, in Australia the route Charleville-Cloncurry—a distance of 825 miles— is covered in 2½ days by air as against seven or more by rail and road. The importance of this air line is that Charleville, Cloncurry, and Camooweal are all railheads which, before the advent of aircraft, were not directly connected by rail, and journeys between them were long and tiring and in the wet season subject to complete interruption.

Taxi work has been a special feature of the Australian Airways, that is to say, machines have been specially chartered to carry out work over districts not served by the main line.

One company states that during the past 2½ years 204 taxi passengers have been carried on urgent errands in this way and not once has the company failed to carry out a flight.

An Air Transport Company in Canada has started an aeroplane service from the railway into the new gold-mining area at Red Lake. On this line all kinds of goods are carried, provisions, gold ore, medicine, &c., and the passengers varied from children of three years of age to their grandparents of over 80. Since February, 1926, to the end of last year, 576 passengers, 24,000 lb. of freight, and 4,000 letters were carried in a total flying time of 146 hours without any mishap.

Medical Assistance.

Permanent settlement in virgin territory is made much more possible where the conditions are such that a man may be accompanied by his wife and children. Here again the provision of not only communication but rapid communication is essential. How many lives are lost by the fact that doctors and the necessary medical requisites are unable to reach the patient in time owing to the slowness of existing transport? In Australia many patients have been conveyed to hospital by air when road travel would have been fatal, and doctors have been flown on many urgent missions. For instance, in one case, where an epidemic of typhoid fever had been reported, the doctor, by using aircraft, was able to reach the scene in the space of eight hours instead of the two or three days which would have been occupied by the ordinary means of transport.

Civil aviation can therefore claim to-day that many lives have been saved by its agency.

Another possible use of aircraft in facilitating emigration deserves consideration. Experiments carried out in the United States indicate that in all probability regions which are rendered almost uninhabitable by reason of insect pests can be

cleansed by spraying from aircraft in a more rapid and economical manner than by any other means. Where the nature and density of the growth surrounding mosquito breeding-grounds is a barrier to operations on the ground aircraft have obvious advantages.

Aids to Agriculture and Industries.

This paper has so far dealt with the advantages that civil aviation has to offer to Colonies where new territory is awaiting development. This is not by any means all. The question still to be considered is the extent to which civil aviation can assist that part of the Colony where agriculture and industries already exist. This divides itself into (1) advantages to agriculture and industry and (2) advantages to the local Government. Dealing with the first:

Protection of Crops.—Where the raising of crops is precarious owing to the epidemics of pests and diseases, aircraft can, in favourable conditions, provide an effective and economical method of control. The protection of cotton crops in the United States of America by means of insecticides sprayed from the air is well established on a sound commercial basis. On test a single aeroplane has proved capable of doing the work of 40 cart dusting machines.

Eight bases have been established to dust an area of from 5,000 to 7,000 acres of cotton each. The company formed to undertake this operation charges $7 per acre for five applications as against an average of $7.26 for ground dusting, and the work is done by air 100 times faster. 98 per cent. of the farmers who have subscribed to the service are contracting for increased acreage. Out of 40 million acres under cotton cultivation in the United States about 15 million are suited for dusting by aeroplane, and it is estimated that 3,000 aeroplanes would be needed to treat this area.

Peach and other fruit trees, and sugar canes have been treated in the same way with successful results, and Australia is now seriously considering the use of aircraft for treating fields of lucerne which are being ravaged by caterpillars.

Drought.—Australia is one of the biggest producers of wool in the world. The success of the wool yield depends on maintaining the animals under the most favourable conditions. It is common knowledge that droughts in Australia cause great financial loss to the stock owners and suffering to the animals. Not once but many times in the past few years owners of big stations have used aircraft as a means of searching out new grazing lands and watering places for both sheep and cattle. These journeys have been accomplished in a few days instead of weeks and have been the means of avoiding large losses.

Air Survey.—This work has already been mentioned in connection with pioneer work. The air photograph, if made to do its full work, serves not only the surveyor but the geologist, railway engineer, irrigation engineer, drainage engineer,

mineralogist, the public health and town planning department, archæologist, and many others.

Wheat and Timber Disease.—Canada is carrying out successful experiments to determine the origin and control the spread of wheat rust disease which occurs in the Prairie Provinces. Striking results have been achieved. It has been definitely established that the spores responsible for the epidemics are wind-borne. Similar experiments have been successfully conducted against a disease known as the " white pine blister rust." Experiments on similar lines have also been carried out in the United States.

Observation of Shoals.—This is in its infancy, but experiments so far carried out lead to the conclusion that as a means of extending the normal range of vision aircraft will play an important part in improving the conditions of the fishing industry.

Assistance to Local Governments.

Conveyance of Administrative Officers.—Many and varied uses have been found for aircraft in assisting the work of the Government. In many countries, notably Australia, Canada, French West Africa, Syria, Indo-China, West Africa, and Soviet Russia, aircraft are being used frequently to convey legislators, Political Officers, Justices, Officers of the Health, Agricultural, Lighthouse, Postal, and Customs services, and many others, over long distances of undeveloped country. Such an aeroplane as the " Moth "—easy to fly and maintain—is eminently suitable for this class of work.

Prevention of Smuggling.—Several countries have experimented with aircraft observation as a possible solution to the problem of preventing drug and liquor smuggling.

Forest Fire Protection.—Experience in Canada and in other countries has now shown that in certain conditions aircraft patrols are the most efficient method of controlling the fire hazard in forests. The maximum efficiency is reached in areas where population and ordinary transport are sparse and ground forces cannot be fully organised.

Conclusion.

The foregoing notes merely outline some of the more important uses of civil aviation in colonisation, and suggest the extent to which it will ultimately be developed.

Civil aviation is destined to be a most vital and beneficial factor in world development. Territory which to-day is commercially inaccessible will be opened to the settler, good communications will be established in place of the existing primitive ones, and a closer understanding between peoples will be established.

April, 1927.

APPENDIX XII.

The Relation of Road Transport to Railway Development.

MEMORANDUM BY THE SENIOR CROWN AGENT FOR THE COLONIES.

Road motor competition has within the last few years severely affected railways both in this country and in the Colonies. In this country (to quote the Award of the National Wages Board cited with approval by the Chairman of the Great Western Railway at the annual meeting last year) the view of the railways is :—

> "That the rapid growth of road motor transport undoubtedly constitutes a serious menace to the railway industry; that road transport undertakings contribute only a small proportion of the cost of maintaining the roads of which they have unrestricted use; that Railway Companies are called upon to contribute a disproportionate share, through local taxation, of the cost of maintaining those roadways, and generally that they are facing a subsidised form of competition which constitutes a state of affairs that ought not to be allowed to continue."

Some of these statements are disputed by other interests, and some of the difficulties of the companies here, such as the burden of local taxation, are peculiar to this country, but most General Managers of Colonial Railways have to face similar problems.

In the Federated Malay States the Railway, although it has some of the lowest rates of any Colonial Railway, in many cases lower than those charged by road motors, is feeling the competitive effect of road transport. This appears to be due to the superior convenience of the road motor, and it would seem that the competition cannot be effectively met by reducing railway rates.

In Ceylon the General Manager in his Report for 1925 comments on the marked increase in the competition of motor-buses during the year, to meet which reductions in rates and fares had been and, he says, will be made and the result carefully watched, in order to take such further steps as may be necessary. Improved train services have been introduced and rail motor services established together with a large number of additional halting places. Experiments with the Sentinel Cammell rail

motor have been so successful in meeting the 'bus competition that the Ceylon Railway has now ten more on order and a further four are to be ordered, while three cars of the Clayton type are also in course of construction.

In Mauritius the Railway Department Report, 1924-25, remarks on the decrease of passengers and of passenger revenue, and attributes it partly to " the serious competition of motor vehicles on the routes of most lucrative railway traffic where roads to a large extent short-circuit the railways."

The African railways as a whole probably suffer less, for some of them, e.g., Nigeria, enjoy very long hauls, but the Kenya and Uganda Railway Report for 1925 comments on the decline in week-end tickets from Nairobi to certain places and says that " this decrease can be attributed to the larger number of motor-cars now in the Colony, and the growing tendency of the public to travel by road in preference to rail. This is most marked in the case of the Thika Line, where natives in large numbers now patronise the numerous motor-buses plying between Nairobi and the districts served by that railway."

In the Gold Coast (1925-26) the battle goes on with varying results, and it is stated that " the increased passenger traffic in the Accra neighbourhood represents traffic recaptured from motor competition and the decreases further north in that district represent traffic lost through motor competition." The competition of motor-lorries with the Central Province Railway was thought to be so severe in 1925 that drastic cuts in rates were suggested.

In Trinidad there has been a continuous fall in the Railway receipts since 1920 owing chiefly to the loss of passenger traffic consequent upon the competition of motor vehicles. The Jamaica Railway suffers severely from the competition of lorries and drays and a special Report on Transport Problems in Jamaica was furnished in 1923 by Colonel Hammond which contains much of interest, though the position of the Jamaica Railway with a heavy burden of capital debt and an average haul of only 33 miles is far less favourable than most Colonial Railways. The policy recommended by Colonel Hammond was that " it should be definitely recognised that motor traction has come to stay and that it should be expected to pay a fair share of road improvements and maintenance; that the railway should always manage to hold successfully the big bulk traffics and of the others it should endeavour to obtain its legitimate share by the use of rates which are economically sound so far as it is concerned." It appears that for twenty years past the Railway Department had vainly tried to cut out by exceedingly low rates the road competition of the country carts in goods traffic between Kingston, Spanish Town, Old Harbour, and May Penn, but without success.

The general principles underlying the problem are clearly stated in Mr. Spiller's recent Report on the Federated Malay

States Railway from which I take the following paragraphs (pages 64-66) :—

> " Rail transport starts with an enormous mechanical advantage. The tractive resistance of a steel wheel on a steel rail is about 8 to 10 lb. per ton, while the tractive resistance of vehicles on macadam roads is about 75 lb. per ton for roads of good surface, and about 100 lb. per ton for roads of inferior surface, a difference of 10 to 1 in favour of rail transport. This fundamental difference will always militate against cheap motor transport. In Great Britain to-day, in spite of the heavy cost of wages and materials, the total freight of the country is being handled on the railways—excluding the cost of collection and delivery—at less than 1½*d.* per ton mile. Motor transport can never hope to operate so cheaply. Why, then, does motor transport continue to compete so successfully with rail transport? With regard to passenger traffic the motor-bus picks up the passenger nearer to the starting point of his journey and delivers him nearer to his destination, it does, in fact, complete in one operation a journey which, if the traveller goes by rail, includes a rail journey and possibly two ricksha rides. It is difficult to see how a railway can so modify its system of working as to neutralise the effects of this disadvantage.
>
> " With respect to goods traffic, motors possess again the great advantage that they can in many instances include the collection, transport, and delivery of commodities in a single journey and for a single rate. Motor traffic, too, is able to take the more profitable traffic and leave the less remunerative to the railway. Railway rates vary in some measure according to the value of the article conveyed, valuable goods paying a higher rate than articles of small value, although the actual cost of transport may not be materially different. As a result, a railway has to earn a large percentage of its revenue from a small percentage of its freight, and, as a corollary of this, is compelled to handle a considerable amount of freight at rates which leave little or no margin of profit. The motor-lorry leaves this kind of freight to the railway and handles only those commodities which can afford to pay remunerative rates, such as parcel traffic, perishable commodities, etc. If motor transport was compelled to handle a considerable volume of low-grade traffic at unremunerative rates, as is the obligation of a railway, it would be compelled materially to raise its rates on the traffic which it normally handles. When considering, therefore, the effect of motor competition it should be remembered that not only has the railway lost a considerable volume of traffic, but this traffic was, in a great measure, its most remunerative traffic.

" Further, the railway rates cover the whole cost of transport including the cost of maintenance of the permanent way, bridges, equipment, etc., while the cost of road transport covers only a small percentage of the cost of road upkeep. The total cost of maintaining 2,619 miles of road in the States of Perak, Selangor, Negri Sembilan, and Pahang in 1924 amounted to $3,326,277; motors contributed partly towards the cost by payment for licences and Customs duty on motor spirit. The total receipts from motor licences in the above four States in 1924 amounted to $282,920 while Customs dues on motor spirit in the same year amounted to $288,400. It will be seen therefore that the motor transport industry contributed only 17 per cent. towards the cost of road maintenance. It will, I think, be freely admitted that, having regard to the extent to which motor traffic uses the roads and the damage it does to them, it could justly be called upon to pay a higher proportion of the cost of upkeep. If motor transport was called upon to bear its fair share of the burden of road maintenance, it would be compelled to charge materially higher rates for transport services. By providing and maintaining roads suitable for motor transport, the Government is, in effect, subsidising an industry which competes so successfully with its own railway. The same argument is applicable to bullock-wagon transport, which by payment of a tax of $12 per annum is allowed free use of roads which cost over $3,000,000 to maintain yearly. If bullock-wagon owners were compelled to pay their fair share of the cost of road maintenance, the cost of this form of transport would be higher.

" It is unfortunately the fact that in many districts the roads run parallel to the railway, thus providing two forms of transport in a country where areas of considerable extent exist without transport facilities of any kind. Schemes of road improvements are at present in hand or under consideration for raising the standard of existing roads to render them suitable for motor traffic, although an existing railway serves the district. It would certainly appear that funds available for providing additional transport facilities could be spent to better advantage by building either new roads or new railways in districts where no form of transport exists to-day rather than by duplicating existing transport facilities. Feeder roads built at right angles to the railway are likely to prove more profitable to the country than the construction of modern motor roads parallel to the railway.

" *Feeder roads or branch lines.*—Cases may occur where it will be necessary to consider the desirability of building either a feeder road or a branch line of railway, and the question of the relative economy of motor transport and

rail transport will arise. It should be recognised that it is exceedingly difficult to reduce all the factors affecting these two forms of transport to a comparable basis. A railway is constructed, equipped, and operated by a single authority who controls and makes charges for all uses to which the railway is put. While, therefore, the total cost of operating a railway, including the cost of maintenance of way and structures, is fairly chargeable against the traffic transported, it is difficult to determine what proportion of the cost of road construction and maintenance is properly debitable to a motor service using such roads in conjunction with other users. A railway involves heavy constructional cost and requires special equipment. The interest on capital invested is, therefore, considerable, but the operating expenses are low. A motor road, on the other hand, does not involve such costly construction and equipment charges, but the operating expenses are higher. A railway service will, then, be more economical than a motor road service if the amount of traffic to be transported is sufficient to make the saving on operating expenses justify the cost of its special construction and equipment. There is, in fact, a certain critical volume of traffic, the transport of which can be performed with equal economy by a rail service or a road service; for a greater volume a railway, and for a smaller volume a road service, would prove the more economical. It will be seen, then, that the question as to the relative economy of these two different forms of transport really involves a comparison between the critical volume of traffic and the amount which is likely to be offered."

This, then, is the problem. It is clear that to ascertain the critical volume of traffic it is necessary to examine in detail the circumstances of each particular case and no general solution of the problem can be offered.

Certain general considerations may, however, be suggested.

(1) Railways in the Colonies are with few exceptions the property of the Government, and, being in their nature commercial enterprises, i.e., undertakings which sell to the public services which ought to be self-supporting, Government and the community generally have a direct interest in ensuring that they do not suffer unnecessary loss from other activities of the Government itself. It is to be feared that in the past roads have often been built without any consideration of their effect on railways. In his Report on the Palestine Railways (1925) Mr. Anthony remarks on a programme of roads for Palestine that the plan which accompanied it "shows with hardly an exception that all roads existing or proposed are or will be in direct competition with the Railway instead of acting as feeders to it and supplementing traffic which it carries."

No programme of road extension should be sanctioned by a Colonial Government without consultation with the Railway Administration and consideration of its effect on the Railway. Probably some form of Committee or Board on which Treasury, Public Works, and Railway are represented would be useful in those Colonies where no machinery for the purpose at present exists. Such a body should consider not only whether new roads which are proposed will damage the railway but whether the money to be spent could not be more advantageously devoted to roads which would act as feeders to the railway, so that the motor instead of being the competitor may become the ally of the railway.

(2) Railways in the Colonies, as in this country, are required to provide their own roads and to incur heavy expenditure for the safety and convenience of the public. There is no reason whatever in the nature of things why their competitors should expect to enjoy the use of the ordinary roads without paying an adequate contribution to their upkeep. What that contribution should be must, of course, depend in every case on the particular circumstances, but it is clear that no advantage accrues to the community as a whole if traffic is diverted from the railway to the roads merely because the motor is in fact being subsidised by getting a special advantage in the use of roads provided at the public expense.

In connection with the two preceding paragraphs some remarks by Sir William Hoy in his Report on the South African Railways for the year ended 31st March, 1923, are interesting. He refers to the fact that road transport evades its proper share of responsibility, and proceeds :—

> " In South Africa, road transport companies are at liberty to pick and choose their traffic and raise whatever charges they please, whereas the activities of the railways as common carriers are governed by public regulations and public tariffs. Motor transport, in my opinion, is not destined to rival railway transport. Its function is to act as an auxiliary to the railways and so assist in increasing and extending the utility of existing railway systems.
>
> " Road transport companies have no highways to maintain, and to this extent they are placed in a more favourable position for competitive purposes than the railways.
>
> " There are many districts in South Africa whose development is being retarded by inadequate transport facilities, but in which, on account of the capital expenditure involved in construction, not even a light line of railway would be justified. Motor transport could, however, do good work in the majority of such districts, given suitable roads.

" The Administration has established several road-motor services, the operation of which during the last financial year yielded a profit of £1,207."

(3) Sir William Hoy's employment of the motor as an auxiliary to the railway is no doubt the best of all solutions, but it is not always possible, and it must be recognised that motor competition has come to stay. It is even possible that in some cases (for instance, very short distance passenger traffic) it is useless for the railway to hope to recapture the traffic, but such cases must be exceptional. Sometimes the best course may be to reply by reducing rates. In other cases a better service may be necessary. In some the cost of operation can be materially reduced, e.g., by the use of smaller and cheaper units. In all cases the first step is to decide whether the rate in question is or is not remunerative, and this must depend largely on the accounts and statistics kept, since no railway rate can be considered as standing entirely by itself. It has not in the past been possible to say for some Colonial Railways whether even the whole undertaking was paying its way or not, but the separation of the Railway accounts from the ordinary budget which was urged last year by the Secretary of State will, where adopted, give a sound basis, and, while it is quite true that money can be wasted on statistics, considerable economies can often be made if adequate statistics are kept. Some Colonial Railways now prepare ton-mile figures, but those Railways which keep few statistics and suffer from road competition should consider whether they have or have not sufficient knowledge of their own costs of operation in order that they may decide with certainty how far they can afford to cut the rates.

H. L.

21*st March*, 1927.

APPENDIX XIII.

Developments in Mechanical Transport.

(A.)—REPORT BY THE CROWN AGENTS FOR THE COLONIES.

In compliance with the Secretary of State's wishes, we have prepared the following report on the features of, and results achieved by, various types of motor transport vehicles which would appear suitable for use under severe conditions in the Colonies, &c. In so far as the subjoined information concerns vehicles of the " Kegresse " and " Roadless " half-track types, this report should be regarded as a continuation of our previous statement dated 9th December, 1925, copies of which were furnished to various Colonies and Protectorates under cover of the Secretary of State's Circular despatch dated 2nd February, 1926. The remainder of this report deals with the new rigid-framed 6-wheeled lorries, a type of vehicle which is now proving extraordinarily successful both for road transport and for cross-country work. This new six-wheeler appears to be very well adapted for use in the Colonies.

The replies to the Secretary of State's Circular despatch dated 2nd February, 1926, from Gold Coast and Kenya (Appendices B and C) and the reply (Appendix D) from the High Commissioner for 'Iraq, who was also consulted in regard to the employment of this type of vehicle in 'Iraq, undoubtedly serve as a very useful guide in forming a general impression of the capabilities as well as the shortcomings of half-track lorries, but the fact should not be lost sight of that the experience upon which these replies are based is in reality not very extensive. However, the demonstrations given in Kenya and Gold Coast show that exceptionally difficult obstacles may be overcome by the creeper track vehicle.

The Nigerian reply to the Secretary of State's Circular despatch (Appendix A) shows that in certain respects the track mechanisms required improvement in design and construction and that the cost of track renewals was heavy. Yet on the whole the over-all commercial efficiencies expressed in costs per ton mile were by no means disappointing, and further reductions might confidently be expected in running costs due to improved design of those parts of the track mechanisms which require periodical renewal. The first set of tracks on the Empire Cotton Growing Corporation's 1-ton Guy Roadless lorry is stated to have required renewal after having run 1,084 miles,

and the track bands of the Burford-Kegresse lorry to have required renewal after 1,001 miles; but to these figures should be added the 1,000 miles which were run in this country before despatch. Thus both the " Roadless " steel track and the " Kegresse " rubber track gave approximately equal service, viz., 2,000 miles. The steel tracks, however, failed in a special manner, not from general wear and tear, but from excessive abrasion of the track teeth, and since the replace parts have been suitably altered in design to overcome this fault it is not improbable that 7,000 miles' life for this type of track may henceforth be realised.

We recently had an opportunity of interviewing the Chief Mechanical Transport Officer of the Nigerian Railways, under whose supervision the Empire Cotton Growing Corporation's lorries have been run. He mentioned the difficulty experienced in lubricating the track, but we are inclined to think that he undertook that rather laborious task much more frequently than was necessary, since he admitted that when the track was taken off to be renewed no perceptible wear could be discovered in the joints, and that except for wear on the teeth the track was practically as good as new. The trouble of the sand and grit accumulating in the grooves between the teeth of the driving sprockets has, it is hoped, now been overcome by making the grooves bottomless, and further tests are proceeding with the new type of sprocket. He mentioned that a difficulty peculiar to the " Roadless " steel track was experienced when going through mud in tropical sunshine. The mud picked up on the steel tracks dried almost instantly in a hard layer which gradually increased in thickness until the track became so tight and stiff that the lorry was brought to a standstill through lack of power to overcome the excessive friction which resulted, and progress could not be resumed until the tracks had been washed and scraped to remove the crust of dried-on mud. It will be observed that the same trouble was experienced with the Morris Roadless lorry which was demonstrated in Kenya.

In Messrs. Roadless Traction's later designs, track-scrapers have been fitted and the driving sprockets have bottomless grooves between the teeth to avoid lodgment of mud and grit. In the largest size of track, such as is fitted to the Sentinel Steam Tractor, the track plates are being made to overlap as an additional preventative against mud entering between the plates, and all pin joints are being fitted for grease gun lubrication. These improvements should considerably lengthen the running life of the tracks and lessen the amount of attention which they now require.

It will be observed from the Nigerian reply that the Empire Cotton Growing Corporation's half-track lorries are being run in conjunction with pneumatic-tyred trailers, and that from the behaviour of the trailers in some of the soft ground which had to be traversed it would seem almost necessary that they also should

be equipped with a form of roadless track. The Chief Mechanical Transport Officer of the Gold Coast, after witnessing a demonstration of the Vulcan Roadless lorry, in conjunction with pneumatic-tyred trailers, makes a similar remark. It may be useful to know that such idler tracks are now made by Messrs. Roadless Traction, Ltd. They are of a much cheaper construction than those fitted to lorries and tractor vehicles, and the units are made to be interchangeable with ordinary wheels without alteration to the existing axles. These tracks are now being tried by the Admiralty in place of wheels on heavy Naval gun carriages, and by the Lifeboat Service on launching cradles for lifeboats: also, the Empire Cotton Growing Corporation has recently ordered, for trial in Nigeria, a two-ton trailer equipped with four of these track units instead of wheels. Two sizes of trailer track units are at present under production; these are suitable for 5-6-ton and 1-ton net axle loads respectively. A third size suitable for a net axle load of two tons is in course of preparation. An idea of the cost of these units may be gathered from the following prices which were obtained from the makers in August, 1926, viz. :—

Set of 2 units to carry a total net axle load of 1 ton—£47 10*s*. f.o.b.

Set of 4 units to carry a total net axle load of 5 tons—£130 f.o.b.

Since making our previous report dated 9th December, 1925, on half-track vehicles, there has been very rapid development in the production of six-wheeled motor vehicles of the type known as the rigid six-wheeler, so called to distinguish it from the older type of six-wheeler in which the frame is articulated in the region of the middle pair of wheels, and in which only one pair of wheels is driven. The rigid type of six-wheeler originated in France. About two years ago the War Office purchased for experimental purposes a French Renault six-wheeler of the type which crossed the Sahara and made the journey from Algiers to Cape Town. Exhaustive tests were carried out on this vehicle and many weak features were discovered. The outcome of this enterprise on the part of the authorities at the War Office was that they were enabled to evolve and patent a satisfactory design for the arrangement of the twin driving axles which eliminated the faults of the Renault. This improved design has been adopted by all British makers of these vehicles.

The rigid six-wheeler differs from the ordinary type of lorry in that the major part of the load is supported on two rear axles instead of one, both of which are driven. Thus the load is distributed and the pressure on the road is very much reduced as compared with normal four-wheelers. Special non-skid chain tracks of light construction may be carried on the footboard, and can be quickly coupled round the pair of twin driving wheels on each side when required, which virtually transforms the vehicle

into a half-track machine and thereby still further reduces any tendency to sink in soft ground, while at the same time giving firmer grip and preventing wheel spin. We attach hereto, as Appendix E, a memorandum, prepared by the War Office, entitled " Notes on some Characteristics of the War Department Type Rigid-Framed Six-wheeled Vehicles," together with particulars of the " Hathi " (Mark II) Four-wheeled Drive Tractor. As the special features and merits of these machines are sufficiently described in the War Office memorandum, it is only necessary for us to express general views regarding the sphere of usefulness of the rigid six-wheeler, and its limitations, and to draw a comparison between it and vehicles of the half-track type.

The cross-country performance of the six-wheeler is immeasurably superior to that of any four-wheeled vehicle, and when the chains are in use it is practically as good as that of the half-track type. But the chains are not suitable for continuous running as they are only of light construction. Also there is a slight tendency for the chains to come off when the vehicle is steered very sharply or is tilted considerably sideways, and when this happens there is a risk of damaging either the tyres or the chain.

All British rigid six-wheelers are fitted with four-speed gear boxes and auxiliary two-speed gears, giving a range of eight speeds in all. This wide range of gears offers a speed to suit every possible emergency. The tractive forces on the lower speeds are enormous and very suitable for getting the vehicle out of awkward places or for emergency towing purposes. For ordinary commercial use it is possible that the auxiliary two-speed gear will be an optional fitting, since the normal four-speed gearbox is probably sufficient for most conditions overseas as well as in this country. Although these vehicles possess the advantage over four-wheelers in having the extra road adhesion of an additional pair of driving wheels, it should not be assumed that they have an appreciably greater capacity for trailer haulage than ordinary four-wheeled lorries of the same size: for economic trailer haulage is dependent on both tractive effort and speed. In our opinion the rigid six-wheelers at present on the market are not suitably geared for trailer haulage in top gear. But on third gear (where four speeds are provided) the Morris, Guy, and Albion lorries have sufficient power for trailer haulage at economic speeds to enable their normal loads to be increased by 100 per cent. Similarly, in the case of the Karrier and Thornycroft vehicles the normal loads could be increased by 50 per cent. and 25 per cent., respectively. In all cases greater power is, of course, available on first and second gears, but the corresponding road speeds are too low for economic trailer haulage.

Rigid six-wheelers are equally as suitable for running on good roads as the ordinary four-wheeled types : in fact they ride much

more comfortably than the latter owing to the shock-absorbing properties of the four-wheeled driving bogie, and partly for that reason they are becoming very popular for char-a-banc and 'bus work. Six-wheeled passenger vehicles are already being used by many Corporations in this country and by the Cape Town Tramways. The use of these vehicles for goods-carrying is also making rapid headway, and considerable numbers are already employed by the Navy, the Army, the Air Force, and many private trading concerns. A considerable number have been shipped to the Sudan Government, the African and Eastern Trading Corporation (for use on the Gold Coast), the Burma Oil Company, and various other undertakings in South Africa, Australia, Brazil, and elsewhere.

Rigid six-wheelers are normally fitted with twin pneumatic tyres on each of the four driving wheels. This circumstance might at first appear to be a disadvantage from the point of view of the risk of tyre failure owing to the large number of tyres employed, viz., ten per vehicle. But this has not proved to be the case in practice since the vehicles are very liberally tyred for the loads they have to carry, and tyre trouble is consequently almost unknown. The object of using twin tyres on the rear wheels is to enable the occasional use of chain tracks. Hitherto no chain track has been designed which would work satisfactorily over a pair of single-tyred wheels, although experiments are still being made to solve this problem. However, in cases where road conditions are not so severe as to require the occasional use of chain tracks the vehicles can, if desired, be fitted with single tyres. Another point in connection with the tyres of rigid six-wheelers is that it is important that all the driving tyres should be of the same actual (as distinct from merely nominal) diameter, or at least that the average actual diameter of the tyres on one axle should be the same as the average actual diameter of the tyres on the other, so as to ensure that both driving axles shall share the drive equally. Each driving axle has the usual differential for equalising the drive between its near and offside wheels, but there is no differential to equalise the drive between the two axles. If this point is not attended to, tyre wear will probably be accelerated.

As regards reliability, experience has already shown that the rigid six-wheeler is quite equal to the ordinary four-wheeler. This is to be expected since all the component parts of the former are modelled on those of the latter.

As regards price, the six-wheeler does not cost much more than the ordinary four-wheeler of the same capacity, and we consider that the many advantages which it has over the four-wheeler for traversing soft or rough roads should result in this type being more economical to employ than the latter for average overseas conditions. The following are examples of recent quotations which we have received for rigid six-wheeled vehicles.

The prices are net for delivery at works: packing and freight are extras:—

GUY RIGID SIX-WHEELED CHASSIS.

Net carrying capacity 2-3 tons.
Tyres 34 inches × 7 inches single pneumatics on all wheels.
One spare tyre.
Electric lighting.
Four-speed gear and auxiliary two-speed gearbox.
Spring drawbar.
Speedometer.—£933.

KARRIER RIGID SIX-WHEELED CHASSIS.

Net carrying capacity 2-3 tons.
Tyres 34 inches × 7 inches single pneumatics on all wheels.
One spare wheel and tyre.
Oil lamps.
Spring drawbar.
Four-speed gearbox.—£707 15*s*.
Ditto, but with twin tyres on rear wheels.—£766 10*s*.
Auxiliary two-speed gearbox, extra, £29 5*s*.
One pair chain tracks, extra, £13 15*s*.
Electric lighting, extra, £27 10*s*.

THORNEYCROFT RIGID SIX-WHEELED CHASSIS.

Net carrying capacity 2-2½ tons.
Tyres 34 inches × 7 inches single pneumatics on all wheels.
Four-speed gear and auxiliary two-speed gearbox.
Electric lighting.—£650.
Spring drawbar, extra, £9.

MORRIS RIGID SIX-WHEELED CHASSIS.

Net carrying capacity 20-30 cwt.
Tyres 32 inches × 4½ inches pneumatic singles on front, twins on rear.
One spare tyre.
Electric lighting.
Four-speed gear and auxiliary two-speed gearbox.
Mechanical tyre pump.
Speedometer.
One pair chain tracks.—£405.
Lorry (complete as above) with body.—£455.

Since it is likely that in the majority of cases where a motor vehicle would be employed for cross-country work the exceptionally severe stretches will be intermittent and of comparatively short duration we are now inclined to think that there is a much

wider field of usefulness for rigid six-wheelers for average overseas conditions than for the half-track type of vehicle. But where the utmost trailer haulage ability is required, or where the conditions are so severe as to necessitate almost continuous use of the chain tracks on the wheels of rigid six-wheelers in order to avoid sinkage, the " Roadless " or " Kegresse " half-track vehicles are unequalled.

J. F. H. CARMICHAEL.

February, 1927.

APPENDIX A.

Extract from a despatch from the Governor's Deputy, Nigeria, to the Secretary of State for the Colonies.

22*nd June*, 1926.

* * * * * *

Experiments have recently been carried out in Nigeria with the following " half-track " motor vehicles which were sent out by the Empire Cotton Growing Corporation :—

(1) 25-cwt Guy lorry, roadless tracks in place of rear wheels, pneumatic tyres on front wheels. Weight in working order 2½ tons. Load 1,800 lb.

(2) Two-ton Burford Kegresse lorry, Kegre attachment in place of rear wheels, pneumatic tyres on front wheels. Weight in working order 3 tons 2 cwt. Load 2,400 lb.

(3) Two 2-ton four-wheeled trailers.

(4) Two ½-ton two-wheeled trailers.

The lorries had undergone a test, covering 1,000 miles, before shipment to Nigeria. By arrangement with the Empire Cotton Growing Corporation, the lorries were run under the supervision of the Nigerian Railway Transport Department and were driven by drivers engaged by the Corporation.

I transmit, herewith, a report† on the behaviour of the lorries and trailers enumerated above. The results can be summarised as follows :—

Guy Roadless Tractor.—Put into service on the Zaria-Gusau road 19th November, 1925. Ran 1,650 miles. The roadless tracks were then completely worn out and have now been returned to the makers. Tonnage carried, 43 tons 2 cwt., which included the weight hauled on trailers. The lorry worked 18 days only.

---

† Annex 1.

Burford Kegresse.—Put into service on the Zaria-Gusau road 11th November, 1925. Ran 1,001 miles, when bands were completely worn out and had to be renewed at a cost of £102. Up to the end of March, 1926, this lorry had run 1,914 miles in 27 days, and had carried 94 tons, in conjunction with trailers.

Early in May, a 2½-ton Guy Roadless tractor lorry was imported by the Empire Cotton Growing Corporation, and has been tested on the Zaria-Kaduna road. A report‡ on the test forms the second enclosure to this despatch.

The General Manager reports that neither the Roadless tractors nor the Kegresse bands do any serious damage on a metalled road, but it has been found that the Kegresse bands disturb the surface of an unbound road when turning or rounding corners.

6. You will observe from the report on the trials mentioned above that serious defects in the constructional details of the tractors have yet to be overcome; and, while it is hoped that it will be possible to continue to investigate the possibilities of this form of transport, I am not of opinion that those possibilities are such as to warrant the curtailment of the policy of extending the road system of this country.

* * * * * *

H. M. MOORE,
Governor's Deputy.

ANNEX 1.

Extract from a report on Tractors and Trailers.

Guy No. 1.

1. This is a one-tonner, with steel tracks, and was put into service on 19th November, and up to the end of January has accomplished 1,084 miles, being in commission 18 days only. The remainder of the time, 62 days, the lorry has been under repairs. The chief difficulty is the lubricating of the track: the present system is totally unsuitable as it takes far too long to extract the oil plugs after they have been in contact with the road. The oil way between the oil box and ball joint is too small, and gets choked with the fine particles of dust coagulating with the oil, thus causing plates to squeak. The sprocket wheels show abnormal signs of very uneven wear due no doubt to the sand and grit lodging in the bottom of the

‡ Annex 2.

tooth spaces and setting up a grinding action as the track teeth engage. I estimate the life of these sprocket wheels at 2,500 miles.

There is a tendency for the bogie wheels to run hot. This seems to affect the rubber tyres, and we have had the tyres come off on more than one occasion. The main "Mushroom-top" bearing of the bogie that bears the weight of chassis is inclined to lift off the head and so admit dirt and thus clog the oil ways. The joint should be entirely closed or redesigned and hung, in a similar way to the Kegresse, by links. The steepest grade traversed so far is about 1 in 4 or 5 and a two-ton trailer loaded with 1 ton and 1 ton in body of tractor is about its maximum load. It is not advisable to take more than a two-ton load where such grades exist.

The radius of operation is 60 miles. This means that a useful load of two tons can be carried 60 miles in one day at 1*s*. per ton-mile, equal to £6 as a day's earnings. The petrol consumption works out at 7·5 miles per gallon. The total working costs exclusive of general superintendence works out at 10·2*d*. per ton-mile, that is with a two-ton trailer. These figures will improve greatly when we are able to keep the tractor fully employed.

BURFORD No. 2.

2. This is a 30-cwt tractor with the Kegresse Tractor unit fitted (rubber bands). It was put into service on 11th November and has accomplished a mileage of 1,001 miles up to end of January. The rubber bands are now worn out and we are awaiting the arrival of spares. Some of the teeth on the band have pulled out and large gashes have appeared on the outside of the belts just where the ladder comes, hence it is desirable to fit the herring bone type of belt which will prevent this fault, I think. The new bands have just arrived and are of the herring bone type. The bogies of this tractor are exceedingly satisfactory and designed on sound lines. There is just one fault, which is that the rear bogie wheels are too near the driving wheel, and under certain conditions rub one another, wearing the rim of the aluminium bogie wheel. It will be observed that the rubber band tends to drag the bogie back and the wheels can be made to touch; more clearance is required here. The Burford is running very satisfactorily and is capable of doing very useful work, and if the rubber tracks will only give a reasonable mileage and can be made at reasonable cost there should be a wide field of operation for this type of vehicle. No doubt during the rainy season we may get very different results, but that remains to be seen.

The tractor has been in commission 27 days, and under repairs and awaiting spares 54 days. Now the new tracks have

arrived I look forward to keeping this vehicle in fairly constant use. The total working costs, exclusive of general superintendence, work out at 10·7*d.* per ton-mile, and that is with a 3½ ton load.

SUGGESTIONS.

Tracks.

3.—(*a*) I would suggest that too much care is being taken to preserve the ball joint in track from wear and tear through sand and water getting in the joint. It would appear to be impossible, to say nothing of the expense, to arrive at such an ideal fitting. My suggestion is to abandon the idea of making the joint dust-proof, have a hardened ball and socket as now, lubricate through the centre of the pin axially with a spring ball to close the hole in end of pin. A grease gun could then force in lubricant to joint, which would push out the dirt and exude the grease on sides of ball joint. I think the ball joint would last as long then as the track plates. It would also be an easy matter to lubricate a track. The time expended lubricating the track now far outweighs the cost of a new joint.

Sprockets.

(*b*) I believe these are being altered to make the teeth spaces bottomless. This, I think, is a step in the right direction.

Bogies.

(*c*) Clips to hold tyres from coming off could easily be fitted, then if a tyre did get slack it could not get off and do damage to track by letting bogie down on top of track teeth. The tyres have a tendency to overheat, and this seems to loosen them.

Chassis.

(*d*) A sturdy sprag should be fitted on tractor to prevent running backward on a steep grade, designed so as to hold tractor and trailer with brakes off. It is sometimes necessary to relieve the strain on gears by releasing brakes if the tractor sticks on a grade before gear can be changed to a lower one, hence the use of a sprag which should have a flange 6 inches from point to prevent it digging too far in ground.

Trailers.

4. The Carrimore trailer is of very poor workmanship and is obviously a cheap trailer. The design is good, the wide track of wheels being very suitable for the roads here and the loads it has to carry, viz., half-pressed bales of cotton and bags of seed cotton. Loads such as this raise the centre of gravity and a wide-tracked vehicle is necessary. All towing hooks and

attachments should be without springs and should be capable of moving easily in the holes of frames. It is a mistake to rivet a towing hook on to a frame and make it rigid; it must give to all inequalities of the road. A universal joint between the vehicle and trailer is essential. Roller bearings should be fitted to all wheels, such as Timkin roller bearings. Axles are subject to severe shocks and should be strengthened accordingly. Brakes should be applicable from front of trailer and also from the lorry. The Bartle trailer is of good workmanship, but the track is far too narrow. The overhang of body is too great, and it is only with the greatest care that these trailers are prevented from overturning. This means loss of time on an uneven road. Wheel tracks should never be less than 4 feet 11 inches and not greater than 5 feet 11 inches. Because the wheel track is so narrow it is not advisable to carry bulky loads in them, and they are all right for groundnuts but not cotton.

* * * * * *

26th February, 1926.

ANNEX 2.

Extract from a report by the Motor Transport Officer of first trial with Guy 2½-Tonner on 10th May, 1926.

The third tractor from the Empire Cotton Growing Corporation arrived at Zaria on 1st May, 1926. It is a 2½-ton Guy Roadless. A trial trip was made to nine miles on the Kaduna road with 6½ tons of cement. The vehicle operated very satisfactorily and averaged about seven miles per hour, hauling the load without any difficulty on the level or slight grade, but when meeting a short steep grade the engine stalled and would not pull one trailer up 1 in 5, being obviously overgeared. To be of any service in our particular work these tractors should have an extremely low double reduction gear for the lowest speed, say, 150 to 1, and if the makers could send me out the wheels necessary for this reduction we could fit them in here. This exceedingly low gear is necessary because on some parts of the road short grades of 1 in 4 are met with, and if the vehicle is not able to negotiate this then the hauling capacity is reduced to an uneconomical load. The double reduction gear would only be used very occasionally. A speed of seven to eight miles per hour on top gear is required. As far as I can judge the present track is a great improvement on the former one. The driving sprocket wheel would be much improved if the teeth spaces were bottomless so that the dirt would not lodge in bottom of teeth.

The accommodation for the drivers is very uncomfortable, the seat is far too cramped, the driver has to sit partly doubled

over the steering wheel, and the back, being at right angles instead of sloping, makes it very tiring on a long journey. I have demonstrated to the Public Works Department Engineer that the tractor cannot damage the road, and he is now quite satisfied on this point. He was of the reverse opinion until he witnessed the recent demonstration.

* * * * * *

14*th May*, 1926.

Report by the driver :—

Left the garage at 11.15 a.m. with two Bartle trailers, each trailer carrying full 2-ton load (12 barrels of cement), the tractor carrying 15 barrels. The tractor behaved splendidly throughout the test. The engine pulls well and develops plenty of power, but gear ratios are far too high for hauling a commercial load (say 6½ tons). The double reduction lowest gear is too high for the gradients on the Zaria-Kidandan route. The radiator boiled at mile 4, due more to the fact that up to this point the tractor had been running on second and third speeds than to other reasons. I should say that radiator capacity is up to climatic requirements. In several soft patches where the trailer wheels sank below the rims the Guy just left an impression of the tracks. On arriving at Siya Bridge I dropped one trailer the Zaria side of the river bed, and proceeded to take remaining trailer over the drift. Everything went well until the Guy began the climb up and out the further side. At the very steepest part of the grade, about 1 in 4, the narrow tyres of the trailer sank into the boggy surface and the Guy stalled. I gave her a couple of tries and concluded she would not do it, so dropped the trailer and, taking the tractor into a less steep part of the ascent, tried hauling the trailer with a wire rope. I had no sooner commenced to haul away when the off-side wheels of the trailer happened to sink further down in a particularly soft patch and over she went, luckily doing no material damage. The running time for the sixteen miles was two hours, and I should say that, with an extra low reduction gear, say, 100 to 130 to 1, the 2½-ton Guy will comfortably haul a 6½-ton load on a very bad road, such as the Zaria-Kidandan road.

Appendix B.

Extract from a despatch from the Governor of the Gold Coast to the Secretary of State for the Colonies.

22*nd March*, 1926.

* * * * * *

With reference to your Circular despatch dated the 2nd of February, 1926, on the subject of creeping track motor vehicles

of the " half-track " type, I have the honour to transit copies of reports on trials made in this Colony with the Vulcan Roadless Creeper Track* and Citroen-Kegresse† light machines.

* * * * * *

F. G. GUGGISBERG,
Governor.

ANNEX 1.

The two Citroen-Kegresse light machines which were reported on in my case P/1/84 of 14th April, 1924, of which I attach a copy, have not been used since their demonstration at Kumasi and at Huni Valley in June, 1924. Under the exceptionally severe conditions of these tests, which took place during the rainy season, I understand that the rubber and canvas track-bands lasted only about 500 miles each.

Another defect, which has, I believe, since been overcome to a great extent by a change of design, was the frequent fouling of the driving axle housing on tree-stumps and similar obstructions due to the very small ground clearance provided between the tracks.

Experiments were discontinued by the firm concerned for financial reasons and because no party appeared to be sufficiently interested to purchase the demonstration or similar vehicles.

It would appear that vehicles of this type are not likely to be used in the Gold Coast until the cotton industry becomes established in the Northern Territories, as the numerous and extensive gravel roads are quite capable of carrying, during the dry season, which is also the cocoa season, all the light lorry traffic necessary to bring the cocoa to the main motor roads and railways; and, at present, the cost of maintenance of these roads can be met from the annual revenue.

The comparatively small general trade during the rainy season would not justify the employment of half-creeper track vehicles for operating over the existing roads while they are closed to ordinary lorry traffic.

The mechanical details of this type of vehicle require considerable improvement in design and construction before it can compete with the ordinary wheeled type on the score of reliability alone, and it will always cost more in upkeep by reason of its greater weight and complication; though this could be counterbalanced to some extent by reduced taxation in consideration

---

* Annex 2. † Annexes 1 and 3.

of the lower cost of construction and maintenance of the necessary tracks, as compared with the cost of even gravel roads required by the wheeled type.

Chief Transport Officer.

12*th March*, 1926.

ANNEX 2.

The Vulcan Roadless Half-track lorry consists of a standard 2 tons capacity Vulcan lorry chassis with platform body and fitted with a creeper track conversion set, replacing the rear wheels, manufactured by Messrs. Roadless Traction, Limited, of Hounslow. The chief and unique feature of this form of creeper track is its ability to lay itself on the ground in a curve when the vehicle is turned from a straight path. This gives a very small turning circle to the vehicle to which it is fitted—37 feet in diameter in the case of this Vulcan lorry—and prevents damage to the surface over which it is operated, besides greatly reducing the weight and increasing the life of the track itself.

Furthermore, it can be made suitable for any size of vehicle, from a 1-ton Morris truck (to which make several sets have already been fitted) up to a 20-ton Army "Whippet Tank," and is greatly in advance of the French Kegresse canvas and rubber track so widely advertised by the Citroen trans-Sahara demonstration.

This demonstration consisted of hauling two light four-wheeled trailers of special design, constructed by the British "Haulage Improvement Company" and fitted with 32-inch x 4½-inch S.S. pneumatic tyres, each loaded with 1 ton of concrete blocks, while carrying a load on the lorry body of 2 tons of similar blocks. This was done, on top gear at 15 miles per hour, along the Christiansborg Road and then, on third and second gears, cross-country in the vicinity of the Rifle Range. The tractor lorry finally hauled the trailers over the sandy hollow by the seashore near Government House and up a slope of approximately 1 in 8 on the return journey. It was noticeable that the front wheels of the tractor lorry and the trailer wheels made more impression on the soft sandy surface than did the tracks, which were also transmitting the necessary tractive effort.

A further demonstration, without the trailers, but with the 2-tons load on the lorry, was then given. This consisted of driving over the softest and most water-logged portions of the course, up the steepest slope—and an astonishing grade of 1 in 3—and out on to the foreshore through the soft dry sand and up to the axles in seawater on the comparatively hard strip.

The vehicle performed throughout without a hitch, and only boiled when hauling both trailers up the steep slope off the beach.

The light drawbars of the trailers are not, however, strong enough to resist the " concertina " effect of going down the same slope without the trailer brakes in operation. In regular use, the trailer brakes would have to be linked up for operation by the lorry driver in order to comply with the requirements of the Motor Traffic Ordinance.

The demonstration showed that the vehicle would be suitable for haulage work over a simple track, cleared of trees and similar obstructions and provided with bridges over the larger streams, or along the seashore on the sand. I still maintain that for regular use during the rains over ungravelled tracks the trailers should be mounted on " idler " creeper tracks and not on wheels, which would eventually make ruts and render the tracks impassable.

Chief Transport Officer.

28*th August*, 1925.

ANNEX 3.

Case No. P/1/84.

Trial of a Citroen-Kegresse Vehicle.

On the 10th instant I tested a Citroen-Kegresse half-creeper track cross-country vehicle. The vehicle was fitted with a convertible body which could be used either as a four-seater car or, with the rear seat removed, as a small lorry. To enable a heavy load to be carried in this body, iron castings, weighing 15-17 cwt., were taken. The larger platform area of the lorry models would enable an equal weight of cocoa to be carried on the vehicle. In addition, a " Roger " steel two-wheeled trailer, weighing 5-6 cwt. and carrying ten bags of cocoa (12½ cwt.) was hauled.

The special two-speed rear axle fitted to the vehicle gives, for use on soft ground or when hauling very heavy loads, a second series of three forward ratios, the top gear of which is slightly lower than first speed on the higher series. There are thus six forward speeds and two in reverse.

Starting from Station Road at 2.15, the vehicle and trailer proceeded along the Nsawam Road at 15 m.p.h. on top gear as far as the second milestone, when the cross-country section was started. This consisted of making for the Water Tower near the Dodowah Road, a distance of 2½ miles in a straight line, by the most

direct route possible. The second gear of the higher series was engaged on leaving the road, and on this gear most of the level ground was covered at about 12 m.p.h. For soft sandy stretches the first gear of the higher series was necessary, and, to climb the steeper hillocks, top gear of the lower series. This gave quieter running than using the gearbox and the higher rear axle ratio.

No difficulty was experienced anywhere during the trial, and it was noticed that the arrangements for steering by means of brakes on the left or right track when the front wheels leave the ground passing over irregularities functioned well, although more movement of the steering wheel was necessary than when the front wheels were on the ground.

The return journey was made via the Dodowah Road and Selwyn Market Street on top gear. The engine was not stopped during the whole distance of from 7¾ to 8 miles, occupying about one hour's running time, and I estimate the quantity of water lost as a pint and a half. Owing to the large quantity of oil in circulation—one gallon is passed by the pump in every five minutes—there is no reason why the vehicle should not continue running all day without distress.

In my opinion the sphere of utility of this small machine is limited to the following uses :—

(*a*) For railway construction work : transporting bridge building materials (30 cwt. per trip with trailer) across open country or along simple clearings through forest, ahead of " formation."

(*b*) For new roads construction work : transporting similar materials, stone, &c., over " soft " sections.

(*c*) For medical and other emergency use without trailer, as a car or light lorry, over roads partially or totally submerged during the rains.

(*d*) For general transport work in the Northern Territories or other open country where no roads exist. The provision of a trailer supported on idler tracks is essential for the full development of this type of transport, and I doubt if an ordinary wheeled trailer could be used under the conditions detailed in (*b*) or its use permitted when pioneer roads are closed to wheeled traffic after rain; although the light half-creeper track vehicle itself would do no damage to the softest road.

Acting Chief Mechanical Transport Officer

14th April, 1924.

APPENDIX C.

Extract from a despatch from the Governor of Kenya to the Secretary of State for the Colonies.

26*th October*, 1926.

* * * * * *

I have the honour to transmit a report with annexures upon the demonstration conducted by the firm of Roadless Traction, Limited, with a Morris one-ton Roadless Machine and Trailer.

I am advised that the vehicles are suitable where a considerable amount of transport over sandy roads is required.

It is regretted that the uncompleted trials over black cotton soil, by force of circumstances, were conducted after the worst of the rains were over.

I am, however, of opinion that the vehicle is capable of transporting one-ton loads over the majority of roads which are impassable at certain seasons to other vehicles.

I propose to use them for the transport of pipes in the Shimba Hills for the Mombasa Water Supply.

EDWARD GRIGG,
Governor.

ANNEX.

Morris Roadless Lorry Trials.

The vehicle arrived in Nairobi on the 18th January after having been tried on a run from Voi to Taveta and back and again from Athi River to Nairobi. These runs were observed by an officer of the Uganda Transport Service, and a copy of his report is attached hereto*. A demonstration was arranged for the Governors then attending the Conference in Nairobi. This was held on the 11th February. An extract from the local press is given as Sub-Annex 2.

A trial was arranged over the worst known available stretch of sandy road by sending the lorry down to Mombasa. The road on which this trial was held is one on which a trial was especially desirable, as a large quantity of pipes for the Mombasa Water Supply must be transported over it in the near future. The trial demonstrated that the vehicle will do, efficiently, work which certainly could not be done by wheeled vehicles without a considerable expenditure on road surfacing and grading. A report on this trial is attached as Sub-Annex 3.

The trial over wet ground was necessarily put back for the arrival of the rains, and, moreover, the makers of the chassis

* Sub-Annex 1.

were sending out a new engine of greater power as described in Sub-Annex 1. This engine duly arrived, but unforeseen delays occurred in landing it, such that when the vehicle was finally delivered in Nairobi for further trails there had been no rain for two days, and the roads were not then in the worst condition in which it was desired to test the machine. A short trial was, however, undertaken immediately on arrival, which is described in Sub-Annex 4.

In Sub-Annex 1 various defects in the tracks are pointed out, so I handed a copy of this report to Mr. Skelton, the representative of the makers of the roadless track. His reply is given in Sub-Annex 5. I again inspected the tracks, and consider that the alterations carried out in the light of the experiences on the Voi-Taveta Road have, to a large extent, overcome the defects.

Acting Assistant Director of Public Works.

Sub-Annex 1.

Report upon actual Tests carried out with Morris One-ton Roadless Machine and Trailer.

It was decided to entrain the machine and trailer to Voi, and make a start to Moshi from that point.

Left Voi at 9.0 a.m. on the 14th January for Moshi, by the road. Approximate weight carried by the machine just under one ton, including driver and three passengers. Approximate weight in trailer about 10 cwt., including two natives, petrol tank full—8 gallons. For the first 20 miles there are a number of steep gradients, and as the machine was not pulling well we were three hours in completing 21 miles. At mile 33 four gallons of petrol were put in the tank, and at mile 38, Maktaw, a stoppage was made to tune up the carburettor. From mile 38 to mile 68, over red sandy country, much better time was made —an average of 12 miles per hour. Stopping at mile 68 to put in four gallons of petrol we were caught in a very heavy rainstorm. Proceeding slowly, in a very short time the red sandy soil was a quagmire, and as visibility was bad, and the machine sliding on the narrow road, a stop was made at mile 70 until the rain ceased. At 9.0 p.m. the rain held up so a start was made, the road leading through several steep dongas, on the upgrades of which all hands had to get out. The mud was so deep and slippery that it was impossible to walk alongside the machine without supporting oneself by the machine. These grades were taken in second gear in reduction, and owing to side slip three spuds were fitted to each track. Progress was very slow, but we eventually arrived at Taveta, Mile 74, at 10.10 p.m. The

machine, in my opinion, behaved very well, as the engine was not running up to its power, requiring retuning to suit the altitude, and at no time was the trailer taken off. Left Taveta at 9.30 a.m. on the 15th for Moshi, having fitted six spuds to each track. After going through a few miles of wet red soil the spuds were taken off to increase speed, but we soon ran into drying black cotton soil. In less than half a mile the flexible track was stiff with mud, necessitating using low gear in reduction, with a speed of 1½ to 2 miles per hour. These were exactly the conditions under which the manufacturer's representatives wished to carry out the testing of the machine. The trailer was uncoupled, but this made little improvement in the machine pulling through the drying cotton soil. As we were out to test the machine and not to do stunts, there was no point in our proceeding through Moshi, so it was decided to try out the machine on the plains and afterwards return to Voi. During these tests the drying mixture of black cotton soil and grass, clogging the plates, joints, sprocket, and idler, tightened up the track, so that it was only possible to use low gear in reduction. The machine was then taken to a dry patch of level ground, and it was found that it was impossible for six men to push it along. This mixture dries hard in the bottom of the sprocket teeth, and in the recessed portion of the sprocket circumference between the teeth, adhering to the sprocket teeth supporting ribs. This tends to throw the track plate teeth out of mesh. On the idler it packs up between the side plates, forcing itself into the lightening holes and around the bolt distance pieces, and, with a quarter of an inch of the mixture on that portion of the inside of the track plates upon which the bogies run, prevents the track from running on the idler wheel rubber tyres. This quarter of an inch of the mixture also causes the silencing rings on the sprocket to hold the teeth of the track out of engagement with the sprocket teeth, causing extra track tension. The track unit was cleared of mud, &c., releasing the tension on the track and showing about three inches of sag, one man then being able to push the machine along the level. Several tests of the same nature were run, the result of which disclosed the fact that more engine power, more efficient cooling, more clearances in the component parts of the track unit, to take the mud away, and scrapers on the outside of the track, were needed.

Returned to Voi by road on the 16th, entrained machine and trailer to Athi River Station, ran over the Athi Plains, arriving at Nairobi at 6.30 p.m. on the 17th. On the 18th dismantled the track unit and put the machine on road wheels. Time taken—about 6 hours. A great deal of time was wasted during this operation owing to all bolts and nuts being locked by split pins. With lock nuts this change over should only take about three hours.

The following alterations to the track unit of the vehicle are now being undertaken at Nairobi :—

Fitting of a scraper to clear the outside of the track plates. Cutting away a portion of the sprocket teeth supporting ribs, but leaving sufficient for support, also cutting away the sprocket on each side of the ribs for mud clearance. Alterations to bogie mud shield, and rubber rings on sprocket silencer.

The Roadless Traction Company are experimenting with a sprocket with bottomless teeth. This should be a great improvement on the present sprocket.

In place of the present 13.9 h.p. engine the Morris Commercial Motor Company have decided to instal an 80 × 125 m/m engine with maximum torque 95 feet lb. at 800 r.p.m.—18 h.p. This engine is in course of production, and will be fitted in place of the present engine.

With these alterations and improvements the trackless vehicle should doubtless be of use in this country.

(Report transmitted from the Transport Department.—Uganda Government.)

Sub-Annex 2.

Extract from "Weekly Standard" Dated 13th February, 1926.

The *Standard* representative was a passenger on the tractor from Nairobi House to the valley near Pagani villiage which had been selected as the site for the tests. The outward journey, accomplished at about 15 miles per hour, was extremely comfortable. Attached to the tractor was a four-wheeled trailer weighing 15 cwt. and carrying a load of 2,800 lb. This was detached for the purposes of the main tests.

It is important to emphasise that the programme carried out on Friday afternoon was not meant to constitute a real trial; that can only happen in the rainy season when the test will be the negotiation of roads which at such times are impassable even by light pleasure cars: it was intended to indicate the capabilities of the vehicle over rough steep ground which would not normally be traversed by the more familiar mediums of transport. Even so, the test was no light one. The valley near Pagani village abounds in ruts, hillocks, and severe gradients; some of the gradients being as steep as one in two. It is intersected by a swamp which, despite the long spell of hot dry weather, was still in quite good condition—as a swamp. Its appearance was deceptive, for it seemed to be fairly well-baked clay; whereas in fact there was only a crust beneath which was two feet of quite good mud.

The demonstration proper consisted of driving the machine loaded with 15 cwt. of stone over some of the roughest portions of the ground, through the bed of the stream near the bridge, up

the steep rough slope at the other side to the summit of the hill, down the hill the gradient of which in places is one in two, turning on the level portion at the bottom and climbing straight up one of the steepest parts of the hill, descending again and plunging through the swamp (the machine seemed positively to enjoy this part of the proceedings), turning at the other side with the vehicle at an angle of 45 degrees, twice again through the swamp at different points, and then a dash up the steep hillside to the road. This itinerary was repeated, and the Governors and Government officials seemed greatly impressed by the performance.

Hauling Ability.

After the completion of the tests in the valley a short demonstration was given of the capabilities of the machine hauling the trailer loaded with stone weighing 2,800 lb. over very rough ground at the top of the hill. During part of the time Mr. Walmsley took the wheel and expressed surprise at the facility with which the tractor could be steered.

One of the advantages of the new vehicle is that the rear tractors can very quickly be replaced by ordinary wheels for dry-weather transport. The machine with which the demonstrations were made is not a production model inasmuch as it is fitted with the standard Morris-Oxford engine of 14-28 h.p. and a three-speed gearbox; whereas the machine which will be marketed will have an 18-36 h.p. engine and a four-speed gearbox. The price *ex* works in England will be approximately £550.

Sub-Annex 3.

Morris Roadless Truck Lorry.

Result of Tests on 6th and 8th March, 1926.

The 20 cwt. Roadless Truck Lorry with trailer attached was tested on the Construction Road Mombasa Pipe Track from Mreri to the top of the steep sandy hill at Mile 4-10. As a result of experience in running a Dodge car over the whole road during the past three months, it is considered that this hill and the road between it and Mreri is the most difficult to negotiate with a wheeled vehicle.

For this run the loading, in addition to the chassis weight, was as follows:—

Body on Truck	5 cwt.
Weight of Empty Trailer	15 cwt.
Load on Truck	1,000 lb.
Load on Trailer	300 lb.

The journey to the base of the hill referred to was accomplished without the slightest trouble, and particular notice was

taken of the turning of the vehicles around some of the sharp corners encountered, several of which are in a loose sand formation. There was no sign of the road being cut up, and the action of the tracks appeared to be decidedly beneficial in smoothing out existing ruts in the loose sand. The pneumatic tyres on the trailer make a deeper impression on the sand than do the caterpillar tracks.

At the base of the hill an additional load of 1,100 lb. was placed on the truck, and the vehicle then travelled up the hill without the least sign of distress. The driver demonstrated his ability to stop and start the vehicle on the steepest and sandiest parts of the road, and also travelled over a hole on the stiffest part of the gradient out of which nine cubic feet of sand had been taken. In some places the grade is almost 1 in 6.

The driver then turned the vehicle off the road and crossed two ditches and a borrow pit in loose sand without any difficulty. It was noticed that the mechanical construction of the caterpillars enabled them to conform exactly to the profile of the narrow ditches.

The Morris-Oxford engine, while obviously underpowered for this class of work, put up a very good performance, and the load could probably have been increased by a further 10 per cent. without stalling the engine.

With the bigger engine which is to be installed shortly all difficulties as to adequate power to operate the vehicle should be overcome.

The trailer drawn by this vehicle possesses remarkable self-tracking properties, and while travelling around the sharpest corners on the road it was found that the trailer wheels never deviated more than 6 inches from the centre of the caterpillar tracks. Of course the present trailer, being about 10 feet long over all, is too short for pipe transport, but the features which render it so successful in conforming to the path of the caterpillars could probably be embodied in a trailer with a longer wheel-base.

The manufacturers of this trailer are the Haulage Improvement Construction Company, Limited, Granville House, Arundel Street, Strand, W.C. The self-tracking effect appears to be due not to any mechanism but solely to the varying compression of the two springs, one on each side of the centre line of the vehicle, which are affected by the pull of the drawbar.

On 8th March, the tractor and trailer having been brought into Mombasa, it was decided to examine the track and its operating mechanism for signs of wear, as it was thought that this might prove excessive owing to the considerable quantities of sand thrown about by the track. A pin connecting two links of the track was chosen at random and punched out. No signs of wear were visible on either the pin or its bushing, although it is claimed that the machine has already covered 800 miles

since its arrival in East Africa. The oil in these flexible joints is apparently successful in keeping sand and dirt out. This pin is being despatched to you under separate cover.

The wear on the sprockets, teeth, idlers, &c., may be considered negligible.

Although the Morris-Oxford engine is admittedly underpowered for this work, and much of the travelling had to be done on the lowest gear, the cooling water does not boil, as a large fan has been substituted for that originally used.

These tests unfortunately only apply to dry weather conditions, but with the very light bearing pressures imposed by the driving caterpillars it is improbable that trouble would be encountered in the rainy season. The steering is exceptionally easy. The "Roadless" track is very flexible and gives one the impression of a sound engineering job.

In connection with the trailer it is suggested that, under the conditions for this work, wide iron wheels might be substituted for pneumatic tyres on the trailer, or trailing wheels, if a six-wheeler is used, as running costs would be reduced, greater bearing area would be available, and tractive resistance would probably be reduced.

P.W.D.

March, 1926.

Sub-Annex 4.

Report on Morris Roadless Lorry over Wet "Black Cotton Soil."

On 16th May the new lorry with 15.9 h.p. (R.A.C. rating) engine was delivered in Nairobi and was given a preliminary run on the Athi River road on the following day. The engine was not properly tuned for altitude, but no difficulty whatever was experienced in travelling through soft patches on this road. These patches numbered over twenty, and I consider that each and every one of them was impassable to the ordinary motor-car with chains. Two drifts, the bottoms of which were of liquid mud of uncertain depth, were negotiated with comparative ease, one without any spuds being fixed, and the other with one spud on each track. The depth to which the tracks sank was about fifteen inches.

After leaving the second drift, the lorry was turned over the "black cotton" veldt, which was in a thoroughly wet condition. The track left by the vehicle was barely an inch deep.

It is worth mentioning here that engine makers do not seem to appreciate the necessity for special tuning for altitudes. In the case of vehicles sent for test to a country such as this, the subject should have more attention and a full range of carburettor jets and choke tubes should be sent where the correct

ones are not previously known. In this case the want of tune on the first trial prevented a better test being carried out.

I tried the vehicle again when the tuning had been carried out. On this occasion a speed of 20 miles per hour over rough roads on the level, with a load of one ton, was easily kept. The radiator boiled to excess on the first trial, but only slightly on the second trial. I am informed that the makers are now prepared to guarantee that no overheating will occur at any altitude, as they have modified the radiator and cooling arrangements still further.

Acting Assistant Director of Public Works.

May, 1926.

Sub-Annex 5.

Comments on the Report on Morris Roadless Lorry.

Running of Machine in Drying Cotton Soil.

The report states that the speed of the machine was 1½ to 2 miles per hour. This is a pardonable error, as speeds are very hard to judge. The actual speed of machine with trailer recorded by the speedometer was 5 to 6 miles per hour. This would no doubt have been in the region of 10 miles per hour had the carburettor been fitted with a smaller choke tube and jet, suitable for the altitude we were running at.

Regarding the stiffening of the track due to soil adhering to the outside, and the intrusion of soil into the unit, thereby causing loss of efficiency, I should like to correct this report in one or two details. The report states that the track unit was cleaned, and one man was then able to push the machine. Only the soil adhering to the outside of the track was cleaned off, the soil in the unit was not removed, so it will be seen that the intrusion of soil into the unit contributed but a little to the loss of efficiency of the machine. I have since carried out tests both in black cotton soil and red soil when in a drying condition, and by the use of a very simple scrape I find that the external part of the track can be made self cleaning, so removing a defect which reduced the efficiency of the machine. By alteration to the driving sprockets, allowing larger mud scrapes, removing the ribs between the teeth, and altering the silencing rings, the tendency for the track to ride out of mesh was reduced to a minimum.

Since this test took place, I have been informed by the patentees of the track unit, Roadless Traction, Limited, that they have produced a new type of sprocket which will obviate the packing of soil in the teeth and in the recess between each tooth, and that any soil that gets on to the path when the bogies run will not cause the teeth of the track to come out of mesh.

On this new type of sprocket the teeth are open at the bottom as also is the recess between each tooth, so that any soil that is between the track and the sprocket must pass through without interfering with the pitch or causing the teeth to come out of mesh.

The report states that when the soil was cleaned from the track unit the track showed three inches of sag. The report is quite correct regarding the sag, but not the cause. These tracks, when correctly adjusted, have a sag of 1½ to 2 inches, so in this case there was roughly one inch of sag in excess of what is allowed. The sag in the track was noticed after running on dry soil for about ten miles. This slack in the track I attributed to the idler wheels, which are used to adjust the track to the correct tension, slacking themselves back owing to the spindles which hold them in position not being sufficiently tight. The soil which got into the idler wheels in no way interfered with or reduced the efficiency of the machine. It meant that one carried 15 to 20 lb. more on the machine. This will be obviated on future machines. The machine has since been tested on sand and in wet black cotton soil, when it was in probably its worst condition and was able to negotiate either in a very satisfactory way.

The new larger power unit has been tried out here under very severe conditions, and found to be very satisfactory. The cooling in future will be adequate under any conditions. From the foregoing comment, it will be seen that defects in the first machine have been noted, and the machines now being produced will be free from these and will operate satisfactorily under the most severe conditions.

C. SKELTON.

June, 1926.

APPENDIX D.

Extract from a despatch from the High Commissioner for 'Iraq to the Secretary of State for the Colonies.

19*th May*, 1926.

* * * * * *

I have the honour to transmit for your information the enclosed copies of correspondence, in which details are given of the experimental use of Citroen Kegresse vehicles in this country.

As you will observe, these vehicles have not yet been used in this country to any great extent, but the information

so far obtained is sufficient to show that they are well adapted for use in 'Iraq in the rainy season.

* * * * * *

H. DOBBS.
High Commissioner for 'Iraq.

ANNEX 1.

Extract from a Memorandum dated 29th April, 1926, from Air Headquarters, Baghdad, to the Secretary to His Excellency the High Commissioner, Baghdad.

Caterpillar Track Vehicles.

* * * * * *

1. A Citroen Kegresse has been undergoing tests with the Shergat-Mosul Convoy throughout the recent winter.

2. Mileage with the Convoy Section to 1st April, 1926, was 1,014 miles, but this vehicle has seen a certain amount of previous service.

3. The Kegresse tracks are easily penetrated and damaged by flints on metal roads, and except in emergency it is not used on such surfaces.

4. During the recent wet season this vehicle has accomplished trips up to 40 miles, when the conditions were such that the journey could not be accomplished by a Ford with certainty.

5. It has, on numerous occasions, retrieved badly bogged Ford cars and Ford ton trucks.

6. On one occasion it retrieved a Leyland lorry which was unapproachable by other vehicles.

7. It has never itself been " bogged " or incapable of extricating itself.

8. Its performance is excellent in very soft sand. In the case of an aeroplane which had crashed on very soft sand this vehicle was able to tow it to hard ground when no other method of moving it was possible.

* * * * * *

ANNEX 2.

Extract from a letter dated 7th May, 1926, from the Managing Director, Cotterell and Greig, Limited, Baghdad, to the Under-Secretary to His Excellency the High Commissioner for 'Iraq, Baghdad.

Roadless Traction.

* * * * * *

I have to state that to the best of my knowledge no type of trackless transport has been employed here with the exception of Holt Caterpillar Tractors and Bullock ditto. These were imported by the British Army during the war, and on account of their ponderousness and heavy fuel consumption may be ruled out from the point of view of economical transport.

The only "half-track" type of transport so far introduced into 'Iraq is the Citroen Kegresse. This consists of a Kegresse attachment to an ordinary type of touring car.

When the Nairn Transport was held up last winter by heavy rains about 50 miles outside Ramadi, this Citroen Kegresse was chartered by the Nairn Agents to proceed to the convoy's assistance and to bring in the mails. I am reliably informed that it successfully negotiated, on low speed, most of the distance between Baghdad and Ramadi, and only came to a standstill owing to some fault in the gearbox. At this time no other cars were able to proceed, and there is no doubt that the road conditions at that time were appalling.

I understand that the road track was completely obliterated by mud and water and that the driver made no serious attempt to keep to the road, but simply made his way in the direction of Ramadi, clearing obstacles as best he could. Despite the breakdown alluded to above, I consider that this incident demonstrates the all-round utility of the half-track vehicle in this country.

We ourselves have carried out a great deal of transport work with Fordson tractors, but to date these have been entirely confined to tractors with four wheels. From the performance of these vehicles on the roads, we have come to the conclusion that they are not entirely suitable for traction on heavy sand, neither are they suitable for hill climbing except in dry weather.

* * * * * *

APPENDIX E.

Notes on some Characteristics of the War Department Type Rigid-Frame Six-Wheeled Vehicles.

It has been the aim of the War Department since the war to encourage designs of load-carrying vehicles suitable for war,

which would also be suitable for commercial production and employment.

One of the main desiderata is that such vehicles, without undue detriment to their road performance, shall have a considerable ability to travel "off the road" or on very bad roads. The rigid-frame six-wheeler appeared to present a suitable line of investigation.

For some years the Experimental Branch of the R.A.S.C. has been carrying out examination of the many six-wheel designs, and exhaustive trials with a Renault six-wheeler of the well-known Trans-Sahara type.

The conclusions arrived at were that, apart from the general desiderata, such as light weight, strength, use of standard units, &c., the salient points on which the successful performances of the six-wheeler depend are :—

(*a*) That the suspension of the driving axles should be such that, under all conditions of tractive effort, the weight of all four driving wheels on the ground shall remain equal.

(*b*) That the suspension shall also permit of free articulation of the driving axles, within as wide limits as is practicable, in such a manner that the springs are not twisted, nor the equal weight distribution over the four driving wheels disturbed. This enables the wheels to conform to rough ground without affecting the drive and whilst causing a minimum of chassis displacement and distortion.

(*c*) That a high tractive effort is required, and should be obtained, rather by gearing down a moderate-sized engine than by provision of a very large engine.

(*d*) That a low intensity of pressure between driving wheels and the ground is required to reduce sinkage and some form of non-skid to enable sufficient adhesion to be obtained to make full use of the high tractive effort provided, when travelling over soft or friable ground.

It was found that no existing designs complied entirely with (*a*), (*b*), and (*d*).

Suspension.—A new design was therefore prepared for the suspension. This design, patented by the War Department, has given excellent results, and the principle is incorporated in the vehicles now being developed.

Transmission.—In addition to a normal four-speed and reverse gearbox, a two-speed reducing gear is incorporated. There are thus provided four speeds and reverse of a normal order for use when running on roads, or good going, and four speeds and reverse of a much lower order to produce the high tractive effort required for negotiating soft or rough going and steep gradients.

Tyres.—The vehicle is equipped with heavy straight-sided pneumatic tyres. When liable for difficult cross-country work, the four driving wheels are equipped with two tyres each, thus increasing the area of ground contact and enabling use to be made of the overall chain. Standard :—32 inch x 4½ inch tyres for " light " and 36 inch x 6 inch for " medium " six-wheelers.

Overall Non-skid Chain.—A form of chain has been evolved which can be fitted quickly round the two driving wheels on each side, and materially increases the cross-country ability of the vehicle by reducing sinkage and increasing adhesion.

It is simple and inexpensive, and only a few minutes are required to fit or remove a pair. It is not dependent on any particular degree of tension for its operation, and, since the pitch of the links is immaterial (no sprockets), the limit of wear is to complete wearing out of the pins. It is doubtless capable of further improvement in regard to details of construction, weight, &c., but has given such results under most strenuous test as to warrant faith in its application to enable wheeled vehicles to cope with more difficult " going " than would otherwise be possible. The use of the chain is only called for when conditions of " going " are very bad.

Size of Vehicle.—The vehicles are developing in two general sizes :—

W.D. " Light " carries 30 cwt. on road : 20 cwt. across country. Price £450—£600.

W.D. " Medium " carries 60 cwt. on road : 40 cwt. across country. Price £650—£850.

N.B.—These W.D. loadings do not represent the maximum practical useful loads for all different makes in each class.

War Department Subsidy.—The War Department subsidy of £40 a year for three years is now payable to owners in the United Kingdom of " medium " War Department type six-wheeled vehicles of approved makes and types.

Summary.—The vehicle gives a cross-country performance far superior to that of the four-wheeler.

This advantage of the greatest military value is accompanied by an increase in roadworthiness which must appeal to the commercial user in that :—

(*a*) Heavier useful loads can be carried for a given unladen weight and engine power, due to reduced rolling and impact resistances, and elimination of wheel spin ;

(*b*) For the same reasons fuel consumption is low ;

(*c*) Tyre wear is reduced due to elimination of wheel spin ;

(*d*) Since axle loads are light, pneumatic tyres of reasonable size can be employed;

(*e*) Smoother riding is attained, with advantages in regard to the load carried, and the wear and tear of the vehicle (only one-half of the movement of the rear wheels due to road inequalities is transmitted to the frame irrespective of spring action);

(*f*) Skidding is practically eliminated, while the braking qualities of the vehicle are vastly improved; thus the vehicle can be driven much faster with safety;

(*g*) Damage to the road surface is materially reduced in respect of weight, impact, and abrasion.

A considerable development of this type of vehicle, suitable for both the War and other Government Departments as well as for the commercial user, seems probable. The vehicles should have a great appeal for use in the Dominions and Colonies. Already a considerable number of machines, both "Medium" and "Light," are in use abroad by the Sudan Government, the Indian Army, the British Army in Egypt, the South African Railways, and by numerous owners in other parts of the Empire.

Makers.

Light.	*Medium.*
Morris Commercial Cars, Ltd.	J. I. Thornycroft and Company, Limited.
Vulcan Motor and Engineering Company, Ltd.	Guy Motors, Limited.
*Crossley Motors, Limited.	Karrier Motors, Limited.
	Leyland Motors, Limited.
	Albion Motor Car Company, Limited.
	Crossley Motors, Limited.
	*Halley Motors, Limited.
	*Vulcan Motor and Engineering Company, Limited.

ANNEX.

Notes on "Hathi" (Mark II) Four-wheel Drive Tractor.

This tractor has been produced by Messrs. J. I. Thornycroft and Company, Limited, to War Department specification.

It is economical to run for rapid haulage of heavy loads over most types of ground, being capable of exerting a great drawbar pull.

---

* In various stages of design and experimental production, and not yet finally tried out by War Department

It is fitted with six forward and two reverse speeds, and a power-driven winding gear (with automatic laying-on device) carrying 500 feet of wire rope with which it can pull itself and its load up extreme gradients, &c. :—

Average speed (on road), 15-20 m.p.h.
Average speed (across country), 8-10 m.p.h.
Weight ready for road, 5 tons 4 cwt.
Engine, 6-cylinder water-cooled, 54.12 h.p. (Treasury rating).
Load hauled (on road), 10 tons.
Load hauled (across country), 5-7 tons.
Maximum drawbar pull, 9,300 lb.
Maximum rope pull, 7 tons.

(B).—RECENT DEVELOPMENTS IN MECHANICAL TRANSPORT SUITABLE FOR USE IN TROPICAL DEPENDENCIES.

MEMORANDUM BY THE MECHANICAL TRANSPORT SUB-COMMITTEE OF THE EMPIRE COTTON GROWING CORPORATION.

Mr. G. H. Baillie.
Mr. R. H. Brackenbury.
Colonel C. N. French.

The formation of the E.C.G.C. Mechanical Transport Sub-Committee.

In March, 1924, the Executive Committee of the Corporation, realising that there were large areas in Tropical Africa excluded from cotton growing for lack of transport, appointed the above Sub-Committee to investigate and report on the best and cheapest form of mechanical transport (other than railways) for carrying cotton and its rotational crops. Since that time the Sub-Committee have been engaged in collecting information about local conditions, fuels other than petrol, and different types of vehicles and their effect upon roads, and have run some new types of vehicles in England and Nigeria to ascertain their possibilities.

This Memorandum embodies the results of the Sub-Committee's work and their conclusions under the following heads :—

(*a*) The present position of transport in Tropical Africa and the need for its development.

(*b*) The Sub-Committee's tests and their conclusions.

(*c*) Recommendations for the development of transport and future investigation and experiment.

(*d*) Suggestions for continuing the work initiated by the Sub-Committee.

ANNEX I.—The problem of Cotton Transport.

ANNEX II.—The Committee's conclusions on roads in Tropical Africa.

ANNEX III.—Performance in soft sand of high and low pressure tyres.

ANNEX IV.—Suction gas producers.

(a) The present position of transport in Tropical Africa and the need for its development.

Cotton Transport.

(1) The problem of cotton transport is dealt with fully in Annex I. Areas that are available and suitable for cotton growing are at present inaccessible for lack of transport. Moreover, as cotton should preferably be grown in rotation with other crops of low price, transport must be available for all kinds of agricultural commodities, and therefore cheap. The problem of cotton transport is, in fact, the problem of African transport generally.

Railways.

(2) A railway is the best and cheapest form of transport, provided that it has enough to carry. When run to capacity in Tropical Africa it can carry produce for about 2*d*. a ton-mile.

(3) At present, for economic reasons, only arterial railways are possible in Tropical Africa. The average distance between them is over 300 miles, and there seems little prospect of this average being reduced.

(4) A railway in these areas develops commercially a strip of country about 50 miles wide on either side of it, but existing means of transport do not permit of development on a substantial scale much beyond this distance. These means of transport are described in paragraph (6). They are becoming more expensive as production increases.

The types of lorry now in use carry produce at about 1*s*. 6*d*. per ton-mile under favourable conditions. For a distance of only 50 miles this amounts to 75*s*. per ton, and for longer distances, up to the 150 miles required, the cost is prohibitive except for high-priced goods.

Main Feeders.

(5) The first essential then is a *main feeder* to drain effectively the inter-railway area and to fill the gap which exists between long railway transport at 2*d*. a ton-mile and short lorry trans-

port at 1*s*. 6*d*. per ton-mile. This must be a form of transport capable of carrying produce at a much lower rate than the existing 2 or 3 ton lorry for a distance of 100-150 miles. To be cheap it must necessarily carry heavy loads and at the same time must not give rise to heavy expenditure on roads.

Minor Feeders.

(6) Such a main feeder could not economically collect produce in small quantities and must be supplied by a system of *minor feeders*. These exist in Africa in the following forms :—

Porters.
Pack animals.
Ox and mule wagons.
Motor lorries on wheels.

Each of these forms of transport has a justifiable economic sphere, but at present all of them are being used outside it, because each is attempting to act as a main feeder.

For small loads porterage is used over considerable distances, but, as wasting labour which could be better employed, should as far as possible be limited to distances of one or two miles, acting only as a subsidiary minor feeder.

Pack animals and ox and mule wagons are available only in certain districts and, excepting camels, do great damage to roads.

Motor lorries on wheels, from 10 cwt. to 3 ton, are now being used to a rapidly increasing extent in Africa for journeys up to 200 miles. Only goods of high value can stand a freight charge of 1*s*. 6*d*. per ton-mile over distances exceeding 50 miles, but at present there is no alternative. The economic range of motor lorries may be put, on the average, at 25 miles for 10 cwt. lorries to 50 miles for 3 ton lorries.

Roads.

(7) The road is an essential part of both main and minor feeders, but roads constructed and maintained as in highly civilised countries are out of the question in Africa. The best that can be expected for many years are superficially metalled roads in the more populous areas and plain earth roads throughout the rest of the continent.

(8) In most Tropical African Colonies, legislation has safeguarded the road by limiting the weight of vehicles to some 3 tons and requiring the use of pneumatic tyres. Up to the present this safeguard has been adequate because there is not sufficient production for the traffic to become intense. Certain roads, however, where traffic has been growing, are showing signs of rapid deterioration, and, if traffic on the present system is allowed to develop, the cost of road maintenance will rise rapidly.

(b) The Sub-Committee's tests and their Conclusions.

(1) *The effect of different forms of transport and vehicles on road surfaces.*

The damage done by a vehicle on a road depends primarily on the pressure per square inch of the tyre or track on the road, and secondarily on the speed.

At a pressure of 12 lb. per square inch a rubber tyre or a track will actually improve an earth road, but so low a pressure is at present impracticable with wheeled vehicles.

A pressure of 25 lb. per square inch is, however, practicable with the present type of semi-balloon tyres, but large tyres are needed to carry heavy loads. Thus, with 6-inch tyres, the limiting weights for this pressure are 1 to 1½ tons for a four-wheeled vehicle, to 3 tons for a six-wheeled vehicle with twin wheels on the two back axles.

Roads with lightly metalled surfaces will, the Sub-Committee believe, withstand intensive traffic, provided the pressure is kept down to about 25 lb. per square inch and high speeds avoided. Earth roads, under the same conditions, will not withstand more than a light traffic.

At present, lorry tyres are used with a pressure of some 90 lb. per square inch. Such high-pressure tyres are little better than solid ones in their effect on roads. If the practice be continued, the Colonies will find themselves faced with a ruinous expenditure on road maintenance wherever the traffic becomes intense.

Experiments have recently been made in the Sudan with two six-wheeled lorries, one with 100 lb. and the other with 20-30 lb. pressure in the tyres. Both in performance of the lorry and in the effect on the surface, whether soft sand or rough black cotton soil, the low-pressure tyres showed to advantage. (See Annex III.)

Research, however, is needed to ascertain the best diameter and pressure of tyres in relation to economical running on the one hand and damage to road surfaces on the other hand; also on the effect of tropical climates on rubber tyres.

Another point which requires investigation is the speed at which both wheeled and track vehicles can travel without seriously damaging African roads. It is clear that a high speed is desirable from the purely economic point of view of transport, but, to the road maker and the local Administration, whose point of view is that the effect of vehicles on roads is little if at all less important than the effect of roads on vehicles, a low speed is essential, being far less damaging than a high one to the road surface. The Sub-Committee are of opinion that the present high speeds of wheeled lorries will have to be reduced by some form of " speed governor," which will come into operation in accordance with speed on the road and not with engine speed. With such a governor vehicles would have their full power available on their lower gears.

(2) *The Sub-Committee's tests on vehicles.*

The first experiments made by the Sub-Committee were on two types of "half-track" vehicles, one with a Kegresse rubber track and the other with a Roadless Traction flexible metal track. These lorries ranged in size from 1 to 2½ tonners.

These types were selected because the pressure per square inch of their tracks on the road was very low and their tractive effort high, and it was anticipated that they could traverse soft ground without doing damage to the surface, while hauling heavier loads than wheeled vehicles of equal power. These half-track lorries were, however, practically untried and they were sent out to Nigeria to test the principle of the half-track, and with no idea of their competing commercially with wheeled lorries of the same small capacity. The Sub-Committee believed that, once the principle of the track itself was proved and its mechanical details perfected, the development of a half-track vehicle of economic type and size would soon follow.

It was found that these vehicles were entirely satisfactory in their effect on road surfaces, and an earth road was improved by them instead of being damaged. A year's experience has revealed various weak points in their design and construction, which have now been altered and the vehicles are running well. It is too soon to say that all troubles have been overcome, but the Sub-Committee are satisfied that only time and experience are needed to make them as reliable as wheeled vehicles.

The trials show that an ordinary 2½-ton lorry chassis fitted with a half-track and drawing a trailer will take a normal load of 5 tons at 15 miles an hour on earth roads and will improve the road surface.

The Sub-Committee incline, however, to the opinion that, for loads up to 5 tons, four and six-wheeled vehicles on low pressure pneumatic tyres are the best means for transport. For higher loads half-track and full-track vehicles or tractors drawing trailers are preferable to wheeled vehicles, and are, at present, the only practicable means of transport on African roads.

(3) *Investigation of the form of transport which can operate as a main feeder.*

In the case of the metal-track vehicles, difficulties of construction diminish as the size is increased. A tractor has actually been built with a haulage capacity of 20-25 tons, and one to haul 100 tons has been designed. Whatever the size, the pressure per square inch on the road can be kept to a value of about 12 lb. It is believed also that the Kegresse tractor is susceptible of considerable increase in size.

The Sub-Committee believe that the track tractor with a haulage capacity of not less than 20 tons and preferably of 50 tons or more can meet the requirements of a main feeder as discussed above. With an average load of 50 per cent. of its capacity a 50-ton tractor with its trailers should be able to carry goods at 4*d*. to 6*d*. per ton-mile. It could use earth roads without doing

them damage, and has the great advantage over a branch railway that it can vary its course to meet traffic needs. Though such a tractor would require permanent and expensive bridges over deep water, such bridges would be few in number because this road train will be able to go through 3 feet of water.

The minor feeders to this main feeder could be the existing forms of transport, but in many cases there should be scope for half-track tractors hauling 5 to 20 tons at a lower rate per ton mile than that of 3-ton wheeled lorries.

(4) *Search for a cheaper fuel than petrol.*

The high cost of petrol in many cotton-growing areas induced the Sub-Committee to investigate cheaper alternative fuels.

Alcohol.—Alcohol is now made and sold as a motor fuel both in Natal and in Uganda. Exact facts are therefore available. It is not a business proposition to construct a factory for the manufacture of alcohol only. It can be and is produced economically as a by-product in the manufacture of sugar. The cost even so is high, probably about 2*s*. a gallon. It can be used successfully in the standard type of petrol engine with very little, if any, modification of the carburettor. Seeing that the economical exploitation of this fuel in Africa has already been effectively taken in hand by the sugar manufacturers and that, even under the best conditions, the price is high, the Committee on Transport confined their enquiry to a collection of the essential facts while preserving an open mind in regard to possible future developments of alcohol as a motor fuel.

Producer Gas.—Producer gas from charcoal, anthracite, or wood is the most promising alternative to petrol. It can reduce the fuel cost to about one-fifteenth that of petrol, and, the raw material being charcoal or wood, it would be a home-produced fuel. Charcoal is obtainable throughout the wooded parts of Africa at £1 or £2 a ton. In the Belgian Congo lorries have been run on producer gas for many years.

Its disadvantages are that the producer unit, with fuel, is heavy and bulky, that the engine has to be modified to avoid undue loss of power, and that about twenty minutes is required to start from cold. The weight and bulk are of importance in small vehicles and the delay in starting is of importance when runs are short. For vehicles of 5 tons and over, on runs of 25 miles or over, these defects become insignificant and would not militate against its use on larger vehicles in Africa. In England, however, the saving in cost of petrol is generally too small to outweigh the disadvantages, especially with the lighter types of vehicle, and the principal development can be expected only in the Colonies.

The Sub-Committee, after examining a number of types, acquired a Tulloch-Reading producer and, with the collaboration of Messrs. Guy Motors, had it fitted to a Guy lorry with modified

engine. The preliminary tests were entirely successful, both on anthracite and on native-made Nigerian charcoal, and the lorry has now been doing ordinary commercial work in England for the past six months. (See Annex IV.)

This experiment has now reached the stage when the lorry should be tried under local conditions.

Diesel Engines.—The Diesel type of engine working on crude oil cannot be said to have yet been perfected for road vehicles although extremely efficient and reliable both as a stationary and as a marine engine. Charcoal burning is a native industry in Central Africa whereas crude mineral oil must be imported. Other things being equal, the Committee are inclined to favour an engine consuming a local fuel. Apart from that, however, more mechanical progress has been made in the direction of perfecting an engine, suitable for use in vehicles, of the producer-gas engine type than of the Diesel type. The Committee are watching with the greatest interest the development of the Diesel engine for motor vehicles by such firms as the Avance and Polar-Diesel in Scandinavia, Peugeot-Tartrais in France, and Benz in Germany, but feel that the time is not yet ripe for trials by the Corporation of Diesel engines, though many of the objections would disappear if they were used as prime movers for heavy tractors of slow speeds.

(c) Recommendations for the development of transport and future investigation and experiment.

Tractor as main feeder.

(1) The Sub-Committee consider that the most important step to be taken is to evolve a main feeder transport unit by building a track tractor with trailers with a total capacity of 50 tons, trying it out in England, and then running it commercially in some area of Tropical Africa where there are actual or potential possibilities of production on a fairly large scale, provided that cheap transport is available.

The details of such a tractor train have already been worked out, because a preliminary arrangement was made between the Sudan Government Railway and Roadless Traction Co. to carry out certain transport work in the Sudan by means of a 100-ton track train. To the regret of all concerned, it was decided that the project was not capable of immediate realisation because it was found impossible to guarantee the requisite amount of produce.

Half-Track Vehicles.

(2) The present running of the three half-track vehicles under skilled observation in Nigeria should be continued. Though the Sub-Committee feel that these vehicles are too small for half-tracks, the experience to be gained from them will serve for the larger vehicles which will have their economic sphere.

Six-wheeled Vehicles and Tyres.

(3) A six-wheeled vehicle should be run, also under skilled observation, and should be used for research on the behaviour and running costs of low-pressure tyres of different sizes and with different pressures, and their effect on the road surfaces.

Gas Producers.

(4) The gas producers should be tried on native charcoal under local conditions.

Road Construction.

(5) Road construction and maintenance and different types of bridges, culverts, and fords should be investigated, with reference to the different types of vehicles and tyres.

(d) Suggestions for continuing the work initiated by the Sub-Committee.

The whole of the investigations and experiments carried out by the Sub-Committee have been financed up to the present by the Empire Cotton Growing Corporation. As, however, cotton growing in the Empire is the primary interest of the Corporation, the Committee hardly feels justified in advising them single-handed to finance the research and experiments recommended, important though they are.

Moreover the investigations outlined above not only would depend on the assistance and interest of Administrations on the spot, but are of such a scope that it would be almost imperative to obtain the assistance of various scientific and research bodies in this country, if the best results are to be obtained. Most, if not all of them, seem to be of interest to all tropical territories, and therefore, wherever they are carried out, it is desirable that there should be some machinery which will ensure that the results are given the widest possible circulation.

The Committee are of opinion that, as at present constituted, they are neither sufficiently representative nor financially able to carry out this work. At the same time, they would like to take this opportunity of acknowledging the great assistance they have received during the past three years from both Administrations and individuals, and in particular the valuable co-operation of the Nigerian Government and the Military authorities.

They suggest the establishment of some body which will specialise in the requirements of motor transport in the Tropics, and particularly in Africa; not only in respect of vehicles and their prime movers, but also in regard to roads. Such a body could be in close touch with and collect information from many territories. It could co-ordinate, tabulate, and compare results obtained everywhere; it could initiate tests and experiments and advise local Administrations and make available for their use the information thus gained. It is not suggested, for various

reasons, that this body should be a Government Committee in the strict meaning of the term. On the other hand, it is desirable that the Colonial Office should be represented on it in order to ensure its touch with local Administrations, while representatives of the different territories could be nominated to act as its local advisers and would be invited to get in personal touch with it when on leave. As an example of completely satisfactory relations, those existing between the Sudan Government and the Corporation's Mechanical Transport Committee may be cited. All information is exchanged, and at intervals the technical advisers of the Sudan Government meet the Committee and sit as a common body.

As regards finance, it is suggested that, if this scheme, or a modification of it, is accepted by any Administration, they should make an annual grant, for say a period of three to five years, to finance research and experiments, and that an appeal should be made also for assistance to those bodies and associations in trade that are likely to be interested.

April, 1927.

ANNEX I.

The Problem of Cotton Transport.

(1) Cotton Transport varies in different territories according to local circumstances. It is not necessary to describe in detail the main differences in various areas, but two characteristic examples may serve to illustrate such variations.

In the cotton-growing area of Uganda, where there are many small ginneries in a comparatively limited area and where road making has to a certain extent been facilitated by the absence of transport animals, the growers have hitherto carried their seed cotton on their heads or backs to the nearest market or ginnery over distances which are rarely more than ten miles. From the ginneries the bales have been transported by lorries over a network of excellent roads to the nearest lake port or railway at a cost of 1*s*. to 1*s*. 6*d*. per ton-mile. These methods of transport are showing signs of change. Each year the growers are less ready to carry their cotton to the buying centres and a larger proportion is carried to the markets and ginneries in small lorries, the owners of which charge exorbitant rates ranging from 2*s*. 6*d*. to 6*s*. per ton-mile. Apart from this it is quite open to question whether 1*s*. to 1*s*. 6*d*. per ton-mile is really an economic price from the point of view of the lorry owners, many of whom are natives who overload and overdrive their vehicles, and do not make allowances for a high rate of depreciation.

In Northern Nigeria the areas in which exportable cotton is grown are more scattered than in Uganda, and pack donkeys, camels, and bullocks in large numbers have been in use for many years. Until quite recently there have been few and large

ginneries, and the roads are not as good as those in Uganda. A considerable proportion of cotton is bought in the fields by middlemen, but all exported cotton before it is taken to ginnery has to pass through one of the recognised markets which are controlled and inspected by the Agricultural Department. After purchase at the markets the seed cotton is carried either by motor lorry or by pack animals to the nearest ginnery over distances ranging from ten to seventy miles. The distances over which seed cotton has to be transported by road are therefore far greater than in Uganda, and the expenses of this transport more than counterbalance the cheaper rail and sea freights of Nigerian cotton.

The present tendency in Nigeria is to increase the number of ginneries and to develop motor transport, because otherwise the area in which cotton can be grown is limited by the small carrying capacity of, and delays caused by, the use of pack animals. Quite apart from this the amount of exportable produce has been increasing beyond the capacity of the pack animals available, with the result that the cost of pack transport is increasing to more than economic cost. It should be understood, however, that pack animals still have and probably always will have their uses provided they are employed on short leads over routes which are not fit for motors.

Such examples and such differences could be multiplied. Indeed every cotton-growing area in Africa has its own particular problem which consists in how to combine modern mechanical transport with existing methods of carrying cotton or other agricultural produce. . .

(2) Although the high price of cotton a few years ago made it possible to grow it at a profit in spite of heavy transport charges, such conditions are not likely to obtain permanently. Three years ago the average price of American middling cotton during the season was 17·66*d.*, and as the price of so much of the world's cotton is based on that of American middling the price of African cotton was correspondingly high and the proportion of transport cost was relatively small. To-day, however, while the average price of American middling has fallen to about 7½*d.*, the cost of transport has remained the same or has become a little greater owing to increased production and therefore increased demand for transport. As the actual grower has to bear this cost, or the greater part of it, it is evident that, in cases where the cost of growing can be calculated with any accuracy, the grower has only a very small margin of profit, while in those cases where natives do not and cannot calculate their costs, and can indeed afford to grow cotton when the price of American middling is very low indeed, they are nevertheless discouraged and perturbed, for they cannot understand the fluctuations in price of a commodity which is sold in many of the world's markets. For these reasons alone lower transport costs are essential. It is, of course, impossible to foresee the future fluctuations of cotton prices, but it is to be hoped that, for the sake of the Lancashire industry,

prices will remain not only reasonably low but much steadier than they have been in the years since the war. If they do, and cotton growing in the Empire may do much to stabilise prices by developing cotton fields in many areas which are not all likely simultaneously to be affected by climatic and other conditions, then the transport charges will be of very great importance and cotton will become more and more comparable to other comparatively low-priced agricultural commodities of which some cannot even be exported from Africa at the present time because the cost of moving them is more than they are worth. As an example of what expensive transport means, it was found that in 1925 the growers in the Punjaub were actually being paid more for their seed cotton than were the farmers in Uganda for cotton of much superior quality. This was mainly due to transport, though high ginning charges were also to a certain extent responsible.

(3) If cotton is to be grown successfully, it is almost essential to grow it as a rotational crop, and therefore the transport of other and lower priced rotational crops must be facilitated so that they also can be exported.

This conclusion is based on scientific agricultural opinion and has been confirmed by many reports received by the Corporation since its formation. In some territories, such as Nyasaland, it has become increasingly difficult to grow cotton owing to the attack of insect pests, the depredations of which a sound rotational system of farming can minimise if not eliminate. Transport from that territory is, however, so expensive that the cheaper crops cannot be exported and therefore are not grown, because the local population is not large enough to provide more than a very small internal market.

In Rhodesia, on the other hand, European farmers have found that it is worth their while to grow cotton, even when prices are very low, on account of the much improved yields of maize obtained on land where cotton has been grown the previous year. It is evident, therefore, that the cultivation of cotton in tropical countries is merely one of several farming operations, and that its transport involves that of agricultural commodities in general.

ANNEX II.

The Sub-Committee's Conclusions on Roads in Tropical Africa.

Roads in Africa are and must be of a type that require special vehicles. They are bound to cover great distances because it is economically impossible to cover any part of the continent with a network of railways such as exists in most highly-developed countries, and the gaps between the railways are large. They are also bound to traverse stretches of country which are unproductive and barren, either because the population is sparse, or,

agriculturally speaking, backward, or because there are great stretches of desert which separate potentially productive areas.

For financial reasons the heavily-metalled, perfectly surfaced roads of this country are impossible, and for many years to come roads in Africa must be either unmetalled " earth " ones or lightly-metalled ones surfaced with a thin layer of laterite gravel like the roads of Uganda, which are probably the best in Africa.

It is obvious, therefore, that vehicles evolved for use in highly-industrialised temperate countries are not necessarily serviceable in the Tropics and that vehicles specially designed for tropical conditions can be advantageously used in England

Although roads in the Tropics vary in construction and maintenance to suit local circumstances, almost all the following difficulties have to be considered and overcome :—

(*a*) The scour and erosion caused by tropical rain storms.
(*b*) The vigorous growth of vegetation.
(*c*) The expense of good metalling.
(*d*) The great distances that have to be traversed.
(*e*) The expense of bridging.
(*f*) The damage caused by primitive carts and all transport animals except camels.

During their investigations nothing has impressed the Committee so much as the differences in opinion regarding the best type of road and the most economical method of road construction and maintenance among local experts, and the fact that few had given serious attention to the damaging effect of vehicles and how this could be minimised.

There were some who held that all important roads must be metalled as heavily as possible and built as " all weather " roads. Others held that the native-made earth roads were the best type and that all available money should be spent on making fords passable with " Irish bridges " and on bridging streams and swamps with solid permanent structures capable of carrying very considerable weights. There is a great deal to be said for the latter view because to a large extent it is true that once a road always a road, many modern main thoroughfares in England having been in existence as trackways in prehistoric times. Moreover, in many areas agricultural produce is transported during the dry season and therefore very little transport is moving during the rains.

While the Committee do not feel competent to lay down what is the best type of road for Africa, they offer the following suggestions :—

(1) That where transport animals, except camels, exist in any number they should be made to use a road other than that which is intended for motor vehicles. In this connection it should be pointed out that the excellence of the

roads in Uganda, while reflecting the greatest credit on the Administration and the Public Works Department, is probably in very large measure due to the absence of any kind of transport animals in that Protectorate, and that from the road makers' point of view the tsetse fly is a blessing in disguise.

(2) That high-speed lorries are very destructive to lightly-metalled roads and that a maximum speed of 15 m.p.h. for lorries with loads of more than 1 ton would be quite sufficient.

(3) That road reserves of at least 100 yards in width are desirable so as to prevent encroachments in the shape of buildings, native gardens, etc., close to any road. Such encroachments almost inevitably lead to damage and make future realignments difficult. The principle of road reserves is followed in India with good results.

(4) That what is required even more than a good surface is one that is wide and well drained with ditches at a considerable distance from the actual road.

(5) That gradients, especially where leading to and from fords, should be eased to about 1 in 10.

(6) That there is a great deal to be said for the Irish bridge, especially in areas where there is a sufficient period of dry weather for transport purposes; culverts and small bridges are often the cause of erosion because they tend to concentrate flood water.

(7) That where a bridge is necessary it should be a permanent one capable of carrying even heavy road trains such as are described in this memorandum.

Finally, the Committee recommend most strongly that this question of roads should be treated as being inseparable from that of modern developments in transport vehicles, that the effect of vehicles and traffic generally on roads should be studied, and that it is most desirable to pool and disseminate, not only to technical but to administrative officers, all information about road building and maintenance, experimental types of roads and bridges, and the possibility of standardising the latter.

ANNEX III.

Note by the Director of Mechanical Transport, Sudan, on Performance in Soft Sand of High and Low Pressure Tyres.

Two identical Rigid Six-Wheel Thornycroft lorries carrying two tons each were tried over some small mounds of dry wind-blown sand near Khartoum.

One lorry had the normal pressure, viz., 100 lb. in all tyres, and the second had between 20 and 30 lb. per square inch.

The tyres were all the same, being new 40″ × 8″ Dunlops (high-pressure type).

The lorry with high pressures in the tyres failed as soon as all the wheels got into soft sand. The failure was due to the wheels sinking in and wheel-slip taking place.

The lorry with low pressures in the tyres went over the soft sand easily on the flat and also over small mounds, and only stalled when attempting to climb up the side of a steepish mound. This failure was also due to the wheels sinking in and slipping.

The difference in the depth of impress of the tyre tread was of great interest. The high-pressure tyre always sank so deep that the tread impressions were covered up after the passage of the wheel by the sides of the trough so made falling in. The tread impressions of the low-pressure tyres were perfectly clear cut and sharp on the top of the sand until the limiting point of adhesion was reached and wheel-slip occurred.

Over hard ground the lorry with the low pressures was found to ride easier and there was much less tendency for the front axle to bounce. This latter trouble was particularly noticeable in the high-pressure-tyred lorry when traversing rough cotton soil. The steering of the low-pressure lorry was, however, noticeably heavier and there was naturally some tendency to roll when turning sharply.

It was observed that the pattern on the tread of the tyre appeared to be a definite disadvantage in sand as it allowed the sand to flow away from under the tread. It is considered that a plain square tread would be better, or possibly one with circumferential grooves. The advantages of the grooved tread of the Dunlop type appear very doubtful (for this country) because the condition of a road surface with a thin greasy covering is met with very rarely; the roads or tracks in these parts either being dry or, after rains, forming heavy mud necessitating the use of non-skid chains.

There would therefore appear to be a *primâ facie* case for the development of low-pressure tyres for lorries, such tyres to have plain treads, or at all events treads without transverse grooves or patterns equivalent thereto. Not only will such tyres enable lorries to cross soft sand that would be otherwise impassable, but less damage will be done to earth roads.

There is, however, one very important essential requirement of these low-pressure tyres—they must be as proof against punctures as the high-pressure ones. In small cars, e.g., Fords and Renaults, low-pressure (balloon) tyres have been found very unsatisfactory owing to innumerable punctures. These punctures are produced by thorns and small tree stumps which are very common on all sandy routes in the Sudan. The thorns are not long or strong enough to penetrate through the tread of a high-pressure lorry tyre. Tree stumps do occasionally penetrate, but comparatively rarely.

It is therefore hoped that tyre manufacturers will take up the development of a low-pressure tyre to fulfil the requirements of such countries as the Sudan.

I would add that I am indebted to Colonel Johnson (of the Roadless Traction Co.) for making the suggestion that led to these experiments.

K. M. F. HEDGES,
Director of Mechanical Transport.

20*th February*, 1927.

ANNEX IV.

Suction Gas Producers.

A portable suction gas producer suitable for fitting on a motor lorry generates gas on a small scale by the same method in principle as that used for making gas from coal for lighting a city. Briefly, air is drawn through an incandescent mass of fuel, in this case anthracite or charcoal, in an enclosed chamber. The gas thus formed is sucked through pipes and various cleaning devices to the engine and, having been mixed with several times its own bulk of air, is drawn into the cylinders and exploded in the usual way.

The only advantage that this system has over the ordinary petrol engine is economy. Where suitable fuel is cheap, as in Africa and in some countries of Europe, power can be obtained from a suction gas engine at a fraction of the cost of a petrol engine. For instance, charcoal at £1 per ton provides power at a price which could only be developed by a petrol engine if petrol were 2*d*. a gallon. As petrol in Africa costs 3*s*. and more per gallon, the saving is very marked, particularly where high powers are in question.

In England, with anthracite at £4 per ton, charcoal at £8 or £9 per ton, and petrol at 1*s*. 1*d*. per gallon, the saving is less obvious, especially where only comparatively low engine power is required.

A producer-gas engine has the disadvantage, as against the petrol type, that it cannot be started at a moment's notice from cold. A fire has to be lighted and blown up by hand before the engine can be set in motion. This operation takes perhaps fifteen or twenty minutes. Here again the objection is more felt in England with its short journeys and high-priced labour than in Africa where the distances are great and a native can be given the task of lighting the fire and blowing it up.

The Transport Committee of the Empire Cotton Growing Corporation went exhaustively into the construction of a number of gas producer plants which were recommended for use on

motor lorries. In 1926 the Committee decided in favour of the Tulloch-Reading plant which seemed to have made the most progress towards overcoming the initial difficulties with which the early development of these plants is faced. Such as :—

(*a*) The tendency on a long continuous run to a gradually increasing temperature in the gas which will, unless checked, rise to such a pitch that the value of the gas will be much reduced by combustion before it reaches the engine.

This feature has been turned to advantage in the Tulloch-Reading producer by a simple lever under the driver's control by which a water feed to the combustion chamber is regulated. The heat of the fire turns this water into steam which is drawn with the air through the fire, thus cooling the fire to any required extent and adding at the same time the valuable constituents of the water (oxygen and hydrogen) to the gas. Thus the driver can keep absolute control of the temperature of the gas well within the 200° permissible variation by merely operating a lever on the steering column.

(*b*) Formation of tar, a natural by-product of combustion of anthracite or charcoal. The effect of tar in engine cylinders is disastrous. This evil can, however, be eliminated by drawing the gas through the centre of the fire; the tar is thus completely consumed or "cracked" into its elements and disappears.

(*c*) Soot and grit passing with the gas into the engine. Filters, or scrubbers, for the gas are provided in the form of hollow cylinders packed with wood wool which effectively trap any particles of solid matter carried over by the gas. These scrubbers are made with quickly detachable heads in an accessible position in order that changing the filtering material may be neither a laborious nor a disagreeable operation.

Finally, the type of engine which operates best on producer gas is not identically the same as the type which operates best on petrol gas. The compression in the former should be higher and the speed of travel of the gases should be slower in order to get the best results. Even under these conditions a producer-gas engine will develop about 20 per cent. less power than a petrol engine of the same cylinder capacity. In the opinion of the Committee it is not satisfactory to attempt to put a producer-gas plant into a standard chassis with a standard petrol engine. The required modifications are, however, not fundamental. It is usually possible to fit an engine of 20 per cent. greater cylinder capacity into a standard chassis, particularly if the stroke has been lengthened. Increased compression means a redesigned cylinder head. Slower gas speed calls for larger valves or a longer lift.

In the latter part of 1926 the Empire Cotton Growing Corporation and Messrs. Guy Motors, Ltd., of Wolverhampton, came to an arrangement to carry out tests jointly on a Tulloch-Reading producer-gas plant mounted in a standard 2½-ton Guy four-wheeled lorry chassis but fitted with an engine 4¼-inch bore by 5½-inch stroke with the head modified to give higher compression and the valves a longer lift than in the standard engine 4-inch bore by 5½-inch stroke.

The lorry was first tested on anthracite and, with a load of 2½ tons which gradually diminished to about 2 tons, was run for 1,100 miles. The fuel consumption was 17½ cwt. (1,960 lb.) and the vehicle would do from 27 to 30 miles an hour. There was only one involuntary stop and that was due to the tube of the vapouriser becoming unwelded. For the first 600-700 miles the vehicle was driven by Mr. Reading; the last 500 miles by one of the works drivers, who reported that there was no difficulty in controlling the vehicle when running on gas. Except that it was necessary to adjust the air-control lever whenever an appreciable change of engine speed took place, the driver noticed little difference between this and a petrol-driven vehicle. The acceleration seemed to be about the same and on top gear it would run as slowly on gas as on petrol. The actual power was, of course, less than on the petrol-driven model. Exactly how much less has yet to be ascertained.

The engine was not touched or opened up until 1,100 miles had been run. It was then found to be in a satisfactory state, hardly distinguishable from an engine which had been run similarly on petrol.

Oil from the crank case was submitted to analysis. 2½ gallons had been added in the course of running. The oil was tested by the works chemist for viscosity, water content, and foreign matter. The viscosity was unimpaired. There was a slight trace of water, traces of foreign matter, and no acidity. These results are considered to be entirely satisfactory.

Preliminary tests on charcoal, sent for the purpose from Nigeria, show that more power is obtainable from gas generated from this fuel than from anthracite. These tests have not yet been concluded, but the latest report from Messrs. Guy is to the effect that, in the hands of an unmechanical and not particularly skilled driver, the vehicle has behaved quite satisfactorily and that, with a load of 2½ to 3 tons, the consumption of charcoal on hard roads is 2 lb. per mile.

(C)—REPORT OF COMMITTEE ON MECHANICAL TRANSPORT.

The Committee was appointed in accordance with the decision taken at the 11th Meeting of the Conference, with the following terms of reference:—

> "To frame and submit to the Conference a scheme for the establishment and financing of a Committee to carry further

the necessary investigations into, and improvement of, new forms of mechanical transport, with a view to their adaptation to the requirements of undeveloped tropical territories.''

The Committee was constituted as follows :—

Brig.-General Sir Gordon Guggisberg, K.C.M.G., D.S.O. (*Chairman*).
Brig.-General Sir Joseph Byrne, K.B.E., C.B.
Brig.-General F. D. Hammond, C.B.E., D.S.O.
Colonel S. C. Peck, C.B., D.S.O.
Mr. R. S. D. Rankine, C.M.G.
Lieut.-Colonel J. F. H. Carmichael, C.M.G., C.B.E.
Mr. R. H. Brackenbury.

Mr. G. E. J. Gent, D.S.O., M.C. } *Joint*
Mr. W. E. Hogg. } *Secretaries.*

The Committee has the honour to submit the following recommendations :—

1. That a Council entitled '' The Council for Mechanical Transport in the Colonies '' be appointed to control the necessary investigations into, and improvements of, new forms of mechanical transport with a view to their adaptation to the requirements of undeveloped tropical territories.

2. That the Council should consist of the following members :—

A Chairman to be nominated by the Secretary of State,
A representative of the Colonial Office,
A representative of the Crown Agents,
A representative of the War Office,
Mr. R. H. Brackenbury,
Mr. G. H. Baillie,
Brig.-General F. D. Hammond, C.B.E., D.S.O.,

And that the Empire Marketing Board, the Sudan Government Railways, and the Empire Cotton Growing Corporation should each be invited to nominate a representative to the Council.

3. That the Council should have power to co-opt such other members as may be advisable, due regard being paid to the desirability of securing the co-operation of such bodies as the Institutions of Civil, Mechanical, and Automobile Engineers.

4. That a Secretary to the Council should be appointed by the Secretary of State.

5. That the Council should be responsible to the Secretary of State for all funds placed at its disposal.

6. That the actual work of investigation and experiment should be carried out by an Executive Committee composed of Experts, who should be appointed by and responsible to the Council.

7. That the Executive Committee should be small and composed of the most suitable and experienced persons available, and that any payments found necessary to secure their services should be regarded as a proper charge on the funds at the Council's disposal.

8. That the investigations and experimental work of ascertaining the most suitable forms of mechanical transport should be undertaken on a considerable scale, both at home and abroad, with a view to results being obtained as early as possible.

9. That an initial sum of £50,000 and thereafter an annual sum of £20,000 should be placed at the disposal of the Council, this annual sum to be re-considered from time to time as may be necessary in the light of future developments.

10. That the Institutions of Civil, Mechanical, and Automobile Engineers, the Empire Cotton Growing Corporation, the Sudan Government Railways, and any commercial or manufacturing concerns interested, should be invited to contribute towards the funds required for the work; and that the Empire Marketing Board should also be invited to make a grant, preferably of a lump sum towards the initial funds needed, and that the balance of the money required should be contributed in proportion to their revenues by those Dependencies likely to benefit from the operations of the Council.

11. That experiments should not be confined to one Colony or area; and that the Colonial Governments contributing to the funds should be prepared to co-operate with the Executive Committee in the work of conducting the local trials necessary to ascertain the suitability of the types of vehicle under experiment in relation to local conditions of road construction and transport. But that, while the actual working of the vehicles and the local carrying out of the experiments should be in the hands of the Executive Committee, their representatives in the Colonies should, for purposes of local administration, be placed under the Government concerned.

12. That the Council should from time to time disseminate to the different Colonial Governments concerned full information as to the progress which is being made in the various experiments undertaken both by the Council and by foreign Governments.

F. G. GUGGISBERG,
CHAIRMAN,
AND ON BEHALF OF THE COMMITTEE.

COLONIAL OFFICE,
21st May, 1927.

APPENDIX XIV.

Wireless Communications, Internal and External, and Broadcasting.

MEMORANDUM PREPARED IN THE COLONIAL OFFICE.

A.—Wireless Telegraphy Communications.

The Imperial Wireless Telegraphy Committee of 1924, appointed to advise on the policy to be adopted as regards the Imperial Wireless Services, recommended that the Expert Wireless Telegraphy Commission should be requested to report on the extent and cost of a wireless system for the Colonies necessary to complete the Empire network of wireless communication. Progress in the application of wireless telegraphy is, however, still so rapid that the formulation of any very definite general scheme would probably be premature at present. The amount of work in connection with wireless telegraphy in the Colonies and Protectorates has not hitherto been extensive. During the last fifteen years about thirty small stations have been erected, involving a capital expenditure in the neighbourhood of £100,000. These stations are utilised mainly for local requirements, communication with shipping, &c., but they may be regarded as the preliminary links in the network of inter-Imperial wireless communications which is ultimately to be expected. Laws and regulations governing the administration of wireless telegraphy exist in all Colonies.

B.—Reception Overseas of the Rugby Transmissions.

(1) *Wireless Telegraphy.*

In March, 1926, a Circular despatch was addressed to all Governors, containing information of the new Rugby Station and of the British Official News Service which would be transmitted from it. The Secretary of State asked that the widest possible publicity should be given to this News Service, and that reports should be sent home of the extent to which the messages were received and reproduced in the local Press. With one or two exceptions, the replies indicated that generally the reception of the news, and especially of the noon transmission (G.M.T.), were satisfactory, and, where facilities existed, it was reproduced in the local Press. In some instances a certain element of competition in the latter respect was experienced with the News Service supplied by Reuter. In many cases advice as to the improvement of reception was furnished by the General Post Office, including specifications of types of receiver recommended for Rugby reception, and later reports

from the Colonies concerned showed that such advice has been most fruitful.

It may be mentioned that the handling of the British Official Wireless Service in India is entrusted to Reuter's by arrangement with the Associated Press and Indian News Agency and Press. An application was received from Reuter's at the beginning of last year that the reception and distribution of the Official Rugby News Service should be entrusted to them similarly by the Colonial and Protectorate Administrations in the Far East, and, in due course, elsewhere in the Empire. It was, however, pointed out to them that as these messages were addressed " C.Q.", indicating that they might be picked up by any station and published without payment, it would not be possible for exclusive rights of distribution in any particular country to be accorded to them. No objection appeared, however, to Reuter's making such arrangements as they could with Colonial Governments to provide for the systematic reception and distribution locally of the News Service without prejudice to the freedom of the authorities to come to similar arrangements with any other news agencies which might desire them.

Recently, Marconi's Wireless Telegraph Company have approached the Colonial Office in the matter of a new type of receiving apparatus which was recently developed and designed by them, and which, according to the claims made for it, could be relied on to give a satisfactory reception of Rugby transmissions in any of the Colonies. The reduced price of this complete set is rather over £200. Demonstrations of its performance have, it is understood, been made before technical representatives of the Home Government and the Crown Agents, who are stated to have been fully satisfied of its value, and, on the recommendation of the Crown Agents, receivers of this type have been purchased by the Governments of Zanzibar, the Bahamas, and the Straits Settlements.

In June last year the Postmaster-General asked for the cooperation of the Governments of the Straits Settlements, Hong Kong, and Kenya to be invited in tests with this country of the short-wave system for long distance wireless telegraphy. It was explained that the laws governing the propagation of waves below 100 metres were still the subject of research, but experience showed that by means of relatively inexpensive low-power stations it was possible to establish communication over great distances for a limited period per diem on certain wave-lengths. Successful experiments with a low-power transmitter installed at Leafield for short-wave transmission to Nova Scotia and Cairo had been carried out, and it was thought that the system might be suitable for wireless communication between this country and certain Colonies. A specification and diagram of a suitable transmitter and receiver for these tests were sent out accordingly to the Governors of the Colonies mentioned Neither Kenya nor Hong Kong were, however, in a position

to participate in the tests, but a most interesting report on experiments at Singapore by the Engineer-Operator of the Paya Lebar Station at Singapore was received. This officer explained that he had been carrying out experiments in short-wave wireless telegraphy since the middle of 1925 on his own receiving set. At first his experiments were only conducted during the night and he found that it was possible to hear stations situated in any part of the world clearly and regularly. Signals from the Government Radio Laboratory at Bandoeng, Java, were so strong that he suggested the inauguration of daylight experiments with Singapore as a result of which it was found that signals could be received at commercial strength throughout the day at Singapore. The Dutch authorities had had no previous reports indicating that signals from their experimental short-wave station were effective at any distance during day-time, and as a result of the experience gained they proceeded to link up the principal towns in the Netherlands East Indies with the short-wave wireless system and also to conduct successful experiments between Java and Holland. Experimental transmitting tests were started in January, 1926, at Paya Lebar Station; the power used was 400 watts alternating current at 300 cycles applied direct to the anode of 1 M.T. 4 valve. The wave-length used was approximately 34 metres, the transmitted signals being of the " tonic train " variety. The aerial was a single vertical wire 27 feet high; the counterpoise was a single horizontal wire 19 feet long. Tests were carried out between 7 a.m. and 6 p.m. on three stated dates, of which an intimation had been sent to a number of short-wave receiving stations. The reports from Java at a distance of 600 miles showed the signals were received with sufficient strength to operate a Morse recorder. From stations 400 miles distant they were received very satisfactorily all day, but were not commercially reliable between 11 a.m. and 4 p.m., a defect which could easily be remedied by a slight increase in power as well as alteration of the transmitter arrangement. From Manila and Hong Kong (1,500 miles distant) it appeared that commercial signals could be received during the night-time with the power and transmitter used.

The Engineer-Operator's conclusion as a result of his experiments was that the short-wave system appeared to have the following advantages over the longer wave system :—

(*a*) Comparative low power required.

(*b*) Greater distance with less power

(*c*) Low cost of installation.

(*d*) Low maintenance cost.

(*e*) No elaborate buildings and high masts necessary for medium ranges.

(*f*) Comparative freedom from atmospheric disturbances

(*g*) Comparative freedom from interference with, and by, other wireless stations.

(*h*) Possibility of diplex-duplex working without having to employ expensive apparatus and separate transmitting and receiving sites.

As an indication of its greater efficiency he mentioned that communication between Singapore and Penang was unreliable with 5,000 watts power on the longer wave-lengths but had been proved by the experiments to be quite satisfactory with 400 watts power on the short-wave system. The adoption of short-wave services between Singapore, Penang, and neighbouring States is now contemplated by the Straits Settlements Government.

It may be added that, although Hong Kong was not in a position to co-operate with the Home Government by transmitting on short wave-lengths, their tests of the reception of short waves by night during the period in question resulted in stations all over the world being heard.

Kenya contemplates being in a position to pick up short-wave transmissions from this country very shortly as soon as the necessary apparatus has been installed in the Colony.

(2) *Wireless Telephony.*

In May, 1926, a Circular despatch was sent to Governors reporting the progress of radio-telephonic communication from Rugby across the Atlantic, and asking that they should co-operate in the experiments which were proceeding by making such local arrangements as were possible for ascertaining the degree of the local reception of these Rugby transmissions. As a result of the replies which were sent home, it seemed that a considerable element of success in picking up the Rugby conversations was obtained only in Gibraltar and the Gold Coast, It is to be noted that in the Gold Coast a greater degree of success was recorded in the case of European and American stations using a short wave-length. The Rugby conversations also appeared to be picked up to a certain degree in the Straits Settlements, British Guiana, and Sierra Leone. In several cases, at the request of the Colonial authorities, the General Post Office furnished advice and specifications of suitable types of receiver. The cost of the type of receiver which they recommended, for instance for the Gambia and Hong Kong, was esti mated to be in the neighbourhood of £1,000.

Although the possibilities of radiotelephony for local communication in, and between, certain Colonies are being examined by the respective Administrations, it would be premature to say that developments have so far taken actual shape in any of the Dependencies. The practical advantages, however, which a system of radio-telephony would possess as compared with communication by cable or land line, especially in undeveloped areas, are not to be questioned.

(C) Broadcasting.

In many of the larger Colonies the stage has been reached in which it is necessary to formulate with care a policy in the matter of broadcasting as a channel of information and a means of entertainment. Colonies have been kept informed of the recent developments in this country which have resulted in the establishment of the British Broadcasting Corporation, and of the terms and conditions on which licences for receiving sets are issued in the United Kingdom. A copy of the Command Paper* containing the drafts of the Royal Charter of Incorporation of the British Broadcasting Corporation, and of the Licence and Agreement with the Corporation, is annexed to this memorandum, and it may also be useful to attach a copy of the Report† of the Broadcasting Committee, 1925, which not only contains the Report of the 1925 Committee, on which the present scheme is based, but also, in Appendix 2, an historical summary of the British Broadcasting Service up to the time of the appointment of the Committee. Under the powers given to him by Section 4 (3) of the Licence, the Postmaster-General has given notice to the British Broadcasting Corporation that he requires it to refrain from broadcasting statements expressing its opinion on matters of public policy, and also speeches and lectures containing statements on topics of political, religious, or industrial controversy.

The total number of receiving licences in force in England and Wales, Scotland, and Northern Ireland, on the 31st March last was approximately 2,264,000.

It is, of course, recognised that the arrangements in this country are not necessarily suitable for adoption in the Colonies, and that broadcasting services in the Colonies, and the conditions on which they can be allowed, must depend upon the varying local conditions and requirements as well as on the facilities available. In the Colonies the lead in introducing a broadcasting scheme was taken by Ceylon in 1924.

Ceylon.—On the occasion of an application by a local firm of engineers and contractors for the issue of a licence with a view to the establishment of one or more broadcasting stations in Ceylon, the Government set up a committee under the chairmanship of the Postmaster-General to consider :—

(*a*) Whether broadcasting should be permitted in Ceylon.

(*b*) Whether the operation of the broadcasting service, if and when established, should be under State or private control.

(*c*) If the latter, whether an unlimited number of licences should be issued, or only one licence to a single broadcasting company.

---

* Cmd. 2756. † Cmd. 2599.

(*d*) Whether a Board should be appointed to control broadcasting, and, if so, how it should be constituted.

The committee reported to the effect that broadcasting under State control, though not necessarily operated by the State, should be permitted in the Colony, that every facility should be accorded to the public, and that for this purpose an unlimited number of licences for listening-in sets should be issued under the local Wireless Telegraph Rules; the committee added a recommendation that a scheme of broadcasting should be undertaken by the Government wireless station at Colombo, and that they were in favour of the appointment of a broadcasting board, with the Postmaster-General as Chairman, and with the following members :—

One member of the Press.
One deputy of the Radio Society of Ceylon.
One representative of the electrical trade.
One deputy of the Chamber of Commerce.
One deputy of the Inspector-General of Police.

Under the Wireless Telegraph Rules in the Colony, licences are required for receiving and transmitting sets, the fee for which is Rs.10 annually. In July, 1924, experimental broadcasting was started from the Government station, and programmes were transmitted twice weekly. Until December, 1925, the broadcasting equipment consisted merely of an improvised set, with a power of about half a kilowatt. The scope of the broadcasting service was gradually extended during 1925 so as to cover news, share prices, &c., in addition to musical programmes. By the end of the year, the number of broadcasting licences was 175; with the inauguration of new plant in December, 1925, it was expected that this number would increase at an accelerated rate. In November, last year, new Wireless Telegraph Regulations were notified which required, among other things, that a receiving set for which a licence for broadcast receiving only had been issued should consist of a standard set of a type approved by the Postmaster-General*, should be used exclusively for the reception of public broadcasting services, should not be used in such a manner as to cause interference with the working of other stations, and would be liable to be taken over or removed by the authorities in case of public emergency.

Straits Settlements.—For the last three or four years, the question of establishing a broadcasting service has engaged the active attention of the Government of the Straits Settlements, and in 1925 the final report of the local Wireless Committee in the Colony was issued. Amongst their other recommendations, this Committee recommended that commercial and other transmitting licences should not be granted to foreigners,

* A similar provision is no longer in force in this country, in view of the large number of home-constructed sets.

and that, in the event of an application being made by a company incorporated in a British Colony or protected State, it should be required that the directors should be British subjects or subjects of a ruler of a Malay State under British protection, and that at least 60 per cent. of the voting power should be in the hands of such subjects. The Committee also recommended that the broadcasting licence should be granted for a term of ten years; on the advice of the General Post Office in this country, the Committee subsequently agreed to reduce this to five years. The present information in the Colonial Office does not indicate that any broadcasting system has yet been put into operation in the Straits Settlements.

In certain other Dependencies, the terms and conditions of the establishment of broadcasting have been, and are at present, engaging the consideration of the Government concerned: for instance, in Hong Kong, Palestine, the Gold Coast, Kenya, Cyprus, and Zanzibar.

Gold Coast.—The question of broadcasting in this Colony was at first made contingent on the development of the Imperial wireless communications, but it is now suggested that broadcasting shall be proceeded with independently. The results obtained in the Gold Coast in the experimental reception of short-wave wireless telephony transmissions from American stations are claimed to justify further development, and, as a first step, a proposal is under consideration to proceed with the erection of a small broadcasting transmitter, at a cost of between £400 and £450, which can later be absorbed in a larger scheme as a relay station. With short waves it is anticipated that such a transmitter would give a range of between 70 and 100 miles for two-valve receiving sets.

Kenya.—The Government of Kenya have recently gone carefully into the possibility of establishing a broadcasting service in that territory, and it is a matter for consideration how far a single broadcasting service can be set up for residents in Kenya, Uganda, Tanganyika Territory, and Zanzibar. A copy is attached* of such parts of the Kenya Wireless Telegraph Rules as deal with (*a*) broadcasting licences, and (*b*) receiving licences. It will be noted that a broadcasting licence is to be valid for a term of five years, and that for a receiving licence for a private residence a fee of 50s. per annum is fixed.

The Kenya Government has now under active consideration an application for a broadcasting licence. The applicant proposed various conditions and terms on which the licence should be granted, and the General Post Office in this country were good enough to give their advice on the more important points concerned, viz.:—

(1) Wave-length. The General Post Office advised that the use of a wave-length between 15 and 100 metres for

---

* Annex I: not printed here.

broadcasting would be a departure from the practice followed generally in this and other European countries. Most broadcasting stations were of wave-lengths within the band of 250 to 500 metres, and commercial wireless receiving sets would be unsuitable without modification for working on the shorter wave-length proposed by the Kenya applicant, a fact which might have the result of increasing the cost of receiving apparatus in the Colony.

(2) Under the terms of the draft licence, the applicant company could apparently not be required to provide a second station in the event of one station proving inadequate, and a licence could not be granted to any other person or body. It appeared desirable, therefore, that some more elastic arrangement should be made either as regards the power of the station, or as regards the rights of the Government to secure the provision of additional stations.

(3) Receiving licence fees. As these were fixed by the Wireless Telegraphy Rules in Kenya and were for collection by the Post Office, no alteration of them by the broadcasting company ought to be allowed without the prior consent of the Government.

(4) The General Post Office also referred to the doubts which had arisen under the terms of the Wireless Telegraphy Act, 1904, in this country as to whether a licence for reception only was necessary, and that it had been found desirable to make clear by a further Act of 1925 that persons using receiving apparatus did require a licence.

(5) At home, the obligation not to interfere with other stations is imposed as a condition of each receiving licence.

COLONIAL OFFICE.
April, 1927.

APPENDIX XV.

Forestry.

MEMORANDUM BY THE TECHNICAL COMMISSIONER FORESTRY COMMISSION.

It appears from the statements furnished to the Empire Forestry Conferences of 1920 and 1923 that there are in the territories with which this Conference is concerned approximately 450,000 square miles of forest, equivalent to 30 per cent. of the total area. The figures are necessarily tentative, but they are accurate enough to indicate that the right usage of the forests

and the realisation of such potentialities as exist are matters worthy of close consideration.

These forests are predominantly tropical and broad-leaved in character and enclose a vast number of species. They are a source of wealth not only in their timbers but also in the numerous materials, such as gums and resins, included in the general term "minor forest produce."

I. The Bases of Forest Policy.

Forest policy is necessarily a part of land policy as a whole. It cannot and ought not to stand alone, but should stand in careful adjustment with other rural industries and with industry in general. In certain cases also, as in Great Britain, forestry may have some bearing on questions such as national defence and land settlement. In formulating land policies there must almost always be competition between agriculture and forestry for certain types of land. It is a reasonable principle that where land is suitable for food production it is better used for that purpose than for forest, but in almost all countries there are border-line types which are of poor agricultural but of excellent forest value. Cases in point are large areas of rough grazing land in Great Britain and land devoted to shifting cultivation in tropical countries. It is also possible under certain circumstances for agriculture to over-reach itself and, by appropriating for rudimentary cultivation an excessive proportion of the land, to reduce the total production of food materials.

On the other hand, forestry is one of the handmaidens of industry. Modern civilisation makes more and more use of forest products, whether timber, derivatives of wood, or minor produce. Great Britain to-day uses *per capita* approximately three times the quantity of wood and timber she did one hundred years ago. This close connection between industry and forestry ought not to be forgotten in determining Colonial forest policies. With increased populations, consequent on settled conditions and the advance of medical science, with better education, and with developments in mining and manufacturing, there are bound to come demands for more timber, more fuel, more paper, and so on. Time is the essence of forestry and results are often slow. Demands, therefore, have often to be anticipated and provided for long before they occur.

Broadly the objects of forest policy can be summarised under two main heads:—

(1) *Supply and Revenue.*—To provide, against current and prospective demands, adequate supplies of timber, fuel, and minor forest products.

The satisfaction of demands, whether internal or external, may be an important source of revenue.

(2) *Protection.*—To safeguard agriculture and sometimes stream-flow and river navigation.

Forests play an important part in many countries in preventing excessive denudation and in maintaining the conditions under which agricultural crops flourish. The effects of erosion following indiscriminate destruction of forest are often spectacular and the dangers need not be emphasised. It is impossible in a word to deal with the more general relationship between forests, on the one hand, and local climate and water supply on the other, beyond saying that it is of importance, and that, where climate and water supply are apt to fluctuate violently in respect of the conditions required by agricultural crops, corresponding care must be taken in dealing with the forests.

The Determination and Definition of Forest Policy.

For the formulation of a comprehensive forest policy two sets of data are required: first, the nature and quantity of existing resources, and, secondly, the nature and quantity of existing and prospective demands. The former involves a definite stock-taking of the forests; this has been urged by the Empire Forestry Conferences of 1920 and 1923 and some progress has been made. So far as forest products of known merchantability are concerned it is a relatively simple process provided staff are available for the purpose. The difficulty is that many Colonial forest products at present not utilised may yet be found to be merchantable. Ordinary commonsense leads to the conclusion that forests should not be alienated or destroyed until they have been carefully examined. To that extent, at least, forest policy should provide that the forests shall be considered sacrosanct

The assessment of present demands also is relatively easy; the assessment of future demands requires vision and faith in the country's development and, in the case of exporting countries, faith in the march of existing civilisation.* Here again there is a guiding principle in the fact that while it is relatively easy to destroy valuable forests it is often an impossibility or at best a very tedious process to restore them.

It may be objected that such data are vague and unsatisfactory as a basis for permanent policy. This is true to the extent that policy must be a thing of steady growth. It may be modified by significant local and world changes, by the results of research, and so on, but if the plant is well-rooted in the first instance and carefully tended it can be made to respond without violence to all reasonable requirements. Continuity in policy is essential, especially where changes in the higher administration are relatively frequent. Year-to-year changes in the work of the forest service can be met as described later under the heading "Forest Programmes."

* The question of the world's timber supplies is considered briefly in Annex I.

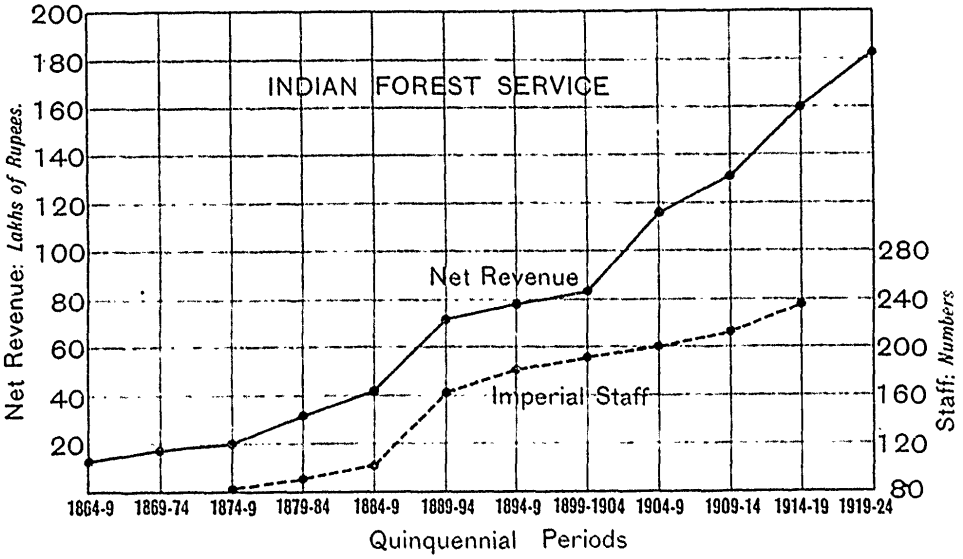
It is a general principle, which has withstood the test of time, that the forest should subserve, first, the essential requirements of the local population, secondly, those of the country as a whole, and, thirdly, external requirements.

When, in fact, a forest policy has been determined it should be promulgated in a form which carries full authority. The forest officer is placed in an impossible position if he has to defend his individual actions by arguing afresh the whole case for forestry; he must be given a firm foundation on which to take his stand.

Forest Finance.

Stability in policy cannot be attained without some measure of stability in financing the forest department. It is not contended that forest finance should be placed on an altogether different basis from that of other departments, or divorced from the current financial position of the country. On the other hand, forestry is a long-range business, the nature of which is not always clearly comprehended, and it is an easy subject for economies which in the long run may prove to be most uneconomical.

It may be of interest here to point out that it pays to put money into the forest. Experience in India aptly illustrates this contention. Beginning with forests which had been devastated by centuries of misuse, the Forest Service has been able to show with every increase in staff and with every increase in working expenditure a corresponding gain in net revenue. The diagram below indicates, for this long-established Department, the relationship between the numbers of the higher technical staff and the net revenue.



A word is necessary about accounting procedure. It is essential, if a fair view is to be obtained of the financial returns from the forests, that the value of free services, whether to

other departments or to private persons, shall be brought to account. The values involved are sometimes quite considerable.

Forest Programmes.

Forest policy must necessarily be defined in general terms and should, therefore, for working purposes be interpreted from time to time into schemes with limited objectives. The procedure adopted in Great Britain, where a 10-year programme was laid down for the period 1919-1929, has much to recommend it.

The programme should state the quantities of work to be done (under the main categories of activities) and the estimated cost of each. The programme should be subject to a " control " which takes account of annual progress and compares the actual with the projected position. The objective is the achievement of blocks of work over a definite period and the year-to-year quantities can be adjusted according to current circumstances.

Although the British programme, which involved an expenditure of £3½ millions, was drawn up in 1917 under difficult conditions, it now, in the eighth year, appears that the main lines of work will be carried out with a quantitative error of not more than 10 per cent., and that the financial estimates will be correct to within 5 per cent.

II. The Execution of Forest Policy.

The Forest Estate.—An important step preliminary to effective forest management is the definition of the status of the individual forests. This process, known in India as " forest settlement," aims at laying down or demarcating the boundaries of the forests and regulating questions such as rights of user. Obviously the task in many cases will call for the collaboration of the administrative and the forest officer, but until it has been completed the latter cannot proceed with any degree of precision to formulate his working plans. When the forest has been " settled " responsibility for working it, within the terms of settlement, should lie wholly with the Forest Department.

The Forest Department.—The constitutional status of the Forest Department must depend on the importance of forestry relatively to other activities of Government. In general, however, it has been found to be a mistake to tie forestry too closely to agriculture. The outlook required for the one and the other is quite different, and in times of stringency it is all too easy to take a short-sighted view with regard to the former. No progress was made with British State forestry until responsibility for progress was definitely placed on an *ad hoc* Commission.

Again, the head of the Forestry Department should be, save on very exceptional occasions, the final adviser of Government on all forestry questions.

The Staff.—Three branches of staff are required for a well-equipped service: the higher or superior technical, the lower or subordinate technical, and the clerical; of these it is sufficient to consider here the two branches of technical staff. In the first stages of development in which Colonial forestry now stands, the higher technical staff is to all intents and purposes the forestry department; as the management of the forests develops, more and better trained lower technical staff will be required. It is almost as important for sound and economical working to have intelligent local supervision as sound direction. While, therefore, the superior staff is rightly trained in Britain, the necessity of training a native staff at some local or regional centre must not be forgotten.

A point which the Conference might perhaps bear in mind is the possibility of securing a greater degree of interchangeability in the superior staffs of the Colonial forest services. It appears to one taking an outside view that the machine composed of the individual services might thus be used more effectively in promoting the development of Colonial forestry as a whole. Nor should the interchangeability be limited to senior officers required to take control of existing Forest Departments or to inaugurate new ones.

Education: Recruitment and Training.—With the establishment of the Imperial Forestry Institute, to which the non-self-governing Colonies and the Forestry Commission have jointly contributed, the machinery for the education and training of forest probationers in Great Britain has been greatly improved. Graduates in forestry from other British Universities as well as from Oxford itself can now be assembled at the Institute and given a final year's course before taking up their appointments. This also admits of specialisation where necessary and of training in methods of forest research. The Institute further provides refresher courses for forest officers at home on leave.

Reference has already been made to the training of subordinate technical officers. This is a matter with which the local Governments must deal either individually or in groups.

The question of recruitment is important. The forestry profession is peculiar in that its members have to look mainly to Government services for employment. This is particularly the case in the non-self-governing Colonies. On the other hand, the qualifications now required in a forest probationer are exacting, not less so in fact than those required in administrative officers. In order to secure a satisfactory flow of recruits, young men and their parents should be provided with some assurance that there will be reasonable prospects of employment at the end of an expensive 4-year University training. Every effort should therefore be made to forecast and make known the probable number of vacancies four to five years in advance. While it may not be possible to forecast the needs of individual

Colonies with minute precision, it ought to be possible to make a reasonably accurate estimate for the services as a whole.

Research.—There is no need to labour the point that research is urgently required in both the main branches of forestry, namely, in the growing and in the utilisation of forest products. It is, however, necessary to note that research cannot be left to forest officers charged with heavy routine duties, that specially trained men are required, and that officers trained and appointed for research, &c., should not be expected to undertake both research and executive work.

One of the initial but still outstanding problems in many of the Colonial forests is the identification of tree species, and, following that, the determination of the properties of the timbers. In the latter connection arrangements have been made by the Department of Scientific and Industrial Research (Forest Products Research Laboratory) and the Imperial Forestry Institute to undertake work of this character in collaboration with Colonial forestry departments. Almost the whole field of research into silviculture and forest management lies untouched. The extensive work of the Indian Forest Department should be of great use to the Colonies, as regards both methods and results, but it is highly undesirable to apply general results wholesale to local conditions. Each Colony or group of Colonies has to work out its own technique, and this can be most economically done with the aid of local research and field experiment.

Much the same considerations apply to the local utilisation of forest products. The Forest Products Research Laboratory in Great Britain can determine the general properties, the best methods of handling, and the probable uses of timbers to be employed in this country, but it cannot give precise data on the same points for the timbers when employed under the altogether different conditions prevailing in the country of origin.

Stress is laid here on the first stages of forest research work, namely, botany, silviculture, and management and utilisation, all of which should come within the routine work of the forest department. Problems of forest protection, involving, for instance, the assistance of the entomologist and the mycologist, have not been overlooked, but it is felt that for the time being the young services will have to be content with such outside aid as can be made available for the investigation of special and urgent matters.

Marketing of Forest Products.—The question of extending the overseas markets for Colonial timbers is of considerable importance.

The possibility of an automatic broadening of markets in connection with world supplies and markets is referred to in Annex I. Bearing in mind the fact that most of the Colonial

timbers are " special purposes " timbers the process of introducing such of them as are new to European or North American markets must be slow. Apart from suitability and price, users have to be satisfied on a number of points such as the amounts periodically available, continuity of supplies, and uniformity in quality.

The process can be speeded up by research such as the Forest Products Research Laboratory is prepared to do, but this is preliminary to the formation of a marketing organisation. In this connection, the experience gained during the last few years by the Forest Research Institute of the Indian Forest Department of Dehra Dun should be of the utmost value. This question is dealt with further in a note (Annex II) by Mr. R. S. Pearson, Director of the Forest Products Research Laboratory.

The Empire Forestry Conference, 1928.

It is desired to say a word on the Third Empire Forestry Conference, which is to be held in Australia and New Zealand in 1928, and to express the hope that it will receive the full support of this Conference, as it has already received the approval of the Imperial Conference, 1926. There is no doubt that the two Empire Forestry Conferences already held have done a very great deal towards promoting a better understanding of the aims and objects of Forestry. Future Conferences will be devoted more and more to the improvement of forestry technique, and it is believed that the contribution which the foresters of the Colonial Services can make and the benefit which they will derive in attending the Conference will amply repay the cost.

R. L. R.

April, 1927.

ANNEX I.

World Timber Supplies.

Timber may be divided into two main classes, softwoods and hardwoods. Softwoods, the product of pines, spruces, and firs, are used for constructional purposes and also provide most of the raw material used in the manufacture of pulp and paper. They are usually light in weight and comparatively easy to work. Hardwoods, on the other hand, although often more durable than softwoods, are for the most part heavy, hard, and difficult to handle. Owing to these characteristics the demand of industrial countries is mainly for softwoods. Great Britain, for example, imports about 9¼ million loads of softwoods annually, but only three-quarters of a million loads of hardwoods. The latter, apart from shipbuilding and railway-wagon construction, are used chiefly in the manufacture of furniture, wainscoting, &c.

In the case of hardwoods it is necessary to make a distinction between those from tropical and those from temperate regions. Although hardwoods from tropical countries include such valuable timbers as teak, mahogany, and greenheart, they are not at present used in such large quantities as oak, ash, chestnut, beech, and other hardwoods from temperate regions.

The principal sources of supply of softwoods are North America, Siberia, and Northern Europe. In North America exploitation is proceeding so rapidly that, taken in conjunction with loss from forest fires and insect pests, the accessible virgin forests will probably be worked out within the next 20 years. At present the United States consumes about half of the world's lumber, and when it has come to an end of its virgin timber resources there is every prospect of severe competition for the world's remaining softwoods. Exports of this class of material from Canada to the United States are very large and constantly increasing. In Siberia and Northern Europe inaccessibility renders a very large part of the forest area valueless; moreover it is estimated that the consumption of softwoods in Europe exceeds the growth by about 3,000 million cubic feet annually.

The world's available hardwood forests are also being seriously depleted. Canada, for example, instead of exporting hardwoods, as was once the case, now requires to import on a considerable scale. In the United States the consumption of hardwoods is about four times greater than the annual growth, while the ravages of the chestnut blight are making further inroads into timber of this class. Only in tropical hardwoods are the world's forests able to show a surplus, and here there seems to be a distinct possibility in many British Colonies of developing utilisation. It appears probable that many tropical countries will be compelled in future to rely more and more on indigenous hardwoods, to take the place of imported coniferous softwoods.

In view of the timber position generally it seems advisable that individual Colonies should immediately take steps to render themselves as far as possible independent of outside sources of supply. Research may be expected to show which of the tropical timbers are likely to prove useful in substitution of softwoods, but it is equally important that forest surveys should be undertaken or completed, so as to ascertain the location and amount of suitable material, and in order to study the best means of transport and similar matters. The question of forest surveys in connection with timber supplies received considerable attention at the Empire Forestry Conferences of 1920 and 1923. Realising the importance of a knowledge of forest resources, the collection of statistics was commenced by the British Forestry Commission in 1920. Enquiry schedules were issued to all forest authorities in the Empire at that time and these included skeleton tables which were successful in ensuring standardised treatment. Quite recently the tables have been revised and re-issued in order to obtain more up-to-date information, which will be laid before the Empire Forestry Conference

of 1928. Emphasis is laid on the necessity of conducting forest surveys, because the results are essential for the formulation of forest policy and as a preliminary to the study of timber supplies both for home use and for export.

ANNEX II.

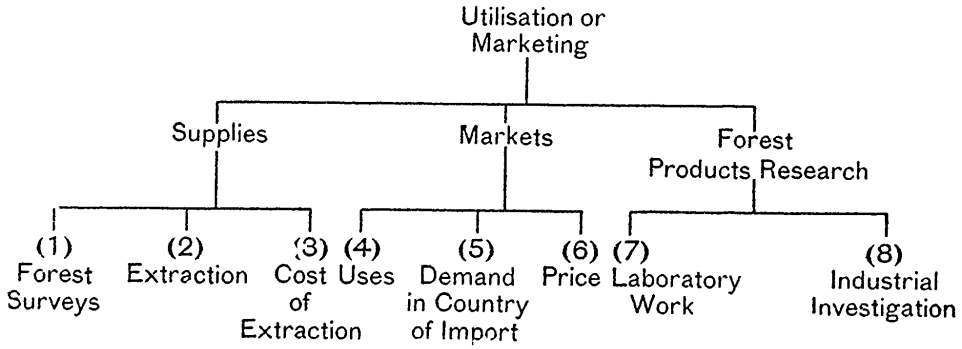
Brief Note on Forest Utilisation when the Timber or Minor Forest Produce is for Export.

Work in forest utilisation naturally falls under three main heads: supplies, markets, and forest products research, the last being the necessary agency for developing, or in certain cases creating, new markets.

To develop or create a demand for forest produce it is necessary to know (1) what supplies are available, (2) whether extraction is possible, and (3) at what cost the timber or minor forest produce can be landed at a centre of consumption or at a port. It is also necessary to determine (4) to what uses the timber might be put, (5) whether a demand exists or has to be created, and (6) what value such forest produce has or might have on the market.

The work under headings (1), (2), and (3) must necessarily be carried out in the Colony itself; it entails both forest and forest engineering surveys. In connection with (4) (uses in the country of import) a considerable amount of research work will probably be necessary to determine the seasoning, strength, and working qualities of the timber in question. The same remarks apply to (5) and (6), which involve industrial surveys by utilisation officers, in close co-operation with the timber trade on the one hand and purely research workers on the other.

The liaison between the three main classes of work, namely, on supplies, marketing, and research, may be shown graphically as follows:—



The liaison is obvious. Information under (1) and (3) must be supplied to enable (8) to function, while to determine uses (4), and thus indicate where to look for markets, laboratory work (7) must be set in motion to determine the qualities of the timber for which markets are desired.

R.S.P.

APPENDIX XVI.

Medical and Public Health Questions.

(A)—MEDICAL RESEARCH AND MEDICAL EDUCATION, INCLUDING THE TRAINING OF SUBORDINATE PERSONNEL.

MEMORANDUM BY THE CHIEF MEDICAL ADVISER TO THE SECRETARY OF STATE FOR THE COLONIES.

In a despatch dated 25th November, 1898, Mr. Joseph Chamberlain, then Secretary of State for the Colonies, informed Colonial Governments that he had under consideration the important question of reducing the abnormal mortality among Europeans resident in tropical climates and that, after consultation with some of the principal medical authorities, he had decided to take action in two directions. First, it was proposed to establish a School of Tropical Medicine in London at which medical officers of the Colonies would be given special instruction in the treatment of tropical diseases, and, secondly, he proposed to encourage, by every means in his power, scientific enquiry into the causes of tropical diseases. Of this despatch it has been said that "it may well be doubted if a despatch of greater import was ever penned by a Secretary of State for the Colonies."

Mr. Chamberlain had in view especially the health of Europeans resident in the Tropics. In later years an increased sense of responsibility for the welfare of native peoples and a recognition of the economic value of health in a community have led to a considerable extension of the measures at first contemplated. The present policy aims at safeguarding and improving the health of all inhabitants of the Tropics, and, through the medical training of the native peoples, attaining this result mainly by the efforts of the people themselves. If this hope is to find fulfilment, efforts must still be directed to further developments in medical research and medical education and towards "the evolution of a health conscience" among the people.

Medical Research.

There are now well-equipped Institutes for Medical Research, more or less adequately staffed, in the West African, East African, Middle Eastern, and Far Eastern groups of Colonies.

In West Africa there are research institutes at Yaba in Nigeria and at Accra in the Gold Coast; in Sierra Leone the Liverpool School of Tropical Medicine, aided by a Government grant, maintains a research laboratory at Freetown. At Sherifuri in Northern Nigeria a separate organisation exists for the study of trypanosomiasis, and at Lagos in Southern Nigeria the

International Health Board of the Rockefeller Foundation has established a laboratory where its officers, in co-operation with the West African Medical Staff, are engaged in an investigation of the difficult problem of yellow fever.

In East Africa there are research institutes at Entebbe in Uganda, at Dar-es-Salaam in Tanganyika Territory, and at Nairobi in Kenya. Nyasaland employs a medical entomologist and Zanzibar an economic biologist whose duties are mainly concerned with medical research. At Entebbe also a League of Nations International Commission has its headquarters and is engaged in the study of certain aspects of the problem of trypanosomiasis

In the Middle East there are research laboratories at Jerusalem in Palestine and at Baghdad in 'Iraq, in both of which important work has been done, especially in connection with rabies prevention.

In the Far East there are research institutes at Colombo in Ceylon, at Kuala Lumpur in the Federated Malay States, and at Hong Kong. At Singapore in the Straits Settlements the College of Medicine has well-equipped laboratories where research can be undertaken.

In the Western Pacific and in the West Indian groups of Colonies provision for organized medical research has hitherto been limited, mainly perhaps by financial considerations. In both areas, however, generous assistance has been given by the International Health Board in the study of local problems, and under the auspices of the Royal Society an investigation is now in progress in the West Indies in connection with filariasis and nephritis.

In the main then it may be said that Colonial Governments are alive to the importance of medical research and within the limits of their resources are giving it adequate support. It is, however, for consideration whether the distribution of these research organisations is the best possible, having in view all our interests in the Tropics. Though there is an important centre for agricultural research in the West Indies, it has not been found possible to make any corresponding provision for medical research there.

Hitherto effective contact has been lacking between research workers in the Tropics and those engaged in similar activities in Great Britain and other countries. The need for co-operation has long been acutely felt by those who work in comparative isolation in the Tropics, and it is now coming to be recognized that research in the Tropics may on occasion have an important bearing upon disease problems in temperate zones. It is realized, too, on the other hand, that medical work in the Tropics is mainly concerned with diseases that are equally prevalent in temperate climates just as tropical diseases are not always confined to the Tropics. The time is

therefore opportune, especially through the interest of the Medical Research Council in extending its activities to questions of tropical importance, for the establishment of facilities for co-operation. A proposal is now under consideration for the formation of a joint Colonial Office and Medical Research Council Committee, the "Colonial Medical Research Committee," to serve as a connecting link between research organisations at home and those in the Colonies.

At present Colonial Governments make contributions to the Tropical Diseases Research Fund, amounting to about £2,000 a year, and a Committee advises the Secretary of State as to the management of the Fund. The functions of this advisory body it will be proposed to transfer to the new "Colonial Medical Research Committee," which will also consider the reports from laboratories and research institutes, a duty which has hitherto been undertaken by the Colonial Advisory Medical and Sanitary Committee. It is also proposed to appoint a Medical Secretary to the new Committee, whose salary will be defrayed in equal parts from the Tropical Diseases Research Fund and the funds of the Medical Research Council. These re-arrangements, if they are approved, will involve no new charge upon the funds of Colonial Governments, but it is hoped that they will continue their present contributions to the Tropical Diseases Research Fund.

Besides the two groups primarily concerned, research institutes in the Tropics, and the Medical Research Council, the new Committee will, through its secretariat and personnel, maintain contact with the Royal Society, the Committee of Civil Research, the Schools of Tropical Medicine, the Imperial Bureau of Entomology, and other research organisations in Great Britain, as well as with international bodies such as the Health Section of the League of Nations and the International Health Board.

The Imperial Conference, 1926, was "impressed by the need of the fullest practicable co-operation between the organisations respectively responsible for agricultural, fisheries, forestry, medical, and industrial research." The need is no less great for co-operation between these organisations in the non-self-governing Colonies. In many of the Colonies themselves, effective co-operation is already assured between medical research and the nearly related sciences of veterinary and agricultural research; the "Colonial Medical Research Committee" will it is anticipated serve as a further connecting link in Great Britain.

On the important point of the exchange of information in relation to medical research problems, it may be noted that in certain of the Colonies journals have been established—the *Kenya Medical Journal*, the *Ceylon Journal of Science*, and the *Malayan Medical Journal* are examples—which serve as mediums of exchange locally. The "Colonial Medical Research Committee" will have a close relationship with the Bureau of Hygiene and Tropical Diseases and with the Imperial Bureau

of Entomology, whose publications—the *Tropical Diseases Bulletin*, the *Bulletin of Hygiene*, the *Veterinary Bulletin*, the *Bulletin of Entomological Research*, and the *Review of Applied Entomology*—admirably fulfil their functions as a central medium of exchange.

The ideal research organisation is that which places facilities at the disposal of the man who can use them—and at the disposal of nobody else. Money spent on research will be thrown away, therefore, unless an adequate supply of competent workers is forthcoming. From time to time various expedients have been suggested to ensure such a supply for medical research in the Tropics. So long ago as 1903 Dr. C. W. Daniels, a pioneer in tropical research, and then Director of the Institute for Medical Research, Federated Malay States, wrote as follows :—

> " Many difficulties would be avoided if the authorities at the Colonial Office could see their way to the formation of a special Colonial or Imperial Service for the work of such institutes, paid either from a general fund or by contributions from a group of Colonies. The members would then, wherever stationed or employed, retain continuity of service, whilst a wider and more practical experience would be gained. Such a service could be recruited from members of the medical services of the Colonies, directly from the Schools of Tropical Medicine or elsewhere, and members of the service might, if necessary, be lent to the teaching staff of a school and paid by that school or employed in the rare cases where an expedition or commission was really required. Members of such a service would for administrative purposes be necessarily considered as belonging to the service of the Colony in which they were employed."

The problem thus presented in 1903 has not yet been solved, and it is commended for consideration by the Colonial Office Conference, 1927.

Medical Education.

1. *Post-graduate instruction in Tropical Medicine.*

The London and Liverpool Schools of Tropical Medicine were founded in 1899, primarily for the special training in tropical medicine of officers of the Colonial medical services. In 1902 the University of Edinburgh also inaugurated special facilities for instruction in this branch.

Special diplomas in the subject were established, in 1903 by the University of Cambridge, in 1904 by the University of Liverpool, and in 1905 by the University of Edinburgh. None of these diplomas has, however, yet been recognized for registration by the General Medical Council.

During the past twenty years the value of a special training in tropical medicine and hygiene has been fully appreciated by Colonial Governments, and facilities for post-graduate instruction of officers proceeding to the Colonies have in con-

sequence steadily improved. A lengthening of the course of study at the London and Liverpool Schools has enabled much greater attention to be paid to tropical hygiene, and the diplomas of Cambridge, the English Colleges, and Liverpool are now considered to be an adequate qualification for junior public health appointments in the Tropics. The lengthening of the courses of study, so that only two courses can be held in one year instead of three as formerly, has, however, greatly increased the difficulties in recruiting a sufficient number of medical officers for the Colonial services, and it has been proposed that a shorter course of three months should be arranged for officers on first appointment.

There is need for improved facilities at the Schools of Tropical Medicine for clinical instruction in diseases of the Tropics In London, and perhaps at other centres also, there is equally a need for better hospital accommodation for the treatment of European residents invalided from the Tropics. Both questions are of great and increasing interest to Colonial Administrations. A Committee appointed by the Ministry of Health has recently been considering " how the necessary clinical and pathological facilities for the study of tropical diseases can best be secured to the London School of Hygiene and Tropical Medicine." This Committee has now reported, and it is hoped that the report will be available for consideration by the Colonial Office Conference.

In 1921 a School of Tropical Medicine, which owes its origin to the genius of Sir Leonard Rogers, was established in Calcutta. This School has attached to it a Hospital for Tropical Diseases of one hundred beds and provides a course of study of six months' duration leading to the Diploma in Tropical Medicine and Hygiene of Calcutta University, and a shorter course of three months for the School certificate. Graduates of Eastern medical colleges are resorting in increasing numbers to Calcutta for post-graduate instruction that was formerly only to be obtained in Europe, and it is not to be doubted that the Calcutta School will exercise a wide and beneficial influence upon medical practice in the eastern Tropics and perhaps further afield.

The Australian Commonwealth Department of Health maintains an Institute of Tropical Medicine, at present situated at Townsville in Queensland. As part of its activities this Institute serves as a training school, for post-graduates, in tropical medicine. The general scheme of training follows closely that of the British schools, and diplomas in tropical medicine are granted after examination by the Universities of Sydney, Melbourne, and Adelaide.

2. *The training of native medical staff.*

Of equal or even greater importance than the training of European medical officers for tropical service is the medical training of natives for service among their own people.

In the Far Eastern group of Colonies native medical schools have long been established. The Ceylon Medical College dates from 1870, the Hong Kong College of Medicine (now absorbed in the University of Hong Kong) from 1887, and the Straits Settlements and Federated Malay States Government Medical School from 1905. Each of these Schools provides a full course of training leading to a diploma which is recognized for registration by the General Medical Council.

There are no other medical schools in the tropical Colonies which have attained this status, though it would seem desirable that in each group of Colonies there should be at least one. The existence of three such schools in one area and none in any other is an anomaly.

The training of native subordinate personnel—hospital assistants, dressers, laboratory assistants, midwives, and health visitors—is a question of great complexity owing to the varying standards of education and mental capacity of the native peoples in the different Colonies. This problem does not lend itself to solution by any uniform plan and a programme of training that may be suitable for the Chinese and Indians of the Eastern Colonies may be ill suited to the natives of Africa.

In most Colonies the training of subordinate staff has hitherto been conducted in a somewhat haphazard manner and as an additional duty by medical officers whose time was already fully occupied in other directions. Here and there only, the enterprise or enthusiasm of individuals, Government medical officers, or missionaries, as in Uganda, has resulted in the establishment of training centres.

At the Ceylon Medical College a two years' course of instruction for Government apothecaries is provided, but elsewhere the plan of combining in one institution facilities for a full and a partial course of training has not been found successful.

At Suva in Fiji a native medical school provides a three years' course of training for native medical practitioners, and a proposal is under consideration to establish at Suva a Central Medical School as a training centre for the Western Pacific. In Tanganyika Territory, and in Northern Nigeria also, training schools for African medical staff are about to be established.

Mr Ormsby Gore in an account of his tour in West Africa has written* :—

> " . . . some system must be found for supplementing the fully-qualified service by natives who have received a good general education, and who in addition have been trained as dispensers and dressers and given such an amount of general medical training as to fit them to take emergency measures and to supervise generally the sanitation and public health of a village . . . by this means alone can modern medicine be made available for the bulk of the population . . . ."

* Cmd. 2744, page 75.

How best to effect this object must be considered in the light of the special circumstances in each Colony and the varied characteristics of the native peoples. It is suggested that it will be found necessary to establish special training centres, at least one for each of the larger Colonies, and to place in charge of them officers specially selected for this duty. In those Colonies whose Medical Departments are of such size as to warrant division into medical, sanitary, and laboratory services there might well be added, in view of its relative importance, a fourth division—medical education—to which officers having special aptitude for teaching should be assigned.

A.T.S.

April, 1927.

(B)—SANITATION, TOWN PLANNING, HOUSING, ETC.

MEMORANDUM BY MAJOR-GENERAL SIR WILFRED W. O. BEVERIDGE, K.B.E., C.B., D.S.O., LATELY DIRECTOR OF HYGIENE, WAR OFFICE.

When we speak of Tropical Sanitation or Tropical Hygiene, it is necessary to remember that nothing more is meant than the application of the recognised laws and precepts of hygiene and sanitation to the requirements of tropical life and tropical environment. There are certain difficulties in the application, but none which cannot be overcome with patience, education of the people, and financial aid. We cannot expect to secure health without putting our hands in our pockets, and there can be no greater return for our money than the security of health. Although the results of our expenditure may not be apparent at once, still the good effects will accumulate and, when once set going, can be maintained with little outlay.

The history of hygienic and sanitary achievement in the Great War is an example of what can be done in the most adverse circumstances, far more difficult than any conditions which now exist in the tropics. Although problems arose in the war which could never have been anticipated, and diseases new to science occurred, they were successfully combated and defeated, so that hygiene and sanitation in the field reached a pitch of excellence never before attained or dreamt of, with a corresponding gain in man-power and financial saving to the State. It is not too much to say that had the sanitary conditions of our armies in the field remained at the level of those in the South African war the termination of the Great War might have had quite another issue.

Not only is the successful application of sanitation and prevention of diseases a means of immense saving of life and suffering, but also of economy in hospital accommodation, personnel and materials of the medical services.

In the practical application of sanitary science, much can be done and considerable economy effected by the use of what the French term sanitary appliances *à fortune*, or extemporisation. For instance, a case arose lately where incineration was abandoned in one of our Colonies because money was not forthcoming to provide expensive destructors, whereas the situation could have been met by the provision of extemporised appliances at little or no cost which would have proved sufficient for the time. What is required is organised effort to show what can be done for the time being and certainly confidence will then be established and more permanent and improved appliances will follow. One of the most important points in presenting a sanitary policy is to see that due provision is made for the practical application of existing knowledge.

In this country we are advancing rapidly in Public Health administration and practice and probably lead the World, whereas in the tropics and many sub-tropical countries practical sanitation does not always receive the encouragement it merits, possibly owing to apathy in those responsible, or from lack of sufficient funds. If it were more clearly realised that sanitation is one of the soundest forms of investment, the obstacle of financial support would rapidly disappear. No country can advance without a healthy population, and without organised sanitary effort necessarily the value of labour must deteriorate and production suffer in consequence. Certain Colonies which claim to be health resorts may owe the fact to climate alone, and once the existing insanitary conditions are discovered visitors will cease to come and a financial loss will result. It will never pay to spend money to secure the sanitation of hotels and places frequented by visitors, whilst neglecting the native population and its environment. The great improvement in the health of Europeans in many of our Possessions overseas at the present time is not always paralleled in the case of native populations, and the appalling infant mortality which still prevails points to lack of efficient hygienic and sanitary organisation and practice. It is certain that it is more profitable to spend money in decreasing mortality by education of the parents, the establishment of infant welfare centres, the use of health visitors, trained midwives, and district nurses, than to expend large sums on the establishment of hospitals. In the Army an empty hospital is looked upon as marking the efficiency of preventive measures against disease. It is also more of a practical proposition to attack areas of over-crowding and to take measures to prevent soil pollution than to spend money only on the treatment of diseases such as typhoid, tuberculosis, and ankylostomiasis, which with good sanitary conditions should be under control. It must be remembered that tuberculosis is one of the most

important diseases in the tropics. It is, however, gratifying to note that the care of infants is making great progress in most of our Colonies and that many of those responsible are interesting themselves in the question and providing funds and encouraging voluntary aid. The effects will be evident in the future of the native populations concerned and much benefit undoubtedly will result.

Having directed our efforts to the saving of infant lives, it behoves us to improve the conditions of life by better housing, the avoidance of overcrowding, and, what is very important, the regulation and control of the dietary in infancy and adolescence. One of the greatest causes of physical unfitness in adolescence is malnutrition in childhood. It may be noted that in this country we have found that one of the chief causes of rejection of men presenting themselves for the Army (which amounts on medical examination at the present time to about 54 per cent.) is malnutrition in childhood.

For the successful maintenance of good sanitation and the improvement in the health conditions of a Colony, and the native population especially, certain essentials are necessary. The sanitary condition of any of our Colonies can be assured if certain sanitary measures can be carried into effect. These are :—

1. Education of the population in Hygiene and Sanitation as far as it concerns the daily life, and especially hygiene education in schools.

2. The provision of an efficient sanitary service, the staff of which must include European and native sanitary inspectors. The services of a municipal engineer should always be available and plans of all new sanitary services, including the construction of new buildings, should be submitted and, after approval, be signed by the Chief Health Officer. Type plans of sanitary appliances should be made to suit local circumstances and adhered to. There is often no consistency in this matter. It is necessary and desirable to decide on the best type of sanitary appliances suitable to the requirements of the community and to adhere to them.

3. The institution of a piped water supply in all cities and towns.

4. The provision of a water-borne system of sewage disposal with efficient disposal at the outfall.

5. The strict prevention of the pollution of the soil by human and animal excreta and trade wastes.

6. The avoidance of overcrowding, which should include not only the number of people living in one house, but also restriction in the number of houses and factories per acre.

7. The provision of up to-date markets, dairies, laundries, and slaughter-houses

Education and the diffusion of sanitary principles, not forgetting the all-important measures of personal hygiene.

Sir George Newman has said, " the progress of preventive medicine depends in an extraordinary degree upon the enlightenment and education of the people. The individual, to reap his full advantage and at the same time to act loyally as a member of the community, is under an obligation to cultivate his own health and so to conduct himself as not to conduce to the hurt or risk of his neighbours."

We are all aware how difficult it is to instil the principles and practice of sanitation into the minds of our own people as they are often inclined to treat any new measure with suspicion and to think that it can be advantageous only to the medical authorities who suggest it. It is not to be wondered at, then, that the native is still more shy of sanitary measures, the advantages of which he may not visualise, largely from indifference and chiefly from lack of education. Without the formation of a sound public opinion on Public Health matters it would be difficult to carry through any scheme of sanitary reform which is urgently necessary if the health of a community is to be advanced. Any hygienic reform or innovation can be secured only by first educating the people to the value of it, and education should commence in the schools. Children are more receptive and impressionable, and hygienic precepts once acquired will be maintained throughout their lives. Just as we need colour in our streets to avoid drabness and monotony, so must the teaching of hygiene be full of colour and be attractive. It is no good throwing dry facts at natives or children. Teaching should be practical, scholars should be shown examples of good sanitation, should visit well-conducted institutions, such as schools, public baths, market places, and well-sanitated dwellings, and also be shown examples of what should not be. They should be taught to make extemporised sanitary appliances, such as incinerators. Lectures should include diagrams, and pictures and films of various preventible diseases are invaluable. Museums for teaching the practical side of sanitation are also instructive and are easily formed with little expense. " The co-operation of the school teachers is essential to progress in hygiene, and public health officers should be in intimate touch and learn their problems and difficulties. The school teachers in turn will often carry the gospel of better health where the health officer alone may never be able to, personally or officially "

In regard to this hygienic education in schools, there are two points which deserve attention. Firstly, there is little use teaching hygiene in a school which is in itself insanitary. It is a matter for regret that the schools in some of our Colonies are neglected in this way or are entirely lacking in efficient sanitation. The defects include lack of, or faulty, latrine accommodation, facilities for washing not provided, over-

crowding, bad lighting, insufficient ventilation, and unsuitable desks and forms. Regular medical inspection of school children may not be carried out and encouragement of personal hygiene is absent. A great advance in the sanitary conditions of many of our Colonies lies in concentrating on rendering the schools as perfect in hygienic and sanitary conditions as possible. In this way a hygienic atmosphere is created and a sanitary conscience awakened.

The other point is that much of the value taught in schools is lost if children have to return to insanitary homes. The homes are the real primary schools of the children. "A nation will be what its homes make it."

In regard to general sanitary education, much can be done in this way by establishing a Bureau of Public Health Instruction in each Colony. Such a Bureau would aim at keeping the public well informed on health matters so as to familiarise the people with the latest methods of disease control, sanitary measures, and the latest ideas on child hygiene, pre-natal care, and promotion of the general adult health. The Bureau would issue leaflets from time to time, arrange lectures and cinema demonstrations, and prepare health exhibits, the value of which is being more and more recognised both in this country and America.

Under this heading one would emphasise the need of qualified European Sanitary Inspectors in all our Colonies. Candidates for the certificate of Sanitary Inspector in the tropics can now be examined in sanitation relating to the tropics at the Royal Sanitary Institute, and there should be little difficulty in obtaining well-qualified and suitable men. Sanitary Inspectors are specially required in the West Indian Islands, where their services would be invaluable. Barbados has no qualified Sanitary Inspector at the present time. Sanitary Inspectors form a very necessary link between the Health Officer and the Native Inspector; they acquire an intimate knowledge of local conditions and keep in close touch with the people. They are able to instruct and carry the knowledge of sanitation to the homes of the people, and gather valuable information as to conditions prevailing which could be done in no other way. In England every Sanitary Authority is required to appoint an adequate number of Sanitary Inspectors, and there is no doubt that an adequate number of European Sanitary Inspectors should be insisted upon in all our Colonies and mandated territories. The service of sanitary inspectors and municipal engineers may be looked upon as one of the greatest assets in sanitary organisation and practice.

Water Supplies.

The two greatest problems confronting the sanitary engineer are the disposal of waste matter and the provision of safe and adequate water supplies, and the denser the population the more difficult does the problem become. In all countries there is

probably no public health provision which has produced more immediate and lasting good effects than the substitution of a good piped water supply for an unreliable source, such as shallow wells. A piped water supply with protected gathering grounds, filtered and sterilised when necessary, is under control, but, however good a given supply from wells or rain, there is always the danger of intermittent contamination, often impossible to foresee. The provision of a pure water supply will be followed by a reduction in the incidence of typhoid fever, dysentery, diarrhœa, schistosomiasis, and infection by other animal parasites. Many of our Colonies have installed a pipe supply with good results, but there are others where temporary substitutes have been preferred, which require rigid supervision and in the long run undoubtedly will prove to be more costly than the more expensive course. The sources of water supply in the tropics require to be very carefully guarded against pollution and, even with precautions, collecting grounds may yield at times an impure water especially if the site has dwelling houses upon it.

Rivers and springs are liable to great fluctuation and can never be relied upon as safe sources unless the water is purified before distribution. Water from these sources should be chlorinated. Wells, unless of the deep or artesian variety, are often a source of great danger, especially when we have so much evidence of soil pollution. How many of the wells in our tropical possessions are properly constructed and protected? It would be a great advantage if, after a well in any district has been passed by the Public Health Authorities as rendering a safe supply, it were marked " safe supply " or " fit for drinking," by a Government label. Very soon the number of wells remaining unmarked would constitute a reproach, and improvement in the whole supply would result. It should be taken as an axiom in the tropics that there is no safe method of preventing water-borne disease, except by sterilization. We read in the Annual Medical Report of a Colony for the year 1925 that 95 per cent. of the inhabitants of a town are obliged to consume crude and impure water derived from river and canal sources. The danger has, however, been recognised and chlorination of the supplies is being introduced. Chlorination of water, after filtration or storage when necessary, renders any water supply absolutely safe and it should be adopted far more than it is at the present time. Chlorination is easily controlled and, beyond the initial cost for the plant, is economical and requires little or no labour.

The new ammonia-chlorine method of sterilization, originated by Major Child and now adopted in the Army and by the Metropolitan Water Board, is worthy of attention. It is certain and inexpensive, and experience has shown that, when a water is treated with minute doses of ammonia and then with chlorine, taste troubles are usually completely eliminated. The addition of ammonia prevents the chlorine from being absorbed

and reduced by oxidation and preserves it for action on the microbes in the water, and the action continues after the disappearance of free chlorine.

Where the water supply is derived from rain only, as in Gibraltar and Bermuda, underground reservoirs and tanks are often liable to contamination unless properly constructed and cared for. Tanks should be impermeable and coated inside with cement or be lime-washed and properly ventilated and mosquito-proofed. There is no reason why the water of these tanks and even wells should not be chlorinated. By the ammonia-chlorine process sparklets are obtainable to provide the necessary chemicals in the proper proportions, and these can be used by any householder without any technical knowledge.

A word may be said in regard to the use of hard water in laundries. By softening the supply, an enormous saving in the cost of soap and an improvement in the appearance of the washed clothes are effected and, what is a very practical point, an effluent results which can be disposed of in the ground or into a river without nuisance. There probably is no better process than the Permuttit. The softening substance requires only the occasional addition of common salt to make it work almost indefinitely.

The Prevention of Soil Pollution.

Soil pollution is one of the chief sanitary defects of many tropical countries, and its prevention is always a difficulty where native populations are concerned. Soil pollution in the case of European communities, however, is a disgrace for which there is little or no excuse. Soil pollution is the cause of diseases known as filth diseases. These are typhoid, prevalent in varying degree in most Colonies, dysentery, diarrhœa, cholera, ankylostomiasis, and infection by animal parasites. Soil pollution also is responsible for the presence of disease-carrying flies. The presence or absence of house flies is an indication of the amount of pollution present and the lack of efficient disposal of horse manure.

Given an efficient water supply, a water carriage system of sewage disposal should always be considered and the sooner it is carried into effect the sooner will many insanitary troubles cease. The cost in the first place is heavy, owing to the cost of transport of pipes and the disposal of effluent, but in the long run it pays. For small scattered populations, and when the necessary funds are not available to install a water-carriage system, we have to think of other means. There is a remarkable diversity of opinion on the various types of latrines suitable and in some Colonies there appears to be no standard type. In Ceylon, Palestine, and Kenya, for example, the Sanitary and Municipal Engineering Departments have issued admirable type plans, not only of latrines, but of traps, wells, water reservoirs, market places, slaughter-houses, etc., and one would

like to see a similar provision made throughout our Empire beyond the Seas. One of the best methods for the disposal of excreta in lieu of a water-carriage system is undoubtedly incineration. It is surprising how little it has been adopted in view of the great success it attained during the war. Properly carried out, incineration affords the best solution for the disposal of refuse and excreta and results in a considerable financial saving. During the war, incineration was carried out in all theatres and the excreta of 1,000 men were easily disposed of every 24 hours in one destructor. It entails the provision of efficient latrines provided with fly-proofed buckets and with cemented floors. Incinerators may be of any type on the Horsfall principle. Nothing need be added to the pails, which are emptied once or twice daily. The destructor must be placed in a shed to protect it from rain and provided with a concrete floor and a trapped drain leading to a soakage pit, into which urine from the bucket is poured. The success depends on the provision of a few trained men (two men only are required for incinerators burning excreta of from 500-1,200 men), the regular removal and substitution of clean pails for full ones, and the supply of fuel, about ½ cwt. daily for destruction when refuse is not available.

It is not possible here to discuss the merits of the different latrine systems used in the various Colonies, but mention may be made of the smoke latrine to prevent fly infection. It is convenient, inexpensive, and well worth a trial, when the nature of the soil and the level of the ground water permit its construction. Examples are found in that designed by Captain Stokes, and the type used in Sierra Leone.

In unsewered areas recourse may be had also to what is termed the chemical sanitary system whereby certain chemicals are added to the excreta to sterilise and render them more liquid so that the effluent can be disposed of safely in soak pits or in the ground. The Kaustine system used in America and the Elsan system in this country and elsewhere are examples.

Every effort should be made to limit the number of flies. This can only be done by attacking their breeding places in the first instance. Methods for the disposal of horse manure and its protection from fly breeding, such as those of Baber, Mason, and Allnutt, should be adopted.

Overcrowding.

Overcrowding in this country is said to exist when the average number of persons per room exceeds two. Each person should have as a minimum 800 cubic feet of space. It must be remembered that there are many families who are in reality living and sleeping in overcrowded conditions although the average number of persons to a room is not more than two, when all the rooms in a house are taken into account. Overcrowding leads to physical deterioration. The Housing Commission reported some years ago " that the general deteriora-

tion in the health of the people is a worse feature of overcrowding even than the encouragement by it of infectious disease." Overcrowding results in uncleanliness, debility, depression, and enhanced liability to disease. It is responsible for the spread of infectious diseases which are respiratory in transmission, that is, by personal contact, droplet infection from coughing, sneezing, and even talking. Such diseases are smallpox, diphtheria, influenza, pneumonia, tuberculosis, cerebro-spinal meningitis, poliomyelitis, measles, and whooping cough and many more.

During the war it was found that epidemic cerebro-spinal meningitis could be controlled by spacing out. The distance between beds in institutions is an important factor, at least three feet between beds should be allowed. If this is necessary at home, it is even more so in the tropics. Overcrowding is often due to the inability of tenants to pay rent sufficient to ensure adequate accommodation and also to wasteful expenditure on drink and gambling. The effects of overcrowding can be stated by statistical evidence with greater precision than almost any other insanitary condition; mortality rates and incidence of infectious diseases are generally used. It has been pointed out that other factors should also be taken into account such as age-distribution, birth-rate, and the means and character of the people.

The question of town planning, reconstruction, and the housing of natives is intimately concerned with the Public Health and with the growth of populations consequent on the concentration in convenient centres of those concerned in the labour of manufactories, mines, and estates. Poverty is intimately associated with bad housing and hence the insanitary habits of the people are often as much at fault as defective dwellings. An increase in infant mortality and incidence of tuberculosis can always be shown among people living in insanitary and congested areas. Defective dwellings mean lack of ventilation, want of light, dampness, fouling of the ground, and often defects in water supply and sewage disposal. It is probably of little use to better the habitations alone if the habits of the people due to poverty, ignorance, and other causes cannot be improved. Improvement in both must be considered together.

In addition to improvement in the houses themselves and sanitary conditions as a whole, town planning must be such as to prevent repetition of past defects. The need for future expansion must not be lost sight of in considering the area. Streets and roads must be broad, sufficient space should be provided between huts or houses; generally in the tropics roads should be 50 feet wide to allow of safety from fire, free access of air and ventilation, and general facility for cleanliness. In labour camps and hutments, latrines should be provided on a basis of 5 per cent. Allowance must be made for size of plots, open spaces, and reservations for public purposes. When a site

for new construction is selected a drainage system should be worked out and levels obtained, even though it is not possible to install a system at once. The necessity for an adequate water supply must be anticipated. Arrangements must be made to house the people ejected from slums while reconstruction is in progress. As a rule only one-half of a plot should contain a building except in the case of native-owned land where a hardship might result. Making roads through slums with the idea of bettering the conditions, without reconstruction of the habitations, is to be deprecated, since this only leads to increased facility for trading and subsequent increased congestion. Verandahs of all houses should be ventilated and, for protection against mosquitoes, doors, windows, and verandahs should be provided with wire meshing. Sufficient ground should be available for playgrounds for schools. All grain stores must be rat-proofed. To avoid congestion of inhabited areas the necessary machinery for promoting local development, with provision for central control, is necessary. All schemes of town planning and reconstruction must be submitted to the Sanitary Authority, who alone is able to advise on health requirements under local conditions, and co-operation is essential to avoid mistakes which otherwise might arise. In the Medical Report of a Colony for 1925 we read the astounding statement that " the Medical Department has now no word to say, legally, in the erection or reconstruction of buildings." In the Army no plan of construction is passed without the approval of the Director of Hygiene, and in civil life in England Medical Officers of Health of the district concerned are responsible from the health point of view and they work in conjunction with the Public Works Department. The Public Works Department of any Colony cannot afford to dispense with the services of its Medical Department, otherwise failure is inevitable.

Some General Measures of Sanitation.

Steam kitchens are to be recommended for native compounds since the system is economical and ensures properly cooked food. The cooking should be regulated to prevent the Vitamin C content of the food being destroyed by prolonged cooking, or otherwise scurvy may result. All kitchens, food safes, preparation rooms, and stores should be fly-proofed. Ordinary netting used by fishermen placed over the doors of kitchens is probably a better guard against the entrance of flies than wire gauze, which is liable to be broken. Blue-tinted windows also afford protection from flies. It is of little use preaching against uncleanliness unless ways and means of prevention are provided. The efficient disposal of refuse must be arranged for. Covered galvanized bins of approved pattern should be supplied to all bungalows, shops, factories, and compounds, and a daily removal arranged. The contents should be removed in covered tipping waggons and taken to a selected

area well removed from habitations, where they should be burnt in destructors or dumped in suitable pits and the surface covered over with earth daily. Shower-baths in mines and compounds are essential and are more economical than bath tubs.

The sanitary control of malaria, ankylostomiasis, and kindred diseases has not been referred to, since great advance is being made and excellent work done in this direction in almost all our Colonies. It is true that sanitation has advanced greatly during the last few years in most of our Colonies and mandated territories, but there are still some where the necessity for a higher standard has not been sufficiently recognised, and in others failure to raise the standard of public health has occurred from lack of funds. The question of public health administration in many cases should be considered from a much wider angle and sanitary measures carried out on a more comprehensive scale. There is often a tendency towards too much quibbling and the adoption of a makeshift policy, instead of facing the real and important issues. Public Health control will be far better managed in the hands of a competent Public Health Board than if relegated to Parish Councils. Centralisation in most cases will lead to better and more far-reaching results.

Close co-operation between the Health Service and the Public Works Department is essential to secure the best results and should be constantly borne in mind. Furthermore, co-operation between Colonies is a vital necessity and, when possible, a periodic exchange of views on recent methods and new developments in Health work should be arranged.

W. W. O. B.

April, 1927.

(C)—THE ESTABLISHMENT OF AN "IMPERIAL SCIENCE SERVICE."

Memorandum by the Director of Medical and Sanitary Services, Kenya.

In an address to the Congress of the Universities of the Empire in July, 1926, Dr. Andrew Balfour stated, "There is no doubt that at present much time is wasted, energy dissipated, and money thrown away owing to the fact that, in the great and important domain of tropical medicine, men are, to a large extent, working in watertight compartments." Later on, in the same address, he pointed out that India, with its organised medical and sanitary research, feels the lack of a connecting link with institutions in this country. If work in a vast Dominion is hampered by a lack of liaison, what is the position in the smaller Colonies?

Modern scientific research has become so complicated that a solitary worker is not able to conduct the operations involved in investigating a problem of any magnitude. Often knowledge of, and practical skill in, different branches of science are required. Teams of workers are necessary and these must become acquainted—often, under the best conditions, the work of weeks —with all the literature of the subject, before operations are commenced.

The smaller Colonies are unable to maintain more than very modest laboratories manned by only a few workers having their time mainly occupied by routine work, which must be carried out. There is little time for research and none for research into big problems. Should vacancies among the staff occur, there is considerable delay in their being filled. The libraries are small. Even were money available, which it is not, for the purchase of every journal published, the contents could not be assimilated. The staffs are too small even were the necessary knowledge of languages available. The literature is increasing daily. Above all, there is no liaison with other countries, especially England, and no medium, other than on a personal basis, for the exchange of ideas. If information, which is not available locally, is required, the only means of obtaining it is by personally addressing someone in another country, who may have the requisite knowledge. A satisfactory answer may or may not be received; if it is received, it is merely through the courtesy of the person to whom application is made. Work may even be reduplicated.

In discussing the need for liaison in research, it must be remembered that the findings in distant countries may and do have an important bearing on problems at home. Indeed, it may very well be that the investigations necessary to solve a home problem can only be undertaken among a primitive people. The reverse is also the case.

It is suggested that the best remedy for the existing condition of affairs is the creation of an "Imperial Science Service" in which research workers all over the Empire should be enrolled. The expedient of multiplying scientific staff in the various countries will always fall short of the ideal, if there is no recognised and definite channel by which contact may be maintained with other institutions wherever such may be situated.

The suggested service would have as its executive head a Director, and its research activities should be controlled by a council, of whom the Director should be a member, somewhat on the lines of the Medical Research Council. Control would be by the Privy Council and not by any existing Department of State.

Officers of the service would be obtained, in the first place, by enrolling, with their consent, existing research and laboratory officers of such Colonial or Dominion Governments or indepen-

dent institutions as may be willing to fall in with the scheme. The special conditions attached to the Army and Navy might render it impossible for these Services to be included.

The revenue of the service would be derived from the various Governments, &c., who may co-operate. Contributions would be based on expenditure incurred normally on the salaries, &c., of scientific staff. The pensions of existing staff would be guaranteed by the payment of sums based on actuarial computation to cover future liabilities. In return for the annual payments, the service would second to the various authorities officers, who would carry on work as at present. An increase of local staff would mean increased contribution. Control of these officers would be carried out by and through the local authorities. In addition to payment based on normal expenditure, the Governments concerned would be required to furnish additional contributions, adjusted possibly in proportion to the amounts of their revenue, in order to cover what may be termed central research, i.e., research into large problems, instituted by the central authority of the service, and for other purposes to be shown later. The Imperial Government might well make a contribution. There exists at least one important official body, the Empire Marketing Board, which controls large funds, a part of which might very well be devoted to Empire research. A fund for research, maintained by annually recurring grants from Colonial revenues, is in existence. Considerable contributions in the way of fees for services rendered might be expected from services, Governments, and institutions which find themselves unable to join fully in the scheme.

An essential part of the suggested machinery would be a section where all the literature is received, references recorded, and précis made. Occasional bulletins might be published. The Tropical Diseases Bureau is an existing example of the kind of institution required, but it does not cater for the physiologist, chemist, &c. On application to the literature section, an officer would be entitled to receive the fullest information with regard to previous work having a bearing on his particular problem. The Automobile Association furnishes to its members information as to roads and routes. The literature section of an Imperial Science Service would supply full details of existing scientific knowledge.

An officer joining the Imperial Service would render himself liable for service in any part of the world. New recruits would join under conditions of pay, pensions, &c., which would require to be drawn up.

The subjects into which research is being conducted in the various countries and institutions would be reported to the Director, who would be responsible for seeing that overlapping or reduplication does not take place. The Council would be made aware of the major problems into which research is required, and with it would rest the decision as to whether, where,

and how the necessary investigations are to be conducted. On a decision being arrived at to conduct any special research the Director, in consultation perhaps with the rest of the Council, would decide as to the personnel to be employed. Officers considered suitable, wherever they may be employed at the moment, would be detailed for the special work, reliefs being supplied to take their places. The reliefs would be drawn from the men ready and anxious to join the service, who would be glad of temporary employment, while awaiting a vacancy on the permanent staff. The particular locality or institution, perhaps more than one, where work is to be carried out would be decided in a similar manner by the committee.

The foregoing sketch of an Imperial Service is submitted as a possible means of removing some of the disabilities under which research in the Colonies is labouring; whether it is practicable is another matter. The main objection to its adoption will doubtless be political. If extended application is impossible, it could at least be applied to the smaller Dependencies under the control of the Colonial Office. It has been drawn up chiefly with regard to the needs of medical research but, if possible, the other sciences should be included: hence the suggested title. Particularly should the needs of the twin-sister science, veterinary research, not be forgotten.

JOHN L. GILKS.

LONDON,
January, 1927.

(D)—THE WORK OF THE BUREAU OF HYGIENE AND TROPICAL DISEASES.

MEMORANDUM BY DR. A. G. BAGSHAWE, C.M.G., DIRECTOR OF THE BUREAU.

In 1908 the Colonial Office established the Sleeping Sickness Bureau for the collection and dissemination of information respecting African sleeping sickness to Medical Officers in the Colonies and Dependencies concerned and to investigators engaged in research. In 1911 the Bureau also undertook a similar service for the disease Kala Azar. In 1912 its scope was widened to embrace all diseases in the tropics both of men and of domestic animals, and it became the Tropical Diseases Bureau. A further development took place in 1926 when, with the publication of the new *Bulletin of Hygiene*, its name was changed to the Bureau of Hygiene and Tropical Diseases, a title co-extensive with its increased activities.

The main function of the Bureau as regards tropical diseases is to collect from every possible source information concerning their prevalence, recognition, prevention, and treatment; to collate, condense, and, where necessary, translate this information, and to render it accessible to medical and veterinary officers in the tropics and to investigators with as little delay as possible.

As regards hygiene, up to the end of 1925 the Bureau surveyed only the information definitely relating to the tropics; from 1926 the function of the Bureau has included the study of the literature of all branches of public health and preventive medicine throughout the world, information about which it collates, condenses, translates where necessary, and disseminates on lines similar to those instituted for tropical diseases.

The three serial publications of the Bureau are the mediums for disseminating the information collected.

These are :—

(i) The *Bulletin of Hygiene*, published monthly and now in its second volume. This contains summaries and reviews of publications on all branches of public health and preventive medicine and is intended to meet more particularly the needs of Britain overseas. The following selection from the list of subjects indicates its scope—Bacteriology and Immunology, Cancer, Dental Hygiene, Diet, Deficiency Diseases, Vitamins, Epidemic and Endemic Diseases, Epidemiology and Vital Statistics, Eugenics, Food and Milk, Heating, Ventilation, Lighting, Housing, Industrial Hygiene, Light Therapy, Maternity and Child Welfare, Medical Education and Propaganda, Mental Hygiene, Port and Ship Hygiene, Sanitary Administration and Law, Sewage and Refuse Disposal, School Hygiene, Town Planning, Tropical Hygiene, Venereal Diseases, Veterinary Diseases in Relation to Man, and Water.

The Bulletin is freely illustrated and carefully classified and indexed for convenience of reference.

(ii) The *Tropical Diseases Bulletin*, published monthly and now in its twenty-fourth volume. This contains classified summaries of current papers and reports from the medical and scientific publications of the world on human diseases of the tropics and warm countries. The following list indicates its scope —Amoebiasis and Dysentery, Beriberi, Blackwater Fever, Cholera, Dengue, Enteric Fevers, Fevers (unclassed) of the Tropics, Heat Stroke, Verminous Infections (including Hookworm), Kala Azar, Leprosy, Malaria, Medical Zoology, Pellagra, Plague, Rabies, Relapsing Fever and other Spirochaetoses, Sleeping Sickness, Sprue, Tropical Dermatology, Tropical Mycology, Tropical Ophthalmology, Undulant and Abortus Fevers, Yaws, and Yellow Fever.

(iii) The *Tropical Veterinary Bulletin*, published quarterly and now in its fifteenth volume. This deals with the diseases of domestic animals in the tropics, such as Anaplasmosis, Piroplasmosis and the eradication of ticks, Trypanosomiasis (Surra,

Nagana, Dourine, &c.), Leishmaniasis, Coccidiosis, Epizootic Lymphangitis, Rinderpest, Horse Sickness, Contagious Abortion, Spirochaetosis, Rabies, Bovine Pleuro-pneumonia, East Coast Fever, Pernicious Anaemia, Haemorrhagic Septicaemia, Heartwater, Anthrax, Demodectic Mange, Staggers, Worm Diseases, Foot-and-Mouth Disease, Swamp Fever, Tuberculosis, Poisonous Fodder Plants, &c.

The larger part of each issue of these publications is distributed to the subscribing Governments, and the remainder is on sale.

It will be seen that the Bureau's task is of considerable magnitude and likely to increase steadily with the growth of medical science and its application to public health problems. To make its survey as nearly world-wide and all-inclusive as possible the Bureau regularly keeps watch on over 500 medical and veterinary periodicals, mostly obtained by exchange or purchase, published throughout the world in many languages, and numerous reports. The references thus collected—which in 1926 exceeded 3,000 for hygiene, 2,000 for tropical diseases of man, and 250 for tropical veterinary diseases—are distributed for careful reading and summarizing to a staff of sectional editors or contributors, each of whom has expert and intimate knowledge of the diseases or the subjects for which he is responsible and whose duty it is to point out errors when, in his belief, statements made by the author are not correct, and thus to afford guidance as to the value of the paper summarized. The summaries so prepared by sectional editors and contributors are carefully collated at the Bureau before publication in the appropriate Bulletin. In this way any discovery or development, whether published in an English journal or in a little-accessible foreign periodical, promptly comes under notice, and is communicated in appropriate detail and scrupulous accuracy to all concerned.

The value of these services to the medical, sanitary, and veterinary services of the Empire and to the skilled investigators engaged in research can scarcely be over-estimated. It would be impossible for any one person to read or even to skim the voluminous literature of tropical diseases for himself, but the *Tropical Diseases Bulletin* and *Tropical Veterinary Bulletin* provide the most remote practitioner with a means of keeping in touch with the recent development of tropical medicine.

Similarly, with regard to hygiene, so many branches of science are germane to the subject, so many are the languages and journals in which original work is reported that, without a survey such as that provided by the *Bulletin of Hygiene*, the full benefits, both economic and hygienic, accruing from the prompt and efficient application of knowledge to the control of disease cannot be enjoyed. No adequate review of public health literature has hitherto existed in English.

Such a centralized intelligence service, therefore, is essential both to provide a focus for contemporary knowledge and to avoid

the waste of time and energy arising from unnecessary duplication of work. The fact that no other organization is covering the same ground is evidenced by the publications of the Bureau being much in request among foreign workers.

Apart from its publications the Bureau has built up a valuable library now pooled with that of the London School of Hygiene and Tropical Medicine, whose hospitality the Bureau enjoys at a low rental. The Bureau's library contains, among other selected works, complete or nearly complete files of all the tropical medical journals and a large number of pertinent reports and reprints; and is being rapidly developed also on the hygiene side. It is open to medical men and others who come to this country from the Dominions and other parts of the Empire.

The staff of the Bureau supply information on the subjects with which it deals to any enquirer, or indicate to him original sources of information, and copies of papers from its large collection of reprints are posted on loan to any part of the world on application.

The Bureau is maintained by official grants from Imperial funds and from funds provided by Dominion and Colonial Governments; contributions are received also from Egypt, the Sudan, and certain Indian Provincial Governments. The income from official sources is now a little over £7,000. A subsidiary source of income is derived from publication sales and advertisements, amounting in the last completed year to £1,900, bringing the total annual income to about £9,000. The expenditure in the financial year just completed amounted to £8,600; for 1927-28 it is estimated at £9,750. The accounts of the Bureau are audited by His Majesty's Comptroller and Auditor-General, and a Statement of Account is presented annually to Parliament.

The Bureau is under the control of an Honorary Managing Committee, appointed by the Secretary of State for the Colonies, which meets at the Colonial Office under the Chairmanship of the Chief Medical Adviser. It includes representatives of the Medical Research Council, the Royal Society, the Ministry of Health, and the Ministry of Agriculture. The whole-time staff consists of a Director, Assistant Director, Secretary, five Lady Assistants, and a Despatch Clerk. There are seventeen Sectional Editors for the *Tropical Diseases Bulletin*, over forty contributors for the *Bulletin of Hygiene*, and a Veterinary Editor for the *Tropical Veterinary Bulletin*.

A. G. B.

May, 1927.

(E)—THE INTERNATIONAL SANITARY CONVENTION, 1926. ADHERENCE OF THE COLONIES.

MEMORANDUM BY SIR G. S. BUCHANAN, C.B., M.D., MINISTRY OF HEALTH.

The International Sanitary Convention (Paris), 1926, continues the provisions of the antecedent Conventions of Paris 1912, Paris 1903, Venice 1897, Paris 1894, and Dresden 1893, and relates mainly to :—

(*a*) communication of facts as to cholera, plague, yellow fever, smallpox, and typhus;

(*b*) the action (whether specified as maximum action or recommended) to be taken at ports and on ships in respect of these diseases and also, in less detail, at land frontiers;

(*c*) special provisions for the sanitary protection of the Mecca pilgrimage, for quarantine in the Near East and its administration by the International Quarantine Board of Egypt, in the Persian Gulf, &c.

The Convention to be superseded (that of Paris 1912), and its predecessors, were ratified by Great Britain for itself, but not also on behalf of British Colonies. In point of fact, recent Colonial quarantine regulations and practice have in large measure been governed by the international agreements in force, but Colonial administrations have not sought formally to adhere to them, nor have they been pressed to do so. These Conventions, though to a decreasing extent, have been generally regarded in the Colonies as mainly of interest to Europe as a means for protecting it against epidemic diseases (originally cholera and no other) being imported from their endemic or epidemic centres in the East.

Owing to the widespread dissemination of plague by sea traffic, to the general increase and greater range of quarantine measures taken in America, Japan, Australia, and other countries remote from Europe, and to diverse other circumstances, the new (1926) Convention has been designed to be of world-wide application which, however, may be supplemented where desired by local international agreements (consistent with the Convention) which will facilitate its application. The International Sanitary Conference, which drew it up, included official delegates from 70 Governments, all of whom (with three negligible exceptions) signed the Protocol. The signatories included numerous smaller countries with relatively little international maritime traffic, and those whose port sanitary services are by no means well developed. It is understood that the French Government will

again ratify on behalf of the French Colonies as well as for France, and the Netherlands Government for the Dutch East Indies.

The International Sanitary Conference of 1926 also differed from previous conferences in that a detailed draft was available beforehand. The British departments concerned, therefore, on this occasion were able to communicate in advance of the Conference with the various Colonial administrations (Colonial Office Circular despatch of 6th May, 1925), to collect and consider their observations, and to include a medical representative of the Colonial Office in the British delegation. In this way, by including representatives of shipping interests, and otherwise, the 1926 delegation may be said to have been strong, representative, and well prepared. Consequently, when the Conference was ended, and it was clear that the new Convention embodied the principal matters for which the British Delegation had been contending, it was thought reasonable to invite the several Colonies on this occasion, when they had considered the new Convention and the delegates' report, to signify their special reasons, not for being included in the British ratification, but for being excluded, if they hesitated to commit their administrations to the new Agreement. A general world code of quarantine procedure, imposing limitations on quarantine action which are highly desirable in the interest of shipping and yet consistent with modern public health requirements (e.g., as regards healthy cholera " carriers " or measures to deal with the carriage of plague infection from port to port by ships' rats) would be conspicuously weakened if British Colonies did not share in it. And there was reason to consider that all Colonial administrations would benefit by an international system which dealt, on modern lines, with the transmission of these diseases from country to country, gave an agreed basis on which ships of all nationalities would be dealt with, and prescribed a method by which the results of quarantine work in general would be reviewed at the International Health Office, which in its turn would be responsible for providing " intelligence " data for the use of all port sanitary administrations.

Present position of the British Dependencies.

From replies now to hand it appears that the Governments of fifteen of the Oversea Dependencies* have thus far signified their desire to adhere to the Convention.

To these should be added seven other Governments†, which, however, specify that in their case adherence should be made

* Bahamas, British Honduras, Gambia, Gold Coast, Nyasaland, Zanzibar Cyprus, Tanganyika Territory, Straits Settlements, Federated Malay States, North Borneo, Ceylon, Fiji, St. Helena, Palestine and Trans-Jordania.

† Nigeria, Sierra Leone, Northern Rhodesia, Seychelles, Falkland Islands, Johore, Kedah.

subject to the reservation regarding Article 8 allowed for in the Protocol of Signature (inability to give full effect to the provisions relating to the obligatory notification of the diseases in question). This will not occasion any difficulty.

Replies to a similar effect have also been received from British Guiana and Barbados, but as these two Colonies are parties to the West Indian Colonial Sanitary Convention (see below) it will be convenient for the moment to regard their position as alongside that of the other three Colonies who are active participants in that Convention.

There remain eighteen Colonial Administrations* (counting the six West Indian Colonies referred to) which desire to be excluded from the International Convention, some suggesting that their subsequent inclusion can be considered later. For the reasons above outlined it would be desirable that this list should be reduced and that the number of Colonies adhering should be as large as possible. A study of the replies suggest that this may be hoped for in consideration of the following points :—

1. One set of objections seems to be based on the assumption that the 1926 Convention cannot properly be ratified until legislation, regulation, and administration have first been brought into line. This position however has not, so far as I am aware, been adopted by any of the signatory countries, nor was it contemplated at the International Sanitary Conference. It is universally recognised that quarantine regulations and practice are often regulated by numerous documents made at different dates and that any revision necessary to bring them into line with the new Convention requires time. Thus for the United Kingdom, for which it is proposed to ratify at once, the occasion will be taken for recasting and consolidating the orders relating to port sanitary authorities, the utilisation of Customs officers, and like questions; and it may well need a year or two before these new orders can be issued.

2. Another set of objections is based on the apprehension that the requirements of the new Convention would place an excessive burden on the Colony in respect of administration and cost. It is realised that as regards the various measures prescribed in Chapter II (infected ships, &c.) the administration is not bound to take the prescribed action unless it so desires. The agreement is merely that any action taken should comply with certain principles, and should not exceed a certain maximum. Such difficulties as have been stated relate to the following provisions of Chapter I :—

Article 6 has been interpreted to mean that the Convention would require an excessive or impracticable amount of

* Kenya, Uganda, Somaliland, Gibraltar, Gilbert and Ellice Islands and Solomon Islands, Mauritius, Hong Kong, Weihaiwei, Sarawak, Trengganu, Brunei, Kelantan, British Guiana, Barbados, Trinidad, Jamaica, Windward Islands, Leeward Islands.

bacteriological examination of rats. It seems also to be inferred that under this Article the systematic bacteriological examination of rats in every " plague-infected area " applies to the whole country in the case of its being plague-infected.

It seems clear from the text, and certainly was the intention of the Conference, that the obligation of Article 6 is limited to seaports and naturally, in view of the character of the Convention, it may be interpreted as being limited in practice only to those seaports which are of any importance from the point of view of international commerce.

It is suggested by one Dependency that the Article could not be complied with unless a bacteriologist was specially appointed for the purpose. But provided that the Medical Officer of a Colonial port is able himself to look over specimen rats to detect the enlarged glands which result from plague and, where necessary, to make smears for microscopic examination (or alternatively to get these things done by some competent person) it would seem that he could, without difficulty, comply with this Article.

Article 14 has apparently been regarded as constituting a very onerous requirement. By this Governments undertake to maintain in their large ports and in their surroundings, and, as far as possible, in other ports and their surroundings, sanitary services possessing an organisation and equipment capable of carrying out an application of the prophylactic measures specified.

On this it may be observed that the extent of the steps to be taken in future will, no doubt, have to be considered in all countries (as will be the case in the United Kingdom) as a consequence of the Convention. But the existence of this Article need not alarm Colonies which possess perhaps only one or two seaports of any international importance and whose port sanitary service cannot in any case be extensive. It should be noted that the obligation in respect of " minor ports " is limited by the words " as far as possible." For the major ports it may, at any rate, always be assumed that there is a port medical officer and provision for the hospital treatment of infectious cases arriving on board ship. Even a small Colonial port, moreover, would be able, or could easily make itself able, to carry out the kind of disinfection which would ordinarily be necessary and to undertake the medical examination of contacts The Convention is being accepted by many countries whose organisation is known not to be perfect, and as a practical matter it must be recognised that the term " sanitary services possessing an organisation and equipment capable of carrying out an application of the pro-

phylactic measures " will necessarily vary in quality. It is quite legitimate that some of these services, in the case of smaller ports in smaller countries with a comparatively small amount of foreign traffic, will be rudimentary by comparison with important world ports. They should, however, without much difficulty be capable of meeting the primary requirements of the Convention, and in this connection it must be remembered that where the public health service of a port does not find itself in a position fully to carry out any exceptionally heavy requirements, for example, the complete " deratisation " of a ship, it is open to that service, under the Convention, to make arrangements with another port of the same country or even with other Governments to let the ship go on for this purpose to another sanitary station (Article 50).

It may be added that the second paragraph of Article 14, by which the Governments supply information to the International Health Office in Paris regarding the sanitary organisation of their ports, was introduced with the special object of giving practical recognition to the fact that the extent of organisation in different ports must vary. The idea of the Sanitary Conference was that it would be more in the interest of progress and good administration to ask each country to say what it is able to do than to elaborate a stock pattern of port sanitary service and equipment which every Government must provide. It is with the same point of view that the matters specified in Articles 50 and 51 as appropriate for provision in large seaports are merely recommended, and are not (as seems to have been inferred in the reply from Kenya) imposed as obligations.

Position in regard to the West Indian Colonial Sanitary Convention.

In the case of the group of Colonies which since 1904 have been associated in the West Indian Inter-Colonial Sanitary Convention,* the hesitation expressed appears to result from the natural desire to avoid any upset of the quarantine system which for many years has been adopted under this Agreement. The latter provides a common code, which, though only in force in five British Colonies, and originally based on the epidemiological knowledge of 1903, continues to meet most practical needs and has, in fact, from time to time been supplemented by subsequent regulations. Three main questions seem to arise in this connection :—

(1) The present quarantine practice in the West Indies, as determined in 1904, was certainly more exacting than that adopted in the United Kingdom, and it also went beyond

* The following Colonies are active participants in the West Indian Convention:—British Guiana, Trinidad, Barbados, Windward Islands, Leeward Islands. Jamaica signed the 1904 Convention, but has never enacted the necessary legislation.

the International Sanitary Convention of that time, 1903. Would this practice be prejudiced now by the adoption of the new Convention of 1926 by the West Indian Colonies? Comparison of the documents in question seems to give a sufficient answer. The Inter-Colonial Convention, 1904, took powers by which the Central Quarantine Authority for the West Indies could decide what diseases should be treated as infectious diseases within the meaning of the quarantine regulations. The chief difference between it and the International Convention of 1903 was that the latter only related to cholera and plague, while the former made specific provisions for yellow fever and smallpox. The new International Sanitary Convention, 1926, however, covers all four diseases, as well as typhus.

The Inter-Colonial Convention provided for the possibility of " observation " (i.e., detention of passengers by the port sanitary authority) to a greater extent that had been allowed in English regulations under the International Sanitary Convention of 1903. The new International Convention of 1926 provides more elastic definitions of " surveillance " and " observation " (see Definitions and also the note to Article 25), and under these the Colonial administrations would be able to continue a practice which from the home point of view was regarded as exceptionally stringent when the Colonial Convention was made.

Again, Article 17 of the Inter-Colonial Convention required that when any port within a Colony was infected, measures, including the examination of departing passengers, should be taken which were in excess of the requirements of the International Sanitary Convention, 1903, then in force. But the new International Sanitary Convention, 1926, makes special provision for action by the port sanitary authority of an infected port on the departure of the ship (Article 13). By the new Convention, therefore, sufficient warrant is given for the quarantine action in the West Indies which was desired in 1903 but was not then covered by the International Sanitary Convention.

(2) Would the West Indian Colonies benefit by being parties to the new international Agreement? The answer to this seems hardly in doubt :—

(*a*) Their intelligence system in regard to infectious diseases would be improved and brought into line with the general international scheme to which it is anticipated the foreign countries in closest relation with the West Indies, including the United States, will be a party. (*b*) The procedures adopted in the case of each disease—plague, cholera, yellow fever, smallpox, &c.—would be an up-to-date agreed procedure based on modern knowledge and applicable to each disease according to its method of spread. (*c*) In the case of plague, the West Indian Colonies can, if they so desire,

take part in the systematic examination of ships every six months, at principal ports designated for the purpose under Article 28, to ascertain their condition in regard to rats and issue necessary certificates. And, finally, (*d*) the West Indian administrations, by participating in the Convention, will assist the International Health Office at Paris in its various duties as a central clearing-house for information under the Convention and in so doing will receive systematic information of much value for their current administration.

(3) Would acceptance of the 1926 International Convention make it necessary to drop the existing inter-Colonial system, designed to secure similar practice in the various West Indian Colonies? The answer to this is Article 57 of the Convention :—

> " Governments, taking into account their particular situation, may conclude special agreements amongst themselves, in order to make the sanitary measures prescribed by the Convention more efficacious and less burdensome."

So far as I am able to judge, a revision of the inter-Colonial Agreement and regulations thereunder, to bring them into line with, and make them the effective instrument of, the new International Sanitary Convention, might need a good deal of work and attention to detail, but would raise no difficulty in principle, whether regarded internationally or inter-Colonially.

In sum, therefore, it would seem reasonable in the circumstances to invite the West Indian Colonial Governments to consider whether they might not, safely and with profit, agree to adhere to the new Convention forthwith, while arranging for an early consideration of the inter-Colonial code which would cover the international provisions and form a supplementary special agreement under Article 57.

Hong Kong.

The position of Hong Kong in regard to adherence is of special interest in view of the enormous commerce of that port and its international traffic. The objection of Hong Kong is that the Convention of 1926 does not give sufficiently full warrant to their port authorities to place coolies and emigrants arriving from China *en masse* under " observation " (i.e., detention in camp for a sufficient period). It is considered that mere " surveillance " is inadequate. The Japanese Government in this respect made a special reservation in the Protocol of Signature of its right to " take such measures concerning cholera germ carriers as the sanitary authorities consider necessary." It is, however, doubtful whether this reservation was really required. The risks of introduction of cholera by coolies and emigrants travelling

short distances by sea was realised in preparing the draft Convention. The provision (Article 25, note) that " in all cases where the present Convention refers to *surveillance* the sanitary authority may substitute *observation* as an exceptional measure in the case of persons who do not offer adequate sanitary quarantine " was intended to meet this class of case. Further details regarding the necessities of Hong Kong would seem desirable before it can be finally concluded that the Convention would prevent the action which is considered necessary in this matter.

Notifications and " Intelligence " under the new Convention.

The International Health Office in Paris is now preparing for the collection of information, to be published in an annual handbook, regarding the sanitary organisation of principal ports, the list of ports which undertake to " deratise " pattern forms of certificates, and like matters. In this work the British delegates to the Office are being duly consulted, and will endeavour to ensure that the information sought and distributed is presented in a concise and practically useful form.

The Paris Office is also arranging with the Health Organisation of the League of Nations that any special notices or *communiqués* which it receives regarding the infectious diseases concerned, and which should be communicated generally, will be included in the weekly " epidemiological intelligence " bulletins now issued from Geneva and Singapore. Similar arrangements will probably be made shortly with the Pan-American Sanitary Bureau and with the International Quarantine Board of Egypt.

In view of the observations of one Colony (Uganda) it may be added that the immediate reporting of first outbreaks of cholera, plague, and yellow fever, or the existence of an " epidemic " of smallpox or typhus, required under Articles 1 and 2 of the Convention,* can normally be complied with, in the case of British Colonial administrations, by their continuing the present practice of informing the Colonial Office of such happenings by telegram. Necessary communications to the Paris Office will then be made from London. In addition, Colonial administrations will, under Article 3 of the Convention, be required to furnish similar notifications to diplomatic missions or consulates in the capital of their territory and to hold them at the disposition of other consular representatives established in their territory.

In order to save useless long-distance telegraphing, the International Health Office in Paris proposes to make free use of

* These are not of frequent occurrence. So far as can be reckoned, the number of such reportable happenings in any one year, in respect of all the diseases dealt with by the Convention in all parts of the world, would at most be about 150.

Article 7 for the purpose of distributing information regarding these first outbreaks, &c. Agreements have already been made with the League of Nations " Epidemiological Intelligence " Bureau at Singapore by which that Bureau will use its systems of code, cable, and wireless to transmit such information as received to countries in a " Far Eastern " zone. The Agreement will be open for the acceptance of any British Colony within that area, and should be of great utility and convenience to them. Agreements of the same kind with the Pan-American Sanitary Bureau for North and South America and with the International Quarantine Board of Egypt at Alexandria may also be expected. In all these cases it is intended that the individual country or Colony will be free to include itself in the regional scheme, or otherwise, on being acquainted with the nature of the arrangement.

It should be added that the International Pacific Health Conference, held in Melbourne in December last, outlined a plan by which administrations in an " Austral-Pacific " area (defined as south of the Equator between longitudes 140° E. and 140° W.) would satisfy all obligations of notification under the Convention by simply sending their messages to the Commonwealth Health Department, Melbourne, which would then, at its own charges, transmit the information to the International Health Office at Paris as well as the Singapore Bureau. In the same way, the Commonwealth Health Department would undertake the transmission to the administrations in the Austral-Pacific area of all information received by it from Paris, Singapore, &c. under the Convention. This suggestion has yet to be considered by the Governments concerned, but it seems to offer considerable general convenience. I may add that I was assured at Melbourne that any information which called for cabling to Paris would also be communicated to London and thus be at the disposal of any British administration.

G. S. B.

19*th May*, 1927.

APPENDIX XVII

Education.

(A)—CONSTITUTION OF AN ADVISORY COUNCIL ON EDUCATION TO COVER EDUCATION IN ALL THE COLONIES, PROTECTORATES, AND MANDATED TERRITORIES.

MEMORANDUM ON THE ADVISORY COMMITTEE ON NATIVE EDUCATION IN TROPICAL AFRICA BY MR. H. VISCHER, C.B.E., SECRETARY OF THE ADVISORY COMMITTEE.

Origin.

On the 6th June, 1923, a Conference was held at the Colonial Office to consider a Memorandum submitted, on behalf of the Education Committee of the Conference of Missionary Societies in Great Britain and Ireland, to the Secretary of State. This Memorandum set forth the state of native education in Africa, the importance of co-operation between missionary bodies and the Government, and the need for the establishment of a permanent Educational Advisory Committee at the Colonial Office.

The Conference was under the Chairmanship of the Parliamentary Under-Secretary of State, Mr. Ormsby Gore, and the following attended: Sir Hugh Clifford, Governor of Nigeria, Sir Gordon Guggisberg, Governor of the Gold Coast, Sir Ransford Slater, Governor of Sierra Leone, Sir Robert Coryndon, Governor of Kenya, Sir George Smith, Governor of Nyasaland, Mr. A. C. Hollis, of Tanganyika Territory, the Archbishop of Canterbury, Mr. J. H. Oldham, Secretary of the International Missionary Council, the Rev. Dr. Garfield Williams, of the Church Missionary Society, Dr. Jesse Jones, of the Phelps-Stokes Fund, Sir Herbert Read, Assistant Under-Secretary of State, and the heads of the four African Departments at the Colonial Office.

The recommendations submitted to the Secretary of State were as follows:—

1. A Committee to be constituted in the first instance as follows:—

(*a*) The Parliamentary Under-Secretary of State for the Colonies.

(*b*) An Assistant Under-Secretary of State or an Assistant Secretary.

(*c*) A representative appointed by the Board of Education.

(*d*) Five additional members, nominated by the Secretary of State, viz.,

Sir Frederick Lugard;
Sir Michael Sadler;
The Bishop of St. Edmundsbury and Ipswich;

A representative of the Conference of Missionary Societies;

A representative of Roman Catholic missions.

(*e*) The Governors of the African Colonies ex officio when at home.

2. The Committee to have power to co-opt additional members, subject to the approval of the Secretary of State.

3. Members of the Committee to be appointed for a period of three years and to be eligible for re-appointment.

4. When vacancies occur, the Committee to submit nominations to the Secretary of State for appointment.

5. The Committee to have power to appoint its own Secretary, subject to the approval of the Secretary of State.

6. The expenses of the Committee, including the salary of the Secretary, to be provided by the Colonial Governments.

7. The functions of the Committee to be the following :—

(*a*) To obtain and, in so far as may seem desirable, to publish information regarding the state and progress of education in the Colonies and Protectorates and Mandated Territories in Africa.

(*b*) To obtain information regarding the education of backward races and communities in other parts of the world and regarding the educational work of other Governments, e.g., negro education in the United States, native education in the Union of South Africa, the educational work of the United States Government in the Philippines, of the Belgian and French Governments in Africa, etc.

(*c*) To advise officers of the Education Departments in the African Colonies, and missionery educators, where they can best study particular problems in which they may be interested, and to put within the reach of teachers the best available experience and knowledge relating to their tasks.

(*d*) To keep in touch with British schools and universities with a view to keeping the claims of educational service in Africa before them and to assist in recruiting good men for educational work.

(*e*) In consultation with the Colonial Governments to help in thinking out the kind of education best adapted to the needs of the inhabitants of the African Colonies and the best means of providing it.

(*f*) To consider and advise regarding the means of bringing about the most effective and harmonious co-operation between the State and private agencies in education.

(*g*) To afford a means of consultation and reference with foreign States for the furtherance of a common inter-

national policy and co-operation in matters of African education.

(*h*) To advise the Colonial Governments in any matters which may be specifically referred by them to the Committee.

On the recommendations formulated at this Conference the Secretary of State created the Advisory Committee on Native Education in Tropical Africa.

Terms of Reference.

The terms of reference of the Advisory Committee are :—

To advise the Secretary of State on any matters of native education in the British Colonies and Protectorates in Tropical Africa, which he may from time to time refer to it, and to assist him in advancing the progress of education in those Colonies and Protectorates.

Composition of Committee.

The following were appointed to the Committee by the Secretary of State in 1923 :—

Mr. Ormsby Gore, as Parliamentary Under-Secretary of State, to be Chairman.

The following to be members :—

Sir Herbert Read, Assistant Under-Secretary of State;

The Right Rev. A. A. David, Bishop of Liverpool, former Headmaster of Rugby School;

The Right Rev. Bishop Bidwell, nominated by the Cardinal of Westminster, as representing Roman Catholic Missions;

Sir James Currie, formerly of the Sudan Education Service and Head of the Gordon College at Khartoum;

Sir Frederick Lugard, former Governor of Nigeria;

Mr. J. H. Oldham, as representing the Protestant Missions;

Sir Michael Sadler, Master of University College, Oxford.

Mr. H. Vischer, former Director of Education, Northern Nigeria, was appointed as Secretary and member.

During the time that Lord Arnold was Chairman of the Committee as Parliamentary Under-Secretary of State for the Colonies, Mr. Ormsby Gore joined the Committee as a member. On his return from East Africa, which he had visited as a member of the Parliamentary Commission, Major A. G. Church was appointed a member. Sir Charles Strachey replaced Sir Herbert Read as Assistant Under-Secretary of State.

In view of the important developments taking place in regard to female education, the Secretary of State in 1926 appointed the following as members :—

Miss S. Burstall, late Headmistress of Manchester Girls' High School and a member of various important bodies in Great Britain connected with women's education;

Miss A. W. Whitelaw, late Headmistress of Wycombe Abbey and a member of Mr. Oldham's Mission to South Africa and East Africa.

Owing to pressure of work, the Bishop of Liverpool resigned his membership towards the end of 1926 and Dr. T. P. Nunn, Professor of Education at London University and Principal of the London Day Training College, joined the Committee as a member.

Ex-officio Members.

All the Governors of the various African Dependencies are ex-officio members of the Committee and are invited to the meetings taking place during their presence in this country.

Directors of Education and Experts.

Directors of Education and senior officers of the various education departments, as well as senior officials from the various Dependencies, are invited to attend meetings to assist the Committee in understanding and discussing the various matters submitted to it, and the Chairman also arranges for the advice of special experts who may be available in this country to be obtained on specific subjects under discussion.

Financial.

The expenses of the Committee are met from contributions received from various Tropical African Dependencies. The expenses consist of the salaries of the Secretary and his office staff, payment of travelling expenses of members attending the meetings, and the cost of printing special documents for distribution, as well as any expenditure incurred in the course of special inquiries being made on behalf of the Committee.

Routine.

The Secretary has a room in the Colonial Office as an office. In this room are kept records of all work and correspondence. The Secretary's work can be divided into two parts: (1) his work with the various Dependencies through the Colonial Office, and (2) his work with the non-official agencies. As regards the first, he works in close contact with the various African Departments of the Colonial Office, who refer to him all correspondence dealing with native education in the various Dependencies. In consultation with the Chairman of the Committee, the Secretary prepares the agenda of the Committee meetings and decides

on the selection of subjects to be brought up for discussion at them. Minor points are dealt with directly between him and the heads of the various African Departments and Major Furse, the head of the Appointments Department.

The Secretary works with Major Furse regarding recruiting and the selection of candidates for educational appointments. Since the Secretary has taken up his duties, Major Furse has given him an opportunity of discussing every single appointment to an African education department, and all candidates have been interviewed either with him or at the Secretary's office.

The more important appointments have been referred to the Committee and very valuable assistance has been given by Members in finding specially qualified men for the various posts.

Secretary's Work.

An important part of the Secretary's work is to keep in personal touch with the Governors and the Directors of Education in the various African Dependencies on the one hand and with the missionary societies and all agencies connected with the work of native education on the other. In this way it has been found possible to keep the Committee informed of the progress of education and the various problems as they present themselves in the different African Dependencies. The Secretary may also be called upon to visit countries in Africa or elsewhere as the Secretary of State may direct.

Committee Meetings.

The agenda for the meetings of the Committee are prepared by the Secretary in the manner aforesaid in consultation with the Chairman and the heads of the various African Departments. Documents referring to matters under consideration are circulated to all members of the Committee. The various subjects discussed at the Committee meetings are shown below in the record of the Committee's work up to the present date.

Printing and Distribution of Minutes, &c.

After the Minutes of each meeting have been approved, they are printed and circulated to all members of the Committee as well as to the Governors of the various African Dependencies; together with the Minutes, despatches referring to matters that have been discussed, as well as memoranda drawn up by the Committee on special subjects, are dealt with in the same way.

The number of copies of these records sent to each Dependency is determined by the respective Governor and usually includes copies for the Colonial Secretaries and Directors of Education.

All these documents are confidential and it has not been found advisable to make them available for a wider public, although requests have been received from different Administrations for a wider distribution.

Demand for an educational Bulletin.

Some time ago a communication was received from an African Education Department, asking that the Committee should consider the possibility of issuing a regular Bulletin on native education, for distribution to missionary societies and all those interested in native education. The need is being felt everywhere for some means which would help all those engaged in native education to keep in touch with the work done in different parts of Africa and to profit from the experience gained by others.

The Committee, while feeling in sympathy with this proposal, were of opinion that the views of the various African Governors should first of all be ascertained, and their wishes carried out. A certain, but not great, expense to Colonial Governments would be involved.

Special work done by members of the Committee.

Apart from assisting in the discussion of the various matters referred to the Committee, members have done very valuable work in assisting in the recruitment of specially qualified candidates and in generally putting before a wider public the needs of native education in Africa. Special reference might be made to a paper written in the *Edinburgh Review* by Sir Frederick Lugard on Education in Tropical Africa, which was reprinted on the recommendation of the Committee and has since been used widely for distribution amongst prospective candidates. Other members have helped by getting candidates to apply for special posts and have served on Selection Committees on various occasions.

Memoranda issued by the Committee.

When the Committee came into existence it was found that a number of problems presented themselves which applied equally to the various Dependencies and called for a general ruling to guide those in charge of native education in the various Dependencies. The Committee dealt with these problems in various memoranda that were drawn up after full discussion and submitted to the Secretary of State. Three such memoranda have been prepared :—

1. *On the Policy of Native Education.*—This Memorandum was issued as a White Paper* in 1925. It was circulated by the Secretary of State to all the African Governors, who adopted it as representing the principles on which their system of native education should be built up.

2. *On British Education Staff.*—This Memorandum, which embodies recommendations of the Committee for recruiting and training Education Officers in Africa and the conditions under which they would be called upon to work in the various De-

* Cmd. 2374.

pendencies, was circulated to the different Governments by the Secretary of State and met with the general approval of the various African Governors.

3. *On the Use of the Vernacular in Native Education.*—This Memorandum, stating the tentative views of the Committee on a very difficult and debatable question, was circulated to all Governors with the request for the views of all those who had actual experience of native education in the various Dependencies. A very large number of replies were received, from official and unofficial sources, containing the most valuable information, which it is hoped to incorporate in a final draft of the Memorandum shortly to be issued.

Summary of other work done.

The following is a short account of the work done by the Committee in connection with the various matters referred to it by the Secretary of State :—

Annual Reports.

1. *Annual Education Department Reports.*—The Annual Reports on Education of the various Tropical Dependencies have been examined and discussed with a view to bringing out certain salient points in the work done and offering suggestions for further development. In this way the Committee hope to bring about a certain uniformity in the way in which these Reports are presented, which would be helpful to all those in charge of native education where the same problems are encountered. A special point is made to make it possible to discuss these Reports in the presence of the respective Directors of Education when on leave. These discussions are made more profitable when the Committee have before them a précis of the Report, bringing out the various salient points.

Special Reports.

2. *Discussion of Special Reports.*—The Committee had an opportunity of discussing with Dr. Jesse Jones his report on the inquiries made by the Phelps-Stokes Education Commission to East Africa. At a dinner given by His Majesty's Government to Dr. Jesse Jones, the members of the Committee met several members of this Commission and the leading people in education in this country as well as in Africa. The Chairman of the Committee publicly announced the Government's policy in native education in Africa, and copies of the White Paper,* containing the Committee's Memorandum, were distributed.

Achimota.

3. *Prince of Wales's College, Achimota.*—The Committee were asked to make a recommendation for the appointment of a Principal, and afterwards had an opportunity on several occasions

* Cmd. 2374.

to discuss the organisation and the work to be done at Achimota with Mr. Fraser and the Governor of the Gold Coast.

JEANES' TEACHERS' SCHOOL.

4. *Jeanes' Teachers' Training College, Kenya Colony.*—The Committee discussed the selection of a Principal and recommended the appointment of Mr. Dougall, whom they met. A member of the Committee, Mr. J. H. Oldham, was able to interest the Carnegie Foundation in this new experiment, and it was due to a donation of £4,500 from this body that this school for training visiting teachers in Kenya could be established.

UGANDA EDUCATION DEPARTMENT.

5. *Uganda Education.*—The Committee were able to discuss this subject very thoroughly with the first Director of Education, Mr. Hussey, whose selection they had recommended, and with the Governor. The Committee's recommendations for the general policy to be followed in the organisation and building up of the new Education Department were embodied in a special Memorandum drawn up by Sir Michael Sadler.

NEW DEVELOPMENTS.

6. Special problems and new developments in native education in the following Dependencies were discussed at various meetings, in the presence of the respective Governors and Education Officers: Southern Provinces of Nigeria. Tanganyika Territory, Zanzibar, Sierra Leone, Nyasaland, Northern Rhodesia, Gold Coast.

EDUCATION ORDINANCES.

7. *Education Ordinances.*—New Education Ordinances in Kenya Colony and the Gold Coast were discussed by the Committee.

New Education Ordinances for the Southern Provinces of Nigeria, Uganda, and Tanganyika Territory are due to be discussed shortly.

POST-GRADUATE COURSE.

8. *Post-Graduate course for Education candidates.*—In their Memorandum on Education Staff, the Committee recommended that arrangements should be made for such a course in England. The various African Governors were consulted and agreed with this proposal and the details of the course are now under consideration.

SPECIAL COURSE FOR MISSIONARIES.

9. *A special course for missionaries and non-officials doing Education work in African Dependencies.*—A proposal for such a course was submitted by the Governor of Tanganyika Territory, and the Committee have suggested, in consultation with Dr. Nunn, of the London Day Training College, that arrangements for this course should be made in London.

SUPERANNUATION ACT.

10. *Teachers' Superannuation Act.*—The Committee discussed this matter before the Bill came before Parliament and made certain suggestions in connection with teachers who might take up work in Africa for shorter periods. These suggestions were accepted and necessary provisions were made in the Act as it was passed by Parliament.

TEXTBOOKS.

11. *School Textbooks.*—The Committee has now appointed a special sub-committee to study the question of school textbooks.

AFRICAN LANGUAGES.

12. *African languages, etc.*—The Committee appointed one of the members, Sir Frederick Lugard, to represent it as its delegate on the Governing Body of the International Institute of African Languages and Cultures. At a Government luncheon, offered to the delegates attending the first General Meeting of the Institute, at which the Secretary of State presided, the members of the Committee met the various delegates attending the Meeting, including the foremost experts on African languages and ethnology.

IMPERIAL EDUCATION CONFERENCE.

13. *Imperial Education Conference.*—The Chairman of the Committee and the Secretary have been appointed as representatives of the Colonial Office to attend the Conference, and all members of the Committee will attend meetings of the Conference at which matters referring to African education will be discussed.

RECRUITING.

14. *Recruiting.*—A number of important educational appointments were referred to the Committee for their suggestions, and various members of the Committee have given valuable help in the matter of recruiting for the African Education Service. On the Committee's suggestion, a paper written by Sir Frederick Lugard on Education in Tropical Africa, for the *Edinburgh Review*, has been reprinted for distribution. The Committee also caused a paper dealing with a special aspect of native education, and written by an officer of the Tanganyika Education Department, to be published and reprinted.

Attendance at Meetings of officials and experts.

Meetings of the Committee have been attended by the Governors of Nigeria, Sierra Leone, the Gold Coast, Kenya, Uganda, Tanganyika Territory, and Northern Rhodesia, and the High Commissioner for Zanzibar, as well as by a number of

senior officers from the various Dependencies. The Committee also had opportunities for discussing various questions regarding their work with the Directors of Education of Tanganyika Territory, Uganda, Kenya, Zanzibar, the Gold Coast, Nigeria, the Principal of Achimota College, and a number of Education Officers belonging to the different Departments. The following attended meetings at the invitation of the Chairman to assist in a discussion of special points before the Committee: Dr. Jesse Jones, of the Phelps-Stokes Fund; the Rev. Dr. Garfield Williams; Bishop Biermans, Head of the Mill Hill Mission; Mr. Goodchild, Registrar of the University of London; Professor Alice Werner, of the London School of Oriental Studies; Dr. Loram, of the Union of South Africa; and the Rev. E. W. Smith.

Extension of Committee.

The above account of the composition of the Committee and the work done by it would seem to show best the way in which it could assist education in other Dependencies.

Most matters referred to the Committee have been connected with problems and difficulties that are encountered in education everywhere. The people qualified to give the best advice are those who understand and have experience of education. Although nearly seven out of the twelve members of the Committee, including the Chairman, have actual knowledge and experience of work in Africa, matters depending on local conditions have always been referred to, or discussed with, those actually connected with the work in Africa. The Committee, in view of possibly more frequent meetings, might require strengthening by the addition of one or two education experts available in this country.

By better co-ordination and preparation of matters for discussion, which the Secretary, in view of his three years' experience, should now be able to accomplish, it ought to be possible for the Committee to deal with the additional work which the extension of its reference would entail, without increasing to any appreciable extent the number of meetings. On the other hand, it will probably be found necessary to add to the Secretary's office staff in view of increasing correspondence and more work in connection with interviewing candidates for educational appointments and interviewing Education Officers when on leave in this country.

HANNS VISCHER.

10th April, 1927.

(B)—THE SUPERVISION OF COLONIAL GOVERNMENT SCHOLARS AND OTHER STUDENTS FROM THE COLONIES.

MEMORANDUM BY THE DIRECTOR OF COLONIAL SCHOLARS.

Office of Director.

Colonial Governments have granted Scholarships to local students for study in the United Kingdom since 1876 or earlier. The office of the Director of Colonial Scholars dates from 1902. Previously the scholars received their stipends through the Crown Agents, but there was no one who supervised them or to whom they could turn for personal advice or assistance; and in that year, on the recommendation of a departmental Committee, and after consultation with the Colonies concerned, the Secretary of State (Mr. Joseph Chamberlain) invited one of the Crown Agents, Mr. (now Sir) William Mercer, to undertake the duty of Director for the scholars of those Colonies which desired to employ his services. An honorarium of £3 a year for each scholar was fixed. Sir W. Mercer held the appointment till 1920, when I succeeded him. With the exception of Barbados, all the Colonial Governments granting scholarships now utilise the services of the Director. The Government of 'Iraq also does so, but students from 'Iraq are not included in what follows.

Director's Duties.

2. The Director's duties are described on page 29 of Sir George Fiddes' book, "The Dominions and Colonial Offices," as follows:—

> "He arranges, where necessary, for the reception of each student at the institution where he is to study; gives him general advice on his arrival, and afterwards as required; authorises the quarterly payment of his allowance, subject to being satisfied as to his conduct and diligence; makes advances to him for the payment of fees or other necessary purposes; sanctions payment on account of his medical expenses within the limits laid down by his Colony; reports periodically to the Colonial Government on the progress of his studies; and arranges for his return home when a passage is provided by the Government on the expiration of his Scholarship."

Schedule of "General" Scholarships.

3. The scholarships awarded by the Colonial Governments may be roughly classified as "general" or "vocational", the latter being granted for training or post-graduate study in special professional subjects, often with a Government appointment in view, while the former are intended for University or professional study generally, the choice of subject and place of study being

left mainly to the student himself subject to the approval of the Government. The following is a schedule of the "general" scholarships as awarded at present:—

Colony.	*Number of Scholarships.*	*Value and duration.*	*Remarks.*
Barbados ...	1 each year	£250 per annum for 3 years (or £750 divided over 4 or 5 years.) No passage allowances or medical expenses.	Age limit 20. Examination of standard for open scholarships at Oxford and Cambridge. Intended mainly for study at Oxford or Cambridge. Not under supervision of Director. Open to Girls since 1920.
Bermuda ...	1 each year	£150 per annum for 2 years.	For school education preparatory to candidature for Rhodes scholarships at Oxford Age 17–19.
British Guiana	1 each year	£600 spread over 3–5 years. May be increased by vote of Combined Council for medical students. No free passages or medical expenses.	Higher certificate test. Age limit 20. In every 3 years 2 for Science, Agriculture or Engineering, 1 for law, medicine or arts.
Ceylon ...	3 each year (from 1927 onwards)	£300 per annum for 2 years extensible for another year. Free passages, medical expenses up to £50. Outfit allowance £50.	1 for Mathematics. 1 for Arts (excluding Mathematics) 1 for Science (excluding Mathematics.) Awarded on London B.A. Honours or B. Sc. special examinations. Age not exceeding 22.
Grenada ...	1 each year (biennially in future)	£175 per annum for 3–5 years. Free passages at discretion of Governor in Council. Medical expenses up to £30. Temporarily increased to £210 per annum since the War, since reduced to £200.	Tenable in Europe, Canada or United States of America. On Cambridge Senior local, Honours standard, with exemption from London Matriculation. Age limit 20.
Jamaica ...	1 each year (Boys).	£750 spread over 3–5 years. No free passages or medical expenses.	On Higher Certificate Examination. Age 17–19.
	1 each year (Girls).	£250 per annum for 3 years. No free passages or medical expenses.	On examination exempting from London Matriculation, or qualifying for admission to a College at Oxford or Cambridge. Age 18–20.
	1 £60 scholarship each year.	£60 per annum for 3 years.	On Higher Certificate Examination. Age 18–19. Not primarily intended for study in England.

Colony.	*Number of Scholarships.*	*Value and duration.*	*Remarks.*
Leeward Islands	1 each year	£150 per annum for 3 years.	On Cambridge Senior (Honours). Age 17–20. Scholars usually go to Canada.
Mauritius ...	2 each year	£250 per annum for 4 years, plus temporary increase 30 per cent. to cover cost of living. Extensible for further period according to course of study. Free passages, and allowance for incidental travelling expenses. Medical expenses up to £50.	1 Classical, 1 Modern, on results of special examination conducted by Cambridge Syndicate. Age limit 20.
Palestine ...	2 each year (or 1).	From £E.200 to £E.275 per annum for 3 years at discretion of Government. Free passages.	Graduates of Beirut University. Intended for study at Oxford or Cambridge. Scholars undertake to serve afterwards for a period in Education Department of Palestine.
St. Lucia ...	1 each year	£175 per annum for 3–5 years. Medical expenses up to £30. Allowances for passages.	Tenable in Europe, Canada, or United States of America. On London Matriculation Examination. Age limit 20.
St. Vincent ...	1 biennially	£250 per annum for 3–5 years. Allowances towards passages. Medical expenses up to £30.	Tenable in Europe, Canada, or United States of America. On Cambridge Senior with 2nd Class Honours and exemption from London Matriculation. Age limit 20.
Seychelles ...	1 each year (Suspended since War).	£600 over 4–5 years.	
Straits Settlements and Malay States.	2 each year	From £150 to £500 per annum for any period up to 6 years, at discretion of Government. Free Passages. Medical expenses up to £100.	Either sex. Age 17–20. On special examination conducted by Cambridge Syndicate. Intended for Oxford or Cambridge (except by special permission).
Trinidad ...	2 each year	£800 over period required. No allowance towards passages. Medical expenses up to £30.	1 "Colonial Scholarship." 1 "Colonial Science Scholarship." On Higher Certificate examination. Age limit 19.

Trans-Jordan.

4. The young son of the Amir of Trans-Jordan has been placed in the Director's charge.

Kedah.

5. Nine sons and grandsons of the Sultan of the Unfederated Malay State of Kedah have also been placed under the supervision of the Director. These are still in England, and two other scholars from the same State were sent over about a year ago. In the case of all these students it is considered desirable to exercise a specially close supervision with frequent personal visits, and a retired Malay States officer has been appointed "Supervisor of Kedah Students," at an annual salary, to assist the Director.

Kelantan.

6. A similar plan has recently been adopted for a State scholar from Kelantan.

Other Malay States.

7. Certain other State students from Malaya have been placed, not in the charge of the Director, but under the direct supervision of a retired Colonial officer or a college tutor.

Vocational Scholarships.

8. The scholarships of Palestine, being intended for subsequent service in the Education Department, might be properly classed as vocational. Trinidad established an agricultural scholarship a few years ago, which has since, I gather, been merged in the "Colonial Science Scholarship." But the plan of granting vocational scholarships has been developed chiefly by Ceylon and Mauritius.

Ceylon.

9. Ceylon awards annually one scholarship for the study of agriculture or forestry and two for engineering, both on the results of the London B.Sc. Final. The emoluments and conditions are generally the same as in the case of the general University scholarships, except that the Engineering scholarships are tenable for three years, extensible for a fourth year for practical training. No promise of a Government appointment is given, nor any undertaking required from scholars that they will serve the Government, but some preference is given to them in filling vacancies. Ceylon also gave a scholarship on one occasion to a recently qualified native doctor for the special study of radiology, in preparation for his taking up a special hospital appointment in Ceylon; also one or two special engineering scholarships. In 1925 four Ceylonese survey probationers were sent home with scholarship allowances for a year's special course of training at Cambridge and at the Ordnance Survey, Southampton; this plan, I understand, is to be continued from time to time.

Mauritius.

10. Mauritius awards one laureateship of the Mauritius Agricultural College each year, of the total value, inclusive of passages, &c., of Rupees 16,000, spread over two or three years. Age limit 25. The laureate undertakes to serve afterwards if required in the Department of Agriculture. Further, in 1923 the Colonial Government set aside a special "Government Scholarship Fund" of the value of Rupees 500,000 for the purpose of providing, out of the income therefrom, (*a*) grants to officers already in or about to enter Government Departments, to enable them to pursue approved courses of study or practice bearing on the work of the Departments, (*b*) grants to medical or other professional men in aid of approved studies that may be beneficial to the Colony, (*c*) grants of the same nature to students, (*d*) grants for the purpose of approved research work. The grants hitherto made out of this Fund include scholarships for the study of horticulture, civil engineering, railway management, psychological medicine, bacteriology, astronomy, forestry, and radiology. Holders of these special scholarships undertake to serve for a period in a Government Department, if required.

Numbers.

11. The number of scholars and other State students at present under the charge of the Director is 71.

Races.

12. The scholars include students of a great variety of races. Some are of pure white descent, others of African or mixed descent, while the Eastern Colonies send burghers, Singalese, Malays, and Chinese. Scholars of Indian origin also come from Ceylon, Mauritius, and the West Indies.

Sex.

13. Jamaica awards separate scholarships for boys and girls, and in some other Colonies at least (e.g., Barbados and the Straits Settlements) the scholarships are open to candidates of either sex. I am not aware, however, that there have been any girl scholars in the past other than those from Jamaica.

Ages.

14. The scholars are of various ages. As shown above the Bermuda scholarships are for schoolboys. Otherwise the holders of "general" scholarships are usually between 18 and 21 on arrival, the practice being to award them on the results of the Cambridge and Oxford local examinations, or the London Matriculation, or a special examination of similar standard conducted by an English University authority. In Ceylon, however, where there is a University College which

takes students up to the final examinations for the B.A. or B.Sc. of London University, scholarship candidates are now required to have taken one of these degrees, and are therefore rather older. The scholars of Palestine are graduates of the University of Beirut. The "vocational" scholars from Ceylon and Mauritius may be of any age, from youths to men (occasionally) of 40 or 45.

Universities, &c.

15. The Universities attended by the scholars have included Oxford, Cambridge, London, Birmingham, Liverpool, Manchester, Leeds, Bristol, Aberystwyth, Edinburgh, Glasgow, St. Andrews, Aberdeen, Dublin (National University), and Belfast. To these must be added the Inns of Court, various technical colleges and hospital medical schools, and employment with engineering firms.

Value of scholarships and need to implement from private sources.

16. It will be observed that the value of the scholarships (omitting the Jamaica £60 scholarships which are not primarily intended for study in England) varies from £150 to £500 a year. It is, of course, an important question whether the emoluments are sufficient to meet all the necessary expenses of the student without additions from private sources. Some of the Governments intend them to be so sufficient, others not, while in some Colonies the extent to which the expenses of students have increased since the War is perhaps not fully realised. At Oxford or Cambridge, for a student from a distant Colony with no relatives in this country, the minimum total cost of board, lodging, college and university fees, with all personal expenses, including the vacations, assuming reasonable economy, is usually put at £350 to £400 a year; the Oxford Delegacy for Oriental Students insist in fact on an income of this amount being available. In London the figure may be taken at about £50 less, while living would be cheaper again at the Scottish or the provincial English Universities, and possibly still more so in Ireland. These are, of course, only very general figures, and the cost naturally varies with circumstances, such as the social habits of the student, the extent to which he takes part in the corporate life of his college, and also his particular course of study, the fees and the cost of books and equipment being higher for some subjects than for others. It is certainly true at any rate of a large proportion of the Colonial scholars that their scholarship emoluments are not sufficient to cover all expenses. Comparatively few win further scholarships in this country, so that the supply of additional funds from private sources is frequently necessary. Where this is the case it is clearly very desirable that full warning at least should be given to the scholar and his parents before he comes over. Such warnings have not always been given, and I have

known students to arrive with a very inadequate estimation of the income they will need. Some Colonies have adopted a rule requiring scholars to satisfy the Government, before their course and place of study are approved, that they have enough means to meet the expenses involved. One Colony, however, has felt unable to adopt such a rule because it might be open to political misconstruction. In the case of the Malaya Queen's Scholarships the Government is left free, within wide limits, to fix the annual stipend according to the course and place of study and the scholar's financial circumstances.

17. In a few Colonies the scholarship emoluments are not a fixed annual sum but a fixed total sum which is spread over three, four, or five years according to the requirements of the course of study. This stabilises the financial liability of the Government but has the disadvantage that it tends to encourage short-course studies such as law rather than subjects such as medicine (which now usually takes five and a half to six years).

18. Trinidad adopted, for a few years after the War, the plan of giving a fixed annual allowance in addition to the fees payable to the institution at which the scholar was studying. This plan has now been discontinued, and it is not very satisfactory since it frequently gives rise to questions as to whether particular items should be allowed as fees.

Passages.

19. Usually scholars are given free passages to this country and are entitled to return passages if they return within a certain time (usually two years) after their scholarship has expired. Some of the West Indian Colonies, however, do not grant either free passages or an allowance towards the cost of passages. This has had unfortunate results in a few cases where the students, having poor parents, and being unable to save money for their return passage, have relied on getting an appointment at the end of their studies, and on being disappointed in the hope have been reduced to distress.

Medical Expenses.

20. The Director is usually given discretion to meet the necessary medical expenses of scholars up to a limit, which is variously fixed at £30, £50, and £100, for the whole period of the scholarship. There has been no special difficulty in this respect. The practice is to allow (within the prescribed maximum) reasonable expenses for medical, surgical, or dental treatment and nursing, but not to pay for special dentures, spectacles, or medicines.

Director's disciplinary powers.

21. One of the questions considered at the time of the creation of the office of Director was the extent of his disciplinary powers, and in particular whether he should be empowered to fine a

scholar. Several Colonies have given him a limited power to fine, but neither my predecessor nor I have ever had occasion to exercise it. Minor lapses or shortcomings are best dealt with by friendly advice or warnings, to which the student rarely fails to respond. Repeated or serious offences or breaches of the scholarship conditions are reported to the Colony for decision, payment of the allowance being meanwhile suspended if necessary. Fear of forfeiture of the scholarship is the best deterrent, whereas fines would only add to the student's financial difficulties, already frequent enough.

Advances.

22. Some Colonies have at times expressed the view that advances to scholars in anticipation of their allowances should be refused or at least given only very exceptionally. This is, however, scarcely practicable. All scholars have to spend money initially on outfit, equipment, and admission fees, in addition to the incidental expenses connected with the voyage to England. Many take a little time in the novel conditions of this country to "find their feet" and learn the art of regulating their expenditure. Others find that the expenses are much heavier than they were led to expect and cannot arrange at once (if they can arrange at all) for supplementary remittances from their parents. College fees, moreover, are often payable for a year in advance. For all these reasons I have found it necessary to be fairly liberal in authorising advances, especially during the first year, the amounts being recovered in convenient instalments. Even if, at a later stage, a student is in financial straits through his own improvidence, it is not always, in my view, advisable to refuse to assist him with an advance. I endeavour in such cases to use my discretion in the same way as a parent.

Holiday and lodging arrangements.

23. In the letter from the Colonial Office of 27th March, 1902, defining the duties of the Director, one paragraph reads, " Generally it is hoped that the scholars will profit by the advice of the Director especially in regard to the manner in which they spend their vacations, as to which the Committee suggest that some general arrangement may be feasible." This has not proved to be the case. The scholars appear to find no difficulty in arranging how to spend their holidays and rarely or never ask the Director's help or advice. This remark also applies to the question of finding lodgings, in London or elsewhere; in this respect assistance is usually available at the colleges themselves or the scholars have student friends to solve the problem for them.

Admission into Universities, &c.

24. The Director's duties in connection with the securing of admission for scholars into Universities and Colleges have become more onerous during the last few years. Owing to

various causes the demand for admission to higher educational institutions has increased very greatly since the War, and the congestion, especially at Oxford and Cambridge, appears to be less temporary than might have been anticipated. The difficulties in this respect for Colonial Scholars are twofold. In the first place, the Universities and Colleges have stiffened up the educational standards required before admission. At Oxford and Cambridge a candidate must now be clear of Responsions or the Previous Examination before his application will be considered by the Colleges, and the conditions required for exemption from those examinations are not always understood in the Colonies. Difficulty frequently arises, for instance, over the absence of Latin and a second language from the examination on which the student relies for exemption. These difficulties occur more particularly at Oxford and Cambridge, but sometimes also at other Universities, the Inns of Court, &c., and, as the conditions are liable to be changed from time to time, it is important that the Education Departments in the Colonies concerned should keep themselves supplied with up-to-date information in such matters. In the second place, owing probably to the very large number of applicants from India, all the Colleges at Oxford and Cambridge strictly limit the number of Oriental students they will take, and tend to fill up their limited vacancies a long time ahead. At Oxford there is an official Delegacy for Oriental students through which all applications must pass; about the end of March the Delegacy circulates its lists of candidates for the following October to the various Colleges, which exercise an unfettered choice in selecting candidates for admission. At Cambridge there is no such general arrangement, and the Colleges may fill their vacancies for Oriental students even much earlier than March. On the other hand, particulars of new scholars requiring places at Cambridge are usually not received by the Director till February or March. To meet this difficulty a scheme has been in process of arrangement under which a certain number of vacancies at colleges will be reserved up to a given date for Oriental students nominated by the Director subject to their being found acceptable by the Colleges. The scheme is not yet completed, but even when it is it is doubtful if it will provide places for all Colonial Government scholars of Oriental race who want them; and Colonies are in any case strongly advised to send the earliest possible notice to the Director of any scholars requiring places at Cambridge.

Benefits of Scholarship system.

25. When the question of creating the office of the Director was under consideration the Colonies which then awarded scholarships were asked by Mr. Chamberlain whether the system had proved beneficial to the scholars and to the Colonies themselves. These questions were answered by all in the affirmative, and other Colonies have since established scholarships.

Recently, however, the Governors of the West African Colonies expressed the view that the time had not yet arrived for extending the system to them. So far as the scholars themselves are concerned, my experience is that, while few achieve brilliance, they are, with not many exceptions, well-behaved, diligent, and successful students. Of their success in later life I cannot speak as I seldom hear news of them afterwards; the results reported by the Colonies in 1900 were, however, quite satisfactory. Most return to their own Colonies. Of the benefits of the scholarship system to the Colonies I am also not in a position to speak, though it may be pointed out that such benefits may accrue either through the stimulus given to local education by the competitions for the scholarships, or more directly through the scholars themselves—their services in Government employment, their acquaintance with English life and institutions, the friendships they form in this country, their influence as leaders of native public opinion, &c. It is well known, of course, on the other hand, that under some conditions the influence exercised by native students returned from England may be the reverse of beneficial. The danger of ill results, where otherwise real, is perhaps least to be feared in the case of vocational scholarships, followed by Government employment, in such subjects as medicine, engineering, and agriculture.

Private Students from Colonies.

26. So far I have dealt only with Government scholars from the Colonies. Although these are picked students the need for providing them with general supervision and advice has, I think, been confirmed by experience. The need in the case of ordinary private or unofficial students is evidently even greater, but it is far more difficult to meet. I do not refer to children at school, for whom individual arrangements are clearly necessary in each case, but to students of university age. Some idea of the numbers involved is given by the following figures published by the Universities Bureau of the British Empire as the numbers of students from different countries (of both sexes) in the Universities and University Colleges of Great Britain and Ireland in October, 1926 :—

West Africa	46
East Africa	5
Mauritius and Seychelles	33
West Indies and Bermuda	129
Straits Settlements and Malaya	45
Ceylon (included in Indian total of 1,361) (approximate)	200
Palestine	42
Fiji and New Hebrides	2

27. These figures include Government scholars as well as private students. They cover, in addition to Universities, such

institutions as training colleges and the colleges of music, but not the Inns of Court, which would no doubt add substantially to the numbers (though many students at the Inns belong at the same time to a University also), nor students working with engineering, accounting, and other firms.

Special Arrangements for Ceylon Students.

28. The Colony which provides the largest number of private students is Ceylon. The Government of that Colony made a special arrangement about nine years ago, under which private students may be placed by their parents or guardians under the Director's supervision and control. In these cases, of which there are some four or five at a time, the students' allowances are paid through me. Others come to me just for help in obtaining places at colleges, &c., or apprenticeships with firms, or sometimes for advice when they have got into some kind of difficulty. Before any student is given a passport to come to England, the Government require him to fill up a form which gives particulars about himself, his educational attainments, his proposed place and course of study, &c., with certificates and recommendations from his schools and colleges, and the person who undertakes responsibility for providing funds to meet his expenses in England has to sign the form as well as the student himself. Copies of all these forms are sent to me through the Colonial Office. The Ceylon students have an Association which holds meetings in London every month or fortnight and an annual dinner. They have for a few years been endeavouring to secure the establishment, with Government support, of a Union with club rooms in London and residential accommodation, somewhat on the lines of the Indian Students' Hostels, but rather differently governed.

West Indians.

29. A movement for the establishment of a similar Union for West Indian students was started in 1923, and a committee for the purpose was formed with Sir Sydney (now Lord) Olivier as Chairman. The scheme was recommended by the Secretary of State (Mr. J. H. Thomas) to the West Indian Governments, a few of whom expressed their readiness to make small grants towards an endowment fund, but an attempt to organise an appeal for funds to the public in the West Indies met with no support and the scheme was dropped.

Africans, &c.

30. There is a Union of Students of African descent, and some Colonial students join the Students' Christian Movement. A Committee of the Victoria League, I understand, gives assistance to Dominion and Colonial students who apply to it, in the way of introduction and advice. Such institutions are no doubt useful in their various ways, but as a correspondent puts it in regard

to Africans " these efforts avail little, especially as affecting the independent and more difficult kind of Africans who come to this country on their own and want, above all, to be free from control. They are the people who get into trouble." Where control is needed, it must (as under the Ceylon arrangement) be delegated by the parents and include financial control which in the circumstances is the only effective kind. But the work of control may be very troublesome and difficult to get undertaken.

Students in financial straits.

31. Cases have arisen to my knowledge from time to time of Colonial students who for one reason or another have fallen into a state of financial distress and are unable to continue their studies, which may sometimes be on the eve of completion. There are no funds available in this country to assist deserving cases of this sort, and the most that the Colonial Office can usually do is to arrange for repatriation at the expense and after obtaining the consent of the Colonial Government concerned.

P. H. EZECHIEL,
DIRECTOR OF COLONIAL SCHOLARS

2nd April, 1927.

(C).—EXAMINATION STANDARDS FOR LOCAL ENTRY OF CLERKS, ETC., INTO THE COLONIAL SERVICES.

MEMORANDUM BY THE PARLIAMENTARY UNDER-SECRETARY OF STATE FOR THE COLONIES.

Any examination laid down by a Colonial Government in regard to the local entry into the Civil Service is important from two points of view. It is important from the point of view of the quality of the subordinate staff in the Service, but it is even more important from the influence that the Civil Service examination is bound to have on the whole educational curriculum in the schools of the Colony. In many Colonies Government service is increasingly regarded as the goal to be aimed at by pupils in both Government and missionary schools. In the Gold Coast, for example, no less than 1,000 candidates sat for a recent local Civil Service examination. It is essential, therefore, that the Civil Service examinations should be considered in the light of the general educational policy of any Colonial Government, and the interaction of the examination upon the curricula of schools, and of the curricula of schools on the examination, should be constantly borne in mind.

In some Colonies a system obtains whereby the local examinations are supplementary to an educational qualification or diploma, and in some cases entry is by means of selection from among holders of a particular certificate of this kind. For instance, in the Federated Malay States candidates for the General Clerical Service are required to be holders of an Oxford or Cambridge Senior or Junior Local Examination Certificate. In the Straits Settlements it is laid down that candidates for the General Clerical Service should ordinarily be holders of either (*a*) an Oxford or Cambridge Senior or Junior Local Examination Certificate, or (*b*) the Junior Commercial Certificate of the London Chamber of Commerce for English, Arithmetic, Handwriting, Shorthand, Typing, etc. In Sierra Leone candidates who have passed the Cambridge Senior or the First Year Arts (Durham University) Course, with mathematics as a subject, enter the Service on a higher initial salary than those who pass the local examination for entry into the Native Clerical Service; while those who are in possession of a University degree receive a still higher initial salary.

We therefore have to consider not only the type and standard of local Civil Service examinations, but also their influence on the educational system, and making entry into the Civil Service wholly or partly dependent upon the possession of certain external certificates. It is now generally recognised in England that the Oxford and Cambridge Junior Certificates are of doubtful value as certificates of educational attainment, and in the case of the Oxford and Cambridge Senior examinations the question of their adaptation to local needs and environment requires constant watching.

It is obviously impracticable to suggest anything in the nature of uniformity of practice among the Colonies, where the provision made for education varies so widely, and where, for historical if for no other reasons, great differences occur. But it is clear that we are entering a period of Colonial history, especially in Africa, where the educational effort of both Government and missionaries is expanding very rapidly, and consequently this question of examination tests, which has proved a very difficult and controversial question both in India and at home, deserves very careful and far-sighted attention.

In the more advanced and developed Colonies such as Ceylon there is clearly a tendency growing in the minds of the Cingalese in favour of a more extensive replacement of European personnel in the Civil Service by native, and this again raises the question of the standard set in the local Civil Service examination.

One further word by way of introduction. It would seem clear that in most Colonies the standard of education is steadily rising, and as this takes place it is reasonable to require that the standard of entry into the Government Service should rise *pari*

passu. Standards will have to be revised fairly regularly, and thereby the Government can be assured of getting the very best candidates coming forward from the schools in the interests of the Service.

Very few Colonies have embarked upon competitive examinations, and it is questionable whether it is not desirable to avoid competitive examinations wherever possible. In the Gold Coast the examination is both qualifying and competitive. Of the 1,000 candidates to whom I referred above, it appears that 20 per cent. were marked as having been successful, i.e., had obtained not less than 40 per cent. of the marks in each subject. Successful candidates in the examination are placed on a list in order of merit (or, to be more accurate, in order of marks) and are appointed to vacancies as they occur. They then serve as probationers for three years, at the end of which period they may be confirmed in their appointments without any further examination.

In Ceylon all candidates must be between the ages of 17 and 23, and must have previously passed either :—

(*a*) the Cambridge Senior or the London Matriculation or higher examination of the University of London; or

(*b*) the Cambridge Junior or the Elementary School Leaving Certificate Examination, and either (1) the examination for the Commercial Certificate of the Government Technical School or of the Ceylon Chamber of Commerce, or (2) the examination for the London Chamber of Commerce Junior Certificate in English, Arithmetic, and either Book-keeping or Shorthand.

Subject to these preliminary qualifications there is a local competitive examination in two parts.

As far as I have been able to ascertain these are the only two Colonies where the competitive system has so far been introduced.

In Nigeria candidates for the Native Clerical Service are required to pass a qualifying examination unless specially exempted by the Governor. Candidates are not required to have attained any particular standard or certificate. The examination papers are set by the Director of Education and, in addition to the ordinary subjects, include a special general intelligence paper. This latter includes for the lower division the history and geography of Nigeria, and in the case of the higher division the history of the development of West Africa as a whole.

As will be seen from Annex II the Cyprus examination requires every candidate to satisfy the examiners in geography with special questions on Cyprus and " on those countries connected with Cyprus commercially."

In East Africa the conditions vary considerably in the different dependencies. In Kenya, and only in Kenya, is there provision for the local entry of a European Clerical Staff. The Kenya European Clerical staff is divided into learners,

juniors, and the main clerical service. Candidates for entry as learners are not required to pass any special examination, but are required to be in possession of a Cambridge Junior Certificate or its equivalent. Candidates for appointments as juniors, the minimum age of entry for which is 18 years, are required to be in possession of the Cambridge Junior Certificate or its equivalent, or to pass the prescribed examination which is set locally. Candidates for entry into the main European Clerical Service are either promoted from the junior grade on passing a further local examination, or enter direct by express permission of the Colonial Secretary, in the event of there being no suitable candidates among the juniors. The minimum age of entry for the main service is 21 years.

As regards the entry of non-European Clerical Staff in the Government Service in Kenya, candidates are not required to pass any special examination or to have attained any particular standard. Entry is by selection only, but clerks are required to serve on probation for a period of three years and to pass a local examination before confirmation in their appointments at the end of this time.

In Tanganyika Territory there are different conditions for entry into the African Clerical Service and the Asiatic Clerical Service. As regards the African Clerical Service there is a lower and a higher division. Candidates for the lower grade are not required to pass any examination, but are selected for appointment subject to having attained a satisfactory standard at school or to their passing a short test in English and typewriting. The higher division of the Service is recruited either from the lower division or directly by a local examination. This local examination is made by the Director of Education, and selected candidates are required to obtain at least 50 per cent. of the marks.

With regard to the Asiatic Clerical Service, a considerable number of the candidates are still recruited from India, where they are given a test before departure for the Territory. But all Asiatic clerks, whether of local or of Indian origin, are required to pass an examination after a probationary period before they are confirmed in their appointments.

In Nyasaland candidates for the Native Clerical Service are required to pass a special qualifying examination and must be in possession of a certificate not lower than the Second Class VI Standard, but it should be mentioned that, in view of the shortage of candidates coming forward for the Service in Nyasaland, the Governor has recently instituted a special training class under the supervision of the Assistant Secretary.

In Mauritius local candidates for the Civil Service must be between the ages of 17 and 25 and must hold the certificate of the Cambridge Senior or London Matriculation. There is no entrance examination or confirmatory examination.

In Jamaica candidates must be between the ages of 16 and 25 and must either be in possession of a Cambridge Senior Certificate or hold an educational record of equal value in the opinion of the Governor. Approved candidates are interviewed by a special Public Service Selection Committee, on whose recommendation the Governor makes appointments. This Selection Committee may, if they think it necessary, test the educational qualifications of any candidate by special examination.

A statement of the conditions of entry into the Service in Hong Kong will be found in Annex I.

April, 1927. W. O. G.

ANNEX I.

CLERICAL SERVICE IN HONG KONG.

MEMORANDUM BY MR. S. B. B. MCELDERRY, CADET OFFICER, CLASS II, HONG KONG.

1. The clerical service in Hong Kong is divided into two main groups, the Senior Staff numbering about 30 and the General Clerical Establishment about 660.

Senior Staff.

2. The Senior Staff is composed mostly of Europeans with a few Eurasians. Salaries are on a sterling basis, rising from £200 per annum to a maximum of £900 per annum for some special posts at the top. The work of the Senior Staff is often confidential and involves duties of an administrative nature such as the supervision of Chinese staff.

Posts on the Senior Staff have in the past been filled by the transfer of suitable officers from subordinate technical appointments, by appointment of local candidates with clerical experience, and by recruitment from the sons of Europeans living in Hong Kong. This service has recently been reorganised so that it may offer improved prospects of a career to boys of from 18 to 21 entering it as probationers, and it is intended in future to fill the higher posts as far as possible only by promotion from within the service. European officers of the Police, Public Works Department, Sanitary Department, &c., and other European residents of Hong Kong of similar social standing are often glad of opportunities such as this service offers, as they are thus enabled to keep their families together and to exercise continued influence and control over their boys. Generally speaking, these boys will have received their education partly in Hong Kong and partly in Great Britain.

General Establishment.

3. The general clerical establishment is grouped in classes on scales of salary ranging from $450 per annum to $4,800 per annum, all the higher posts being filled by promotion. The lowest class is on the scale $450 to $850 by $50 annually and is recruited locally from Chinese, Indian, and Eurasian boys. Before being posted to Departments, clerks receive a few months' preliminary training in the Treasury and Colonial Secretariat in office routine, methods of filing records, &c.

Entrance Examinations.

Competitive entrance examinations are held by the Education Department twice a year and candidates are classified in order of merit and are called up as vacancies occur. Satisfactory character certificates from their former headmasters are required.

Subjects of Entrance Examination.

The subjects for the entrance examination are the ordinary school subjects. Candidates are expected to be able to read, write, and speak English reasonably well, and to have a good knowledge of elementary arithmetic. In the case of Chinese boys special importance is attached to proficiency in Chinese. A general knowledge paper including questions on geography and history is also included. In the selection no attempt is made to take into account a knowledge of technical subjects specially useful for office work, such as typewriting, shorthand, and bookkeeping, as specialisation in these subjects at the schools would be likely to interfere with the claims of a more general education. But once clerks are appointed and have served satisfactorily for a period of three months they can obtain a year's seniority with the corresponding increment of salary on passing a qualifying examination in typewriting, and a similar arrangement holds good for bookkeeping. Many clerks avail themselves of these opportunities.

Shorthand is encouraged by a system of allowances to clerks holding certificates; but owing to the rather low standard of English obtaining generally among the clerks few have found it possible to reach the minimum standard of proficiency in shorthand. There should be less difficulty in future as the standard of English improves.

Inducements to Complete School Courses.

4. Financial considerations tempt Chinese to take their boys away from school as soon as they can begin to earn a living; in order to counteract this tendency and with a view to keeping boys at school until they reach the standard of Matriculation, special arrangements have been made for the recruitment into

Government service without further examination of boys who have passed the Hong Kong University Matriculation Examination and the Senior Local Examination. Three and two years' seniority and position on the incremental scale are granted respectively for these examinations; so that boys who remain at school do not find themselves placed behind their fellows who may have left school earlier to enter Government service.

Educational Policy of Government.

These arrangements for the recruitment of the clerical staff have now been in force for some years and have noticeably increased the efficiency of the junior ranks. They also serve to further the general educational policy of the Government by inducing boys to remain longer at school and so attain a higher standard of general education; while the importance attached in the entrance examination to a knowledge of Chinese also supports the Government policy of endeavouring to secure that Chinese boys in Hong Kong shall receive a proper grounding in their own language.

Promotions.

5. The numbers of the various classes are fixed by the annual estimates, and promotions are made as vacancies occur. In order to ensure proper reward of merit, and to retain in the service the better men, confidential records, giving the educational and other qualifications of each officer, with a confidential report added each year by the head of the Department in which the officer has been serving, are kept, and when vacancies occur officers are selected for promotion in the light of these records and having regard to seniority.

In addition to the special typing and bookkeeping increments for VIth class clerks, and to the shorthand allowances, bonuses are granted to clerks of whatever standing who pass the prescribed examinations and obtain certificates in interpretation and translation, and these qualifications are also taken into account in connection with promotions.

Special Class for Eurasians and Indians.

6. The Eurasians and higher-class Indians of Hong Kong have as a rule a better command of English than the Chinese and are more suitable for work which brings them into direct contact with the non-Chinese public. They have also more initiative and better powers of discipline and control, and they are not susceptible to the same political and social influences. They therefore command higher salaries in banks and commercial offices, and if they are to be retained in Government service special arrangements must be made for them. There is no very definite dividing line as Eurasians merge into Chinese, and difficulties of special treatment are increased on this account.

A solution of the problem has been found by creating a Special Class on a scale of salary $1,000 to $2,000 by $100 annually (as compared with the lowest salary scale, $450 to $850 by $50, of the general establishment), to which appointments of selected persons are made direct or by transfer from the general establishment. On reaching the maximum of the class clerks are eligible for promotion into Class II of the general establishment on salary $2,200 to $2,800 by $150 annually, when they merge again with the Chinese staff. Specially suitable clerks of the Special Class may also be transferred to the Senior Staff.

Employment of University-Educated Chinese.

7. In Ceylon, Cingalese with an English education are employed in the Secretariat for the drafting of letters and preparation of précis and extracts of documents, thereby setting free the European officers of the Secretariat from much routine work and enabling them to devote their energies more to questions of principle.

It is thought that similar use might be made in Hong Kong of Chinese graduates of the Hong Kong University with a view to economising European personnel, and the idea is now being given a trial. It is too early yet to say whether it is likely to prove successful.

April, 1927. S. B. B. MoE.

ANNEX II.

CYPRUS.

Civil Service Examination.

1. All persons nominated by His Excellency the Governor for employment in the Cyprus Civil Service, except those in a subordinate position, such as Messengers, are required to pass a qualifying examination, or must otherwise satisfy the Government that they possess the necessary qualifications for the posts to which they are appointed.

2. The persons nominated must state which one of the three official languages, English, Turkish, or Greek, is their customary tongue, and will be required to show a good proficiency in it, including Reading, Composition, Grammar, and Dictation.

3. Turkish or Greek speaking candidates, who have passed the Ordinary Standard Examination in English, will not be required to be examined in that language. Those who have not

passed will be required to show such proficiency in English as to assure the Government that they will be able to pass the Ordinary Standard Examination within a reasonable time of their provisional appointment to any post; and the provisional appointment of any such person will not be confirmed until he has passed such examination. Candidates whose customary tongue is English, who have not passed the Ordinary Standard Examination in either Turkish or Greek, will be expected to show a similar proficiency in one of these languages at their option.

Candidates will also be expected to show some acquaintance with the third of the official languages, that is to say, they will be expected, in speaking, to use and understand such easy phrases as will enable them to give simple directions to a messenger, answer simple enquiries, and to obtain the necessaries of life; in reading, to read names and addresses and simple phrases in easy print; and, in writing, to address an envelope and write easy words. The " third of the official languages " means for Turkish-speaking candidates Greek, and for Greek-speaking candidates Turkish.

4. Every candidate must satisfy the Examiners that he has a well grounded knowledge in simple arithmetic; namely, the Four Rules, Simple and Compound, including " Long and Cross Tots " in addition; Cyprus Weights and Measures; the Metric System; Vulgar and Decimal fractions; Practice; Simple Interest; and the solution of problems by the Unitary Method.

This paper will be set in English.

5. Every candidate must satisfy the Examiners in Geography; and show that he can answer simple questions on the general geography of the world, with special questions on Cyprus, and on those countries connected with Cyprus commercially.

6. Every candidate must satisfy the Examiners that he writes a clear hand.

Rules for Examinees.

The following rules will be observed by all candidates at Government Examinations :—

1. Candidates must bring their own pens, ink, and blotting paper.

2. Candidates must write in full their names, Department or School or both, and whether Honour, Ordinary, or Preliminary Examination, on all their papers given in to the Examiners. It is requested that particular attention be paid to this rule.

3. No talking will be allowed during the examination. A candidate talking will be warned twice, on the third occasion his papers will be torn up and no marks given him for that subject. He will, however, be allowed to go on with the other subjects of the examination.

4. Any candidate found cribbing either from a book or from another candidate, or allowing his papers to be copied from by another candidate, will have his name struck off the list of candidates at once, and will forfeit all his marks.

5. Candidates will be required to bring the set books in which they are to be examined with them. These books must have no notes or manuscript notations of any description written on their leaves.

6. Dictionaries will not be allowed, but candidates may ask for information from one of the Examiners on any point not clear.

7. The style and legibility of all handwriting in whatever language will be taken into consideration in awarding marks.

8. A candidate failing in any part of an examination may be required to take the whole examination again.

(D).—SERVICE OF BRITISH TEACHERS IN COLONIAL SCHOOLS.

Memorandum Prepared in the Colonial Office.

The President of the Board of Education has asked that an opportunity may be taken at the Colonial Office Conference of discussing the following questions with regard to the position of teachers who go out from this country for a period of service in the Colonies :—

(*a*) Arrangements for the payment of employers' contributions under the Teachers' (Superannuation) Act, 1925, in the case of teachers temporarily employed (for not more than four years) overseas.

(*b*) The setting up in Colonies of schemes of superannuation for school teachers permitting of reciprocal arrangements under the Teachers' (Superannuation) Act, 1925.

(*c*) Arrangements by which Colonial Governments could, by inspection, give the Board of Education and local education authorities in the United Kingdom a guarantee as to the efficiency of schools in which British teachers have served.

As regards (*a*), the experience of the Board of Education is that teachers enquiring about service in the Colonies have displayed a certain anxiety as to their position as regards pension, if they accept Colonial appointments and are either not confirmed after the usual probationary period, or invalided before being placed on the pensionable establishment of the

Colony. The fear is often expressed that in either such case the period of absence abroad will be lost for purposes of pension on the teacher's return to this country.

Under Section 11 of the Teachers' (Superannuation) Act, 1925, it is possible for a teacher to meet this difficulty, provided his absence abroad does not exceed four years, by continuing to pay to the Board of Education in this country a contribution at the rate of ten per cent. of his salary as at the date of transfer, the consent of the Board of Education being required to any such arrangement. It is felt, however, that the payment of the full contribution of ten per cent. by the teacher himself is a hardship. (During employment in this country half the contribution is payable by the employer.)

The suggestion is accordingly made that when a teacher from this country is appointed to a post in one of the Colonies he should, during the usual period of two or three years' probation, continue to pay contributions to the Board of Education in this country under Section 11 of the Act of 1925, but that the Colonial Government should undertake to defray half the contribution. On the teacher being confirmed in his Colonial appointment these contributions would lapse, and the teacher would join the ordinary pensionable establishment of the Colony. His pensionable service in the Colony would reckon as from the date of confirmation; but it might reckon as from the date of first appointment on probation, if arrangements could be made for the contributions paid to the Board of Education between the date of probation and the date of confirmation to be refunded. If the teacher were not confirmed in his Colonial appointment, he would return for service in this country and no liability for pension or gratuity would fall on the Colonial Government.

Colonial Governments are asked to consider this suggestion as regards teachers who may be appointed to Government Education Departments in the Colonies, &c. With regard to teachers going to non-Government schools in any Dependency, it is doubtful whether the Colonial Government would be prepared to assume liability for a share of the pension contribution in such cases, but in the case of Mission schools in Tropical Africa which receive a grant from the Government there would presumably be no objection to the Mission agreeing to pay a half share of the contribution out of the grant paid to them by the Government.

(*b*) Apart from the question of the period of probation or service of less than four years another difficulty in recruitment is the absence of any arrangement for the aggregation of service at home and overseas for pension purposes. Thus a teacher leaving pensionable service in England for service in East Africa might be compelled for medical or other reasons to return to this country before the usual age of retirement. If retired from East Africa for health reasons, he would, if he had completed ten

years' service, be eligible for pension, otherwise he would be eligible for gratuity only. If his return were due to private reasons, he would not be eligible either for pension or gratuity in respect of his Colonial service. On return to this country he might be in a position to complete the period of service qualifying for a pension under the Teachers' (Superannuation) Act, or he might not. It is possible, therefore, that a teacher, whose total service would have been sufficient, had it been performed wholly in this country or in the Colony, to qualify him for pension, might find himself ineligible for pension either for his home or Colonial service, or even both, owing to his service having been divided.

The Board of Education are empowered under Section 21 (1) (*c*) of the Teachers' (Superannuation) Act to make reciprocal arrangements with any authority administering any statutory scheme for superannuation for school teachers in any part of His Majesty's Dominions with a view to avoiding this difficulty, and they are anxious that the possibility of such reciprocal arrangements should be considered. In view of the diversity of pensions systems in the Colonies, it is not considered desirable at this stage to put forward any definite proposal as to the details of such an arrangement, but Lord Eustace Percy would welcome discussion of the question. The provisions of the Teachers' (Superannuation) Act allow of many different possibilities.

(*c*) Under the Burnham salary scale arrangements, Secondary and Technical school teachers who go out to the Colonies from this country can, on their return home, count their service abroad for increments under the Burnham scale, where the Local Education Authority appointing them is satisfied that their Colonial service was full-time service given in schools of a standard comparable to that of recognised efficient schools here of similar type.

There is no parallel arrangement for Elementary school teachers, and accordingly British teachers who take posts in the Colonies in schools of elementary grade on their return to an English school get no credit for their Colonial service. The President of the Board of Education is not satisfied with this position and proposes to take the matter up with the Burnham Committee. For this purpose it will be necessary to produce some evidence to the Committee that a guarantee can, where required, be given as to the efficiency of Colonial schools, and he would, therefore, be glad if consideration could be given to the question what arrangements Colonial Governments can make for the regular inspection of schools in their territories and how far such inspection could be regarded as guaranteeing the efficiency of schools in which British teachers may serve.

COLONIAL OFFICE,
April, 1927.

APPENDIX XVIII.

Cinematograph Films.

(A)—MEMORANDUM PREPARED IN THE COLONIAL OFFICE.

Prominence has been given in various quarters to the undesirable effects produced by the exhibition of certain types of cinematograph films in the Tropical Dependencies in the Empire. Articles have appeared in the Press in recent months, questions have been asked in Parliament, and Resolutions have been passed by influential bodies in this country all to the same effect, namely, that adequate powers of censorship should exist in the hands of a suitable authority in each Colony and that this should be strictly used to ensure a proper control of films and posters intended for local exhibition generally and especially to non-Europeans.

The information on record in the Colonial Office indicates that in nearly every Dependency power does exist to a greater or less extent for controlling the display of films, and in certain instances it has been thought right to draw the Governor's attention to the desirability of obtaining increased powers of censorship. That the importance and urgency of the matter are generally recognised by the oversea Governments is sufficiently indicated by the activity which has in recent years been shown by them in the constitution of Committees of Enquiry, the enactment of suitable legislation, and in a few cases the representations which have been received in the Colonial Office from persons who have found themselves the victims of the censorship exercised by a Colonial Administration.

The public interest in the question as it affects the Colonies has also been an active one. For instance, the censorship of films for natives was the subject of a Resolution of the East African Unofficial Conference last year in which it was urged that a uniform policy in this matter should be adopted by the Governments of the East African Territories, based on a recognition that films suitable for exhibition to peoples of European civilisation were not necessarily suited to peoples with other ideas and traditions, particularly with regard to the status of women. Subsequently the terms of that Resolution were unanimously supported by the Executive Council of the Joint East Africa Board in London. A long article in *The Times* in October last dealt with the effect of certain film exhibitions in Malaya and elsewhere in the East as a factor in the spread of

communist doctrines. This article contained such expressions of opinion as the following : —

> " The Police Authorities in the East are unanimously attributing many of the more important and complicated crimes to the existence of the cinema. It is, in fact, not necessary for the people to pay to see the most striking passages of the film. Posters outside a cinema display with every possible exaggeration scenes of battle, murder, and sudden death."
>
> " It is generally felt in the East that a certain class of film has done more than anything else in recent years to diminish the prestige which the European used to enjoy."

This was followed by a letter in the same newspaper from Sir Hesketh Bell in which he stated that there was reason to believe that much of it was equally applicable to some of our great African Colonies and Protectorates. It may be worth while to give the following extract from his letter :—

> " The attention of the House of Commons has more than once been drawn to this matter with special reference to its bearing on the inhabitants of our Tropical Colonies and Protectorates, but judging by some of the pictures that are still being shown in those countries one cannot feel convinced that the subject is being treated with the vigour that is needed. The educational potentialities of the cinema for good and evil are immense and the proper control of such a powerful influence on primitive peoples is of the highest importance. The information and enlightenment as to the manner of life of civilised people that are now being given through the films to the natives of our Tropical Territories, especially in Africa, are having a great effect on their mental and moral development, and the proper regulation of such a force may be considered of sufficient importance to warrant action which in other branches of industry might be held to be unusual and arbitrary. I venture to express the view that the censorship of films in many of our Tropical Dependencies is not sufficiently strict. The task is usually done by an overworked police official who cannot possibly give sufficient attention to it, and any film which has passed the Board of Censors in the United Kingdom or which does not include pictures that are flagrantly indecent is usually accepted."

The Secretary of State has set out his policy on this subject in a Confidential Circular despatch recently addressed to Governors, in which he expressed himself as anxious not only that the powers of the Government should in every Dependency be fully adequate in the matter of censorship, but also that each Administration should to the full exercise these powers by preventing the exhibition of any film or section of film which might

be open to objection whether on general grounds or in view of the special character and susceptibilities of the native people before whom the film would be exhibited, or which was calculated to rouse undesirable racial feeling by portraying aspects of life of any section of His Majesty's subjects which, however innocent in themselves, might be liable to be misunderstood by communities with other customs and traditions. He reminded Governors that films prepared in this country or in America were liable to be misunderstood when exhibited out of Europe, and that it must not be assumed that a film which had been passed for exhibition to a general audience here was necessarily suitable for public exhibition in the Colonies. He stated his conviction to be that, whether a particular film was a British or foreign production, the paramount consideration so far as related to its exhibition in those parts of the Empire for which he was responsible must be not its country of origin but it character viewed in the light of local circumstances. In conclusion he stated that he did not hesitate to rely on the discretion of Governors both in the matter of securing adequate censorship powers and in exercising them where required, and that he would be prepared to support their action where they found it advisable to intervene on the grounds he had mentioned.

In the same despatch the attention of Governors was drawn to the request of the War Office that the exhibition of films calculated to bring His Majesty's Uniform and the Army into contempt should be prevented. It is recognised that it is to a great extent a matter of individual taste and judgment what features in a film are open to objection in this respect, but generally speaking it may be said that any film depicting officers or men under the influence of drink or acting in a cowardly or dishonourable way, or tending to discredit the relations between officers and men or to undermine loyalty and discipline, comes within the category of objectionable films; it is also undesirable that in any film of a fictional nature the badges of a particular regiment should be displayed.

To indicate the policy of different Colonial Governments in different parts of the Empire the following brief summaries, based on information supplied by the Colonies in 1925, may be useful :—

Ceylon.—The powers of censorship of cinematograph exhibitions are exercised under the Public Performances Ordinance, or, in municipal areas, under the Municipal Councils Ordinance, the proper local authority being a Superintendent of Police or the Chairman of the Municipal Council respectively. It is stated that films calculated to excite racial animosity are rarely brought to Ceylon, but films which are undesirable on other grounds, such as those that afford instruction in criminal methods, are not infrequently brought for exhibition, and where necessary they are either wholly prohibited or allowed subject to excisions.

Nigeria.—Censorship powers are provided by the Cinematograph Ordinance. Separate regulations are in force under the Ordinance in regard to (*a*) the township of Lagos, (*b*) the rest of Nigeria. In Lagos and townships of the 1st Class the Secretary to the Local Authority is designated as the prescribed officer whose permit is required before a film may be exhibited; in townships of the 2nd and 3rd Class this responsibility is laid on the Local Authority itself, and elsewhere the Administrative Officer in charge of the district in which the exhibition is to be held.

The display of improper posters is governed by the Criminal Code. With regard to Lagos, every film shown is rigorously censored previous to exhibition and nothing is passed by the censor that might encourage racial animosity or is otherwise objectionable.

Kenya.—The exhibition of cinematograph films is governed by the Stage Plays and Cinematograph Exhibition Ordinance of 1912. All cinematograph films intended for public exhibition in Nairobi are censored by a Board consisting of two members of the East Africa Women's League and one Police Officer. In the event of any difference of opinion the film is submitted to the Superintendent of Police, i.e., the Licensing Officer, for his decision. It has been found that this arrangement works admirably. Any picture which it is considered inadvisable to show to natives is licensed for non-natives only, and if considered unfit for exhibition to Europeans no licence is granted. The censoring of films generally is given the most careful scrutiny. Nothing touching on the colour question or anything in any way detrimental to native races is allowed to be shown. The same procedure is adopted in other towns in Kenya with the exception that the Superintendent of Police is not assisted by any unofficial person in the censoring of films.

Fiji.—Censorship powers are exercised under the Cinematograph Ordinance, 1912, which requires the permit of the Inspector-General of Constabulary at his discretion before cinematograph films may be exhibited. All pictures portraying contests between black and white, bedroom scenes, successful crime, and in fact anything of a demoralising nature calculated to excite the passions of the native population are vigorously censored. The cinema hall proprietors themselves work in accord with the Police in these matters and no difficulties of any kind have arisen or are likely to arise in the matter of excluding films from exhibition to which the censors take exception. Proprietors of halls are required to submit for examination to the Inspector-General of Constabulary posters advertising pictures when applying for permits for films. No offensive or objectionable posters had up to the time of this report (1925) been submitted.

Trinidad.—The powers of censorship are exercised under the Cinematograph Ordinances, which give ample power for the control of films and posters advertising films in the Colony. The censors appointed under these Ordinances are guided by the principles of censorship applied by the British Board of Film Censors and no pictures likely to excite racial animosity or otherwise undesirable for exhibition are permitted.

Gold Coast.—Powers of censorship are exercised by the Police under the Cinematograph Exhibitions Ordinance. It is considered that the class of films shown in the Gold Coast is generally satisfactory and that ample powers exist to prohibit the exhibition of unsuitable films.

Mauritius.—The provision for censorship powers by District Committees which existed in the Cinematograph Ordinance, 1912, has been found to be quite unsuitable, the Committees very often disagreeing as to the suitability or not of a particular film. On the recommendation of a local Committee of officials a new Ordinance was enacted in 1926 transferring wider control of films to a Central Committee composed of the Inspector-General of Police and two other members to be appointed only by the Governor. This Committee has the power of permitting or prohibiting the exhibition of a film. It is the experience of Mauritius that several crimes were to be attributed to the influence of certain films exhibited before the recent measure was enacted.

Straits Settlements.—Censorship powers are exercised by the Official Censor under the Cinematograph Films Ordinance. Provision is made in that Ordinance for a Committee of Appeal to consist of ten persons, five to be Government officials nominated by the Governor, two unofficial persons to be nominated by the Governor, and three unofficial persons to be elected by a Justice of the Peace from among their number.

The *Federated Malay States Government* have introduced a measure on similar lines with the object of permitting or prohibiting without further formality in the Federated States the exhibition of films and cinematograph advertisements passed by the Official Censor in the Straits Settlements, and it is provided that an Appeal Committee shall be established for the Federated Malay States on the same lines as that in the Straits Settlements.

It may be of interest to state briefly what is the position in this country of the British Board of Film Censors. This Board came into existence in 1912. It is not an official authority, but is an organisation maintained by the persons engaged in the cinematograph trade. The expenses of the Board, including the salaries of its members, are defrayed out of funds supplied by the trade. It consists of a President and four examiners appointed by the President, and any film to which the examiners take exception is submitted to the President, whose

decision is final. If a film is passed, it is placed in one of two categories :—

(*a*) for " Universal Exhibition ",

(*b*) for " Public Exhibition ",

and a certificate is issued accordingly. Although the censorship is voluntary and self-imposed by the cinematograph trade, the decisions of the Board are made practically effective in the areas of the majority of the local authorities in this country (including the County of London) by the recognition in the local authorities' regulations of the adequacy of the Board's certificate, although, for instance in the London County Council rules, the local authority reserves the right to permit or to prohibit the exhibition of any particular film, irrespective of any action of the Board of Film Censors in regard to that film.

Educational Use of Cinematograph Films.

A note* of this aspect of the films question is attached to this memorandum. The question of the possibility of arranging for propaganda by means of an Empire Film to assist the object for which it was set up is being explored by the Empire Marketing Board.

Economic.

This aspect of the films question was the one with which the Imperial Conference last year especially concerned itself. A copy† of the Report of the General Economic Sub-Committee of the Conference in regard to the exhibition within the Empire of Empire films is attached. It will be seen that the recommendations in this Report had as their object the exhibition throughout the Empire of a larger and increasing proportion of films of Empire origin, and they outlined certain methods by means of which the attainment of this object might be most usefully assisted by the Governments of the various parts of the Empire. The action which has been taken in this country in pursuance of the Conference Resolution has taken the form of the Films Quota Bill now before Parliament, a copy‡ of which is attached together with a copy§ of notes on the various clauses in the Bill, which have been prepared by the Board of Trade. It will be seen, therefore, that of the four methods suggested in the Sub-Committee's Report the Home Government has taken action on the lines of the last two. It may well be that in certain Colonies it would be considered preferable to adopt some other method, but in any case, in accord with the Imperial Conference Resolution, the matter is commended to the consideration of the Governments of the various parts of the Empire with a view to such early and effective action to deal with the serious situation now existing as they may severally find possible. So far, except

---

* Annex I.

† Annex II: not printed here. See pp. 403-406 in Cmd. 2769.

‡ Annex III: not printed here.

§ Annex IV: not printed here.

in the case of those Colonies in which British films receive preferential tariff treatment by reason of the general policy of Empire Preference to which such Colonies adhere, the only Colony which has proposed to take action according to one or other of the methods mentioned in the Sub-Committee's Report is the Straits Settlements, where the Governor has under consideration the advisability of stipulating, as a condition of granting a site for a cinema theatre on Crown land, that a stated proportion of British films shall be exhibited in the theatre. In this connection it will be observed that the maximum percentage of British to foreign films which is contemplated in the Home Government's Bill is 25 per cent., a maximum to be reached by gradual stages in the course of several years.

COLONIAL OFFICE.
April, 1927.

ANNEX I.

The Educational Use of Cinematograph Films.

NOTE BY MR. HANNS VISCHER, C.B.E., SECRETARY OF THE ADVISORY COMMITTEE ON NATIVE EDUCATION IN TROPICAL AFRICA.

The question of using the cinema in connection with instruction in African schools has been raised in the course of discussions at the Advisory Committee on Native Education in Tropical Africa, and the attention of members has also been drawn to the dangers to native education arising from the indiscriminate display of commercial films amongst native communities. It was proposed that inquiries should be made regarding the existence of educational films and the possibilities of making suitable films available to the Directors of Education for use in their schools.

2. It has been shown by reports received at various times from those responsible for education in our Tropical African Dependencies that visual instruction and the cinema would be an aid, not only to teaching in the class-room but also in spreading general knowledge inside and outside the school amongst children and adults. A number of our Directors of Education are actually making use of magic-lantern slides, and an attempt to introduce the cinema into the school curriculum has been made in the Gold Coast.

3. To obtain the information necessary for making any practical proposals is not an easy matter. While the cinema is being used for instructional purposes in most countries on the Continent, and in the United States of America, the educational authorities in this country have so far left it to private enterprise to make experiments. The whole business of films is so complex that an occasional inquirer finds himself very soon mixed up in an inextricable maze of contradictory information and hampered by lack of technical knowledge. The following notes must therefore be regarded as tentative.

4. In the course of my inquiries I have been greatly assisted by Mr. de Valda, founder and director of "Visual Education, Ltd.", and various records have been put at my disposal by Mr. Burrows of the Board of Education. "Visual Education, Ltd." and "British Instructional Films, Ltd." are concerned entirely with educational work. Both concerns are subsidiary companies of Stoll Pictures Productions, Ltd.

5. The following extracts from an article in *The Times Educational Supplement*, dated 19th February, 1927, provide a useful introduction to the study of the subject:—

> "The question of the educational film has been considered in some detail in France. The Musée Pedagogique in Paris is a department of the French Board of Education for supplying lantern slides and films free to schools throughout France. In October, 1926, the Musée had 2,500 films, which are sent on request to any school or society that wishes to give an exhibition where no money is taken at the door. The films are taken free of charge by the French Post Office, and are lent for a fortnight, during which time they can be handed from one authority to another, so long as notice is given to the Musée. The projectors are not supplied to the schools by the State, although a certain amount of money is set apart each year to assist poor schools to purchase the apparatus. The local governing body often helps with buying the projector, or it is given by a benefactor of the school, or it is bought from the proceeds realized by concerts organized for the purpose. The films are not made by the State, but by private companies. At first, films supplied as educational films were of very inferior quality, but now the film companies consult educational experts, and good teaching films are produced. The company keeps the negative, and the State buys four copies of each film.
>
> "The demand for educational films has greatly increased within the last seven years. Whereas in 1920 only 54 films were lent, in 1925 the number had risen to 24,563, and 17,000 were lent in the first half of 1926, from January to June. It is calculated that between 70,000 and 80,000 special classes and societies use these films in a year, and so great is the demand that local offices for film distribution

are growing up all over France. In 1921 a district office for distributing educational films was set up at Lyons, and serves nine departments. By 1925, 170 programmes a week were sent out, and by March, 1927, it is expected that 300 programmes will be sent out each week. Each of the nine departments contributes 5,000f. per year; schools and societies can join for 50f. per year, and four types of programme are supplied :—

(1) A school programme of eight films, of which one is amusing. Eight free programmes are sent to members subscribing 50f. per year, and each programme costs an additional 10f.

(2) Programme for Thursday half-holidays, suited for organized exhibitions to children, partly educational and partly amusing. These are hired by the local government for 1,000f. a year for one programme a week.

(3) A programme similar to No. 2, but for general public exhibitions, consisting usually of four instructional, one comic, and one good feature film of about five reels. Price 40f. each programme.

(4) A programme like No. 3, but of a better type, and making a more general appeal. Price 60f.

" The office sends out the films at a special cheap rate of transport. Each programme can be kept for a fortnight if it is not wanted by some other school. The great aim of the Lyons office is to raise the general tone of film exhibitions, and to use the cinema as a means of character building and training in civic duties. It also aims at encouraging cinemas which show good films, namely, by listing them and pubishing the lists. It gives information to teachers as to how to use educational films, and for some of its films supplies résumés.

" In Germany there is no State service of films as in France, but the German education authorities encourage the use of instructional films in such ways as permitting children to be taken to exhibitions of educational films in school hours; putting no restrictions upon the use of projectors in schools; obtaining the remission of entertainment tax. The making and distribution of films in schools is thus left to commercial companies, of which several, in healthy competition, keep the standard of films at a high level by hiring or selling to one school; by hiring or selling to a cinema committee, that is, to a union of all the schools in one place, made for the purpose of jointly using the same film. The companies also organize a lecture film service for which the towns are grouped in units of from 30 to 40 places. In each is a board of trustees, which usually includes the local school board, the chairman of the parental committee, and the head teachers. These trustees are

advised upon which date the lecturer and films will visit the town, the subject or subjects of the films, and the cinema theatre that has been engaged. The trustees then arrange for the schools to attend the cinema in turn, according to the seating capacity of the house. Each child subscribes about 2d. through the school to the trustees, who deduct the hire of the hall and any expenses they have incurred, and then forward the rest to the company.

" Italy has issued a law authorizing the formation of a national institute for propaganda and education by means of the cinematograph. This institute, known as the " Cinematograph Educational Union," sprang from a modest organization which was founded in November, 1924, on the initiative of the National Insurance Association for the Poor and (at the instigation of Signor Mussolini) with the valuable assistance of the Commissariat General for Emigration, the National Social Insurance Association, and the National Insurance Institute. . . . . .

" The general use of educational films in American schools has made it feasible for companies to devote large sums of money to the encouraging and nursing of a ready and existing market. The initial expense of photographing and editing these films will be recovered in the United States, and the world will then be flooded with American educational films and hire at a cheaper rate than European producers. What is happening in our cinema theatres will happen in our schools, unless encouragement is given to British educational films. A more general use of educational films would put British firms in a position to withstand coming American attacks upon the British school market. . . . . .

" It is obvious, however, that Great Britain and the British Empire are lagging behind the other nations of the world in their use of this method of public instruction. At first British educational authorities took up the commendable attitude that the cinema must first prove itself an educative force before its use could be sanctioned. Now, however, although its use has been proved and other nations are going ahead, British authorities are still waiting. The charge of excessive expense can no longer be levelled against the educational film. France can afford to maintain a free State service. In Great Britain the organization of an educational film service obviously should be undertaken by each local education committee. In the Dominions probably the work should be done by the State rather than by the Federal Governments, as each State has its own problems to face. That the film is the best way of describing one part of the Empire to another has been appreciated by the Imperial Institute, which is establishing a cinema in its galleries. By some means, films of Canada should go to

the Gold Coast, South African films to New Zealand, Maltese to Australia. France, Germany, and Italy are all using the film for Government propaganda purposes."

6. Some tests have recently been carried out by Mr S. J. F. Philpott, lecturer in Experimental Psychology at University College, London, on behalf of the special sub-committees appointed by the Cinema Commission of Inquiry established by the National Council of Public Morals. An account of these tests and the deductions drawn are contained in a book, *The Cinema and Education*, just published by Messrs. George Allen and Unwin, Ltd., London. Another interesting account, showing other experiments in using the cinema in a modern school, is contained in a paper dealing with a demonstration of teaching films at the Haberdashers' Aske's School, Hampstead, in March, 1927. Altogether, films are being used to-day in nearly 300 schools in England for instructional and educational purposes. In some cases, of course, these films are not used by the teacher in the ordinary course of his work, but only for the purposes of special lectures.

7. *The Teaching Film.*—Teaching films are chiefly of value in teaching elementary Natural Science; for example, Chemistry and Physics, the Atmosphere, Water, Magnetism, &c.

Physiology; The Heart, Blood, How we See, How we Hear, &c.

Physical Geography; The Earth, the Sun, the Planets and Stars, Rivers, the Sea, Mountains, &c.

Geography; Scenery and Views from different countries.

Botany; The Life History of Plants, Selection and Fertili sation, &c., &c.

The film enables the phenomena described to be clearly demonstrated by slowing down or speeding up motions not otherwise so readily perceived. These save the use of apparatus, and by enlarging the points of significance in any experiment make it easier for large classes to follow.

I think there can be no doubt that the " laboratory " film is already a real asset in the teaching of science.

8. If Teaching Films have been found useful in countries where there already exists a very complete and specialised school literature, it would seem that they would have an even greater use in Africa, where all education is hampered by the absence of suitable textbooks and where scientific apparatus is rendered rare if only for reasons of expense.

These new films are not, however, cheap. In fact, the first difficulty to be overcome in order to assist African education by films would be that of finance, and it must be pointed out at once that the expense of creating a regular system of instruction by films in African schools could not be met from the budget of

any individual Education Department. To overcome this difficulty it would be necessary to create a system of pooling.

Further, at the present moment there does not seem to exist any really suitable projector. For use in Africa the projector should be portable and fool-proof, not too expensive, and so arranged that it could get its supply of electricity for the light from the main or from an ordinary car battery. I am informed that a projector, costing about £40 to £50, can be made in this country if there was a demand for at least fifty instruments. It would use a 20 volt 10 ampere Osram Nitra lamp which costs about 11*s.* 6*d.* Its weight, with safety drums, all accessories except batteries, but with a motor, would not exceed 35 pounds. The supply of electricity for a projector so constructed would work on a voltage from 110 to 240 off a main, in which case no batteries would be required. Two 12 volt car accumulators could supply the necessary current where no main is available.

9. It would appear from the catalogues I have seen that apart from the teaching films a good number of suitable films of a more general character can be obtained, and it would not be difficult, by having pictures taken in Africa, to add to this list others more specially adapted to local environment.

The cost of a collection of films that could be recommended for use in secondary schools and training colleges and to assist in the spreading of general knowledge, especially dealing with health and economic development, would be about £1,000 if bought outright. None of the existing commercial houses would supply films to any one part of Africa on the hiring system. This estimate does not include cost of transport, packing, &c.

With expert handling, films can be shown in this country up to 300 times. In cinema theatres reels last from 180 to 250 runs and the Visual Education, Ltd., state that they still use films that have been shown over 300 times. It would appear that the necessary knowledge for projecting without ruining the films, and for handling the projector, can be acquired without much time or trouble by the average person, though a certain amount of instruction is necessary. It is still more necessary for the teacher who shows films to grasp the method of teaching with the film, or else the value of the film is lost and it becomes a mere entertainment.

10. From the above, it would seem clear that the cost of introducing films into the educational system is beyond the financial capacity of any single territory. It was, however, suggested that by forming a pool under a central authority at home these difficulties could be overcome, and, further, that by bringing into existence such an arrangement the question of dealing with harmful films could be partially solved.

Such an arrangement would require the services of a specially qualified man and a suitable office. His duties would be :—

(*a*) After receiving the requirements from Africa, stating the number of films and their nature, to select the most suitable films.

(*b*) To re-edit and title these films in consultation with or on the advice of Directors of Education.

(*c*) To make arrangements for the supply and circulation of these films in the various dependencies.

(*d*) To give the necessary training to a number of officers from each Education Department when home on leave.

(*e*) To answer all enquiries regarding new films and to circulate to Colonial Governments periodical lists and prices of such suitable films as become available.

(*f*) To study the development of the use of teaching films in this country and on the Continent.

Dividing the African Education Departments into a West African and East African group, and circulating the films from one dependency to another, it is estimated that a school, or a group of schools, situated in the same neighbourhood, could be supplied with four reels weekly for forty weeks per annum at a cost of about £100. The cost of a projector made in the United Kingdom, to suit local conditions in Africa, would be between £40 and £50. To these items it would be necessary to add cost of electric current, transport, insurance, &c.

From figures which I have been able to obtain it would seem that such an arrangement would bring the whole matter into the realms of practical politics. It would, however, be necessary, before the estimates could be considered as definite, to make more detailed and technical inquiries than it has been found possible to submit in this memorandum.

11. With regard to the second part of the question, namely, that of preventing the display of harmful cinema pictures, it is submitted that the most successful way of doing this is to ensure a supply of good and interesting pictures. There does not exist amongst the Africans a special desire to see the usual sensational film with its American or European sex and crime problems, but there is a very strong desire for interesting and entertaining information, dealing with animal and plant life, and especially Empire industries and Empire history and development. The " travelogue " film is steadily improving, and such films have both an educational and entertainment value.

It is, I am afraid, clear that private enterprise does not provide Colonial dependencies with the best class of film, and consequently it may become necessary for Colonial Governments themselves to provide films. Several Colonies had extremely good films prepared for use at the Wembley Exhibition. These and films like them would not only be less harmful than the type of film now exhibited, but would have both a direct and indirect

educational effect. I therefore suggest that the right department to handle the matter is in every case the Education Department. The Education Departments should accordingly not only be represented on any local board of censors, but should be invited to draw up proposals and frame estimates for a supply of films both for school purposes and for public exhibition.

HANNS VISCHER.

April, 1927.

(B)—MEMORANDUM ON BRITISH FILMS, PREPARED BY THE FEDERATION OF BRITISH INDUSTRIES.

A.—Educational Films.

The Film Group of the Federation recently appointed a Sub-Committee to investigate and make recommendations on the subject.

As a preliminary the Sub-Committee called into conference various Teaching Associations, among whom were the following :—

Association of Preparatory Schools (Incorporated).
Headmasters' Conference.
Headmaster, L.C.C. School, Battersea.
Incorporated Association of Assistant Masters in Secondary Schools.
Joint Committee of the Three Technical and Art Associations.
Joint Four Secondary Associations.
National Union of Teachers.
National Union of Women Teachers.
Private Schools Association.

Representatives of these bodies attended meetings of the Sub-Committee, and we understand that the bodies themselves are in sympathy with the general lines of the Sub-Committee's proposal.

As a result of the discussions which have taken place, a scheme has been provisionally approved, particulars of which are given in an Annex* attached hereto.

It will be seen that the object of this scheme is to provide a classified catalogue of all available British educational pictures, including and differentiating between those strictly educational and suitable for use in the classroom in conjunction with the lesson and those of more general interest.

Pictures are available in two sizes, i.e., standard width film (35 mm.) and sub-standard (16 mm.), but all pictures are not

---

* Annex I.

available in both. The present supply of sub-standard pictures is very much smaller than the supply of the standard size. The sub-standard size is of course only suitable for use in relatively small rooms.

As stated in the scheme, uniform charges will be made (1) for the standard size, (2) for the sub-standard size pictures, and attention is called to the terms on which prints can be hired out for an unlimited period, as this will presumably be more convenient for overseas use. See paragraph 5 of the scheme.

The Sub-Committee has discussed the question of whether arrangements could be made for the censoring and approval of all films included in the catalogue. The manufacturers would welcome this, but certain difficulties are seen by the majority of the educational associations and the question is still under consideration.

It is proposed that the catalogue shall contain full directions as to the use of the various projectors referred to and the preparation of classrooms, so as to enable teachers to carry out the exhibition of films without difficulty.

B.—Film Censorship.

The Film Group of the Federation of British Industries has had under consideration the difficulties which have arisen in regard to the censoring of certain pictures in different parts of the British Empire. They fully realise that the conditions of different parts of the Empire vary widely and that pictures which may be quite suitable in the United Kingdom or in Canada or Australia might not be suitable in other parts of His Majesty's Dominions; moreover, they realise that this variation of conditions probably makes it impossible for any kind of central censorship in this country to deal with the subject satisfactorily, from the point of view of the various Colonies and Protectorates. At the same time they desire to point out to the Conference that, unless some information is available on this side as to the conditions which the various Colonial Governments are compelled to lay down in regard to the censorship of films, producers in this country who have no desire whatever to do anything which will conflict in any way with the views of those Governments are put in a position of some difficulty, since they have not the means of discovering what the requirements and/or restrictions of the different Governments may be.

For reasons which are no doubt well known to the Conference, British film producers have to look almost entirely to British Empire markets for their returns, and even here they are faced with very fierce competition from foreign producers. If therefore they lose sales in the British overseas markets, their chance of securing a profit is substantially impaired, and their difficulties, which are already sufficiently great, are thereby increased.

The Federation therefore ventures to submit that the various Overseas Governments might endeavour to lay down in as precise

terms as possible the principles upon which their respective film censors will act and that a statement of these principles should in each case be made available for producers in this country so that they may clearly realise the conditions they have to meet.

C.—Imperial Films.

The Imperial Conference which met in October, 1926, fully recognised the importance of the film as an agent for maintaining and enhancing our Imperial prestige and the high desirability of building up a strong British film industry for this purpose.

The Film Group of the Federation believe that nothing could do more to enhance the Imperial value of British film production than the making of a series of fine pictures illustrative of the life and story of different parts of the British Empire.

These pictures, in order to attain their object, must not be purely propaganda pictures; they must be of such a kind as to take their place naturally, and by the ordinary commercial method, on the screens of the world and this by reason of their entertainment and dramatic value. In other words, the propaganda value of each picture must depend upon the setting and background of the story.

The production of such pictures could be very much facilitated by the co-operation of the various Colonial Governments. When it is considered that the making of a picture in an overseas territory necessitates the sending out from this country of a more or less expensive company of directors, artistes, technicians and their equipment, the assembly in different parts of that territory of crowds (of natives or white residents), the selection of suitable scenes, both interior and exterior, for the setting of the story, possibly also the use of local police, troops or constabulary, and the photographing of some local event, such as a review, race meeting, &c., it will be seen that the advice and co-operation of the local Government in each case can enormously assist the company in the effective production of a picture and also very greatly reduce its cost without any appreciable cost to the local Government.

The Film Group of the Federation venture to suggest that the Conference should come to some conclusion as to the desirability of extending facilities of this kind to reputable British firms who submit approved projects for Imperial films to any of the Overseas Governments.

The Film Group of the Federation would also be very glad to consider at any time suggestions from any of the Colonial Governments in regard to pictures which those Governments might desire to have made in order to illustrate the story and conditions of their territories. The various Governments will have at their disposal information as to the history and conditions of their territories, which are not readily available on this side, and any suggestion of the kind will always receive most

sympathetic consideration from members of the Federation's Film Group.

Some of these pictures may be of a kind which involve too great a risk to justify their production on an ordinary commercial basis; in these circumstances the local Government might be willing to consider some form of financial assistance to the production, either by a guarantee against the whole or a proportion of the loss, or by the contribution of a definite sum towards the cost of production, or otherwise. This is, however, a matter which could be separately negotiated for each separate picture.

It may be that the powers of the Empire Marketing Board would enable them to assist in the production of some pictures of this kind. The Federation has no definite information on this point, but I am desired to mention it in order that it may receive the consideration of the Conference.

Before closing this memorandum, I am asked to suggest a small point which might be of value to the Overseas Governments, namely, that, when a British company visits any territory for the purpose of producing a film of the above description, advantage might well be taken of their presence by the local Government to arrange for the production, by the Company, of any picture or pictures of an educational or local interest, which the Government might desire to have for local purposes.

Members of the Federation's Group would be very willing to co-operate in any such proposal at any time. I enclose a list* of Members of the Group from which it will be seen that this now includes all companies of importance actually engaged in film production.

CHARLES TENNYSON,
Deputy Director,
FEDERATION OF BRITISH INDUSTRIES.

LONDON.
May, 1927.

ANNEX I.

Educational Films.

The Federation of British Industries Film Group make the following suggestions as a basis for the supply of educational films to the schools.

The Group have had in mind three different classes of scheme for the use of the films:—

(*a*) A scheme such as that in use in Battersea, whereby a selected programme is shown to children out of school hours in a special hall, containing both educational and

*Annex II.

ordinary entertainment pictures of a suitable kind, a small charge being made for admission. The scheme is under the direction of the Local Education Authority.

(*b*) A scheme such as that now in use at Liverpool, where a programme of educational and general interest pictures is shown free to school children in school hours, under the direction of the Local Education Authority, in a local cinema theatre.

(*c*) The use of educational films in schools, whether Elementary, Secondary, or Technical, in connection with the curriculum.

1. *Catalogue.*—The Group are preparing a single catalogue of educational films available, classified under subjects, e.g., Historical, Geographical, Natural History, etc., with the name, in the case of each film, of the firm to whom application should be made. A three-line synopsis of each film will be included and a full synopsis sent on request. The catalogue may be made up in loose-leaf form, so as to allow of additions or corrections whenever necessary. It would be supplied free of charge.

2. *Feature Films.*—A selection of suitable feature films of 5 or 6 reel length could be included in the catalogue. These would be ordinary entertainment pictures of 5 or 6 reels, selected as specially suitable for showing to children.

3. *Rent.*—A uniform charge of 10s. per reel will be made—a reel being not less than 600 feet. There will be the following reductions to schools taking a series of films for a period of twelve months :—

	£	s.	d.
24 reels	10	0	0
36 reels	14	10	0
50 reels	21	0	0

If it could be arranged for a number of schools in any particular area to co-operate and thus save the expense of distribution, further reductions could be made by arrangement in each case.

Films on sub-normal (16 mm.) film stock are also supplied at a rental of 3s. 6d. per reel.

4. *Carriage.*—The firm would pay carriage one way, the hirer paying the return.

5. *Period of Hire.*—The foregoing hiring fees would cover a period of three days, including the day of receipt of the film and the day of return. The films would normally be sent by post so as to arrive in the morning; they would thus be available for use on three successive days.

Films cannot be sold owing to copyright difficulties, but an arrangement can be made for a school to retain the print until it is worn out for a charge of 4d. per foot. This applies to

standard films only. A price for the sub-standard size will be quoted later.

6. *Liability for Damage.*—The hirer would be liable for the actual cost of making good any damage or destruction caused to the film whilst in his custody or through faulty packing.

7. *Projectors.*—A list of British projectors available is annexed. It is believed arrangements could be made for the supply of the more expensive of these on hire-purchase terms, 20 per cent. down and the remainder for twelve months. These projectors are all fire-proof and can be worked with the ordinary electric light supply or from an accumulator. They can safely be used with ordinary celluloid film. The films can be shown during daylight if the windows are covered with ordinary dark blinds.

List of Projectors referred to in Paragraph 7 above.

Name of Projector.	*Sold by*	*Price.*
A.—Standard Projectors:		
The Kinema ...	The Gaumont Co., Ltd., 5 & 6, Sherwood Street, Piccadilly Circus, W.1.	Model A £54 0 6 ,, B 52 10 6 ,, C 57 0 6 (Motor, if required, £8 extra in each case).
The Oxford ...	Oxford Portable Projectors, Ltd., 1, Chiswick Common Road, W.4.	Model de Luxe, 55 guineas.
The Howath ...	Cinema Traders, Ltd., 26, Church Street, Charing Cross Road, W.	Complete machine with lamp, £29 10s. Special Silver Screens :— 5-ft. ... 25/- 6-ft. ... 35/- 7-ft. ... 55/- 8-ft. ... 75/-
The Empire ...	Houghton - Butcher, Ltd., 88–89, High Holborn, W.C.1.	Model 5, £55
The Polyjector ...	British Polyjectors, Ltd., 28, Budge Row, Cannon Street, E.C.4.	School model for projecting 1,000 feet of film, 25-foot throw, £15.
B.—Sub-Standard Projectors.		
British sub-normal	Lloyd & Ramsden, Ltd., 19, Michael Street, Nottingham.	Class-room model for projecting sub-normal films of 16 mm. width, £27 10s.
Kodascope (*American*).	Kodak, Ltd., Kingsway, W.C.2.	Class-room models :— Model A ... £45 Model C ... £15

ANNEX II.

Members of the Federation of British Industries Film Manufacturers Group.

Archibald Nettlefold Productions.
Astra National Productions, Ltd.
Britannia Films, Ltd.
British Instructional Films, Ltd.
British International Pictures, Ltd.
British Projects, Ltd.
British Screen Classics, Ltd.
Burns-Scott Films, Ltd.
Gainsborough Pictures, Ltd.
Gaumont Co., Ltd.
Godal International Films, Ltd.
Ideal Films, Ltd.
New Era Productions, Ltd.
Stoll Picture Productions, Ltd
Topical Film Co., Ltd.
Welsh Pearson & Co. Ltd.

APPENDIX XIX.

CONCLUDING SPEECH BY THE SECRETARY OF STATE FOR THE COLONIES, 31st MAY, 1927.

Mr. AMERY: We are coming, Gentlemen, to the end of our strenuous labours, but before we enter on the last subject on our Agenda, namely, the question of the desirability of holding similar Conferences in future, it may be as well if we pause for a moment to review the work of the last few weeks. I am well aware that the present Conference was initiated at such short notice that it was not possible for many of the Governments or indeed for the Colonial Office to give to the framing of their recommendations all the previous discussion and preparation which they might have wished. But after all we have not suffered as a whole for want of fruitful suggestions or of well thought out proposals, nor indeed from a shortage of memoranda with which to fill in our leisure moments.

In any case, I felt that the important thing was to inaugurate the principle of a Colonial Conference without delay and without the risks which attend all postponements in this life, believing that only the kind of experience we have had together in the last three weeks could have taught us how to prepare efficiently and adequately for another Conference. You can only learn how to hold Conferences by holding them, and the most successful series of Conferences must have a beginning.

Results achieved by Conference.

Has our beginning, considered by itself, been unsuccessful? I should most emphatically answer that question in the negative. We have achieved solid results in more than one direction, and we have sown much good seed which it is for the Colonial Office and for the Governments concerned to water, and to tend to vigorous growth before we meet again to consider what to do with the fruit.

In Field of Research.

Certain things stand out. We have endorsed wholeheartedly the principle of collective action, of collective finance, and of an efficient central organisation in the field of scientific research. In the matter of agricultural research we have crystallised that principle in our acceptance of the main outlines of the proposals embodied in the Report of our Committee which owed so much to the accumulated experience in this subject and infectious enthusiasm of its Chairman, Lord Lovat. I have every confidence that when these proposals have been further worked out in detail and submitted to the various Governments they will commend themselves for general concurrence and co-operation If so, we shall in Latimer's words have " lit a candle ", and established a far reaching and vital precedent for future action, not only in our own Colonial sphere but even beyond. In our own sphere at any rate we have already drawn that conclusion The Committee's Report was confined to agricultural research, but the Conference have definitely instructed the new joint Medical Research Committee, of whose setting up it has approved, to work out and submit to the Governments proposals for a scheme of medical research which will inevitably be on no less broad a basis than our scheme of agricultural research, and we have at any rate visualised the prospect of both veterinary research and forestry research being included within the ambit of the developments of a not too distant future, when we shall have been able to prepare the ground a little more adequately.

Mechanical Transport.

The same principle of efficiency in research through collective action is embodied in our recommendations for research into the problems of mechanical transport which we are asking the Empire Marketing Board to take up on our behalf, and indeed of others outside our sphere who are interested in co-operating with us.

Education.

In another direction, too, in the all important field of education, we have decided to follow up the successful work of the Advisory Committee on African Education by enlarging our advisory organisation so as to cover the whole field of education in the Colonies. These improvements in our central machinery,

in our great general staff, have throughout in our minds been closely associated with the idea of securing the best men for service in the Colonies themselves. As regards research workers, at any rate, they have been devised with the special aim of creating both conditions of salary and opportunities of the best work for each man which should attract ability and ambition.

The lead thus given cannot but re-act favourably in the long run upon every part of the service. The idea of unification, either of actual services or at least of terms of service, in order to facilitate transfers and offer a better career, if not over the general field of Colonial service, at any rate over wide groups of Colonies whose general conditions are similar, has made no little progress during our discussions, and I shall look forward with interest to the development of the idea, either through group Conferences of the special services or otherwise, in the near future.

In other ways, too, in regard to pensions arrangements and information as to conditions of service and cost of living in different Colonies, we have been mindful throughout to consider the interests of the individual official and to improve his prospects of being allowed to do the best work that lies within him.

New Relationship created between Colony and Colony, and between Colonies and Colonial Office.

On the many other matters which we have discussed, on the many fruitful suggestions thrown out and adopted, the mass of useful information which we have all received, I do not think I need dwell this morning. There is, however, something beyond and above information or suggestions or even the more substantial positive results to which I have referred. That is the feeling which I think we have all shared, as the Conference has developed, that we have created a new and better relationship between ourselves, between Colony and Colony, as well as between the Colonies collectively and this Central Office here. It is not only a personal relationship; that was good before, though I think we have made and can continue steadily to make it better. It is even more a new intellectual relationship, a sense begotten under the keen stimulus of our discussions, that we are emerging from the merely negative conception of control and direction by the Colonial Office to a more positive conception that we are all partners together in a great creative enterprise, fascinating in its interest and transcendent in its importance. Such a conception once realised by those who are at the head of the service, and diffused, as it inevitably must be, through the service generally, cannot fail to add immeasurably to its efficiency but also to add to the sense of dignity and worth while in lives spent laboriously, usually in discomfort, often in danger, and with comparatively little recompense in the ordinary currency of reward for effort.

(63019) Wt. 5434—1849/4428 1500 8/27 H. St. G. 25