IMPERIAL ECONOMIC COMMITTEE.

REPORT

OF THE

IMPERIAL ECONOMIC COMMITTEE

ON

Marketing and Preparing for Market of Foodstuffs Produced within the Empire

FOURTH REPORT—DAIRY PRODUCE.

Presented to Parliament by Command of His Majesty

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TERMS OF REFERENCE.

"To consider the possibility of improving the methods of preparing for market and marketing within the United Kingdom the food products of the Overseas parts of the Empire with a view to increasing the consumption of such products in the United Kingdom in preference to imports from foreign countries, and to promote the interests both of producers and consumers."

(NOTE.—The expenses of the Committee in connection with the preparation of this Report amount to £242 0s. 2d. In addition, the cost of printing and publishing the Report is £285 10*s*. 6*d*.)

REPORT

ON THE

METHODS OF MARKETING AND PREPARING FOR MARKET WITHIN THE UNITED KINGDOM OF FOODSTUFFS PRODUCED WITHIN THE EMPIRE.

FOURTH REPORT—DAIRY PRODUCE.

To THE RIGHT HONOURABLE STANLEY BALDWIN, M.P.,
Prime Minister and First Lord of the Treasury.

To THE RIGHT HONOURABLE ARTHUR MEIGHEN, K.C.,
Prime Minister of the Dominion of Canada.

To THE RIGHT HONOURABLE S. M. BRUCE, M.C.,
Prime Minister of the Commonwealth of Australia.

To THE RIGHT HONOURABLE J. G. COATES, M.C.,
Prime Minister of the Dominion of New Zealand.

To GENERAL THE HONOURABLE J. B. M. HERTZOG,
Prime Minister of the Union of South Africa.

To WILLIAM T. COSGRAVE, Esq.,
President of the Executive Council, Irish Free State.

To THE HONOURABLE W. S. MONROE,
Prime Minister of Newfoundland.

To THE HONOURABLE SIR C. P. J. COGHLAN, K.C.M.G.,
Premier of Southern Rhodesia.

To THE RIGHT HONOURABLE THE EARL OF BIRKENHEAD,
Secretary of State for India.

To THE RIGHT HONOURABLE L. C. M. S. AMERY, M.P.,
Secretary of State for the Colonies.

DAIRY PRODUCE REPORT.

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REPORT.

We, the Imperial Economic Committee, representing His Majesty's Government, and the Governments of the Self-Governing Dominions, India, and the Colonies and Protectorates, acting under our Terms of Reference published on the 6th March, 1925, beg leave to present to the Governments of the Empire this our Fourth Report—The Marketing and Preparing for Market of Dairy Produce.

I.—Introduction.

1. Under our Terms of Reference we have been asked to consider the possibility of improving the methods of preparing for market and marketing within the United Kingdom the food products of the Overseas parts of the Empire with a view to increasing the consumption of such products in the United Kingdom in preference to imports from foreign countries, and to promote the interests both of producers and consumers. We have already issued Reports dealing with meat and fruit. On the conclusion of our inquiries into these foodstuffs it was agreed by the Governments of the Empire that we should, as the next stage of our investigation, conduct a similar inquiry into dairy produce.

2. In our inquiry into dairy produce we have concentrated in the main on butter and cheese. We have regarded the supply of fresh milk and cream in the Home country as a domestic problem and have not examined it in any detail, since the supplies are entirely in the United Kingdom itself, with the exception of a small quantity imported from the Irish Free State. In a separate section of this Report we deal with the trade in subsidiary milk products, such as condensed milk, milk powder, ice cream, and casein.

3. Margarine, which enters to some extent into competition with butter, we have not dealt with in this Report, but have reserved it for discussion in a supplementary Report which we annex to this Report. We take this course for the reason that the manufacture of margarine is forbidden in Canada, and also its importation, and the Canadian Government did not think it advisable that under the circumstances their representative should take part in that portion of our investigation.

4. In regard to the subject of dairy produce, we have held 26 meetings. We have examined a considerable number of witnesses, representing both producing and marketing interests. We have further had the advantage of consultation with experienced officials both of the Home and Overseas Governments and with men of scientific eminence, and we desire to take this opportunity of thanking these gentlemen for their skilled assistance.

5. In conducting our present inquiry and in the preparation of this our Fourth Report, we have kept in view the general recommendations set out in our First Report and amplified in our Third Report. Since those Reports were issued the Home Government has set up the "Empire Marketing Board," to which it has entrusted the duties which we desired to see assigned to an "Executive Commission" responsible to Parliament at Westminster. The recommendation that such a Commission should be set up has, therefore, in substance been accepted, and in the present Report our references will no longer be to a proposed Executive Commission, but to the provisionally established Empire Marketing Board. According to the announcement recently made by Mr. Baldwin of the agenda for the coming Imperial Conference, the position of this Board will be one of the matters to be discussed at that Conference.

6. It is, perhaps, well to state that at the cost of a certain amount of repetition we have sought to make each of our Reports complete in itself and not merely instalments of a single long Report. There are some who for the purposes of broad policy will read all our Reports, and we would ask that such readers will forgive repetitions, and will understand that there are others, especially producers of particular commodities in particular parts of the Empire, who will read only that Report which affects in a practical way their own business.

A. THE TRADE IN DAIRY PRODUCE.

II.—Empire Trade in Dairy Produce.

7. The grass crops of the Empire are not less important than its cereal crops. The grass lands of the Empire support 200,000,000 head of cattle and 200,000,000 sheep. Much of the corn produced in the Empire is consumed on the spot, and the value of the imports into the United Kingdom from the grass lands is nearly three times as great as from the corn lands. In the year 1924 the cereals and their products imported into the United Kingdom from Empire countries were valued at £53,000,000, whereas the value of the imports of the products of the grass crops (mainly meat, wool, hides, and dairy produce) were no less than £157,000,000.

8. Of the main classes of foodstuffs imported into the United Kingdom from overseas, dairy produce occupies third place. In 1924 the United Kingdom paid £120,000,000 for imported grain and flour, £106,000,000 for imported meat, and £70,000,000 for various classes of dairy produce. A certain amount of dairy produce to the value of £2,200,000 was re-exported, leaving a balance of £67,800,000 as the value of imported supplies consumed in the United Kingdom. Of the £70,000,000 paid for imported dairy produce, no less than £34,000,000 went to Empire countries.

9. Apart from milk consumed in the liquid form, the most important items of dairy production are butter and cheese. The importation of these two commodities into the United Kingdom is rapidly increasing. Between the years 1913 and 1924 the amount paid to foreign countries for butter and cheese rose by 47 per cent., and the amount paid to Empire countries by no less than 178 per cent.* In 1924 the total value of butter and cheese imported into the United Kingdom from all sources was £63,000,000. Of this sum, £33,000,000. or 52 per cent., was paid to Empire countries.

10. An examination of the quantities, as distinct from the values, of the imported supplies emphasises the development of the trade and the extent to which Empire countries are taking an increasing proportion of it. In the five years ending 1904 the average annual importation of *butter* into the United Kingdom was 3,870,000 cwts. In 1925 this had risen to 5,850,000 cwts. In the interval the Empire supply rose from 18 per cent. to 51 per cent. of the total quantity. A similar growth has occurred in the *cheese* trade. In the five years ending 1904 the United Kingdom imported on the average 2,620,000 cwts. In 1925 this had risen to 3,100,000 cwts. Between these two years the Empire share increased from 68 per cent. to 88 per cent. of the total imported.†

11. Reliable statistics are not available of the quantities of butter and cheese produced in the United Kingdom. We have, therefore, had to depend on such estimates as the Ministry of Agriculture, in the light of their experience, are able to frame. These estimates, we should add, are supplied by the Ministry with considerable reserve. We are told that the output of butter in Great Britain and Northern Ireland, including butter made and consumed on the farms, may be taken as in the neighbourhood of 1,000,000 cwts., and the output of cheese as 1,250,000 cwts. The following table shows the percentages of butter and cheese produced in the United Kingdom itself and imported from Empire and from foreign countries respectively in 1924. For comparative purposes we have also added the percentages for margarine, although that commodity is dealt with in a supplementary Report:—

—	Empire.		Foreign.
	Home.	Overseas Empire.	
	Per cent.	Per cent.	Per cent.
Butter	17	37	46
Cheese	31	60	9
Margarine	70	1	29

Excluding imports from the Irish Free State. † See Appendix I.

12. In Great Britain and Northern Ireland there is a large area devoted to grass crops which form the main source of support of nearly 25,000,000 sheep and 8,000,000 head of cattle. These provide the dairy herds which supply the bulk of the milk consumed in the Home country, for apart from an importation of about 500,000 gallons of fresh milk from the Irish Free State, the whole of the eight or nine hundred million gallons drunk annually is Home produced. We have not conducted a detailed investigation into the fresh milk trade, partly because it is almost entirely a domestic rather than an Imperial question, and partly because it was the subject of an exhaustive inquiry by the Linlithgow Committee in 1923.

13. Of the minor milk products consumed in the United Kingdom the most important is *condensed milk*. In 1924 the value of the imported supplies of this commodity was £5,700,000, the bulk of which came from foreign countries. Relatively small quantities* of *milk powder*, of *cream*, and of *casein* are also imported. The value of these three items together was, however, in 1924, less than £1,000,000.

14. Generally it may be said—

that the Home country provides its own fresh milk;

that the Home production of butter is relatively small, being one-sixth of the total consumption;

that the Empire has come to supply more butter than foreign countries, but that foreign countries are now recovering their position, and will in the near future compete again more keenly; and

that the cheese requirements of the Home country are met to the extent of over 90 per cent. of the consumption from Empire countries.

III.—Sources of Supply to the United Kingdom.

15. The main sources from which the United Kingdom derives its supplies of dairy produce are:—

Canada,	Netherlands,
Australia,	Sweden,
New Zealand,	Russia and Siberia,
Irish Free State,	The Baltic States,
Denmark,	Argentina.

16. As already stated, the *butter* supplies of the United Kingdom have come increasingly from Empire countries during the progress of the present century. This is not merely a post-war development. In pre-war days the relative importance of foreign countries was already declining, but this tendency has been accentuated since the war. In regard to these foreign supplies the most striking features have been—that the United States has disappeared from the list owing to the increased demands

* See Appendix I.

of her own population; that Denmark has held her own; that Siberia is sending supplies which are now rapidly increasing in quantity; that Sweden and the Baltic States have taken the place of France and the Netherlands; and that Argentina has come into the market in competition with the Southern Dominions.

17. The quantity of butter supplied by the Empire, as already indicated, has grown steadily during the present century. New Zealand and Australia are the main sources. In 1925 these two Dominions sent over 40 per cent. of the butter imported into the United Kingdom. Owing, however, largely to climatic conditions, the quantities obtained from Australia have fluctuated to a greater extent than have those from New Zealand. The importation of butter from Canada is again increasing, but the trade is still small; in 1925 less than 3 per cent. of the total imports came from this source, a smaller proportion than was received in the early years of the century. A substantial trade in butter is maintained between the Irish Free State and the United Kingdom, but the amounts have tended rather to decrease than to grow, owing to increased consumption in Ireland itself. As between 1923 and 1925 the Irish proportion of the total imports fell from 9·7 per cent. to 6·9 per cent.

18. The following figures are of interest as showing the development of the trade in butter from the Overseas Dominions to the Home country during the present century :—

——	Canada.	Australia.	New Zealand.	Irish Free State.
	Cwts.	Cwts.	Cwts.	Cwts.
Average 1900–04 ...	219,000	257,000	207,000	—
„ 1909–13 ...	20,000	621,000	304,000	—
„ 1914–18 ...	45,000	405,000	349,000	—
1919	33,000	417,000	319,000	—
1920	32,000	228,000	275,000	—
1921	43,000	964,000	709,000	—
1922	155,000	931,000	1,103,000	—
1923	40,000	533,000	1,131,000	492,000*
1924	131,000	657,000	1,082,000	461,000
1925	163,000	1,161,000	1,256,000	403,000

* Nine months, April–December, only.

19. The bulk of the *cheese* consumed in the United Kingdom is of the well-known "Cheddar" and "Cheshire" types. There are in addition many local and fancy cheeses. In the years preceding the war Canada was supplying from 60 per cent. to 65 per cent. of the cheese imported into the United Kingdom, but the trade was declining both absolutely and relatively. Supplies from the United States, which in 1904 was the next largest contributor, were also dropping out of the market. On the other hand, New Zealand was coming to the front. As will be seen from the statistics given in Appendix I, the total importation of cheese into the United Kingdom fell off by nearly

10 per cent. between 1900-04 and 1909-13. During this period imports from the Netherlands and France were declining and those from Belgium practically disappeared. Italy and Switzerland, on the other hand, were becoming of some importance. During the post-war period these developments have continued. The imports from France, Switzerland, and Italy are of special kinds of cheese which do not compete with the ordinary cheese of household consumption. To-day Canada and New Zealand—apart from the Home Country itself—are the main suppliers of cheese for the British market. Their relative position has, however, altered. In the five years ending 1913 Canada supplied 62 per cent. and New Zealand 20 per cent. of the total importation. In 1925 about 41 per cent. came from Canada and 45 per cent. from New Zealand.

IV.—Consumption in the United Kingdom.

20. In order to form an estimate of the consumption of butter and cheese in the United Kingdom it is necessary to allow for re-exports and also for the Home production. The production of *butter* in the United Kingdom was in 1907, according to the Census of Production taken in that year, approximately 1,855,000 cwts. or 4¾ lbs. per head of the population.* Imported butter retained for Home consumption in the same year was 4,127,000 cwts., or 10½ lbs. per head of the population. Thus the total consumption per head was in the neighbourhood of 15¼ lbs. of butter.

21. For 1925, we are given to understand that the output of butter for Great Britain and the whole of Ireland is substantially the same as it was in 1907, since the slight increase of about 250,000 cwts. in Great Britain is offset by a post war decrease in the Irish Free State. Allowing for the increase in population the consumption of Home produced butter is thus now about 4⅓ lbs. per head.* The retained imports of butter in 1925, omitting the figures of imports from the Irish Free State to the United Kingdom, were 5,178,000 cwts., or 12 lbs. per head. Thus we have for 1925 a total consumption of 16⅓ lbs. per head of the population.

22. The production of *cheese* in the United Kingdom in 1907 was about 575,000 cwts., or 1¼lbs. per head of the population. The contribution of Ireland was negligible. Imports were 2,320,000 cwts., or 6 lbs. per head. The total consumption of cheese in that year was, therefore, about 7½ lbs. per head of the population. In 1925, the Home production of cheese was about 1,250,000 cwts., and the imports retained for Home consumption 2,982,000 cwts. Thus there is a consumption of cheese in the United Kingdom at the present time of 9¾ lbs. per head of the population.

23. Taking butter and cheese together the increase in consumption between 1907 and 1925 is shown by the following figures. For convenience sake we have again added figures for margarine :—

* The quantities of Home produced butter and cheese which are exported are relatively unimportant.

	1907.		1925.	
Butter—	Lbs.		Lbs.	
Home produced	4·72		4·29	
Imported	10·57		12·03	
		15·29		16·32
Margarine—				
Home produced	2·21		6·92	
Imported	2·24		3·14	
		4·45		10·06
Cheese—				
Home produced	1·44		2·87	
Imported	5·94		6·92	
		7·38		9·79

Thus, in a little less than 20 years the consumption of butter per head of the population has increased by 6·7 per cent., margarine by 126 per cent., and cheese by 32·7 per cent. It is interesting to compare the above consumption for the Home country with the estimated consumption of butter in certain Overseas Dominions. The following figures have been supplied to us as representing the annual consumption per head of the population for the countries specified.

Butter.	*lbs.*
United Kingdom	17
Canada	28
Australia	27
New Zealand	21

24. It is apparent from what has been said that during the present century there has been an increase of butter and cheese consumption in the United Kingdom, and that that increase has been accentuated since the war. As we showed in our Third Report the same statements are true in regard to the consumption of fruit, both in respect of totals and per head of the population. On the other hand, as was shown in our Second Report, there has, if anything, been a small decline in the consumption of meat per head.

B.—PRODUCTION

V.—Problems of Production.

25. The figures which we have given make evident the fact that the main problem in the marketing of dairy produce from the Empire is of quite a different order from that which we had to investigate in regard to meat and fruit. In the case of these commodities the market of the United Kingdom has still to be conquered for the Empire,* whereas in the case of dairy produce, the Empire, at Home and Overseas, already dominates the cheese market and commands more than half of the butter market. Therefore, in regard to the former commodities the problem is to win fresh ground, but in regard to the latter it is to defend ground which has already been won.

* This is true for the meat market as a whole, although Empire countries supply just over half of the mutton and lamb.

26. Apart from the new competition of Argentina, it is from countries with low wages and low standards of living that the position of the Empire in the United Kingdom market for dairy produce is threatened at the present time. As we shall show later, the indications are clear that Siberia and the Baltic States may, within a very few years, send great supplies of cheap butter to the United Kingdom. It is obvious that the producer, both at Home and in the Dominions, must see to his methods, especially from the point of view of cost, if he is to hold his own in the market without lowering his standard of living. Dairy farming is one of the most important, if not the most important, of the intensive forms of agriculture, and may therefore play a great part in the redistribution of population within the Empire. It would therefore be difficult to over-emphasise the importance of defending the position which has been won in the British market for Empire butter and cheese.

27. It follows from these considerations that whereas in the case of the commodities dealt with in our previous Reports we were mainly concerned with improving the methods of marketing, in this Report our attention must largely be given to those aspects of preparing for market which influence prices. Indeed, we think that on this occasion we must take the widest view that is permissible of our Terms of Reference. If we can show, as we believe we can, that by improved methods of production it should be possible greatly to reduce costs without touching wages, the Empire producer ought still to be able to hold his own even though prices should fall substantially as a result of the competition which is apparently coming.

28. In milk production certain fixed charges, such as rent, wages, and living costs, do not vary with the total milk output of the herd nor with the money received for that output. The fact of outstanding importance to the producer is that the total output of milk and the yield of butter fat per cow can be greatly increased. They have been increased in a very remarkable degree in Denmark. Thus the cost of production per unit of butter and cheese is diminished by distributing the fixed charges over greater quantities. It has been estimated in Australia that if butter production costs 2*s*. a lb. on the basis of an average annual output of 140 lbs. of butter fat per cow, an increase in that output to 260 lbs. will lead to a reduction in the cost of production to 1*s*. 1*d*. for each lb. of butter made. We append a table showing the cost of production of 1 lb. of butter fat on the basis of certain assumed costs for the maintenance of a cow for a year, where the output of milk and butter fat varies between 4,000 and 8,000 lbs. of milk and from 3·5 per cent. to 5 per cent. of butter fat respectively. These figures have been supplied by a member of the staff of the National Institute for Dairying Research at Reading.*

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* See Appendix II.

29. The improvement in Denmark is shown by the following figures, giving the increase in the average annual output of butter fat per cow between 1864 and 1908 :—

	Lbs. per Cow.
1864	80
1887	116
1908	220

Since 1908 still further increases have been achieved. An examination of the results of milk-testing on the Danish Islands from 1899 to 1922 reveals these important facts: in 1899-1900 there were 23,445 cows on the record lists, giving an average yield of 6,340 lb. of milk, with 3·36 per cent. of butter fat, and 230 lb. of butter; in 1921-22 the number of cows on record was 120,817, with an average milk yield of 7,229 lb., a fat content of 3·69 per cent., and a production of 297 lb. of butter. These figures show that in 22 years the number of cows subjected to control has increased more than five-fold, that the average milk yield per cow has increased by 889 lb., that the fat content of the milk has increased by 0·33 per cent., and that the production of butter per cow has increased 67 lb.

30. In connection with butter production, we must emphasise the great importance of the quality of the cream. Witness after witness has stated that the Empire producer will experience little difficulty in obtaining the highest prices for his produce if he concentrates his attention on supplying butter and cheese of only the highest quality to the United Kingdom market. The responsibility for quality rests largely with the farmer. The creamery or factory manager cannot make the best butter from inferior cream. Bacteria, due to dirt, are the principal cause of inferior cream. Under ordinary conditions bacteria thrive and multiply in milk, cream, and butter alike. They always do harm by developing undesirable flavours. Yet it is undeniable that although the responsibility for quality lies thus largely with the farmer, it is he, of all the interests concerned with butter on its way to market, who has been most critical of late of any failure to secure the best returns. It is, of course, natural for him to compare the final price in the United Kingdom market with the much smaller sum which he himself receives, and to believe that the marketing interests retain too large a share. While there are undoubtedly opportunities for economy and increased efficiency in certain branches of the manufacturing and distributing trades, we see much greater opportunities in production.

31. We need hardly point out that it is not in the interest of the consumer in the United Kingdom that the high standard of living in the Dominions should be lowered. We have consistently urged that the United Kingdom consumer should purchase the produce of the Overseas parts of the Empire in preference to that of foreign countries, just because the inhabitant of the Dominions can afford to make the largest pur-

chases of the manufactured goods of the Home country. Therefore, the more prosperous the dairying industries of the Empire, both in respect of wages and profits, the greater will be their demand for British goods.* At the same time the British consumer cannot afford to ignore price and quality. While it is essential for the Overseas Dominions to send to the United Kingdom produce of the best quality, well graded and packed, it is equally important that it shall be sold at competitive prices. *Therefore, Empire producers must adopt all possible methods of reducing those costs of production which can be curtailed without lowering the standard of living of the members of the industry itself.*

32. Before discussing how Empire dairy producers may improve their efficiency and reduce their costs we desire to contrast the Danish type of dairying with that which prevails in the Overseas Dominions. In Denmark we have intensive farming. Consequently, Denmark is one of the most densely populated countries in the world, although the soil is sandy and poor, and the climate, like that of the United Kingdom, far from ideal for dairying. In the Overseas Dominions, on the other hand, and particularly in Australia, dairying is often practised under the conditions of extensive farming, although the climate and soil are as a rule far more suitable than they are in Denmark. By encouraging the growth of the most suitable grasses, and by raising fodder crops, matters with which we deal later, and by adopting more intensive methods of production generally, the dairying industries of the Empire could support a far larger population to the acre. This would produce that closer type of settlement peculiarly acceptable to the migrant from the Home country, who naturally prefers a relatively thickly populated area with the social life and the educational facilities which it provides.

33. As already indicated, one of the best ways by which the producer can increase his profits, notwithstanding severe foreign competition, is by increasing the output of butter fat per cow. To secure this, we cannot too strongly emphasise the value of cow testing† (milk recording) societies. Considerable progress in this respect has already been achieved both in the United Kingdom and in the Overseas parts of the Empire, as subsequent sections of this Report show. We have had laid before us results which have been obtained in the United Kingdom in recent years. In the case of one society the average yearly yield of milk per cow over a period of four years increased by 168 gallons, representing, at 1*s.* a gallon, a definite gain to the producer of £8 8*s.* per cow on the fourth as compared with the first year. In another society, covering a period of five years, the increase in the annual yield per cow was 194 gallons, repre-

* See also paragraph 247

† In some parts of the Empire this is known as "herd testing" or "milk testing."

senting, at 1*s*. a gallon, an added cash value of £9 14*s*. per cow. The results shown per herd are even more striking. In one herd of 30 cows in the United Kingdom the cash value of the output was £445 10*s*. greater in the seventh year than in the first year. In another herd of 20 cows, over a period of six years, the increased output was £388. In a third case for a herd of 46 cows, over a period of four years, the increase was no less than £798. Similar results have been, and are being, achieved in the Dominions. We have been told of dairy farmers in New Zealand who, by means of herd testing, have reduced their herds by one-third without reducing their output of butter fat. What has been achieved in many herds on record could by the same methods be accomplished in all herds.

34. We do not contemplate that cow testing should have for its object outputs such as 2,000 or 2,500 gallons of milk a year, which have indeed been reached by exceptional cows in competitions amongst different societies. Such achievements have, no doubt, their value from a breeding standpoint, but what we wish to see is a steady and general increase in the milk output per cow and a similar improvement in the percentage of butter fat yield. From the point of view of butter and cheese making, the percentage of butter fat is as important as the volume of milk.

35. We would further point out that the cost of cow testing and milk recording societies is low, and that the return to the producer after a few years is far in excess of any expense entailed. In 1924 the average cost per cow to the members of societies in England and Wales was only 4*s*. 5*d*., though in the case of many societies the cost was much in excess of this amount. With the more efficient working of societies and the spreading of overhead expenses over larger numbers of cattle, the cost per unit should still further decrease. *We are so convinced of the importance of the rapid extension of cow testing and milk recording that we would venture to urge upon the Governments of the Empire that they assist financially in the establishment of schemes where special difficulties arise.*

36. *We recommend that the proposal which we made in our Second Report for payments toward the transport of pedigree breeding stock from the Mother-country to the Dominions should be extended to cover stock for dairying as well as meat-producing herds.* In this connection the maintenance of herd books and the licensing of bulls are most important. *Bull clubs, such as have been initiated in Denmark and adopted in the United Kingdom and Canada, should be multiplied, and the extension of Government stud farms would prove invaluable to the industry as well as repay any initial expenditure.* There is also considerable work to be undertaken in the Overseas Dominions in the eradication of unprofitable cows and scrub bulls unsuited for the propagation of a rich dairying strain.

37. Pasture improvement and fodder conservation are of great importance to producers. A sum has already been set apart from the Empire Marketing Grant for organising research into the mineral content of pastures. There is much work of this type to be undertaken. Experiments are also being conducted in various parts of the Empire to measure the increase in the stock-carrying and milk-producing capacity of pasture which receives applications of artificial fertilisers as compared with pasture which does not receive the additional manure. Further research is necessary, as we indicate below, in connection with foodstuffs for good milk production during the winter period when pasture feeding is not practicable.

38. Not only is it important that research on the lines we have indicated should be carried out, but it is equally important that the producer should be made aware of the results of this research and should apply them in his own pastures and among his own herds. We are told, for instance, that in Australia the application of a top dressing costing in all for the dressing and its application not more than 10*s*. per annum per acre will, in many areas, result in an increase in the carrying capacity of from 75 per cent. to 100 per cent.

39. Considerable emphasis has been laid by various witnesses, well acquainted with the United Kingdom market, on the fact that if the butter of a given producing country is to secure and maintain a high reputation and the best prices, it must be on the market for as long a period as possible during the year. Danish butter is available in a fresh condition throughout the whole year. This has undoubtedly contributed in no small degree to the great prosperity of the Danish dairy producer. The Danes have achieved this result by careful attention to winter dairying. It is a fact that winter dairying is normally more expensive than summer dairying. Stall feeding, entailing the production and the storage of fodder and the provision of cake, involves an additional outlay on the part of the farmer. Nevertheless, we believe that a higher average price is to be obtained from a prolonged supply. *We would, therefore, urge that the producers and their organisations in the Overseas parts of the Empire should carefully re-examine this matter with a view to greater continuity of supply.* If Empire dairy produce is to benefit fully from a publicity campaign, it is essential that supply and advertisement shall continue through as great a part of the year as possible.

40. In some of the Overseas Dominions it may be decided on economic grounds that dairying cannot be undertaken during the whole of the winter period. Even in such cases, we would urge an extension of the season of production. In other areas winter dairying may be practicable only by means of fodder conservation. This, however, should be no deterrent, as we see no reason why much more extensive use should not be made

of hay and ensilage. *In regard to hay and ensilage we would recommend further research into its vitamin content. If it should be found that some present methods of preservation are harmful in this respect, further investigation should be undertaken with the object of discovering improved methods to ensure the preservation of the important vitamins present in the fresh crop.*

41. In certain regions, as, for instance, in parts of Australia, we are disposed to think that winter dairying may even be more practicable than summer dairying. In the very hot period of the year the vegetation is scorched, and except for ensilage and similar fodder no food is available for the cattle. In such areas green barley and certain clovers may be grown in the winter, and on these dairying is not only practicable but decidedly remunerative. *These are questions into which we recommend local investigation.*

C. THE DAIRYING INDUSTRIES OF THE EMPIRE.

42. We now proceed to give a short description of the dairying industries of the different portions of the Empire. The conditions differ so widely that the application of the general principles which we have discussed in the preceding paragraphs must be separately considered.

VI.—United Kingdom Dairying Industry.

43. As the Linlithgow Committee, so recently as 1923, conducted an elaborate inquiry into the methods and costs of distributing Home-produced milk and dairy produce in the United Kingdom, we have not thought it necessary to go into any elaborate repetition of that inquiry. We have, therefore, in our recommendations affecting the Home producer, limited ourselves to emphasising those recommendations in the Report of that Committee which bear upon our present investigation. It is, however, necessary, in order that a proper idea may be formed of the dairying resources of the Empire, to give a brief account of the dairying industry of the United Kingdom.

44. Owing to the density of population in Great Britain, and particularly in England and Wales, dairying is mainly concerned with the production of liquid milk for human consumption. It has been stated in evidence that 80 per cent. of the dairy farmers in England and Wales are engaged in the sale of liquid milk, and a large proportion of them dispose of their whole output by contract throughout the year. On the other hand, some of them are only able to find an outlet for part of their product, and they convert the surplus into butter. Others, again, definitely make cheese during the summer and only revert to the sale of liquid milk in the winter when prices are normally higher. It is usually considered most remunerative to sell milk for direct consumption or, as an alternative, to convert it into cheese. It

is only when a special market can be found for butter, or where remoteness from a market or railway makes the sale of liquid milk impracticable, that butter making is likely to be profitable, though butter making is the usual method of disposal of milk on farms where cattle rearing is the chief concern. There is a fairly substantial production and sale of butter of the best quality at relatively high prices. This high-class farmhouse butter does not compete directly with the Empire products sold on the wholesale markets, but has a specialised and local market which is able to absorb all that is produced at prices which are probably not unremunerative. Apart from this high-class butter, farmers who have surplus milk in irregular quantities also make butter, which is usually of secondary quality. The irregularity and uncertainty of their surplus supply of milk, over and above what is required for immediate consumption, has hitherto been the most serious obstacle to the establishment of butter factories in England and Wales. On the other hand, the quality of cheese made on farms is usually considered superior to anything that can be produced in cheese factories, and for this reason there has not been any very marked development in the manufacture of factory cheese.

45. Accurate statistics of the dairy produce output of Great Britain and Northern Ireland are not available, but it is evident that there has been an increase in the total milk production in recent years. The Home Departments of Agriculture ascertain annually the number of heifers and cows in milk or in calf, and it appears that these have increased from 2,900,000 for 1900-1904 to 3,400,000 in 1925, that is by about 17 per cent. The annual average production of milk is believed to be in the neighbourhood of 440 gallons per head, so that the total production at the present time is about 1,500 million gallons. It is difficult to say exactly what proportion of this total output is used for butter and cheese making, but in the absence of precise figures the Ministry of Agriculture has suggested that the production of butter in Great Britain and Northern Ireland is probably about 1,000,000 cwts., and of cheese 1,250,000 cwts. These quantities taken together would represent 450 million gallons of milk, or about 30 per cent. of the total production of milk.

46. The advantages of selling liquid milk have attracted increasing numbers of farmers to this branch of the trade, and within the last year or two the supply has tended to be slightly in excess of the apparent demand. This has led to a concerted effort by producers and distributors to increase consumption. A National Milk Publicity Council has been established which, besides undertaking a general advertising campaign, employs qualified persons to instruct the general public in the food value of milk and supports nutrition experiments having for their object the testing of its nutritive value. Its expenses are met by a levy on producers and distributors.

47. There is obviously a wide opening in the United Kingdom for an increase in the production and consumption of liquid milk. It was estimated in 1923 that the consumption in England and Wales was approximately 19 gallons per head of the population or slightly under half a pint per day. This is considerably below the consumption of certain foreign countries and a definite increase in the quantity of fresh milk drunk in the United Kingdom, particularly by children, would be of great benefit to the national health. We are told that the quantity of milk consumed in the liquid form in certain foreign countries per head of the population is as follows :—

	Pints a day.
Sweden	1½
Denmark	1½
United States	1

48. As already stated, however, we do not propose to discuss the British milk problem, more especially as we understand that the Ministry of Agriculture has in preparation, as one of its Economic Series, an exhaustive Report dealing with the subject as regards England and Wales. The fundamental point, so far as our immediate inquiry is concerned, is to note that in the Home country the major portion of the production is sold as liquid milk and does not therefore come directly into competition with the products of the Empire overseas, which are necessarily sent to the United Kingdom as butter, cheese, or other manufactured dairy products.

49. The production of cheese is a Home industry of considerable importance. It is the only practical alternative that many dairy farmers have to the sale of liquid milk. The cheese-making areas were originally Somerset and its surrounding counties which produce " Cheddar " and " Cærphilly " cheeses, and Cheshire and the surrounding counties, which produce " Cheshire " cheese. These varieties still account for the great bulk of Home production. Since the inauguration, about 1886, of technical instruction in cheese making, the manufacture of cheese has gradually spread throughout the United Kingdom, and it has been fully demonstrated that good cheese can be made in any county. During the war Home production of cheese suffered a severe set-back owing to the fact that, during the period of war-time Food Control, the value of manufactured dairy products fell in relation to that of liquid milk. The industry has been gradually recovering in recent years.

50. Although a very high standard of excellence in cheese making is reached, the fact that the bulk of the cheese is made on farms and not in factories necessarily leads to a lack of uniformity. It has been suggested to the bodies representing the Cheshire and Cheddar cheese industries that, in order to obtain some, at least, of the advantages which the grading systems adopted in the Overseas Dominions assure, they should prepare a register of accredited producers to which admission

should only be permitted on compliance with certain definite requirements both in regard to production methods and results. Such accredited makers alone would be allowed to use an authorised trade mark of the industry concerned. We understand that as a preliminary the Cheshire cheese industry has already formed a representative federation but has not yet carried the matter further.

51. Since 1914 the English Ministry of Agriculture and Fisheries has encouraged the formation of milk recording (cow testing) societies. These have increased from 16 in 1914 to 52 in 1923-24. The number of members has increased from 264 to 4,764 and the number of cows from 7,331 to 138,086 in the same period. Good as this progress undoubtedly is, the great scope which exists for a further extension of the work is shown by the fact that in Denmark in 1922 no less than 295,290 cows out of a total for the whole country of 1,310,893 dairy cows were under test. This represents over 22 per cent. as against 5 per cent. in England and Wales. Nevertheless, undoubted progress has been made amongst producers connected with the British societies. In one society, in a period of five years, the increase in the annual yield of milk per cow rose from 567 gallons to 761 gallons. In individual herds the increase has been even more striking. In one herd of mixed Shorthorn and Friesian cows the increase over a period of six years in the yield per cow was 388 gallons, the output rising from 616 to 1,004 gallons. The cash value of such an increase, on the basis of 1s. per gallon, represented in that case no less than £388 for the herd. *Such instances bear testimony to the commercial value of milk recording schemes in the United Kingdom and we think that every effort should be made to develop and extend them.* We note that the scheme so far organised by the Ministry of Agriculture and Fisheries does not include testing for the butter-fat content of milk, but we understand that a beginning is being made in this direction and that a definite scheme is to be brought into force on 1st October, 1926.

52. Scotland has long taken a keen interest in the improvement of milk production, and was in fact the pioneer in the United Kingdom of the system of cow-testing now generally followed. Some 24 years ago a Committee was formed in Ayrshire to promote the keeping by farmers and dairymen of records of the milk yield of their herds. The extension of the work of the Committee and the increase in the number of Milk Recording Societies led to an alteration in its constitution, and it ultimately became the Scottish Milk Records Association. During the year 1925 the number of societies affiliated to the Association had increased to 40, the number of herds being 711 and the number of cows tested about 28,250. The Scottish scheme differs from that at present in operation in England, in that in addition to recording the weight of milk, it also records the percentage of butter fat. The scheme has led to a great increase in milk pro-

duction. Cases have occurred in which the milk yield has increased by as much as from 50 to 100 per cent. over a period of years without increase in the cost of production. The registration of recorded cows under efficient safeguards as to checking, has greatly increased the value of the Ayrshire in particular, and has stimulated the export of this breed to Overseas Dominions and foreign countries. In the West of Scotland there has been a considerable development of co-operative creameries at which the farmers' milk is collected for transport to Glasgow and other cities. Any surplus milk which would otherwise be thrown upon the market is converted into butter and cheese and the seasonal price of milk thus rendered more stable.

53. Milk Recording Societies in Northern Ireland have been developed with great rapidity since the formation of the Ministry of Agriculture for Northern Ireland in 1922. In 1926, 52 Milk Recording Societies were in operation, as compared with four in 1921. Some 11,000 cows out of a total cow population of 237,000 are under test. The scheme as operated includes a central butter fat-testing scheme. The development of the milk industry has been considerably facilitated by the operations of the Live Stock Breeding Act (Northern Ireland). The Act makes it an offence for any bull to be retained for service in Northern Ireland unless it has been licensed by the Ministry of Agriculture. That the Act provides means for rapidly and effectively grading up the quality of the cattle may be gathered from the fact that during the year 1926 no less than 30 per cent of the bulls submitted for licence were rejected by the Ministry. This weeding out of scrub bulls was accomplished without reducing the number available for service in Northern Ireland, since the breeders were able to replace those rejected by well-bred animals which would otherwise have been exported or slaughtered. The process of substitution has been carried out without serious hardship to the individual farmer.

VII.—Canadian Dairying Industry.

54. Milk production and butter and cheese making began in Canada with the systematic establishment of permanent French settlements in the St. Lawrence Valley between 1608 and 1663. From the cows then introduced are derived the present-day French-Canadian breed which in Quebec Province is second only to the Ayrshire. The cheese making of those early peasants is continued in the " Orleans " cheese of to-day. Cattle were taken also by Scottish settlers to Nova Scotia in 1622.

55. The two centuries following saw other importations, from England chiefly, and in 1861 there were over 1,000,000 cows in the eastern parts of what is now the Dominion of Canada. Notable among these were importations of the famous milking Shorthorn " Booth " family. Though there was no specialisation in dairying, the production of butter and cheese exceeded

the local demand, and since export was difficult prices were unremunerative.

56. It was not until 1864 that cheese making in factories began and exporting became practicable. Yet in 1867, the year of Confederation, exports of cheese to Great Britain were worth £36,000; in 1878, £760,000; and in 1892, £2,319,000. By 1892 cheese had become the chief of all exports. Its production, which was entirely in factories, was carried on in all the settled parts of Canada. Though the first creamery was established in 1873, the export of butter did not develop in anything like the same degree, partly because cold storage facilities for export were introduced only in 1893. The rapid growth of the cheese industry in this period stimulated the importation of pure-bred cattle of heavy-producing types, and the herds then founded have helped to establish the pre-eminent standing of Canadian breeding stock throughout North America.

57. This exceptional expansion of the cheese industry, in particular between 1865 and 1893, has an important bearing upon the trend of Imperial economy, because cheese was then almost the only economic export to Britain, and no other markets were available for Canadian products. From 1866, successively higher tariffs narrowed, and in 1891 cut off, the convenient United States outlets. Without urban industrial populations at home, without cold storage facilities, and with expensive and inefficient transportation over long distances to England, production and export of perishable produce and of commodities of low values were alike uneconomic.

58. The thirty-five years since the turning point in 1891 saw a further great advancement of the husbandry and industry of dairying, although along new lines. The advent of cold storage facilities initiated the export of bacon, which in fourteen years grew in value from 1 to 14 million dollars. At the same time, the opening of the Canadian West and the development of urban industries greatly increased the home demand for dairy products of every kind. One result was a decline of butter and cheese exports after 1904, when the record figure of 233,980,000 lbs. of cheese had been reached. Another result is seen in the following figures showing growth of values for all dairy production in Canada.

	Value.	
Year.	$	£
1907	94,000,000 or	19,000,000
1910	104,381,000 or	29,000,000
1920	232,408,000 or	48,000,000
1924	234,659,000 or	48,000,000
1925 (estimated) ...	300,000,000 or	62,000,000

59. With this growth of the industry the variety of its products increased. The value given for 1924, analysed, shows 10 per cent. in cheese, 26 per cent. in creamery butter and 13 per cent. in dairy butter, 40 per cent. in milk for direct consumption, and 11 per cent. almost equally divided among various

evaporated milks, ice cream, and sweet cream. In regard to all these items, Ontario and Quebec, where the industry was founded, are still the chief producing Provinces, and, notwithstanding extraordinary advances in the output of butter in the Western Provinces in recent years, they account for over 95 per cent. of Canada's cheese production and nearly 70 per cent. of her butter production. The butter production of the Maritime Provinces, though increasing, as yet scarcely supplies their local needs. British Columbia is and will probably continue to be an importer of butter and cheese throughout the year, the increasing production of milk going into consumption as fresh milk and as cream products. The trend of dairying in Canada, judging from the statistics, is one of steady consolidation and growth in the older Provinces, and of rapid expansion in the three Prairie Provinces. These three Provinces produced only 4 per cent. of Canada's butter in 1900, while in 1924 they accounted for 28 per cent.

60 The development of more profitable dairy herds has on the whole proceeded in harmony with the indicated expansion of the industry. Under economic compulsion before 1891, the need for special milking types was realised by many farmers, some of whom recognised the need for breeding and selection. Notwithstanding the establishment of many pedigree herds of dairy breeds, many farmers continued the use of scrub bulls. The Canadian breeders of pure strains for many years found their profitable market chiefly in the United States, but in 1906 the organising of Cow Testing Associations was begun by the Dominion Department of Agriculture, and the home demand for the best breeding stock was in consequence greatly increased. By 1912 over 15,000 cows, and by 1921 over 50,000, were being tested under registration in the Dominion Associations, besides many otherwise tested.

61. Of herd improvement by selection and breeding, and of increased profits through greater production which followed cow-testing, there is a wealth of evidence. As one broad example, the butter output of Nova Scotia between 1909 and 1919 increased tenfold. Results on such a scale are simply the aggregate of individual cases. Of these, only one need be given, which shows the increased profits and the saving in labour and feed by weeding out the eight poorest cows in a herd of sixteen. The average profit per cow was in this case increased from $5.53 to $18.83. Another herd averaging an output of 4,000 pounds of milk, after six years of testing and weeding averaged over 8,000 pounds. Nineteen years of testing has not achieved the elimination of unprofitable cows in Canada, but by furnishing every community with striking local examples of its results, it has established among the dairy farmers the conviction that radical improvement in the dairy herd is a business necessity. The demand for superior cows to replace those discarded has outrun the supply, and farmers have realised that they must breed their own from the cows retained. This has resulted not only in a general

interest in pedigree bulls for herd improvements, but in an increasingly intelligent discrimination in favour of those derived from high-yielding strains.

62. The more progressive dairy farmers in all sections now breed their herds to high yielding strains, and many of them have adopted stud breeding as an adjunct to dairying. Others have taken advantage of special facilities for obtaining the use of pure-bred bulls, which for years have been furnished by Dominion and Provincial Governments. Chief among these facilities has been the loaning of selected pure-bred bulls to farmers' associations in sections where such bulls would not otherwise be obtainable. In 12 years some 4,400 bulls have been thus loaned. The benefits of this bull-loaning policy, in addition to the quickened development of profitable farming in new districts, have led to general agreement, in both breeding and buying districts, as to the best types. This has been promoted by the Government's purchasing experts, who select on uniform standards. The loaning policy and other educational work of the Dominion and Provincial authorities have accelerated the movement among farmers to purchase pure-bred stock for themselves. This has been aided under the lead of the Dominion and Provincial authorities, working in co-operation, by clubs for joint ownership of bulls. The extent of these developments may for our purpose be sufficiently indicated by quoting the annual contribution by Quebec of over $17,000 toward club purchases of pure-bred sires. Other grants and activities are directed to the promotion of proper care and feeding, especially of breeding stock, and to encouraging emulation by local competitive exhibitions.

63. The recording of pedigrees of pure-bred stock has long been organised under Dominion control More recently the "Record of Performance" was inaugurated, by which the milk and butter fat production of pure-bred dairy cows is officially observed, recorded, and certified. The "Record of Performance," by ensuring against disappointments in current purchases by dairy farmers, secures the maximum improvement in all pedigree herds. Over 13,000 pedigree cows have been certified in the "Record of Performance" to have produced milk and butter fat equal to, or exceeding, the quantities set as standards for their ages and breeds.*

* *Note.*—In the case of the following breeds the standards laid down for milking tests on 365 days in the year are as follows. All heifers and cows admitted must equal or exceed both the records specified :—

	Lbs. milk.	Lbs. Butter fat.		Lbs. milk.	Lbs. Butter fat.
		Ayrshire.			
Under three years ...	7,000	266	Under five years ...	9,000	342
Under four years ...	8,000	304	Mature class ...	10,000	380
		Holstein-Friesian.			
Under three years ...	9,000	306	Under five years ...	11,000	374
Under four years ...	10,000	340	Mature class ...	12,000	408
		Shorthorn.			
Under three years ...	5,000	175	Under five years ...	6,000	210
Under four years ...	5,500	192	Mature class ...	6,500	227

64. That the standards which have been set are high enough to induce a general improvement is evident from the fact that, taking all breeds, only about a third of the cows entered attained them and were admitted to the "Record"; that they are not unreasonably high is evident from the further fact that of the cows admitted nearly one-half surpass their standard by from 20 per cent. to over 100 per cent. To prevent attempts by breeders to attain abnormal records by extraordinary care, the whole pure-bred herd in milk must be entered together and subject to the same conditions. None the less, it is interesting to note that the record production for the world, according to official statements, was won in the years 1920 to 1923 by three different Canadian cows, one of which yielded no less than 33,477 lbs. of milk and 1,686 lbs. of butter fat. Bulls are admitted after four of their progeny, each from a different cow, are in the Records. These are eminently satisfactory results, but it must not be forgotten that a large proportion of the 3,000,000 cows in Canada are still outside the operation of these methods.

65. That feeding is also a vital factor in profitable dairying has long been the basis of the agricultural policy of Canadian Governments, Dominion and Provincial. For two generations research experiments have been carried on continuously by the Experimental Farms, in which production under different conditions of soil and climate, selection of species, varieties and strains, and creation of improved lines have been conjoined with extensive experiments in feeding. Just as wheat productivity was revolutionised by the breeding of the Marquis variety at the Ottawa Experimental Farm, and as the Canadian yields of barley were increased by an average of ten bushels per acre by the hybridisation of the six-rowed barley at the Ontario Agricultural College, so new and improved grasses and fodder crops of all kinds have resulted from the systematic researches of more than thirty experimental stations throughout Canada.

66. Such researches are of necessity complex in their range, because Canada in her 4,000 miles of breadth and her 800 miles of northerly cultivation has every variety of soil, rainfall, and temperature, and dairying is carried on under such varying conditions as those which prevail in the British Isles, Northern Italy, and Siberia. The researches have succeeded in producing for each diverse requirement the highest yielding and most suitable types for pasture, fodder, and ensilage. A new subsoil-feeding clover (sweet clover), which grows luxuriantly in even unfavourable conditions, is unsurpassed for milk production. Permanent pastures and roots of greatly improved values have been widely adopted.

67. Perhaps most significant of all is the evolution of Indian corn as the greatest of ensilage crops, and the successful extension of its use for ensilage in districts where it was

formerly found uneconomic. The progressive experiments in the case of corn alone have included over 600 strains. The rapid general distribution of improved varieties and their adaptation and further improvement have been provided for through the Seed Branch, which regulates the breeding and sale of pure seeds under effective inspection, and promotes the general use of the best strains.

68. The description which we have given of the position of the dairying industry in Canada shows that well calculated efforts have been made in the last two or three generations to establish a high standard of efficiency. Very considerable results have been achieved, but there are still many farmers who lag behind. This inequality expresses itself more clearly when we come to consider the manufacture of butter for the United Kingdom market. Experienced witnesses have told us that although the improvement of grading of Canadian butter, particularly in the year 1925, has been such as to cause a much freer sale, yet the amount of secondary butter still pulls prices down and holds down the price even of the best qualities. It is important, therefore, to record and to emphasise the steps which are being taken for a rapid improvement in this matter, an improvement which, as we have said, is already becoming visible.

69. Each of the nine Provinces, as well as the Federal Government, has its dairy branch organised under a technically qualified officer, and its corps of instructors whose field of duty includes both factories and farms. In the case of butter and cheese, the Federal Branch is chiefly concerned with export, and has legislative authority for compulsory grading, which is effected by grading officers of the Branch. Each of the 2,909 factories (1924) has its registered number, and this, together with the grade mark and an identification number for each vat of cheese and churning of butter during the season, must be shown properly on the respective packages exported. Thus responsibility for defects can be traced to the original source from the ultimate retailer anywhere in the thirty-one countries where Canadian butter and cheese are imported.

70. The practice of grading cream received at creameries, in order that it may be paid for on the basis of quality as determined by flavour, has become well established and standardised. This system originated on a voluntary basis in Alberta and Saskatchewan in 1908, and was adopted two years later in Manitoba. In 1923 these Provinces came to an agreement in regard to the grades to be adopted, and made compulsory a system of price differentials as between the several grades. The work is done by graders appointed and directed by the Dairy Commissioners of the respective Provinces, who fix their salaries, but the cost is borne by the creameries. This system was adopted in Ontario in 1926, and already improvement is noticeable in the average quality of the product.

71. Another recent step toward uniformity is the agreement of the entire Canadian butter and cheese industries, in conference with the Federal authorities, the box makers, and the trade to adopt and make compulsory standardised and uniform containers for butter and cheese in respect of materials and dimensions, and also in respect of the use, shape, colour, and dimensions of manufacturers' brands.

72. Refrigeration facilities for the dairying industry are fairly adequate to its requirements. In every part of the country the industry is served by efficient mechanical cold storage plants, the erection of which was encouraged for a period by Federal subventions up to 30 per cent. of the cost. Where such assistance was given the storage rates are subject to Government approval. Refrigeration of produce in rail transit is efficient, being furnished in special cars owned by the two great railway systems and everywhere available. Low temperatures for long distances can be readily maintained.

73. There is no organisation in Canada on a national scale for marketing butter and cheese within or without the Dominion. In the past, butter and cheese in Canada have been sold mainly to dealers at the Butter Boards or Markets, and then resold to importers in the United Kingdom. Since 1922 several creamery companies manufacturing large quantities of dairy produce have sold their output direct to British buyers. Canadian manufacturers have been influenced to sell direct to Overseas buyers by virtue of the fact that they thus profit by getting their own brands of butter known on the British market and by having the advice and guidance of interested parties who are fully aware of the requirements of the final market. This departure in marketing is purely an individual effort, but is rapidly extending to large operations, both in Western as well as in Eastern provinces. In Quebec and Ontario co-operative organisations, representing groups of factories, exist for the sale of the products of those factories.

74. The manufacture in Canada of pasteurised cheeses marketed in small standard packages under the makers' brands, has been a remarkable development in recent years. These cheeses have attained such an exceptional sale on the Continent, as well as in the United Kingdom and Canada, that the market outlet has been greatly extended in countries where cheddar cheese was not formerly in great demand. As these specialities are made from cheddar cheese, their manufacture has increased the demand for the finest grade of that cheese in Canada, and the competition of these specialities does not restrict the output of or reduce the prices realised for cheddar cheese.

75. The production of the 3,000,000 milking cows of Canada in 1924, both dairy and beef types, is calculated to have been about 12,000,000,000 lbs. (or 1,170,000,000 gallons) of milk, and about 420,000,000 lbs. of butter fat, thus giving an average

of just over 4,000 lbs. (or 390 gallons) of milk and 140 lbs. of butter fat per cow.*

76. In the evidence which we have taken, United Kingdom importers have emphasised the improvement which has been noticed in Canadian dairy produce since the grading regulations referred to above came into operation. At the same time, they have agreed in regarding the Canadian butter sold in the United Kingdom market as being not quite at the head of the list of butters in point of average quality. *We are bound, therefore, to urge that the efforts for improvement should be continued with vigour, notwithstanding the remarkable advances which have already been achieved.* Complaints have been made in regard to the Canadian package, but we anticipate that with the adoption of the new regulations recently recommended this complaint will be removed.

VIII.—Australian Dairying Industry.

77. Among the livestock brought to Sydney by Captain Phillip in 1788 were one bull, four cows, and a calf. To-day Australia possesses 13½ million cattle. Fifty years ago heavily salted Irish butter was still being imported into Australia in kegs as ordinary cargo in sailing ships.

78. To-day dairying ranks second in importance amongst Australia's pastoral industries and is the principal or secondary occupation of approximately 140,000 farmers. These, with their dependents and employees, number probably three-quarters of a million. While dairy production is carried on in all the Australian States, dairying for export is limited to a strip varying up to 300 miles in breadth along the coast, beginning in South Australia to the south of Adelaide, extending round Victoria, through New South Wales, into Queensland and tending to broaden inland, especially in the latter State. In Western Australia the dairying industry is still only on a small

* The statistics of the output of the dairy factories for recent years are:—

Products.	1922.	1923.	1924.
	Cwts	Cwts.	Cwts.
Butter	1,361,624	1,453,880	1,645,454
Cheese	1,212,688	1,353,789	1,032,802
Condensed Milk	189,653	242,130	275,673
Condensed Skim-milk	13,441	46,472	34,809
Evaporated Milk	289,219	109,148	378,868
Milk Powder	12,772	11,832	14,955
Skim-milk Powder	52,877	87,470	97,038
Sterilised Cream	—	1,614	—
Sterilised Milk	1,339	—	207
Condensed Coffee and Cocoa ...	2,655	3,042	2,887
Casein	737	4,986	4,172

scale, insufficient to supply the requirements of the local population. Although Tasmania is specially suited to dairy farming, the industry in that State has not yet made great progress. Certain quantities of dairy produce are, however, exported from Tasmania during three or four months, but for the remainder of the year considerable quantities are imported from the Australian mainland.

79. Prior to the middle of last century it was thought possible to manufacture butter only in the coolest coastal districts of the southern States of Australia. The coming of refrigerating plant soon enabled the Australian farmer to prove that this idea was fallacious. Dairying rapidly extended into northern New South Wales and Queensland, and to-day extends into the tropical portions of the latter State. There exists by Byrom Bay, in the extreme north of New South Wales between the 28° and 29° of southern latitude, the largest individual butter factory in the world, which produces butter to the annual value of £2,000,000 per annum. The production of butter of the highest quality in the semi-tropical and tropical parts of Australia is a fact of great significance to other portions of the Empire, especially to Kenya and other parts of East Africa.

80. Australia's dairy herds now aggregate two-and-a-half million animals. The development of the dairying industry in Australia is shown by the fact that, between 1901 and 1923, the output of butter increased from 910,000 cwts. to 2,000,000 cwts. The production of cheese increased from 103,000 cwts. to 220,000 cwts., and of condensed milk from 40,000 cwts. to 570,000 cwts. in the same period. The quantity exported has also increased very considerably, as the following figures show :—

—	1901.	1923–24.	Percentage increase.
	Cwts.	Cwts.	Per cent.
Butter	310,000	590,000	90
Cheese	2,600	34,000	1,200
Condensed and Preserved Milk ...	9,500	150,000	1,480

81. The growth of an export trade in dairy produce from Australia is a recent development. From the early "sixties" up to the late "seventies" of last century Australia was only able to supply her own local requirements. The first shipment of refrigerated Australian butter arrived in the United Kingdom in January, 1881. This, however, was an isolated instance and no more refrigerated butter was sent for many years, although certain quantities were carried as ordinary cargo. The development of the export trade from Australia has been materially assisted by the advent of the cream separator and the inception of the factory system throughout New South Wales and

Victoria. Prior to this the butter had been produced by the old method of setting the milk in pans, skimming, churning by hand, and marketing the products in kegs. About 75 per cent. of the butter manufactured at the present time is produced by farmers' co-operative factories. The main cheese-making area in Australia is the Darling Downs in Queensland.

82. Great efforts have been made in Australia to improve the industry and raise the standard of production. Each State of the Commonwealth has its Dairy Department and staff of experts who act as instructors to the dairy farmers. The dairyman's herd is inspected from time to time in order to safeguard the wholesomeness of the product. The farmer is also called upon to conform to certain regulations in regard to the construction and sanitation of his dairy buildings which is the first step to first grade marks for his cream or milk at the factory. In all the Australian States the law provides for the complete inspection of factories. The strict grading of cream and milk upon delivery at the factory in accordance with quality and content, with payment on a corresponding scale, is compulsory. Each grader must have a Government certificate of qualification. Under the Commerce Export Dairy Regulations butter and cheese intended for export come under the purview of the Commonwealth graders, whose duty it is to test samples from every consignment to be shipped abroad.

83. The system of export grading adopted in Australia gives points for flavour, texture, and finish. All butter classed as "choicest" must be branded with a "Kangaroo" to denote that such butter is Australia's best quality. As a condition precedent, all butter entitled to carry the "Kangaroo" brand must be manufactured from pasteurised cream. We are told that very great efforts are being made in Australia to maintain the "Kangaroo" brand at an unimpeachable standard of excellence. In view of the competition to which this butter is subject in the United Kingdom after a long overseas voyage, we feel that Australian producers are well advised in this matter and *we should regard any relaxation of the standards imposed as disastrous.*

84. The decision to adopt a national brand was only reached after considerable thought and investigation. Many importers were entirely against the branding of butter with any grade mark, and preferred to sell it "on its merits." The best private brands, it was argued, had in the past and would in the future, obtain the highest prices. While this is true (and still operates, for the national brand is additional to and not in substitution of the factory brand), it was, however, decided that for the reputation of Australian butter it was advisable to provide a ready means of identifying the highest quality butter. Importers in the United Kingdom have informed us that this has been of advantage to Australian butter and of

assistance to the trade. The factory manager also has something to aim at, and he endeavours to earn the national brand for all his butters.

85. Considerable emphasis is now being laid in Australia on milk recording (herd testing) as a means of improving the output. At the present time, we are told, there are twenty-three herd testing associations in New South Wales, thirty in Victoria, five in South Australia, two in Western Australia and five in Tasmania. While these figures indicate a substantial degree of progress it is only necessary to compare the herd testing records of Denmark with what has so far been achieved in Australia to recognise that as yet only a beginning has been made in what may be regarded as the basis of economical dairying production. Considerable financial assistance is given by the State Governments to the associations in the different States, with the exception of Tasmania. At the present time the average yearly milk yield per cow over the whole Commonwealth is about 3,100 lbs. (or 302 gallons). The average butter fat yield per cow is about 140 lbs. We understand that it has been estimated that the average cost of production on the present basis in Australia represents about £14 per cow per annum, which figure includes interest on land and on the value of stock, labour, and all other charges. Assuming that the average cost per cow is £14 per annum, the cost of production of butter per lb. will vary according to the yield of butter fat per cow. It has been estimated that if the cow averages 140 lbs. of butter fat a year the cost of production of the butter is 2*s*. per lb. Where the output is 200 lbs. the cost is 1*s*. 4¾*d*. per lb. Where the output is 260 lbs. the cost is 1*s*. 1*d*. per lb. This clearly indicates the paramount importance of every effort being made to increase the standard of production, and *we are not aware of any better means by which this can be secured than by the encouragement of herd testing associations throughout the whole Commonwealth and by the necessary corollary of the introduction of stock of proved milking strain.*

86. In addition to the betterment of the dairy herds by selection, there is great scope for a general uplifting of the economic position of the industry by means of the improvement of the pastures. It is well known that the soils of Southern Australia are deficient in phosphates. Over forty years ago it was found that the use of superphosphates greatly increased the wheat yield. It is, however, only in the last few years that serious attention has been devoted to the top dressing of pastures with this fertiliser. Most encouraging results have been achieved. We are informed that in the southern portions of Australia wherever rainfall averages 16 inches and over, the top dressing of pastures with small quantities of superphosphate will increase the carrying capacity of land from 50 per cent. to 100 per cent. Not only is this the case, but it has also been established that

the use of superphosphates on land containing clovers, and particularly a variety of clover known as subterranean (*Trifolium subterraneum*) will in districts enjoying a rainfall of over 20 inches increase the carrying capacity from 100 per cent. to 200 per cent. These facts indicate that the wider application of up-to-date methods would enable Australia to double her dairy production without any increase in the areas at present devoted to dairying.

87. Up to the present time the dependence of the Australian dairying industry upon the natural growth of herbage has resulted in a very great seasonal fluctuation in production. We point out elsewhere the importance of regular supplies throughout the year, if dairy produce is to achieve the highest place on the United Kingdom market. In many districts in Australia there is scope for a large extension of winter dairying by means of the growing of green crops. The winter climate affords ample warmth for the rapid growth of such crops as barley and several clovers, and the extension of winter dairying appears only to be limited by the factor of rainfall. In the irrigation districts in particular, suitable crops can readily be grown, and it is to development of systematic dairying in such districts that we would look for the production of such supplies as would place Australian butter upon the United Kingdom market at all seasons of the year. Apart from this radical change of method, *we recommend that the Australian Governments should encourage the dairy farmers in all districts to set aside large reserves of hay and ensilage, and thus to provide, at least in a large degree, against the fluctuations due to seasonal vicissitudes.*

88. In 1924 the Australian Government passed an Act establishing a Dairy Produce Control Board, after the institution of such a system had previously been approved by a referendum of dairy producers. The Dairy Produce Control Board consists of 12 members, mainly representatives of producers with the addition of a Government member. Control came into force on the 1st July, 1925. In order to enable the Board effectively to control the export and the distribution after export of Australian butter and cheese, licences to export granted and issued by the Department of Markets and Migration, on conditions submitted by the Control Board, were made compulsory with effect from that date. The only general exception is in respect of butter and cheese shipped to eastern Asia. We are officially informed by the Australian Department of Markets and Migration that the policy of the Board, by virtue of the powers conferred by the Act, is as follows:—

(1) To improve the organisation of marketing dairy produce in the United Kingdom and on the Continent of Europe and to open up fresh markets in other countries.

(2) To exercise supervision over the sale and distribution in all overseas markets and bring about co-ordination among

distributors and selling agents, chiefly in the United Kingdom. (For this purpose the London Agency has been instructed to confer frequently with distributors and to advise them as to the prices which they consider should be obtained for Australian dairy produce and generally to endeavour to maintain prices on a basis equal at least to those ruling for the products of other countries.)

(3) To take action to establish and maintain the identity of Australian dairy produce in the retail shops and among consumers.

(4) To ensure, as far as practicable, continuity of supplies.

(5) To conduct advertising with a view to bringing Australian butter and cheese directly under the notice of overseas consumers.

(6) To arrange with the Rural Credit Department of the Commonwealth Bank for advances on butter and cheese exported.

89. Under the Act a levy is collected by the Customs Department on all butter and cheese exported to meet the administrative expenses of the Control Board. The levy is at present $\frac{1}{10}d.$ per lb. on butter and $\frac{1}{32}d.$ per lb. on cheese. We may add that since the Board began operations it has negotiated a single marine insurance policy, to cover the whole of the produce exported, on a basis which represents a saving to the Australian producer of approximately £20,000 a year. Negotiations have also taken place between the Board and the shipping companies for a reduction of freight on Australian dairy produce. These negotiations did not, however, make the progress anticipated owing to the seamen's strike in Australia in 1925, but since we commenced the present enquiry a reduction of 6*d.* per case on the ocean freight on butter has been brought into effect. With the operations of both the Australian and New Zealand Control Boards in the United Kingdom market we deal later.

90. Arrangements have been made by the Commonwealth Bank, under the Commonwealth Bank (Rural Credits) Act, 1925, to render financial assistance to organisations of Australian dairy producers in the marketing of their produce. Advances may be made to such organisations by the Rural Credits Department of the Bank upon the security of primary produce placed under the control of the Bank or of other banks.

IX.—New Zealand Dairying Industry.

91. Settlement in New Zealand (and the introduction of livestock) dates from the year 1840. In 1925 the number of cattle in the Dominion was returned at 3,503,744, of which 1,633,000 were for dairy purposes. The number may by comparison appear small—it is about half the number in England and Wales—but considered in relation to the population of the country, 1,380,000, the figures assume their due significance. In the

eighty-six years of its settlement New Zealand has developed its dairy industry to such an extent that it is now one of the principal dairy produce exporting countries in the world, and the leading supplier of such produce to Great Britain. Dairying is now the principal of the three main pillars of New Zealand's prosperity. It also gives employment to 77,000 people, or, including their dependants, say, one quarter of the population.

92. Until the year 1882—when the success of refrigerated ocean transport was first demonstrated—the scope of the dairying industry in New Zealand was limited, so far as butter was concerned, to supplying local needs, and to carrying on a small variable trade with Australia. In 1860, for instance, £7,000 worth of butter was exported, and in 1870 4,460 cwts., worth £13,000. But in 1879 the quantity had fallen away again to 339 cwts., worth £1,600. Much the same story is to be told in regard to cheese, though small quantities of this were at times sent to London. But, with the possibilities opened up with refrigeration, movements at once sprang up to develop manufacture and to supply the British market with both butter and cheese. Under State encouragement, the co-operative factory system was inaugurated, and though for the first few years this effort was mainly concentrated upon the manufacture of cheese, butter factories came to be established in increasing numbers. In the year 1892, 104 creameries were operating and were in a healthy financial state.

93. About the same time there arose the realisation that if New Zealand butter and cheese were to obtain a firm footing on the London market, and a future trade was to be built up, high uniform quality was absolutely essential. It was with the object of achieving this that the Government passed the Dairy Industry Act of 1892. The object of this measure was to regulate the manufacture of dairy produce and to prevent the deceptive branding of butter and cheese. This legislation was amended in 1894, and the Government inspectors were given extended powers to ensure the purity of the milk used. Factories were required to be registered and provision was made for storage in cool stores and for Government grading. Other legislation followed, until finally all was consolidated in 1908 in the Dairy Industry Act, which, in addition to the safeguards regarding the produce mentioned above, gave authority for advances to be made by the State to dairy companies for the purpose of acquiring land, for erecting factories, and for the purchase of machinery. Since then, there has been further amending legislation, all designed to foster and improve the industry. Meanwhile, also, the dairy herds of the Dominion had been undergoing improvement. In the earliest days, Shorthorn cattle were chiefly in use, but other breeds were introduced from time to time, and to-day herd book societies are established in the Dominion for the Jersey, Friesian, Ayrshire, Milking-Shorthorn, and Red Poll breeds.

94. Whereas, in 1905, the total exports of butter and cheese from New Zealand reached only 394,284 cwts., in 1924 the shipments aggregated 2,863,941 cwts. Since the War there has been a great development, as the following table shows :—

	1918.	1925.
	Cwts.	*Cwts.*
Exports of butter ...	431,000	1,245,000
Exports of cheese ...	883,000	1,377,000

It is as well to explain that, so far as New Zealand is concerned, in reviewing the progress of dairying it is necessary to regard butter and cheese exports conjointly. Under the system which is general in New Zealand, the various factories have dual butter-making and cheese-making plants installed, and manufacture can be diverted from one commodity to the other according to the demands of the market.

95. The dairying industry is fairly general over the whole of New Zealand, though it is chiefly centred in the North Island. Of the total number of the dairy cows in the Dominion 77 per cent. are in the North Island. For many years the Taranaki province was the chief butter-producing district, but with the opening up of the lands in the Auckland province during recent years the main output now comes from there. Development of the industry in the North Island is generally held to be responsible for the more rapid increase in the population in that part of the Dominion. The progress of dairying means close settlement; it is essentially a " small " man's industry, and from that point of view it plays a very important part in the economic development of the country. Provided that there is a sure market ahead for an ever-increasing output with profitable prices, it also offers an inducement for migrants with comparatively small capital. This is particularly so in the case of New Zealand, where the land and climate are eminently suitable for the industry, where the pastures (which are English grasses) carry the stock without artificial feeding all the year round, and where a good return can be made from a comparatively small area.

96. The three main factors which have contributed to the success of the industry in New Zealand are :—

(1) Co-operation.

(2) The assistance rendered by the State.

(3) The general use of mechanical aids.

97. Co-operation has been applied to the industry from its earliest days, though its ramifications were extended as time went on. To-day 90 per cent. of the dairy factories are owned, controlled, and financed by the farmers themselves. There are 445 dairy factories, employing 4,324 persons, and the wages paid in 1925 amounted to £882,000. Under this co-operative system the farmer who produces the milk is the joint owner

of the factory, and therefore of the butter and cheese manufactured. The milk or cream supplied to the factory is paid for on its butter-fat content. Payments are made monthly, and are based on a percentage of the average market price of butter or cheese, and any surplus realised over the amount paid out after expenses have been met is subsequently distributed amongst the farmers as a bonus calculated at so much a pound on the butter fat supplied.

98. Co-operation is also applied in other directions, particularly to the ensuring of clean milk supplies from the dairies, to the breeding and selection of the best milk-producing cows, and to the general conduct of the industry on the most scientific lines. Herd testing associations have rapidly gained in numbers and influence, and the results are proving most beneficial in the butter-fat yields of the herds.

99. From the earliest days, the various Governments have recognised the great importance of the dairying industry in the development of the country, and have concentrated upon affording all possible practical assistance. In the beginning of the industry, the very best experts were obtained from the world's greatest dairying countries, a policy that has been continued. The Department of Agriculture placed the encouragement of the industry in the forefront of its activities. Competent men were appointed to act as dairy instructors, whose duty it was to visit the factories and give practical demonstrations in the manufacture of butter and cheese. Periodic courses of instruction were held for factory managers, and their assistants. Experimental State farms were established, and stud bulls were imported and located in various parts of the Dominion. Instructional literature was also widely circulated amongst the farmers. A system was established for authenticating the records of pure-bred cows, and "Certificates of Record" were given. As a result of this "herd testing," dairymen have, in some instances, been able to reduce their herds by one-third without any falling-off in their output of butter fat. Nothing in fact that could be done to foster the industry has been left undone by the State.

100. The official grading system, which has been in existence since the early days of the export industry, is a very rigid one, with the result that the New Zealand Government's grading certificate is usually accepted as final in the sale of the produce. The grading system enables the Department to keep a complete check on the quality of the product from every factory, and when necessary immediate investigation is carried out by its officers. If the cause of complaint cannot be traced to the factory, dairy instructors make investigations at the farms supplying the factory. Finally, there is a grading supervision of the butter and cheese when it arrives in Britain by New Zealand Government experts, who are attached to the office of the High Commissioner.

101. The adoption of milking plants is now general over the whole of New Zealand. With its small population, it would have been impossible for the Dominion to have attained its present output without this extensive use of mechanical milking aids. Home separation has also largely supplanted the old system of conveying the milk daily to the factory, and returning the separated milk or whey to the farm. This has saved farmers valuable time and labour costs. In 1925, there were 15,600 milking plants in operation in New Zealand, capable of milking 56,500 cows simultaneously, and 705,000 cows were being milked in this way night and morning. The machines most generally adopted are of a very highly improved type, and are the product of the Dominion itself. The milking sheds and yards are so constructed as to reduce trouble and labour in the handling of the cows. Much of the old drudgery has, by these labour-saving devices, disappeared from the industry.

102. The extent of home separation can be gathered from the fact that 45,000 of these machines are in use in the Dominion, and their number is being rapidly increased. In this connection it should be stated that most of the factories have now instituted the system of cream grading, and in order to encourage the supply of the highest grade cream, payment is made according to grade. In a few years' time, cheap electrical power will be available to farmers in all parts of the Dominion for their dairy machinery. The Government's hydro-electrical scheme, with head works in various centres of the country, is now well developed, and the distribution of power covers several dairying districts. When the scheme is completed, it will give a further impetus to the production of dairy produce.

103. A new development in the New Zealand dairying industry took place in 1923 when the Dairy Produce Export Control Act was passed. This measure, as in the case of the Australian Act, has to do chiefly with the export and marketing of dairy produce. It establishes a Board consisting of two Government nominees, nine representatives of suppliers to dairy factories, and one person representing manufacturers of dairy produce. A London Agency of the Board has also been constituted, to consist of such number of persons as may be decided upon by the Board—but at least one of its members must be appointed by the Government. The duties of the Board are to control the export and overseas sale of butter and cheese in the interest of the producers, whilst the London Agency is instructed to keep the Board informed as to current prices and other matters relating to the disposal of New Zealand dairy produce overseas. The funds for the administrative expenses of the Board are provided by levies on all butter and cheese exported. This levy has been fixed at $\frac{1}{10}d.$ per lb. on butter and $\frac{1}{32}d.$ per lb. on cheese for all produce exported after the 16th February, 1924. The coming into operation of the Act was subject to veto by a majority of the dairy producers of the Dominion as

determined by popular vote, out the number of votes polled amounted to 22,284 for and 9,255 against the bringing of the Act into operation. The Board has already accomplished good work in reducing costs between producer and consumer by contracting for the carriage by sea and the marine insurance of the whole of the exported output on a basis which has resulted in a considerable saving. In accordance with the provisions of the Act, the Control Board has decided to assume absolute control with effect from 1st September, 1926. With the question of the Board's operations in the United Kingdom market and the general question of the position of Control Boards in the dairying industry we deal later.

X.—South African Dairying Industry.

104. The last fifteen years have seen a rapid extension in dairying in South Africa. The production of butter between 1910-1911 and 1922-1923 increased from 101,000 cwts. to 200,000 cwts., and of cheese from 5,000 cwts. to 50,000 cwts. Before 1910 individual efforts had been made with some success to foster the industry by the Provinces which now constitute the Union. Greater progress has, however, been made since the Union was formed, under the direction of the Dairying Division incorporated in the Union Department of Agriculture.

105. Before considering the future, however, it may be interesting briefly to touch on the reasons why South Africa, which had admittedly large areas suitable for dairying and which has made such progress recently, should have dallied in attainment in earlier years. Until comparatively recent times the circumstances of life throughout South Africa made it necessary to depend on cattle for draught and transport Breeding therefore aimed at producing a type of cattle with a capacity to stand long treks rather than for milking qualities. Further difficulties were the inaccessibility of markets to the majority of farmers and the absence of cold storage facilities. The Anglo-Boer war of 1899-1902 also discouraged production and a succession of cattle epidemics in South Africa considerably reduced stocks. Very valuable research work has, however, resulted in the elimination of rinderpest and other cattle diseases which formerly ravaged the herds. Increased rail and motor facilities have made large dairying areas accessible to markets, and circumstances are therefore more favourable for an advance in the industry. During the last three years the total number of cattle in the Union has risen by over 1,000,000 to about 10,000,000, while the output of milk has increased from 346,000,000 gallons to 388,000,000 gallons. It should be borne in mind that the greater proportion of the increase in the number of cattle was in respect of cattle for draught purposes and for the production of meat.

106. Notwithstanding this increase in production, South Africa is still, to a limited extent, an importing country in the

matter of certain dairy products. Moreover, the increase which has taken place in home consumption in recent years has, notwithstanding the increased production, led to an increase in the quantities imported. In 1920-1921, 3,000 cwts. of butter were imported and in 1923-1924 30,000 cwts. Similarly 1,500 cwts. of cheese were imported in the former year and 9,600 cwts. in the latter year. Such export trade as exists is at present small, and with the increased consumption in South Africa, shows no tendency to expand. It is probable, therefore, that the export trade for some time to come will be of a spasmodic nature. Before a stable and steady export trade can be established a vast amount of propaganda work will undoubtedly have to be undertaken with the object of raising the standards of local production and securing herds of animals with a greatly increased producing capacity.

107. From early days small importations of Friesian cattle from Holland have taken place, and more recently Ayrshires, Jerseys, and other breeds have been imported into South Africa. The importation of pedigree stock has been assisted by the facilities existing under the Ocean Mail contract with the Union Castle Mail Steamship Company whereby pedigree cattle are imported into South Africa on the Company's boats free of charge. Under this arrangement a large number of highly-bred cattle have been sent out. We are told that the result of such importations has been greatly to improve the dairy herds. A Government milk recording scheme is in existence, but the fact that only 700 cows were tested in 1925 clearly points to the fact that it has not been taken up on an adequate scale. The improvement in quality and quantity of output is undoubtedly dependent on the extension of such methods.

108. Although the export trade in dairy produce from South Africa is still insignificant the South African Government have followed the example of the Governments of other Dominions in prescribing conditions under which the export of dairy products will be permitted. Regulations under the Agricultural Products Grading Act provide for the compulsory grading of all butter and cheese for export.

109. We are told that the cheese-making industry in South Africa is likely to expand considerably in the near future, and that already a considerable number of new factories are in course of erection. There are considerable areas suitable for dairying which are situated too far from any rail head to enable milk produced there to be utilised in any way except by conversion into cheese.

110. It has been suggested that in those parts of the Union of South Africa lying to the south and east of the great dividing range, the Drackensberg Mountains, with the possible exception of the coastal strip in Natal and Kaffraria, there is a large area suitable for dairying. On the series of plateaux lying within that territory the natural pasture is excellent and the conditions

very favourable. This matter will no doubt receive the attention of the Union Board of Trade and Industries which has just been instructed to hold an investigation into dairying conditions in the Union under the following terms of reference :

(*a*) To report upon the present creamery system and investigate the causes of the alleged dissatisfaction of cream suppliers with the returns and prices received and the tendency for farmers to revert to the making of butter on their farms and marketing the same themselves.

(*b*) To report upon the present alleged high costs of manufacture of dairy products, viz., butter and cheese, by creameries and cheese factories, and their reported consequent inability to pay higher prices to the farmers for the raw material, special attention being given to the alleged high overhead charges some creameries are reputed to be saddled with, and to suggest what steps can be taken to reduce manufacturing costs to a level of other countries and thus enable South African butter and cheese to compete in price more successfully in oversea markets with the dairy products of such other countries.

(*c*) To suggest what steps should be taken to encourage the greater production of milk and cream, special reference being given to the low standard of production of cattle in the Union.

(*d*) To investigate and report upon the system of marketing butter and cheese locally and the causes of the frequent wide margin between the wholesale and retail prices of these commodities and to suggest what steps can be taken to reduce the same.

(*e*) To report upon the adequacy or otherwise of the present protective duties on butter and cheese and upon any steps which could be taken to encourage and foster export of dairy products oversea.

(*f*) To report upon causes of considerable quantities of surplus milk being produced for town consumption at certain seasons of the year over and above such town requirements and the most profitable means of disposing of the same.

(*g*) To report upon steps which should be taken to encourage and bring about a greater consumption of dairy products in the Union.

(*h*) Generally, to report upon steps which should be taken to improve and standardise the quality of South African dairy products.

XI.—Irish Free State Dairying Industry.

111. For over 200 years butter has been one of the chief commodities exported from Ireland. The grading and branding of butter was carried out in the Cork butter market as far back as the middle of the eighteenth century. The figures which are available for the first quarter of the nineteenth century show that

Ireland was then sending butter in large quantities to England and Portugal, and in smaller quantities to Spain, Italy, Gibraltar, Asia, the West Indies, and other places. For more than 100 years after its establishment by Royal Charter in 1769 the Cork Butter Exchange, as an organised system of inspection and grading, was the leading market in the world. The supplies of butter to the English market at that time came mainly from Ireland, Holland, and France. The high prices obtainable in England during the boom which followed the Franco-Prussian War stimulated the dairying industry in foreign countries. Abundant supplies from these sources then became available, and the long reign of supremacy which Ireland had enjoyed was broken. Nevertheless, Irish production is still of very considerable importance to the English market. According to the Census of Production figures for 1912-13, a normal pre-war period, the total production of dairy produce (butter, milk, cream, and cheese) in Ireland was valued at £12,380,000, which may be taken as equivalent to about 22 per cent. of the total agricultural income at that time.

112. In 1900 the Department of Agriculture and Technical Instruction for Ireland was established. The new Department had not long been in existence when it formulated a scheme designed to secure, by means of inspection of creameries and instruction at farms, creameries, schools, and colleges, that adequate technical information was placed at the disposal of those engaged in the dairying industry. The main features of the scheme were :—

(1) The establishment of a register of well-managed creameries in Ireland;

(2) the provision of technical and practical training for creamery managers and other butter makers;

(3) the awarding of certificates of competency to qualified creamery managers and other employees in creameries; and

(4) the organisation of surprise butter inspections.

Instruction in home butter making was also carried out by the instructors appointed by the County Committees of Agriculture. Further, special research in the interests of dairy production in Ireland has been carried out from time to time by the Department.

113. One of the features which has marked dairy production in Ireland has been the development of co-operative dairying. In 1884 the first farmers' joint stock creamery, as the term is now understood, was established. In 1889, Sir Horace Plunkett advocated the application of co-operative methods to dairying, and in 1894 the Irish Agricultural Organisation Society, founded by him, undertook the work of organising co-operative production and distribution and still continues to organise and supervise co-operative societies. In 1894, 30 Irish co-operative creameries were working. At the end of 1925 there were 184 co-operative

creameries with 191 separating stations and 56 proprietary creameries with 149 separating stations in the Irish Free State. Some butter is still made by individual farmers and is blended and sold for export as "factory butter" as in the past.

114. The maximum export of butter from Ireland was reached in 1914, when 855,000 cwts. were shipped. Of this it was estimated that about 710,000 cwts. were from the Irish Free State. Since that date the export trade has fallen off considerably until in 1925 only 402,000 cwts. of butter were shipped from the Irish Free State. Amongst the various causes which have led to this decline may be mentioned the increased home consumption consequent on a higher standard of living in Ireland, the absence of such imported foods as margarine and American bacon, and, further, the failure of outside butter supplies formerly relied upon during the winter season. A still further cause of the reduction in exports of dairy produce was the high prices offered for store and beef cattle during the period of Food Control and prevailing for some time afterwards. These prices yielded a higher profit to the farmer than the production of milk, butter, and cheese. He was tempted to get rid of good-milch stock and was then forced to replenish the gaps in his herds with inferior animals and to breed from them. The disturbed conditions prevailing in Ireland during the years 1919-23 also discouraged production. We understand, however, that the output of dairy produce in the Irish Free State is once more increasing.

115. Since the establishment of the Irish Free State fresh steps have been taken to assist the industry. In 1924 a Dairy Produce Act became law. This Act was largely based upon the recommendations of a Commission appointed by the Minister of Lands and Agriculture of the Free State to inquire into and report on various matters relating to agriculture in Ireland. The Act is divided into five parts, and different dates may be appointed by Order for the coming into operation of the different parts. The first part, which is already in operation, relates to the conditions of production and endeavours to secure that the milk used in production is as wholesome and clean as possible and that the premises to which such milk is sent are clean and suitable for the purpose of manufacture. Of special importance to Great Britain is that section of the Act dealing with export. This has not yet been brought into operation, but will be at an early date. The Act provides that all butter, with the exception of exports in small consignments or in respect of which a special licence may have been granted, can be exported only from premises registered under the Act, and then only in accordance with the provisions of the Act and Regulations relating to packing, marking, etc. To ensure compliance with these provisions extensive powers of examination and sampling are conferred upon authorised inspectors. In addition, the Minister may prohibit, either absolutely or on failure to comply with certain conditions, the export of any butter found

unsuitable. The Act further provides the setting up of registers of creameries, separating stations, manufacturing exporters, butter factories, and non-manufacturing exporters. Registration is at present taking place, and will be completed towards the end of the present summer. The intention is to secure that butter manufactured on registered premises shall be produced under the best possible conditions, that it shall be packed in such a manner as to ensure its cleanliness and freedom from contamination and deterioration during transit, and that the mark on packages shall be a sure indication of the description of the butter they contain. Notwithstanding that the whole of the Act is not in force at the moment, we have been informed in evidence that since the coming into operation of the Act a marked improvement in the quality and packing of Irish Free State butter has been noticeable. The need for exporting butter of uniformly good quality has been recognised both by the State and the producers.

116. The legislation, which aims at securing a general high standard of manufacture and at guaranteeing the quality of exported butter, was supplemented by legislative and administrative action with a view to increasing and improving the milk supply. The Live Stock Breeding Act of 1925 enables the Ministry to effect a much needed improvement in dairy herds by requiring that, under a system of licences, only bulls passed as being up to a satisfactory standard may be kept. With the aid of Government grants cow-testing associations are steadily increasing in number with gratifying results. From officially checked statistics we are satisfied that merely by the steady exclusion of cows ascertained by test to be inferior and their replacement by average animals it would be easy to increase the milk production from herds, large or small, by upwards of 50 per cent. In some cases recorded, the yield of butter fat was increased in a few years by 100 per cent. *It must be recognised that the Irish Free State cannot hope even to retain its present position in a severely competitive market, much less to improve that position, if the whole body of producers do not keenly and speedily interest themselves in attaining efficiency in production by the adoption of methods which world-wide experience has now shown to be needful.*

117. Ireland produces at present three classes of butter :—(*a*) Irish creamery butter, (*b*) Factory or blended butter, and (*c*) Farmers' butter. " Irish creamery butter " represents the highest quality. The conditions under which it is produced are prescribed in the Dairy Produce Act. " Factory butter " is the blended produce of individual farmers. This butter is sold in local butter markets in lumps of irregular weight, and transmitted to the factories, where it is graded, blended, and packed. By grading and blending the butter attains in the factory a degree of uniformity which is notoriously lacking in the original lumps. Factory butter is not of the same standard of quality as average creamery butter. What is known as " Farmers'

butter " is produced and packed in firkins in the farmer's dairy, and is exported without blending or other treatment. Before this butter can be exported it will, under the provisions of the new Dairy Produce Act, have to pass through a registered non-manufacturing exporter's premises, where it will be examined for water content, etc., and classified. The proportion of the three classes of butter exported are at present approximately :—

	Per cent.
Creamery butter	70
Factory or blended butter	25
Farmers' butter	5
	100

We are told that the exports of factory and farmers' butter will in all probability decrease. The evidence of witnesses, whose knowledge of British marketing conditions is unquestionable, suggests that Irish producers, so favoured by their proximity to the Home market, would be well advised if, like their Danish competitors, they concentrated on exporting to the United Kingdom only butter of the best quality and on extending to the maximum the season of production.

118. Cheese making, which was formerly practised in Ireland, revived considerably during the war. In 1914, when butter reached its maximum, 9,600 cwts. of cheese were shipped. In 1919, 286,000 cwts. were exported from Ireland, and in 1925 only 4,300 cwts. from the Irish Free State. The chief reason for this decrease was that much of the production during the war period was of inferior quality, and could not compete with the supplies from Overseas and with that made in Great Britain. Hence the production of cheese did not prove as remunerative as that of butter, and the facilities afforded to the latter industry by the proximity of Ireland to the British market were not operative to the same degree in the case of cheese. *We see no reason, however, why there should not be possibilities of development in this trade if a quick ripening cheese could be made which more distant countries could not supply.*

119. With the marketing of dairy produce in the United Kingdom we deal later. We should, however, at this stage point out the special circumstances which apply in the case of the Irish Free State. Hitherto Irish producers have not availed themselves fully of the great advantage which their proximity to this market offers to them. Irish butter can reach all the important centres of distribution in Great Britain within 24 hours of its manufacture. We are told that dairy produce for export is, as a rule, consigned direct to Great Britain by individual creameries, either at firm prices as a result of a previous contract, or for sale on commission. In some cases creamery butter is sent to a co-operative selling agency in the Free State which does the marketing, but there is no permanent arrange-

ment between the creameries concerned and the agency. The majority of the creameries deal directly with importers in the United Kingdom. The latter are unable to count on a regular and adequate supply from any creamery or group of creameries, and consequently find it more difficult to create and maintain satisfactory relations with retail traders through the medium of a regular supply.

120. It has been represented to us that it is to the advantage of both the producer and importer that Irish butter should be sold as fresh butter. This entails a comparatively short season of supply and a consequent break between the producer and the consumer, unless winter dairying on a large scale can be introduced. The evidence at our disposal does not justify us in offering an opinion as to the practicability of increasing the supply by extending winter dairying. *In any case it is likely that a more orderly system of marketing would remove for the future all grounds for the complaint made to us that trade relations had suffered from the action of some Irish exporters who failed to carry out contracts on a rising market. Failure to fulfil contracts can, and doubtless will, be effectively prevented by the Irish Free State Government under recent legislation.*

121. Lest it should appear that the improvement of the dairying industry in the Irish Free State is regarded as merely a matter of adopting better technical and commercial methods, it is well to record that the personal training of the producer has not been overlooked. For more than a quarter of a century considerable attention has been paid to all branches of agricultural education and research. In the current year provision has been made for a very considerable extension of the Faculty of Agriculture in the Dublin College of the National University of Ireland, and the Cork College has been separately endowed for the purpose of carrying on both research work and instruction connected with the dairying industry.

XII.—Dairying Industries in the Colonies and Protectorates.

122. For the purposes of export to the United Kingdom market the dairy production of the Colonies and Protectorates is at present negligible, but there are considerable opportunities for development, particularly in East Africa.

123. In July, 1924, the possibilities of the dairying industry in Kenya formed the subject of a Report by a local Economic and Finance Committee. This Report showed a feeling of confidence in the future of the industry in the Colony, if encouragement could be accorded to it in its initial stages. We understand that there are large herds of cattle in Kenya of which little economic use is at present being made. Further, the development of the dairying industry would bring into effective use large areas which cannot be utilised in any other way. We are told that dairying

could be undertaken on an extensive scale in the Rift Valley, Gilgil, Kinangop, West Kenya, Molo, Machakos, and Kiu, in a territory covering over 1,500,000 acres. In the whole of this territory there is abundance of good natural pasturage, absence of severe winter conditions or long periods of drought, ample water supply, and facilities for the production of green crops, cotton seeds, ensilage, etc. In addition, the mixed farming areas will give a further acreage of nearly 800,000 acres, where more advanced dairy farming could be undertaken. There would thus appear to be a total acreage of over 2,000,000 acres available for development if the dairying industry were established on a reasonably large scale in the Colony.

124. In 1925 the stock of cattle in the possession of natives in the Colony was estimated to be about 3,300,000. According to the Agricultural Census of 1925 the following number of cows were, in addition, owned by Europeans :—

Native cows	29,969
Grade cows	62,108
Pure-bred cows	427
	92,504

125. According to the information which we have received, the milk yield of these stocks is :—Native cattle, from 50-90 gallons per annum; grade cattle, from 120-360 gallons per annum. The Director of Agriculture of Kenya has stated that the average percentage of butter fat and solids in the milk of Kenya native cattle is as follows :—

	Per cent.
Fats	5·07
Non-fat solids	9·19

Between 1920 and 1924-5 the output of dairy produce on farms owned by Europeans in Kenya considerably increased, as the following figures show :—

——	Milk.	Butter.	Cheese.
	Galls.	Cwts.	Cwts.
1920	198,000	1,400	600
1924-5...	372,000	2,700	800

126. We are informed that at least 2,500 grade cows, or 4,000 native cows, would be required to provide a minimum supply for a butter factory having an annual output of 200,000 lbs. of butter. This, we understand, would require approximately 400,000 gallons of milk, a figure slightly in excess of the present output. Two co-operative creameries have already been established, one at Lumbwa and the other at Naivasha. Proposals are being considered for another at Nanyuki. The development of an export trade might be expected so to stimulate the development

of the industry that further factories would be established in other areas. It is interesting to record that the first consignment of butter from Kenya reached the United Kingdom in July, 1926, and was favourably reported on by the trade.

127. The Kenya Economic and Finance Committee, which carried out its investigation in 1924, came to the conclusion that good butter could be produced for export at a remunerative rate. *It is clear, however, that such butter can only compete in the world markets if the utmost attention is given to securing the highest standards of quality, grading, and packing. It is also essential to any scheme that adequate cold storage accommodation should be provided at the port of shipment. The provision of such cold storage is a matter which should be undertaken at the earliest possible moment, and we commend it to the Government of the Colony as one deserving of assistance.* In this connection we would also draw attention to the necessity for a comprehensive scheme of organisation for handling the butter between the factory and the ship. The provision of refrigerated rolling stock on the railways, while essential, alone would not suffice. We have been told of damage suffered by butter through careless handling in the Port of London. In a tropical port any carelessness of this kind, or the exposure of the butter to varying temperatures, could not fail to react disastrously on the quality of the product.

128. *To assist the dairying industry in Kenya we would suggest the addition of an experienced dairy officer to the local Department of Agriculture to organise and promote the industry as well as to administer such legislation as may be passed for the grading of exported produce. For the provision of such expert assistance we would recommend that assistance should be given from the Empire Marketing Grant on a 50-50 basis for a limited period on the lines proposed in our Third Report in regard to the marketing and preparing for market of fruit from the tropical Colonies and Protectorates. Further, it is essential, if the industry is to be placed on a satisfactory basis, for the standard of the dairying stock to be raised.* This would, no doubt, be assisted by the supply of pedigree cattle and bulls, in regard to which we have made proposals above. *We also desire to lay emphasis on the importance of co-operation amongst producers to secure orderly marketing.* This is of just as great importance in the Colonies and Protectorates as it is in the Dominions.

129. In considering the development of dairying in East Africa there is one important matter on which we wish to utter a word of warning. The only other tropical country where dairying production is undertaken on a commercial scale is Queensland. Here it is carried on by highly paid white labour. We understand that the development of the industry in Kenya will be largely dependent upon native labour. We have been informed in evidence that many of the native tribes in East

Africa take more naturally to cattle tending than to working on the land. This is an encouraging fact for those concerned in the development of a dairying industry. Nevertheless, it will be essential, if butter of the highest quality is to be produced, for adequate white supervision to be provided and the utmost care taken to ensure that modern methods are adopted. Here we see an opportunity for the development of white settlement in Kenya on a more extensive scale. Its success will naturally depend upon the possibility of a much greater sub-division of land than prevails at present. *We consider that the extensive grazing areas now existing must sooner or later be cut up into smaller holdings, and we would suggest that the Government of Kenya should consider this in connection with the possibility of developing a dairying industry in the Colony.* Dairying is eminently suited for close settlement, and in this way adequate white supervision to secure a high quality output would be ensured. Low-quality butter produced at a low cost can compete on the markets of the world only to a limited extent, and with the increasing output, to which we refer elsewhere, of European countries it behoves the Empire producer, no matter where he may be situated, to concentrate for purposes of export upon the highest quality only.

130. In Tanganyika territory, according to the evidence we have received from Lord Delamere, there are areas quite as suited for dairy farming as are the highlands in Kenya. It would even appear that these areas are more extensive than are those in Kenya Colony *We therefore recommend the local administration to make enquiry into the possibilities of dairying in the highlands of Tanganyika.*

XIII.—Dairy Produce from Foreign Countries.

131. The chief foreign countries from which the United Kingdom obtains dairy produce at the present time are—

Denmark.
The Netherlands.
Sweden.
Russia and Siberia.
The Baltic States.
Argentina.

132. With the exception of Argentina these countries are situated in the northern hemisphere and their supplies of butter and cheese come, therefore, on to the United Kingdom market at the same time as those of the Home country, the Irish Free State, and Canada. Denmark maintains a supply throughout the year, but the quantities normally marketed between April and August are in excess of those marketed during the remaining months. Dairy produce from Argentina competes directly with that from Australia and New Zealand.

133. As will be seen from Appendix I to this Report the supplies of butter from *Denmark* to the United Kingdom have remained fairly stationary during the present century, although the percentage which they represent of the total importation has decreased. This is due to the fact that the total quantity of butter imported into the United Kingdom has increased by over 50 per cent. since the beginning of the century. We have been told in evidence that the output in Denmark has steadily increased and that at the present time it is higher than has ever been known before. The output for the present year to date is understood to be from 10 per cent. to 12 per cent. in excess of that for the similar period in 1925.

134. Denmark enjoys a great advantage in regard to the United Kingdom in her proximity to the market. It must, however, be remembered that the Irish Free State is even nearer. Proximity to the market gave Denmark her opportunity, and by the utmost attention to quality, grading, and continuity of supply she has made the most of that opportunity. Denmark is a conspicuous example of the triumph of human endeavour over natural disadvantages. Her soil and climate are, generally speaking, considerably inferior to those of the British Isles. Her success has been won by hard work, organisation, and the application of science to industry. This has largely been achieved by individual effort. It was not until success had been grasped that Government intervention and assistance appeared, and it was then mainly to protect the position gained rather than to impose improvements on the producer. It should, however, be added that the success of Denmark is in no small degree due to the efficient system of agricultural education at the Danish high schools.

135. The butter is made in Denmark at factories which are usually owned by co-operative societies, the members of which are the local farmers supplying the milk. It is sold by contract either direct to Danish wholesale butter merchants, to large British consumers such as the Co-operative Wholesale Society or the multiple shops who have established buying depots in Denmark, or to co-operative exporting societies whose members consist of the co-operative societies manufacturing the butter. The contract selling price is based on the Copenhagen official butter quotation and is normally somewhat in excess of that figure. The official quotation is fixed by a Copenhagen Committee on which both producing and exporting interests are represented. It is determined and issued every Thursday by this Committee, who have before them full reports as to the state of foreign markets and the approximate quantities (if any) remaining in stock for which orders or shipping instructions are not available. This quotation rules the price paid to producers for all butter received during the previous seven days. In this

way Danish suppliers have for many years effectively controlled the United Kingdom butter market.

136. The two outstanding characteristics of Danish butter which have enabled it to establish so strong a position in the United Kingdom market are the regularity of the supply during the whole year and the uniformity and excellence of quality. In consequence it normally enjoys the highest price on the market. If the exporters find that the price they receive for any particular consignment of butter falls below the official quotation they immediately take steps to ascertain in what respect it is unsatisfactory. If the quality is not improved the makers lose their right to export their butter.

137. As we have already indicated one of the characteristics of Danish butter is that, by the development of winter dairying in Denmark, supplies are on the market throughout the whole of the year. We have been told that the development of winter dairying was undertaken in the first instance with the intention of supplying manures for the poor sandy soil of the country and not with the direct object of providing cream and butter during the winter months. The butter produced, however, was found to command a ready and remunerative market and the Dane undertook winter dairying as a definite business by arranging for a portion of his cows to calve in the spring and the remainder in the autumn. For the maintenance of dairying on this basis large quantities of feeding stuffs are regularly imported into the country when pasture feeding is not possible. *We commend the success of Denmark in this matter to the consideration of the Irish Free State.*

138. Although the *Netherlands* before the war supplied considerable quantities of butter to the United Kingdom they have consistently sent more cheese than butter. In 1925 only slightly over 1 per cent. of the total quantity of butter imported into the United Kingdom came from the Netherlands. In regard to cheese the percentage was 4·6 per cent. This is less, both in actual quantity and in relation to the total importation, than was the case before the war. In fact, the supplies of both butter and cheese from the Netherlands have steadily fallen during the present century. Nevertheless large quantities of cheese and condensed milk, manufactured from the separated milk from which the butter fat has been extracted, are regularly supplied to the United Kingdom.

139. The supply of butter from *Sweden* to the United Kingdom has varied considerably, but since the war the quantity imported has been considerably less than it was in the pre-war period. In 1925 only 1·4 per cent. of the total amount of butter imported came from Sweden. We are told, however, that the production of butter in Sweden has increased considerably in recent years.

140. The quantities of butter reaching the United Kingdom from *Russia* and *Siberia* have increased during the last year or two. The grading and packing, however, leave much to be desired. A very large percentage of the total butter exported from Russia and Siberia is marketed through co-operative organisations affiliated to the Maslocentr. Grading and classifying of Russian and Siberian butter are done in cold store in Leningrad. Supplies for the United Kingdom are then shipped to London where further grading takes place. This is conducted by representatives of the Russian suppliers and of such United Kingdom purchasers as the Co-operative Wholesale Society. We are told that as the result of this system of grading both in Russia and on arrival in the United Kingdom some improvement in the quality of Russian and Siberian supplies has been achieved.

141. The quantity of butter obtained by the United Kingdom from the *Baltic States*, although at present small, is increasing, In these countries agricultural development has been undertaken with considerable vigour since the war. In 1925 Finland supplied 170,000 cwts., Estonia 21,000 cwts., and Latvia 26,000 cwts. of butter to the United Kingdom, representing together rather more than 3·5 per cent. of the total quantity imported. We are told that with the increase in output the standards of grading and packing are being considerably improved and that the quality is steadily rising.

142. In pre-war days the dairying industry in *Argentina* was very small, being quite subsidiary to the meat industry. Only 1·5 per cent. of the butter imported into the United Kingdom during the five years ending 1913 was received from Argentina. But during the war, when the European sources of supply were largely cut off, a considerable trade in dairy produce developed. This trade has been maintained since the war, and now between 8 and 10 per cent. of the total of butter imported into the United Kingdom is derived from Argentina. In 1924, 538,000 cwts., and in 1925, 484,000 cwts. reached the United Kingdom from this source. We have been told in evidence that the Argentine producer, realising the increasing competition with which he is faced in the United Kingdom both from the Overseas parts of the Empire and from European countries, is turning his attention to improving the quality, the grading, and the packing of his produce. Considerable improvements have now been effected in these respects, and Argentine butter, although still one of the cheapest butters on the United Kingdom market, has considerably enhanced its reputation. There is no doubt that owing to these improvements the butter from the southern Dominions may expect to be faced with a growing rival on the United Kingdom market.

D.—MANUFACTURE AND TRANSPORT.

XIV.—Manufacture.

143. In the United Kingdom the production of butter is largely a farmhouse occupation. In the Overseas Dominions it is manufactured mainly in creameries.* The same system operates in the Irish Free State. There is, however, a distinction of very great importance in the methods adopted in the Irish Free State and in the other Dominions. In the Irish Free State the milk itself is taken by the farmer to the creamery and the separated milk returned to the farm for pig feeding and other purposes. In Australia and New Zealand, on the other hand, the milk is mainly separated on the farm and the cream only delivered to the creamery. In Canada both systems are in operation.

144. There can be no doubt that in Canada, Australia, and New Zealand the use of the cream separator has made dairying possible in thinly populated areas. There are many districts in these Dominions where the dairy farmer is situated many miles from the creamery, and it would be very costly, if not altogether impracticable, for him to deliver his milk daily at the creamery and carry the separated milk back to the farm. In the Irish system, where separation takes place at the creamery, it is essential that the milk shall be delivered once a day. On the other hand, where the separation takes place on the farm the cream can be delivered to the creamery less frequently. In the latter event the separated milk is retained on the farm for the feeding of pigs and other uses. The system adopted in Denmark is the same as that in force in the Irish Free State. The farmer takes his milk to the creamery and the separated milk is returned to the farm in the churns.

145. Of the two systems which we have described, we have no hesitation in saying that we regard the daily delivery of the milk at the creamery as much the most advantageous where it is at all practicable. There is less opportunity for the introduction and development of bacteria where this is done. On the other hand, we recognise that such a system is, under present conditions, out of the question in the Overseas Dominions carrying on a scattered dairying industry. There, the carriage of milk over many miles of inferior roads would prove costly and would itself expose the milk to the danger of deterioration. At the same time it must be recognised that cream which has been retained on the farm does not produce butter of so high a quality as that which is made from the cream separated at the creameries.

146. With regard to methods of manufacture in the creamery itself, it has been stated by our witnesses that the creameries

* In certain of the Overseas Dominions, notably Australia and New Zealand, the creamery is known as a "buttery factory."

in the Overseas Dominions are, generally speaking, admirably equipped and efficiently operated. There are, it is true, certain exceptions and *we strongly urge that the most up-to-date methods of manufacture should in all cases be adopted. The pasteurisation of cream we regard as essential for the making of the best grades of butter.* The exclusion of deleterious bacteria from the milk, cream, and butter is absolutely necessary if the produce is to retain its flavour and appearance when placed on the market.

147. The creameries and cheese factories in the Overseas Dominions are organised partly on a co-operative basis and partly as proprietary concerns. In Australia, for instance, co-operative factories exist in all the States. In butter making they vary from 40 per cent. of the total number in South Australia to 90 per cent. in New South Wales. A similar variation is seen in regard to cheese factories. The percentage of co-operative factories varies from 55 per cent. in New South Wales to 99 per cent. in Queensland and South Australia. The transition from proprietary to co-operative manufacture has been more apparent in Queensland than in any other of the Australian States. There, 95 per cent. of the total output of butter and cheese is manufactured in co-operative factories. This contrasts with the position in 1900 when the whole of the business of the manufacture of dairy produce in Queensland was in the hands of proprietary interests. In New Zealand co-operative factories produce over 90 per cent. of the output. In Canada, on the other hand, proprietary creameries and cheese factories are still in a majority, although both types are in existence. In the Irish Free State co-operative creameries largely outnumber the proprietary creameries. The former are organised under the Irish Agricultural Organisation Society. Local conditions throughout the Empire vary, and each country, state, province, county, or district will develop its appropriate methods. The present tendency in most of the Overseas Dominions is undoubtedly in the direction of co-operative factories.

XV.—Grading.

148. We have already drawn attention to the importance of high standards of quality and grading in butter produced in the Overseas parts of the Empire for the United Kingdom market. At the present time each Dominion determines its own standards and prescribes the conditions to which the butter and cheese must conform to secure inclusion in the various grades. Marks are given for flavour, texture, colour, salting, and finish. In the different Dominions the number of points given for these is by no means uniform. Some give more points for flavour and texture and less for other items. Further, variations also exist as to the total number of points which butter must secure to be included in one or other of the various grades. In most of the Dominions three grades are adopted—

first grade, second grade, and third grade. Canada and Australia, however, have a "special" or "choicest" grade which precedes the "first grade." The Irish Free State is contemplating the recognition for export purposes of one grade only. The following tables show standards of grading and the methods of scoring adopted in the different Dominions :—

Classification of Grades.

——	Canada.	Australia.	New Zealand.	South Africa.	Irish Free State.
"Special" or "Choicest" Grade.	94–100 (minimum of 41 for flavour).	92–100	—	—	92–100*
First Grade... ...	92–94 (minimum of 39 for flavour).	89–91	88–100	90–100	—
Second Grade ...	87–92 (minimum of 37 for flavour).	86–88	80–88	80–89	—
Third Grade ...	Under 87 (under 37 for flavour).	—	Under 80	70–79	—
"Cooking" or "Pastry" Butter.	—	Below 86	—	Below 70.	—

* Suggested for brand. No butter below this standard will be passed for export.

Method of Scoring.

——	Canada.	Australia.	New Zealand.	South Africa.	Irish Free State.
Flavour	45	45	50	50	60
Texture	25	20	25*	40†	30
Condition	—	20	—	—	—
Closeness	15	—	—	—	—
Colour	10	—	10	10	5
Salting	—	10	10	—	—
Finish	5	5	5	—	5
	100	100	100	100	100

* Body, moisture, and texture. † Texture, body, grain, and moisture.

149. A similar system, both as regards classification of grades and the method of scoring points, exists in most of the Dominions in connection with the export of cheese.

150. While we do not consider that we are in a position to determine which is the best method of scoring or what should be the total number of points to secure the admission of butter to the respective grades, *we do urge that the Overseas Governments should consider the possibility of adopting some uniform methods of grading for their butter and cheese.* We recognise

that the grading must in the end depend on the personal interpretation of the Regulations by the individual grader and in regard to such matters as flavour an objective standard is extremely difficult. Absolute uniformity is therefore impracticable, and indeed variations take place in one and the same Dominion which is maintaining the same system of scoring and grading throughout the whole of its area. *Nevertheless we do think that an attempt to secure greater uniformity would be of assistance to the trading community in the United Kingdom and so of advantage to Empire producers.*

XVI.—Finance and Transport.

151. The dairy produce trade, in contra-distinction to what we found in the case of the fruit trade, is financed on the usual basis adopted for the majority of other commodities. Consignments of dairy produce shipped to the United Kingdom from the Overseas Dominions are sold by importing houses in the United Kingdom on commission or are purchased outright, either on a c.i.f. or f.o.b. basis, full payment being made to the supplier against documents. Where the product is handled on consignment the importer is usually prepared to advance to the shipper anything up to 75 per cent. or 80 per cent. of the value of the produce, against the delivery of documents.

152. So far as we are aware no serious complaint has been made against this system whereby the United Kingdom importer finances the trade. We understand that with the coming into full operation of the Dairy Produce Control Board in New Zealand no change is contemplated in regard to the financing of butter and cheese. Importers are willing to continue to finance the produce in the recognised manner, although provision is made for the New Zealand factories to obtain financial advances through official sources should they desire to do so. A similar situation exists in Australia where the Australian Government has made arrangements, under the Commonwealth Bank (Rural Credits) Act of 1925, to finance producers' organisations in Australia in the marketing of their produce. This is not in substitution for the existing financial arrangements where the parties concerned desire to maintain them; it is to supplement the existing system.

153. Great improvements have been effected in recent years in the Overseas parts of the Empire in the transport of dairy produce on the railways there. In Canada, for instance, all butter and most of the cheese is carried on the railways in refrigerated cars. In other Dominions, however, there is still room for improvement. We are told, for instance, that butter is carried on some Australian railways in unrefrigerated cars. Louvred vans containing half a ton of ice are normally used.

The Australian Dairy Council has recommended to the Australian Governments that all trucks for the carriage of dairy produce should be refrigerated. With this view we entirely agree and *we strongly recommend in the interests of the Australian dairy producers that such refrigerated vans should be provided for the carriage of the produce from the factory to the port of embarkation.* It is essential, if the butter produced in the distant Dominions is to be marketed in its best condition in the United Kingdom, that it should be transported in refrigerated equipment throughout the whole journey and thus protected from temperature variations. It is obvious that if a successful dairying industry is to be built up in Kenya Colony an adequate service of refrigerated vans on the railways, with special organisation to facilitate the transfer of the produce from the car to the ship at the port, will be essential.

154. The question of ocean transport is one of great importance to the distant Dominions of Australia and New Zealand. Under the Australian Dairy Produce Control Act the Control Board is given the power to arrange for the shipment of dairy produce on such terms and in such quantities as it thinks fit. The New Zealand Dairy Produce Control Act gives similar powers to the New Zealand Board. We understand that some time ago the New Zealand Board obtained a substantial reduction of £1 per ton for butter and a corresponding reduction for cheese as the result of direct negotiations with the shipping lines. During our investigations into the marketing of dairy produce, similar negotiations between the Australian Board and the shipping companies have taken place, and have secured a reduction in the freight charges from Australia to the United Kingdom to bring them into line with those in existence between New Zealand and the Home country. *In our view there is no reason why the freight charges on dairy produce from Australia to the United Kingdom should be higher than those from New Zealand.* Canada has the advantage of a shorter distance, but the cost in proportion to the distance is higher than it is from the southern Dominions.

155. Notwithstanding recent reductions in freights, the cost of ocean transit, especially from the far away Dominions, remains an important factor in the cost of marketing dairy produce in the United Kingdom. The time occupied by the voyage, which varies in the case of Australia and New Zealand from six to eight weeks according to the route taken, also constitutes a special difficulty in the way of the industry. Speed at sea is, however, costly, and beyond a certain point every additional knot becomes very expensive, until it reaches a prohibitive point for all but a few vessels between the great and wealthy populations of Europe and North America if ships are to be run on a commercial basis. Moreover, high speeds can only be attained by the sacrifice of cargo space to engine requirements. This whole question of balancing cost and speed at sea was care-

fully investigated by the Imperial Shipping Committee in regard to the Australian trade three years ago, and the conclusion reached that beyond a certain "economic" speed it would not be practicable to carry cargo except with the aid of Government subsidies. The Imperial Shipping Committee recognised that the factors determining the economic point of speed varied gradually with the advance of invention and methods, although the elements of the problem remained the same. That within the last three years there has been some change is probable, and the economic speed is a little higher than it was. But a very considerable change would be necessary to give an improvement which would be appreciable in the marketing in the United Kingdom of dairy produce from the distant Dominions. This is not a matter on which we can claim the expert knowledge which is available in the Imperial Shipping Committee, but we think it likely that their general conclusions in regard to the subsidies which would be necessary to give high speeds at commercial rates still, in a large measure, hold. It is for the Governments of the Empire to say whether subsidies on an adequate scale would be worth while.

156. We are informed that, acting under the powers conferred by the Dairy Produce Control Act, the New Zealand Board has during the last two years made arrangements for marine insurance policies covering the whole of the produce shipped, which represent a saving to the producers of approximately £25,000 a year. Similar advantageous arrangements have been effected by the Australian Board.

E.—THE MARKETING OF DAIRY PRODUCE.

XVII.—United Kingdom Market.

157. We come now to consider the machinery whereby dairy produce is marketed, and the stages through which it passes in the United Kingdom itself before it reaches the ultimate consumer.

158. The methods of marketing Home-produced dairy produce are in certain respects different from those adopted for Dominion produce. The former were examined in considerable detail by the Linlithgow Committee in its Report on Milk and Milk products issued in 1923. So far as we are aware no similar examination of the marketing of imported dairy produce has yet been undertaken.

159. Home-produced butter and cheese do not pass through the hands of more than two or three intermediaries before they reach the consumer in the large towns. In the smaller market towns and villages the practice of direct sale from the producer to the consumer is extensively adopted. Imported butter and cheese on the other hand normally pass through more hands before reaching the ultimate purchaser. In addition to the

importer, wholesaler, and retailer there may be a secondary wholesaler, and in some cases a blender, as links in the chain of distribution. On the other hand the multiple shop often buys direct from the importer, and the wholesaler and blender may at times purchase direct from the shipper Overseas.

160. The marketing of Home-produced butter, and in a less degree that of cheese, in the United Kingdom is essentially different from that adopted for imported produce. The Home dairy farmer is, in the main, producing milk for consumption in its liquid form, whereas the Overseas producer is chiefly concerned in the manufacture of butter and cheese for export. Certain farmers regularly make a quantity of very high-grade butter each week and obtain for its sale locally the highest prices. But apart from this high-class butter trade there is a considerable output of butter regularly put on the market by dairy farmers who adopt butter making only as a method of utilising their surplus milk not required for consumption in its liquid state.

161. The fact that the Home dairy farmer is in the main interested in liquid milk and not in butter is a fact of paramount importance. The demand for liquid milk is fairly constant the year round. On the other hand production varies considerably with the seasons. The dairy farmer thus frequently has left upon his hands varying quantities of milk which he is unable to sell in liquid form and which he consequently turns into butter. Being only occasional butter makers such farmers have neither the experience nor the incentive to produce butter of the high quality which regular Home butter makers produce. Such butter is frequently purchased by local dealers and to a certain extent used by the blending factories in the manufacture of their proprietary blends. As it leaves the farmer it is naturally variable in quality, texture, and appearance. Were it sold thus to the consumer it would probably obtain a relatively low price. The blender in this respect is undoubtedly of assistance to the irregular producer of butter in supplying a remunerative market for his uncertain output.

162. The trade in Home-produced cheese is more highly organised than is the butter trade. The output is larger and more regular, and the opportunities for the development of a market consequently facilitated. The marketing of cheese produced on farms in the United Kingdom is largely effected through cheese factors, who are primary wholesalers engaged solely in the business of handling cheese. The Linlithgow Committee stated that 90 per cent. of the whole annual make of Cheshire cheese is handled in this way. The factors purchase the cheese outright from the producer. Some take it when it is ready for sale; others, who own large stores and warehouses where it can be stored and ripened, take delivery as soon as it is manufactured. Purchases are made at the producing farms

or at local cheese fairs. On an average nearly nine-tenths of the cheese factor's trade in England is direct with the retailers. In Scotland the factor normally sells to the secondary wholesaler, who, in turn, resells to the retailer.

163. Imported butter is consigned by the Overseas shipper to the *importer* in the United Kingdom. The importer acquires it in one of two ways—he may purchase outright on a f.o.b. or c.i.f. basis, or, as an accredited agent of the shipper, he may receive it for sale on commission. The former method of trading appears to have been preferred in the past by some producers and shippers in Australia and New Zealand, but the tendency now is towards the method of sale on commission. At the present time 85 per cent. of the Australian butter exported is consigned to the United Kingdom for sale on commission, and only 15 per cent. is sold outright to the importer. In Canada, however, sale outright is much the more generally accepted method. Importers who purchase naturally take all the risks of the market. Where sale is on a commission basis the importer charges 2 per cent. to 2½ per cent. In the latter class of business agreed advances are made to shippers by importers, or their agents, ranging from 60 per cent. to 80 per cent., and sometimes rising as high as 90 per cent., of the estimated value.

164. We understand that no advances are made by English importers to Danish butter sellers. Denmark is so close to the United Kingdom that business is normally completed and payment made in one transaction. We recognise that the distance of New Zealand and Australia from the market places them in an essentially different position from Denmark. None the less we look to see ultimately develop a system which will render the Overseas producer as little dependent as the Danish producer upon the importer in the United Kingdom for the financing of his produce. This should be possible as soon as adequate facilities for financing the trade have been provided in the producing country.

165. In our Report on Fruit we draw attention to the fact that importers frequently operate in a dual capacity—they sell some goods on consignment as the agent of the producer and other goods on their own account for a profit. The importer is anxious to obtain a remunerative return on his own goods and naturally tends to give them a preference over the produce he is selling on consignment. In the presence of fluctuating prices, moreover, he is specially anxious lest he should lose on the produce which he has purchased and owns. We believe that the same situation holds in regard to dairy produce. In principle we cannot agree that such a position is satisfactory. In those trades which are highly organised, as, for instance, the buying and selling of stocks and shares, such a competition of

interests on the part of a single firm is forbidden and the functions of merchant and commission salesman are kept apart. *Other things being equal, we think that the Overseas producers' organisations when selling in the United Kingdom should consider the advisability of giving their preference to dealers who are prepared to sell on commission only and do not operate in both capacities.* We recognise, however, that this must be a matter of gradual evolution.

166. The importer sells the butter either to a wholesaler, a blender, or direct to large retailers such as multiple shops which are rapidly extending their operations throughout the country. The *wholesaler* purchases for resale to secondary wholesalers in the large towns or to retailers. He maintains a number of travellers who sell to his secondary wholesale and retail customers not merely butter and cheese, but many other forms of provisions, such as bacon, eggs, and ham. Wholesalers are organised in local associations which provide for the consultation and discussion which modern methods of trade more and more demand. We have been told that these Wholesale Associations do not attempt to fix the selling prices or to regulate the quantities of produce placed on the market.

167. The primary wholesaler is sometimes also a *blender.* Blending was begun in France some thirty years ago and was so successful that French and Italian blended butter captured the English market. In the United Kingdom the development of blending has been encouraged by the variation in quality and appearance in the butter made by milk producers who are merely seeking an outlet for their surplus milk at certain seasons of the year. The blender purchases this butter for re-working with other butter with the object of supplying a product of uniform quality and in regular quantity throughout the year. The blender is also able to adjust his product to the varying tastes of the different districts in the United Kingdom in regard to such matters as colour and saltness.

168. We understand that the demand for blended butter has rapidly increased in the United Kingdom during the last few years and now represents about 10 per cent. of the total quantity consumed. This demand has undoubtedly been encouraged by extensive advertising of the proprietary names of the blends, frequently embodying the names of counties or districts in the United Kingdom well known as dairying areas, and thus conveying the implication that the butters which have been blended are derived from such local sources.* So successful has the English butter-blending industry become that practically no foreign blended butter is now imported. Some blending firms blend imported butter only; others use such Home supplies as are from time to time available.

* See also paragraph 243.

169. The *secondary wholesaler* is frequently a large retailer in a county town or other provincial centre. He sells wholesale to the smaller retailers in the villages and small towns around. As he frequently holds fairly considerable stocks he dislikes and discourages rapid reductions in the retail price, lest he should incur serious loss in disposing of produce he has bought at a higher figure. He displays, however, less hesitation in varying retail prices upwards when wholesale prices are moving in that direction.

170. We have been informed in evidence that in pre-war days the *retailer* of butter in towns made an average gross profit of from 1d. to 1¼d. per lb., in the case of firms having no delivery service. To-day, the average gross profit is probably over 3d. per lb. This increased profit is attributed partly to lessened competition owing to general understandings in the trade, partly to increased prime costs of the commodity, and partly to the need of covering increased expenses.

171. Although there is a movement to eliminate competition between retailers in the matter of price, competition will re-appear in another form. This is actually occurring at the present time in the retail trade in that grocers vie with one another to offer the greater services, in such ways as the provision of credit accommodation to customers and the free delivery of goods. Undoubtedly the statutory restriction of shop hours is working in this direction since customers find it less convenient to shop within the prescribed hours. Price variations are tending to diminish not only between one retailer and another, but at one time as compared with another, for it is the willingness of the individual retailer to cut or raise his price that compels or persuades his competitors to follow the same course.

172. During the present century a very considerable change has come over the retail trade in the United Kingdom by the extension of the system of *multiple shops*. These multiple shops frequently purchase their butter direct from the importer and so eliminate the cost of handling by wholesaler and secondary wholesaler. We understand that in some cases importers are directly interested in multiple shops, and are thus in a position to exert their influence on the determination of retail prices. Generally speaking, it is the multiple shops and the co-operative stores who determine the retail price at which butter is sold. The ordinary retailer, despite the understandings with his fellow retailers, is generally obliged to follow the prices fixed by the local branches of the multiple shops and co-operative societies.

XVIII.—Variations of Supply to Market.

173. The following table shows the variations in the monthly imports of butter into the United Kingdom for 1923, 1924, and 1925 :—

Month.	1923.	1924.	1925.
	1,000 Cwts.		
January	501·2	425·1	540·9
February	461·9	453·7	620·1
March	438·3	455·1	489·5
April	427·5	375·5	625·9
May	541·1	580·9	540·3
June	485·0	411·7	574·9
July	419·1	443·4	466·0
August	409·2	467·8	423·5
September	336·6	431·2	396·4
October	358·3	416·3	322·1
November	388·5	372·2	362·4
December	328·8	454·4	491·2
Total	5,095·5	5,287·3	5,853·2

174. From these figures it will be seen that in recent years a greater quantity of the butter consumed in the United Kingdom has been imported during the first half than during the second half of the year. Taking the normal average requirements of the United Kingdom for imported butter as something in the neighbourhood of 100,000 cwts. a week, it follows that during the first six months of 1925 there were received some 800,000 cwts. in excess of the consumption. This excess was placed in cold store until required.

175. This condition of the trade is due to the fact that butter produced in the northern hemisphere, except that of certain countries in which winter dairying is practised, naturally comes upon the market in the first half of the year. On the other hand the butter from the southern hemisphere which should supply the second half of the year, is most of it six or eight weeks away from the market, with the result that there is such a lag in delivery that supplies from the south are only beginning in the months of November and December and are not arriving in quantity until after the opening of the new year. The following figures show the monthly supplies of butter for 1925 from Denmark, New Zealand, Australia, the Irish Free State, and Canada :—

Month.	Denmark.	New Zealand	Australia.	Irish Free State.	Canada.
			1,000 Cwts.		
January	116·7	164·5	168·5	3·7	·8
February	136·3	207·4	205·1	4·2	—
March	115·9	167·9	110·8	4·9	2·3
April	150·3	173·2	181·1	8·0	2·7
May	136·5	133·0	119·1	23·8	·2
June	155·7	166·7	78·1	63·1	—
July	160·7	61·8	35·8	67·7	38·0
August	142·3	21·4	15·8	61·2	58·8
September	124·0	18·2	55·6	63·8	30·9
October	116·5	3·8	22·6	52·2	25·9
November	130·8	72·5	46·3	33·1	3·3
December	172·4	65·2	122·4	17·4	·2
Total	1,658·1	1,255·6	1,161·2	403·1	163·1

176. From these figures it will be seen that although there is a tendency for slightly more Danish butter to be received in the late summer and autumn than in the early months of the year, there is no great variation from the average of about 140,000 cwts. a month. On the other hand there is very considerable seasonal variation in supplies from Australia, New Zealand, the Irish Free State, and Canada. The bulk of the Canadian supply is, we understand, held in Canada so that it reaches the United Kingdom during the summer and early autumn. The quantities of butter from Canada and the Irish Free State are, however, still relatively small in quantity, amounting in 1925 to less than 10 per cent. of the total importation, but Australia and New Zealand sent 40 per cent. of the total in that year. A substantial increase in the quantities produced in the Empire countries in the northern hemisphere is needed if regular supplies of Empire butter are to be available on the Home market, without long cold storage, continuously throughout the year. Nevertheless, the variations in taste and make of the butter supplied by the different Dominions are such that, even were it practicable to maintain a regular Empire supply from complementary sources in turn, it would still be desirable that each Dominion should prolong as far as possible the period of the year during which its particular butter was available on the market.

177. There are two ways whereby butter from a given country can be kept on the United Kingdom market throughout the year. Butter can be produced during the whole twelve months by means of autumn as well as spring calving, given a sufficiency of feeding stuffs or forage. We have already referred to the importance of the development of winter dairying in the Overseas Dominions. This is the method followed in Denmark. Alternatively the surplus supplies obtained during the producing season can be placed in cold storage and released for the market at regular intervals throughout the year. There is always some deterioration of butter held in cold storage, although when it is of exceptional quality this deterioration may be very slight. It is, therefore, desirable that the butter produced in the Overseas Dominions should be placed on the market as soon as possible after manufacture. *We have, therefore, no hesitation in advocating winter dairying as the preferable method.*

178. It is clear, however, that with existing methods of production it would not be expedient for the whole of the butter produced in Australia or New Zealand during, say, the months of December, January, and February, to be placed on the market at once. The United Kingdom already receives more butter during the early months of the year than it can consume at present prices. Some regularisation of supply from the southern Dominions, involving the use of cold storage for limited periods of time, is thus inevitable.

179. Furthermore, owing to the different speeds and routes of the vessels by which butter is brought from the Antipodes

to the United Kingdom it not infrequently happens that five or six cargoes may be delivered within a few days and that a considerable gap may then ensue. Obviously, cold storage is again the only means of meeting such a situation if alternate gluts and shortages are to be avoided and a regular supply to the market maintained. *We have no hesitation in saying that such regularisation, provided that it does not entail the maintenance of large quantities of butter in cold storage for excessive periods of time, is in the ultimate interests of all parties.*

XIX.—Storage.

180. For the regularisation of supply there are two alternatives in the matter of cold storage. The butter and cheese may be stored in the producing country or in the United Kingdom. Where there are considerable fluctuations in prices, it is obvious that the produce should be near the market if it is to take advantage of a rise. Further, storage in the United Kingdom is an advantage to cover the event of war or other contingencies.

181. On the other hand, the mere fact that there is butter in cold store in the United Kingdom ready to take advantage of price fluctuations is in itself a temptation to the producer to speculate. Such speculation we regard as to the certain disadvantage of the producers as a whole, even though it may on occasion work out to the advantage of individuals. Further, the costs of storage in producing countries are considerably lower than they are in the United Kingdom.

182. But the most important reason which leads us to prefer storage in the producing country rather than in the United Kingdom, is that butter, once it has been manufactured, begins to deteriorate, and that this deterioration is accelerated by exposure to varying temperatures. While deterioration is retarded during cold storage it nevertheless continues, and the extent to which it develops is dependent upon the condition of the butter at the moment it enters the store. If the butter has been exposed to varying temperatures before storage, the risk of serious damage and the deterioration during storage will be greater than would be the case if it had been placed in storage immediately after manufacture. Where exposure to varying temperatures is unavoidable this should take place after the main period of storage and not before it, so that any damage suffered during that period is not further developed in the cold store.

183. The exposure of butter to ordinary temperatures between the factory and the ship, and again between the ship and the cold store in the United Kingdom, cannot fail to have a definitely deleterious effect. If this is allowed to develop further during a period of cold storage in the United Kingdom, it will rapidly show itself after the butter has been finally removed from the store and placed on sale in the retail shop or held for consump-

tion in the home. *We have, therefore, no hesitation in recommending that the cold storage of butter for the main regularisation of supplies should take place in the producing country and that storage in the United Kingdom should be limited to the amounts necessary to rectify gluts and shortages.*

184. We desire to draw attention in this connection to an important matter which has been brought to our notice. The methods by which butter is transferred from the refrigerated chamber on board ship to the cold store in the United Kingdom leave much to be desired. We have had it in evidence that there is not infrequently considerable delay in removing butter from the wharves or unrefrigerated sheds at the docks. Further, butter is frequently moved up the Thames in unrefrigerated barges. Such treatment must injure the quality, notwithstanding all the care that may have been taken in production and in transfer to the cold store immediately after it has been made. *The handling of dairy produce at the United Kingdom docks has undoubtedly improved in recent years, but there is scope for still further improvement.*

185. On the British railways there is apparently a total lack of refrigerated accommodation for the transport of dairy produce. Such produce is carried by passenger or goods train in unrefrigerated vans. The provision of refrigerated vans would be to the advantage no less of the Home producer than of the producer in the Dominions. Further, witnesses have told us that boxes of butter are frequently exposed to the sun for considerable periods on railway platforms, particularly at junctions where transfer is made from one train to another. *We think that the railway companies would be well advised to give this matter careful consideration since producers who find that their produce is damaged on the railways are likely to turn to road transport as an alternative method of carriage.*

186. We understand that the same kind of criticism applies also to the coasting steamers between Ireland and Great Britain which carry dairy produce largely without refrigeration. An improvement in this respect would be of advantage to the Irish butter trade.

XX.—Publication of Cold Storage Information.

187. In connection with storage in the United Kingdom there is an important matter to which we desire to draw attention. On more than one occasion in recent years strong recommendations have been made by Committees and Commissions that statistics should be issued at regular intervals of the quantities of foodstuffs held in cold store in the United Kingdom. The Linlithgow Committee, in 1923, in its report on meat, poultry, and eggs, made the following recommendation :—

> " Equally we regard it as of importance that the stocks of meat of various kinds held in cold storage in Great

Britain should be reliably ascertained and published. A large proportion of the cold storage in London and the provinces is owned by one organisation, itself a large wholesale and retail meat trader, thus exposing the market to the risk of manipulation, though we have no evidence which suggests that undue advantage is, in fact, taken of the opportunities which the present arrangements afford. In the interests of both producers and consumers, it is desirable, however, that information as to the total stocks of meat in cold store should be available at any time to the general public, and we recommend that legislation should be introduced making it compulsory for cold storage proprietors in this country to furnish periodical statistics showing the total quantities of meat of various kinds on hand, and that these statistics should be regularly published by the Government Department concerned."

188. This recommendation on the part of the Linlithgow Committee was supported by the Royal Commission on Food Prices in 1925, which included the following statement in its Report :—

"Your Commissioners . . . are satisfied that the time has come to require proprietors of cold stores to supply this information at regular intervals to the appropriate authority. The collection of information of this kind, not only in the meat trade, but in other food trades, would indeed be one of the most essential functions of the Food Council. As to the precise manner in which such information should be made public, and the possible advantages and disadvantages of the publication of stocks at regular intervals, either for the country as a whole, or for each of the principal towns, or even for each store separately, we do not consider it necessary to make any definite recommendations at the present time.

"The general opinion of traders seems to be favourable to publication, the demand being most explicit on the part of retail traders and Overseas producers. At an annual meeting of the National Federation of Meat Traders' Associations, held at Leeds in March, 1924, a resolution was passed urging upon the Board of Trade 'the desirability of requesting the cold storage companies to provide monthly returns of all meat in cold storage.' The President of the Federation informed us that he is in favour of publication because it would put everyone on a square footing. The producers and the importers already have information enabling them to regulate supplies to a considerable extent, and there can be no harm in the rest of the trade having all the information that is available. Both the New Zealand Meat Producers' Board and the Australian Meat Council have expressed a desire for the publication of

stocks in cold store. We understand that similar figures are published in New Zealand and also in the United States."

189. This recommendation of the Royal Commission on Food Prices was accepted by His Majesty's Government, and in a speech delivered on the 1st June, 1925, the Prime Minister of the United Kingdom stated that the Government adopted the recommendation of the Commission that cold storage proprietors should be required to furnish statistics of food in cold storage—that is, meat, bacon, butter, and cheese. Up to the present time, however, no action has been taken. *We regard the publication of such statistics, particularly in regard to dairy produce, as essential if the trade is to be placed on a satisfactory basis.*

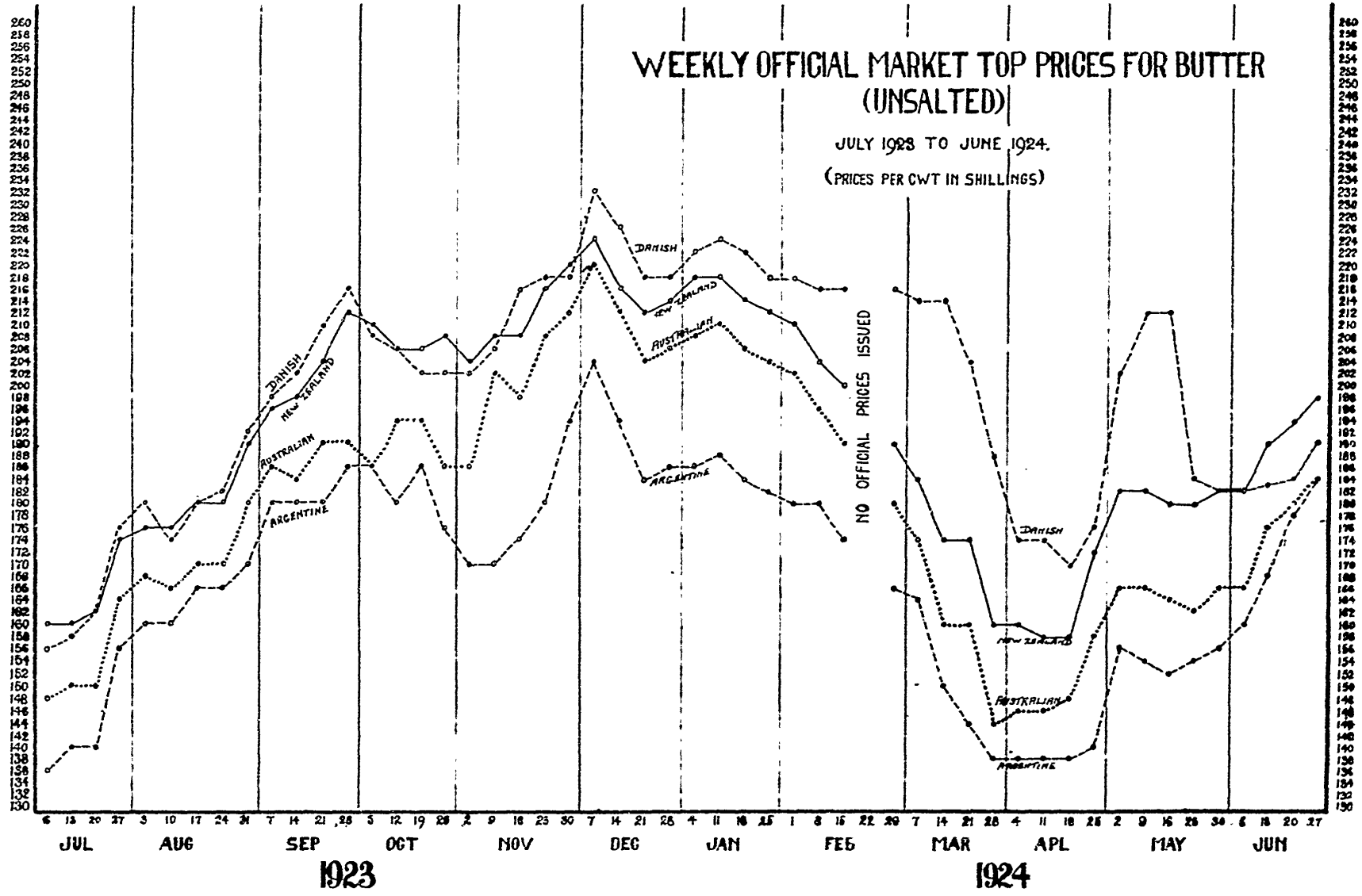
XXI.—Wholesale and Retail Prices.

190. In order that the fluctuations in the wholesale price of butter in recent years may be properly appreciated we include charts showing the variations in the wholesale weekly official market top prices for Danish, New Zealand, Australian, and Argentine butter during the period July 1923 to June 1926.*

191. If these diagrams be compared with the statistics given in paragraph 173 of the monthly arrivals of butter in the United Kingdom, it will be seen that the supplies are highest and wholesale prices lowest in the early months of the year. There are two peaks in the supplies. The first is in January and February when the heavy consignments from the southern hemisphere reach the market. The second is in April and May when the supplies from the northern hemisphere are becoming abundant. The wholesale prices follow the supplies in the normal way. There is a fall at about the opening of the year, a recovery in February and March, and a renewed fall in April. From June onwards there is a gradual fall in the visible supply which lasts until November and during this period prices steadily rise. Then a curious thing takes place. The southern supplies are on their way to the market and their amount is known generally. Yet the wholesale price continues to rise until towards the end of the year, when it suddenly crashes, with the result that when the southern butter arrives much of it is sold at or near the bottom price. The Christmas consumer in the United Kingdom has in consequence to pay an unduly high retail price and within a fortnight the Dominion producer receives an unduly low return.

192. This, in the opinion of skilled witnesses, is the meaning of the diagrams and statistics to which we have referred. The trend of prices has been repeated with remarkable regularity since the war. In consequence buyers have come to regard it as an economic 'law' that butter prices will slump heavily

* See opposite, and also Appendix I to Supplementary Report on Margarine.



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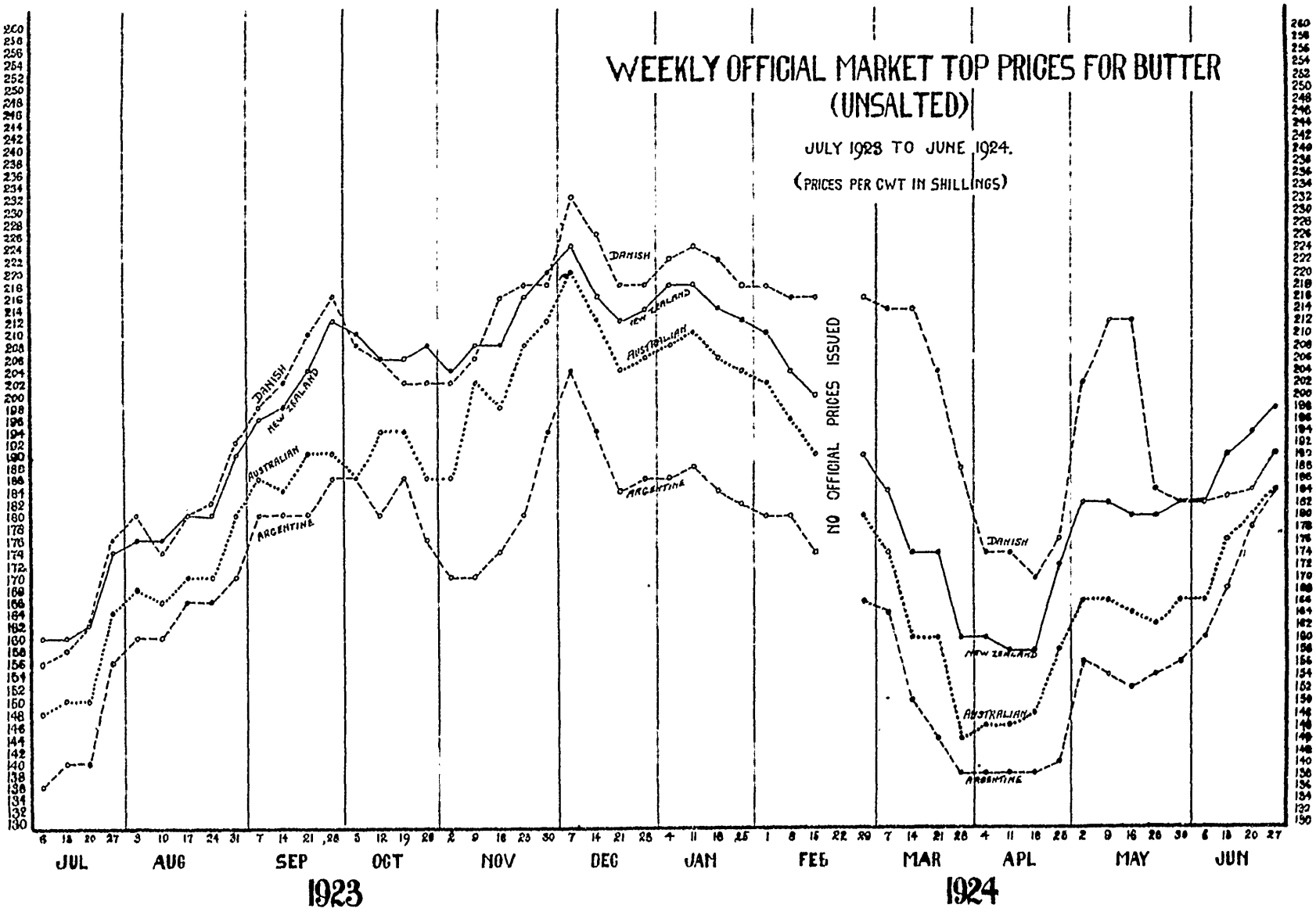

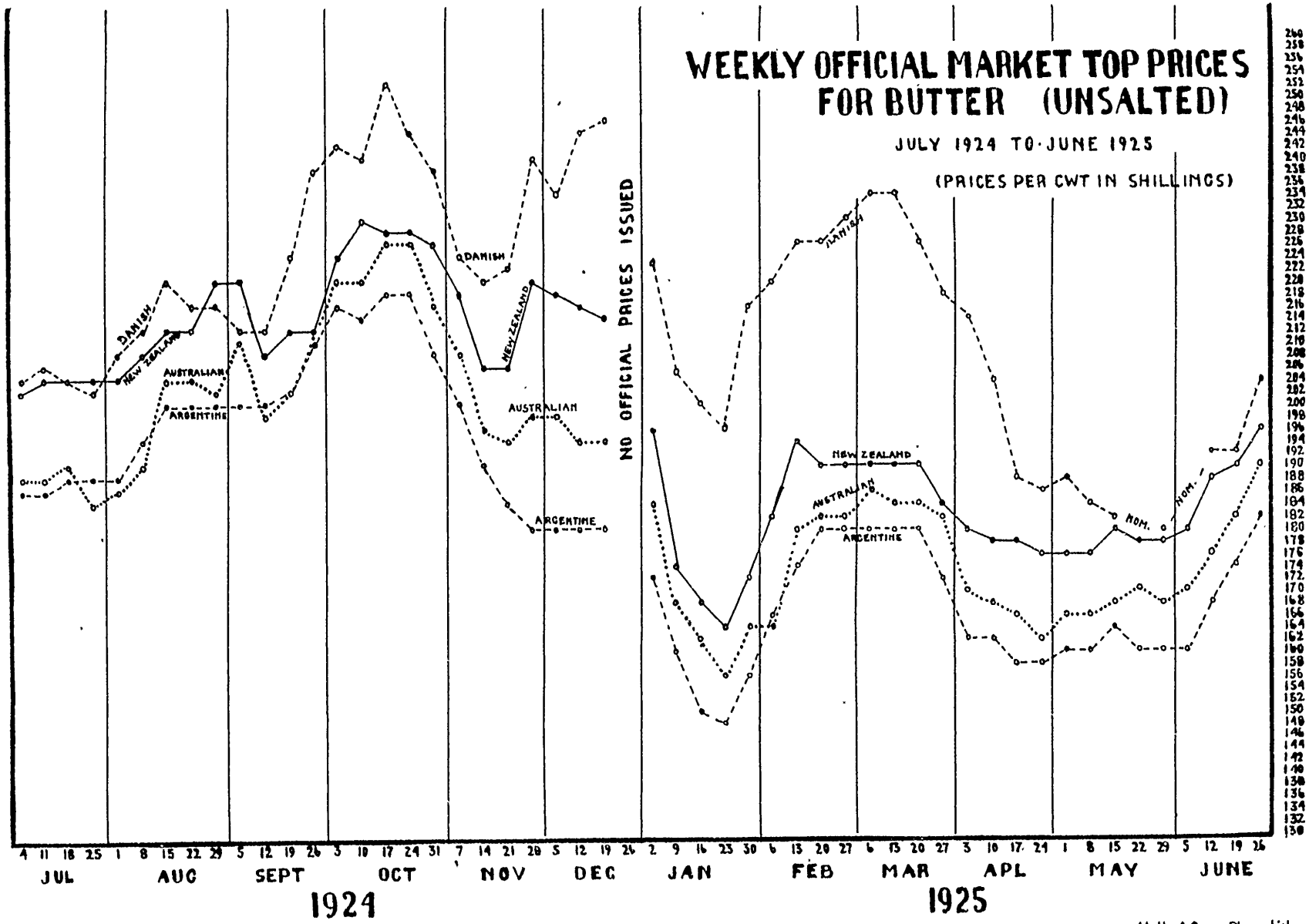

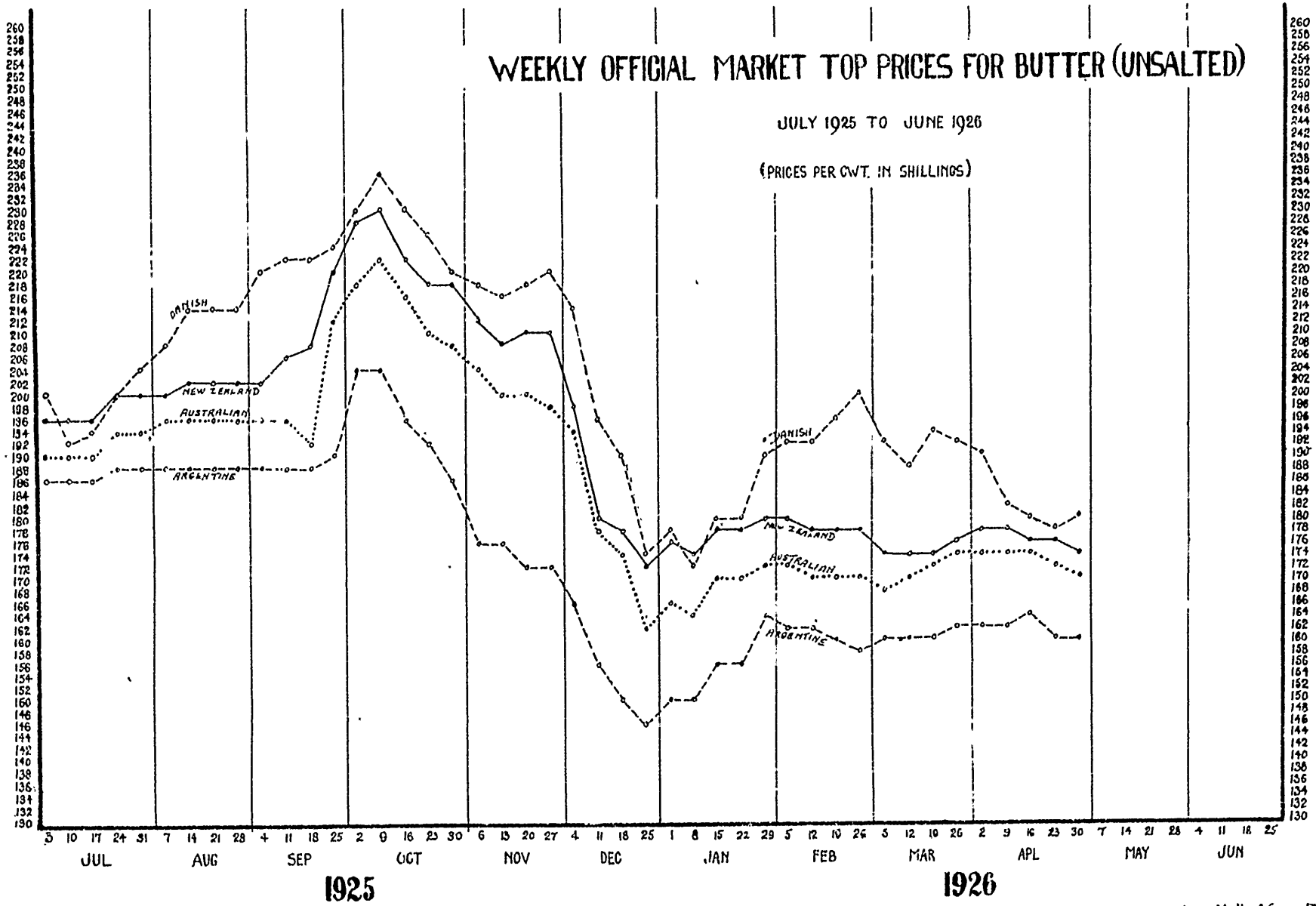

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about the end of the year and they hold off the market in anticipation of the fall. Their reluctance to buy accelerates the drop in price and sends it lower than market conditions justify. When the heavy buyers enter the market the others follow their example on the assumption that the minimum price has been reached. This of itself means that any further fall is out of the question, as all the buyers are endeavouring to make their purchases at the same time. Consequently prices react, and, with a pendulum movement, they rise higher than they should.

193. That the fluctuations which have shown themselves in the wholesale price of butter in recent years, have come to be regarded by buyers as a normal basis for their operations is admitted by the Chairman of one of the large multiple shop organisations, who, in a speech made on the 11th February, 1926, in discussing the supplies of dairy produce from Australia and New Zealand, made the following statement in connection with the anticipated fall in wholesale prices :—

> " In preparation for this drop our stocks were kept down to the minimum. You see the effect of this in the exceptionally large amount of cash available in the balance sheet. This may be altered at any moment, as markets become favourable to our again holding stocks."

194. No one can raise any objection to such action on the part of the buyers. It is their duty, both to their share-holders and to the public, to purchase as cheaply as possible. The situation has, however, caused very considerable dissatisfaction among producers in Australia and New Zealand. The following table shows the highest and lowest prices realised by Australian and New Zealand butter in the United Kingdom during the years 1923, 1924, 1925, and 1926 :—

	Australian.		New Zealand.	
	Low.	High.	Low.	High.
	Per cwt.	Per cwt.	Per cwt.	Per cwt.
	s. d.	s. d.	s. d.	s. d.
1923	134 0	219 0	140 0	222 0
1924	139 0	216 0	151 0	221 0
1925	155 0	210 0	155 0	226 0
1926	157 0	220 0	164 0	232 0

We are given to understand that the greater portion of the butter from these Dominions was sold at or near the lower rather than the higher figure. The higher values were more often the result of scarcity and of consequent speculation in the market.

195. In consequence of the fact that a large portion of the New Zealand supplies has, in recent years, been regularly sold at the time when the lowest prices were ruling, certain New Zealand factories have sent their butter to the United Kingdom with instructions that it must not be sold below a certain price and that it must be held in cold store until the market price rises to that level. *In effect, this means that the New Zealand producer in such cases has himself been speculating in the United Kingdom market in the anticipation of the rise. Such a practice we cannot too strongly condemn.* We have already stated that if it is necessary to hold butter in cold storage, as is undoubtedly the case to a certain extent if supplies are to be regularised, the storage should, as far as possible, take place in the producing country rather than in the United Kingdom.

196. It must be remembered that when butter is held off the market for high prices business is not done. The quantities in store accumulate with the result that when the fall in price does come it is all the more severe. We fully admit that a skilful and lucky speculator may make money if he is fortunate enough to dispose of his holding at the top of the rise. Such a result cannot, however, apply if speculation be attempted with the output of whole districts or countries. To secure the highest average price on large supplies it is necessary that they should enter into consumption regularly and as fresh as possible. In any case the Overseas producer is in a much less favourable position for estimating market fluctuations than is the dealer on the spot.

197. In our view the crux of the situation lies in the retail price. The following figures give the wholesale and retail prices* for the years 1924-1925 and 1925-1926 :—

1924–1925.	Retail.	Whole-sale.	1925–1926.	Retail.	Whole-sale.
	s. d.	s. d.		s. d.	s. d.
July	1 9¾	1 8½	July	1 10¾	1 8½
August	1 11¼	1 9½	August	1 11¾	1 7¾
September ...	2 0¾	1 9½	September ...	2 0¾	1 9¾
October	2 2	2 0	October	2 1½	1 11½
November... ...	2 2¾	1 10¼	November ...	2 1¾	1 10¼
December... ...	2 2	1 10½	December... ...	2 1½	1 7¼
January	2 2	1 7	January	1 11	1 6½
February	1 11½	1 8	February	1 10½	1 7
March	2 0	1 8½	March	1 10¾	1 7
April	2 0	1 6½	April	1 10½	1 6¾
May	1 10½	1 6¼	May	1 10	1 6¼
June	1 9¾	1 7½	June	—	—
Average *for year*	2 0¼	1 8½	Average *for year*	1 11¾	1 8¼

NOTE.—* For the benefit of Canadian readers we have converted the above prices into Canadian Currency at the par rate of exchange.

[*See next page.*]

The retail prices are based on average prices paid in working-class districts for salt butter and are extracted from the "Ministry of Labour Gazette." The wholesale prices are based on the combined monthly average values for Australian, New Zealand, and Danish finest salt butter.

198. We have been frequently informed in evidence that the consumption of butter, to a much greater extent than that of many other commodities, is very susceptible to variations in the retail price. The housewife knowing the value of butter as a food for her family is always ready to purchase as much as her budget outlay will permit. A relatively small variation in price will increase or decrease her butter purchases by a quarter or half a pound, or more according to circumstances. If a reduction in the average retail price could be ensured we are convinced that a very much increased consumption of butter would result.

199. From this point of view it is important to note that retail prices do not necessarily follow wholesale prices. The changes in retail prices are fewer and they lag behind those in wholesale prices, especially when the latter are falling. We recognise the inconvenience of too frequent changes in retail prices, but we are convinced that if the retail prices of butter were more readily adjustable to the total quantities on the market in such a way as to encourage consumption at the time of the maximum available supply, wholesale prices would accommodate themselves to retail prices and the fluctuations in the wholesale price which have caused such dissatisfaction amongst producers would be reduced.

200. Let us take the example of the Christmas prices to which we have already referred. The retail price of butter in October 1925 was 2s. 1½d. per lb. It remained at substantially this price until the end of December. Nevertheless during the same period wholesale prices were rapidly falling from 1s. 11½d. per lb. in October, to 1s. 7¼d. per lb. in December, in harmony

Footnote from previous page :—

1924–1925.	Retail.	Wholesale.	1925–1926.	Retail.	Wholesale.
	Cents.	Cents.		Cents.	Cents.
July	44	41½	July	46	41½
August	47	43½	August	48	40
September ...	50	43½	September ...	50	44
October	52½	48½	October	51½	47½
November... ...	54	45	November... ...	52	45
December... ...	52½	45½	December... ...	51½	39
January	52½	38½	January	46½	37½
February	47½	40½	February	45½	38½
March	48½	41½	March	46	38½
April	48½	37½	April	45½	38
May	45½	37	May	44½	37
June	44	39½	June	—	—
Average *for year*	49	41½	Average *for year*	48	41

with the arrival of increasing quantities and the knowledge that still larger quantities were forthcoming. There was in December a disparity of as much as 6¼d. per lb. between wholesale and retail prices. This shows the opportunity which existed for a reduction in the retail price. A high retail price, such as 2s. 1½d. per lb., means a curtailed consumption. The increasing quantities of butter from the southern Dominions were not being fully consumed as they reached the market and were in part going into cold storage. The buyers were holding off the market, notwithstanding the fall in wholesale prices, because they anticipated a still greater fall. During the winter of 1924-1925 exactly the same phenomenon occurred with even more marked variation between the wholesale and retail price, as the figures given in paragraph 197 show. Had retail prices been more sensitive to the total quantities available during the winters of 1924-25 and 1925-26 an increased consumption would have developed and wholesale buyers would have been obliged to purchase much larger stocks when supplies were at their maximum. This would have steadied the market, and have given producers a better average price for their output, while ensuring to the consumer the maximum quantity at a reasonable price.

201. The British consumer is accustomed to the idea that butter is more expensive in winter than in the summer. As the importation is at its highest from Christmas onwards there should be no justification for this view. It is, however, a view of which the present system takes a full advantage. If arrangements can be devised for a closer correlation of retail prices to available supplies the result should be to provide butter at reasonable prices during the winter season. We need hardly add that an increased consumption of butter during the dark winter months in the United Kingdom would be of undoubted advantage to the health of the population.

202. The individual retailer does not carry very large stocks of butter, and in any case, as we have already pointed out, he largely follows the multiple shops and the co-operative stores in determining his selling price. The situation therefore, resolves itself to this. *If the multiple shops and co-operative stores could be persuaded to adjust their retail prices more closely to the available supplies with the object of increasing consumption during the period of maximum supply, the speculative tendency in the trade would be reduced and both consumer and producer would benefit.*

XXII.—Control Boards.

203. We have described in earlier sections of this Report the development of the dairying industry in Australia and New Zealand and have referred there to the setting up of Control Boards with statutory powers to govern the export of the dairy produce of these Dominions. This step has been taken because

of dissatisfaction among the producers in regard to the conditions under which their butter and cheese have from time to time been marketed in the United Kingdom. Since the war, there have been great fluctuations in the price of butter, and these fluctuations have recurred seasonally with such regularity that buyers have had the opportunity of making substantial profits by buying at a low price for resale after the anticipated rise. Although the maximum and minimum prices which Australian and New Zealand butter have secured in recent years have varied between 134*s*. and 232*s*. per cwt.* the bulk of the supply from these Dominions has been sold at or near the lower rather than the higher figure. The producers believe that these fluctuations have been encouraged by the buyers themselves with the object of making an increased profit.

204. The effect of the fluctuations in price, thus accentuated, has been to render uncertain the price at which the butter of any given Overseas producer might be sold in the United Kingdom. Some of the producers have received good returns while others have seemed to have been deprived of their profits. There arose, therefore, a demand for more orderly marketing with a view to maintaining a more regular average price. With this object, producers formed themselves into co-operative associations. But it was found that organisation on this basis was unable effectively to control the export trade so long as it did not embrace the whole of the exportable supply. Therefore, legislation was demanded to ensure that all producers supplying butter for export were brought within the scheme. This system of statutory control was not, however, adopted, either in Australia or New Zealand, until it had been approved in principle by a majority of the producers voting at a poll of the industry.

205. In his speech on the Second Reading of the Australian Dairy Produce Export Control Bill on the 17th September, 1924, the Commonwealth Prime Minister stated that " The purpose of the measure is to establish a Board to organise the overseas market for Australian butter and cheese ". Mr. Bruce went on to describe how essential it was for Australia, as a debtor country, profitably to dispose of her large exportable surplus of goods in the markets of the world. He added that the primary producer had to incur not only the ordinary risks of business but two additional clearly defined classes of risk : seasonal vicissitudes and excessive fluctuations of price. No other branch of industry, he explained, was so liable to external instability of prices. The Prime Minister added that if the Imperial Economic Committee framed schemes designed to benefit Dominion producers and at the same time to assist consumers of Dominion products in Great Britain, it could not be expected that such schemes would be successful unless the great primary industries established some orderly marketing system and control over their own production.

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* *See* paragraph 194.

206. In the evidence which has been submitted to us, apprehension has been expressed by trade representatives in regard to the Dairy Produce Control Boards of Australia and New Zealand mainly on two grounds. There is some fear that the practice of certain New Zealand factories of holding up supplies in cold store in the United Kingdom for a reserved price will be adopted on a much larger scale by the New Zealand Control Board when it comes into operation on the 1st September, 1926. There is also a feeling that very wide powers have been conferred upon these Boards by their respective Legislatures, and that under these powers interference in other respects with the free course of trade is not impossible.

207. We have already expressed the view that the holding up of butter in cold storage in the United Kingdom for a reserved price is, in our opinion, to be condemned in the interests of the producers themselves. Representatives of the New Zealand Dairy Produce Control Board have given evidence before us, and it is clear that both they and their Government are fully alive to the criticism which has been aroused in the United Kingdom by the action in the past of certain of the New Zealand factories. There is every reason to assume that a Control Board established by Statute, with the Government represented upon it, will consider the larger aspects and the ultimate consequences of its policy much more carefully than would an individual factory. Such a Board will appreciate the economic dangers resulting from mass speculation under the lead of a national organisation and will undoubtedly also be more sensative to public criticism, both in New Zealand and the United Kingdom, than would private traders. The Australian Board has been in operation since the 1st August, 1925, and has shown no evidence of adopting such a practice. The representatives of the Board who have appeared before us have declared that it would be entirely contrary to their present policy.

208. The fears expressed by traders in the United Kingdom are easy to understand, having regard to the extensive powers which have been given to the Control Boards in Australia and New Zealand. The Acts do undoubtedly give very great powers for the control of the dairy produce exported from these two Dominions. Such produce may only be exported by licence from the appropriate Minister on the conditions and restrictions which the Boards prescribe. No contract for the carriage by sea of dairy produce may be made except by the Boards acting as the agents of the owner. The Boards have full authority to make such arrangements and to give such directions as they think fit for the handling, marketing, and storage of produce, its sale and disposal, and its insurance against losses. The Boards may not, it is true, at any stage own the produce, but none the less they can market it in any way they think fit. They can take control of the whole of the supply and ship it to any particular salesman or salesmen in the United Kingdom or elsewhere.

209. In the analogous case of meat, very similar statutory powers have been accorded to the New Zealand Meat Producers' Board, and the functions and activities of that Board were closely investigated by the Royal Commission on Food Prices. The Commission came to the conclusion that however extensive the powers which had been conferred by the Act, these had not been availed of to the full extent by those operating the control. The activities of the Board had been confined in the main to regulation of shipments and to improvement in the methods of grading and marketing.

210. In connection with the development of a system of orderly marketing, we desire to call attention to a practice which has been adopted by the London Agency of the Australian Dairy Produce Control Board. The Agency holds weekly consultations with importers in London of Australian butter, and at these joint sittings, an endeavour is made to give a " lead " to the market in regard to the price of Australian butter. For some years past the selling price of Danish butter has been based upon the Copenhagen official butter quotations. This official quotation is fixed weekly by a Copenhagen Committee on which both producing and exporting interests are represented. The price is not " fixed ", but the quotation is regarded as so far authoritative that bargaining between buyers and sellers starts from it. As a rule contract prices when struck are somewhat in excess of the official quotation. The expressed intention of the Australian representatives in London is to follow this practice. *While we are definitely opposed to any attempt to " fix " prices we think that, from all the evidence we have heard, much good may be done by the publication of a weekly " lead " as a guidance to the market, and we think that in this matter the Control Boards cannot fail to render great service by co-operating with the traders who are doing the business.*

211. Such flexible methods of attaining to more orderly marketing will, we are convinced, avoid both the difficulties and the dangers that are involved on the one hand in the almost chaotic conditions which have hitherto prevailed, and on the other hand in the rigid control which is feared by many critics. We have been told in evidence by traders that one of the great weaknesses of the New Zealand and Australian butter market in the past has been that there has been no " lead " set to the price. In consequence, the trade has been left to find a market price in an indiscriminate way, and weak sellers have often had to take lower prices than they should have taken. Unduly low prices are naturally followed by unduly high prices, and the opportunity for speculation is thus created. Where there is a definite endeavour to set a standard for the market, having regard to all the circumstances of the moment, such excessive fluctuations are discouraged and speculation avoided. The existence of a body which is recognised by the market and by the Overseas producers, and which endeavours to secure what it regards as a reasonable price, in view of the supplies available and the anticipated

demand, will undoubtedly confer no small benefit on the trade, even if this price is not always realised. This is the function which the London Agency of the Australian Control Board has been undertaking, and we have been informed in evidence that since these consultations have been established the market for Australian butter has been much more regular.

212. In this connection we would point out that the Irish butter market has in the past suffered, and to a certain extent still suffers, from the absence of any authoritative means of determining a reasonable price. Individual creameries in the Irish Free State offer their produce for sale to individual dealers in the United Kingdom and there is no central organisation which is capable of giving an effective "lead" to the market. In consequence considerable fluctuations occur. *If some system could be evolved whereby the bulk of the Irish Free State butter shipped to the United Kingdom could be marketed through a limited number of channels or be the subject of consultation between representative dealers and representative traders, the Irish dairying industry as a whole would benefit.* The system of individual marketing has been largely eliminated in Denmark, and export is undertaken by large societies. *We have every reason to believe that the adoption of a more orderly and combined system of marketing by Irish Free State producers would, if supported by highest quality, the best methods of grading and packing, and regularity of supplies, achieve for Irish butter the reputation which Danish butter enjoys at present in the United Kingdom.*

213. Although we have not proposed machinery for adjusting retail prices more closely to supplies,* we consider that it would be easier to quote and publish standard retail prices for the purpose of giving a "lead" to the trade and the public, were a similar "lead" given for wholesale prices. Excessive charges by distributing interests would thus be detected by consumers and would, therefore, as a rule be avoided. Thus far the system would act in favour of the consumer. On the other hand dealers would do their best to reach or exceed the quoted wholesale price since they would be watched by the representatives of the producers. The general result of the publication of a "lead" for wholesale and retail prices would be to establish a criterion in regard to intermediate profits. The steadier prices would have also far reaching effects of another kind, for there is no more effective incentive to greater production than security for a reasonable profit.

214. There is one other important function of the Control Boards to which we have not so far referred. We have already pointed out the advantage which the Danish supplier secures by the fact that his butter is on the United Kingdom market during the whole of the year. We have recommended that the Overseas producers shall consider the possibility of winter dairying and

* See paragraph 202.

other methods whereby they could spread their season of production. The proper method to be aimed at for the regularisation of supplies is to prolong the period of production and at the same time so to distribute shipments that equal consignments may arrive in the United Kingdom at regular intervals throughout the season. Unfortunately there are several impediments which will have to be overcome before this ideal can be realised. Not only will the prolongation of the dairying season necessitate considerable changes in farming practice which can only be brought about by degrees, but there are also changes necessary in the shipping services which are not easy of attainment. Owing to the different routes and the varying speeds of ships, it happens from time to time that five or six ship-loads of butter may arrive at United Kingdom ports from Australia and New Zealand within a few days of each other, and that a gap ensues during which no supplies arrive.

215. It is, therefore, evident that some utilisation of cold storage in the United Kingdom is, under present conditions, unavoidable if temporary gluts and shortages, with the consequent fluctuations in price, are to be eliminated. But the powers to be exercised in this respect should be reasonably used with the object of feeding the market and not of withholding supplies for high prices. In carrying out this policy the Control Boards will be well advised to reduce the period during which the butter remains in cold store in the United Kingdom to the shortest possible limit, as no butter improves in cold store and cold stored butter is never so good or so palatable as fresh butter, particularly after it has been out of store for a number of days. So far as possible the storage which is undertaken with a view to prolonging the season should take place in the producing country; storage in the market country should only be to correct the accidental gluts and scarcities to which we have just referred.

216. *To sum up, we recognise that the conditions of the United Kingdom market, where the irregular arrival of supplies leads to fluctuations in price, have justified special steps on the part of Overseas producers to safeguard their interests. Such fluctuations in price have given the opportunity for speculation to buyers and sellers, whose operations have magnified these fluctuations. The remedy is the regularisation of supply, and, as we have already pointed out, the stimulation of demand. Organised bodies with the object of regulating quantity and improving quality have now come into existence. In Australia and New Zealand they have been given statutory powers. There is a natural fear among traders that bodies enjoying wide statutory powers might be tempted to abuse them. Should they follow the policy of holding up supplies in the United Kingdom for reserved prices, which has been adopted by a certain number of New Zealand factories, they will be venturing upon the very dangerous experiment of mass speculation. If, on the other hand, they limit their activities to the regulation of shipments and the*

gradual development of orderly marketing in the United Kingdom by such methods as the quotation of prices to give a "lead" to the market, they will greatly contribute to the stabilisation of the market and will benefit both producers and consumers. We would, therefore, strongly urge upon these Boards the policy of moderation in the use of their powers.

XXIII.—Cheese.

217. As we have already indicated, the Empire now supplies the bulk of the cheese requirements of the United Kingdom. At the present time 91 per cent. of the cheese consumed is obtained from Home and Overseas Empire sources. The remaining 9 per cent. represents the foreign supplies, largely French, Swiss, and Italian, which are special cheeses competing only to a limited degree with the ordinary cheese of household comsumption. Canadian and New Zealand supplies are complementary to one another rather than competitive. Imports from New Zealand begin in November; the main bulk of the supply arrives between January and June; there is a considerable falling off in July and August; and then the supply dies away. Canadian shipments, on the other hand, begin in May, reach their maximum between September and November, and during the first five months of the year are available in relatively small quantities. The following table shows the monthly variation in supply for New Zealand and Canada and the total importation from all countries for the years 1924 and 1925:—

Month.	New Zealand.		Canada.		All Countries.	
	1924.	1925.	1924.	1925.	1924.	1925.
	(In 1,000 cwts.).					
January	3·9	170·5	18·0	57·6	148·4	272·0
February	299·8	185·4	5·9	21·5	348·4	242·3
March	236·0	190·6	5·5	22·7	272·8	245·7
April	144·0	194·9	3·4	19·3	174·8	265·5
May	253·4	160·8	9·1	21·5	308·5	222·3
June	98·8	164·7	24·9	50·5	154·7	254·6
July	98·7	125·6	113·1	168·2	242·7	331·7
August	79·3	67·7	179·8	203·0	284·3	299·3
September	36·8	14·1	174·7	187·3	242·6	227·4
October	16·3	4·5	261·2	226·1	305·0	265·1
November	59·5	0·8	117·3	129·6	213·9	162·6
December	62·8	113·3	91·6	146·7	191·4	310·2
Total ...	1,479·3	1,392·9	1,004·5	1,254·0	2,887·5	3,098·7

218. The Cheshire and Cheddar cheese manufactured at Home and the Cheddar cheese imported from Empire Countries are so well suited to the requirements of the market and constitute so large a proportion of the total consumption, that there is little

scope of increasing these supplies at the expense of the foreign competitor.

219. The production and marketing of cheese in the Home country was investigated by the Linlithgow Committee in 1923, and we do not think it necessary to go into that matter in any detail here. *We would, however, suggest to the Home producer that he should consider whether it be not practicable to manufacture in greater quantity the cream and other fancy cheeses which are at present in the main derived from the Continent.* In recent years there has undoubtedly been a growth in the manufacture of cream cheese in the United Kingdom, and we hope this growth will be accelerated.

220. The Linlithgow Committee pointed out that cheeses sold in the United Kingdom under the same name may at present differ widely in character. In most of the Dominions a legal minimum standard of fat content is prescribed. There is, however, no such standard in the Home country. The consumer would derive an advantage and the producer would be relieved of unfair competition were it required that cheese with less than a certain percentage of fat should be sold as "SKIMMED MILK CHEESE." *We, therefore, agree with the Linlithgow Committee that the Ministry of Agriculture and Fisheries might examine the situation with a view to the imposition of a legal minimum standard for the sale of cheese, whether Home produced or imported, described as whole milk cheese.*

221. Package foods of specific weight suitable for retail sale are growing in popularity. Many brands of cheese are now on the market in this form. An important additional outlet has been developed on the Continent for Cheddar cheese, which is being milled, pasteurised, and packed in one and five pound containers. The significance lies in the extension of markets into an area where Cheddar cheese was not formerly a common article of diet.

XXIV.—Other Milk Products.

222. In addition to the sale of liquid milk and cream and the manufacture of butter and cheese, there are certain relatively small, but not unimportant, branches of the dairying industry. These are concerned in the production of

Condensed Milk,
Milk Powder,
Ice Cream,
Casein.

223. It will be seen that the sources from which condensed milk and milk powder are obtained have exhibited some very remarkable changes when the statistics showing the quantities imported into the United Kingdom for pre-war and post-war years are compared. Over 70 per cent. of the imports of *unsweetened condensed milk* came before the war from Norway,

which country nas now been almost wholly replaced as a source of supply by the United States of America and Canada. Nearly 70 per cent. of the *whole cream sweetened condensed milk* was obtained from Switzerland before the war. The contribution from that country, which was the original home of the industry, has now fallen to some 30 per cent., its place having been taken by the Netherlands, and in a smaller degree by Denmark and Canada. The supplies of *sweetened skimmed condensed milk* come in the main from Holland, which before the war supplied 90 per cent. of the total quantity imported, and now not less than 70 per cent. The actual quantity shipped has, however, more than doubled. There is a small import trade from the Irish Free State, and supplies from that source in 1925 were double those of 1924. *Unsweetened milk powder* is now, in the main, an Empire product, supplies being obtained from New Zealand and Canada. In 1925 New Zealand sent 53 per cent. of the total supply and Canada 14 per cent. Before the war 85 per cent. of the total quantity of milk powder imported into the United Kingdom .was obtained from foreign countries, the Netherlands, France, and Sweden being the most important suppliers.*

224. A further milk product which is of increasing importance is *casein*. In 1925 116,000 cwts. were imported into the United Kingdom, valued at £316,000. Of this quantity 40 per cent. was obtained from Empire countries. The quantity of casein imported has increased regularly since 1920, the first year for which separate statistics are given in the United Kingdom Trade Accounts. In that year the quantity imported was a little under 80,000 cwts. It should be pointed out that while the quantities obtained from Empire sources during the period 1920 to 1925 have gradually increased, the percentage of the Empire share of the total supply has gradually fallen. Very little casein is produced in the United Kingdom itself. France and Argentina are the chief foreign consignors. The main Empire supplies come from New Zealand, with a small quantity from British India. In 1925 France sent 31 per cent. of the total importation, New Zealand 27 per cent., and Argentina 26 per cent.

225. The condensing and drying of milk are not large industries in the *United Kingdom*. Of the two, condensing is much the larger, and is concerned with the production of condensed full cream milk, both sweetened and unsweetened. Practically all the condensories are proprietary, and are located in Wiltshire and Somerset and in Cheshire, Derbyshire, and Staffordshire. In 1923, the latest year for which figures are available, it was estimated that 30,000,000 gallons of fresh milk were condensed in England and Wales. This is equivalent to 1,000,000 cwts. of condensed milk.

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* Full statistics of supplies of these milk products during recent years are given in Appendix I.

226. During the last twenty years the manufacture of condensed and evaporated milk and milk powder has become well established in *Canada*. The latter industry dates from 1909, and the bulk of the production is skimmed milk powder, which is largely used for baking, confectionery, and ice cream purposes. A small quantity of casein is produced, and is consumed locally or exported to the United States. According to the figures given on page 31 it will be seen that the output of these products in 1924 was as follows :—

	Cwts.
Condensed milk	276,000
Condensed skimmed milk	35,000
Evaporated milk	379,000
Milk powder	15,000
Skimmed milk powder	97,000
Casein	4,000

Substantial quantities are exported to the United Kingdom. As we mention below, the manufacture of ice cream in Canada has become an important branch of the Canadian dairying industry. The value of the production in 1924 was 7,280,000 dollars, or £1,500,000. A legal fat standard of 10 per cent. has been fixed with other milk solids in proportion, ice cream has been standardised as one of the valuable foods.

227. The war gave a considerable stimulus to the condensed and dried milk industries in *Australia*. In five years, from being an importing country Australia has developed a net export trade in these commodities worth £1,500,000. The condensed and dried milk factories are located in districts of heavy production where the milk supply is concentrated within a comparatively small area. The condensory pays a higher price for milk than is derivable either from butter or cheese, but there is no by-product for feeding calves or pigs. Large shipments of condensed milk have been made from Australia to far eastern ports such as Singapore. In 1924-25 some 16,000 cwts. of casein were also exported.

228. The commercial manufacture of dried milk in *New Zealand* began some years before the war in the Wellington district, and by the end of 1917 there were four large factories in operation dealing with many thousands of gallons of milk daily. The total production for that year amounted to 50,000 cwts. In 1925 the quantity exported was 110,000 cwts. There are now six dried milk factories in operation in the Dominion. The manufacture of condensed milk in New Zealand is principally carried on near Invercargill. The quantity exported in 1925 was some 10,000 cwts. The manufacture of casein is a recent development in New Zealand. The first factory began operations during the 1911-12 season. The grading of the product, at the request of the company operating the factory, is undertaken by the Department of Agriculture. The

output in 1918-19 amounted to 6,000 cwts. This supply has gradually increased, and for the year ending 31st March, 1925, nearly 50,000 cwts. of lactic casein and 6,000 cwts. of rennet casein were exported from the Dominion.

229. The condensed milk industry in *South Africa* is at present of little importance. Only one factory operates, and the output of this factory is entirely consumed locally. We are told that a movement is at present on foot for the establishment of more condensed milk factories. No casein is at present produced in the Union, although a certain quantity of crude casein has been manufactured in the past and meets with a ready sale in local markets for the manufacture of paint.

230. The export of condensed milk from the *Irish Free State* is a fairly regular trade. The maximum quantity exported from the whole of Ireland reached 310,000 cwts. in 1914. Since 1919 there has been a steady decline. Only 59,000 cwts. were exported in 1925 from the Irish Free State. With the decline in the export of butter, cheese, and condensed milk, there has been a very considerable increase in the quantity of milk and separated milk exported. Much of this, however, represents a trans-border trade into Northern Ireland.

231. In connection with the trade in condensed milk we would draw attention to the very great trade which exists between Holland and the United Kingdom for the supply to the British market of cheese and condensed sweetened milk made from skimmed milk. It is important that the consumer should realise that the article usually known as "skimmed milk" should properly be described as "separated milk"—that is milk from which the whole of the butter fat has been extracted by machinery. We use the expression "skimmed milk" in this part of our Report only for the reason that it is more familiar to the general public. In 1925 Holland shipped to the United Kingdom one-and-a-quarter million cwts. of sweetened condensed milk made from skimmed milk. Under the United Kingdom Public Health (Condensed Milk) Regulations of 1923 all sweetened or unsweetened condensed machine-skimmed milk must be labelled as such and must bear, in addition, the words "UNFIT FOR BABIES."

232. The Linlithgow Committee drew attention to the tendency to substitute condensed separated milk for condensed whole cream milk to the undoubted disadvantage of the consumer. That Committee added that the manufacture of whole cream condensed milk in the United Kingdom had shown a marked decline, due to the increased use of imported condensed skimmed milk. In evidence which has been given before us emphasis has been laid upon this aspect of the question, and witnesses have urged that the manufacture and importation of condensed skimmed milk should be prohibited. We agree that it is important to prevent deception of the consumer; for, however

valuable the food properties of skimmed milk may be, it cannot be gainsaid that the whole milk, including as it does the fats as well as the residues found in the skimmed product, must be a better foodstuff from all points of view than the skimmed milk only. The labelling prescribed by the Ministry of Health Regulations, mentioned above, goes some way to secure this. *We think, however, that the whole question should be reconsidered when the research into the use and properties of milk residues, which we propose in the Research Section of this Report, has been carried out.*

233. The Linlithgow Committee recommended the imposition of a legal minimum standard of fat content for cream and milk powder made in or imported into the United Kingdom. For the reason already explained in the case of cheese, the absence of any such requirement encourages the production of low-grade cream and milk powder at the expense of foodstuffs containing high percentages of butter fat and, therefore, of greater food value. *We strongly support the recommendation of the Linlithgow Committee in this respect that such a legal minimum standard of fat content should be prescribed for both cream and milk powder in the interest of both producer and consumer.*

234. Ice cream is another important milk product. Its consumption has, in recent years, been greatly extended in the United States and in Canada by the adoption of modern methods of manufacture. At the present time in the United Kingdom it is still treated as a luxury or a confectionery article. If the public of the United Kingdom could be persuaded to regard it as a normal article of diet it would constitute a very valuable foodstuff and its manufacture would become an important branch of the dairying industry. For ice cream to be generally recognised as a food it is essential that standards should be prescribed as to its minimum fat content. As we have already mentioned, in Canada a legal fat standard of 10 per cent., with other milk solids in proportion, has been fixed. The food value of such ice cream consists not only of a proper and nourishing balance of milk protein and butter fat, but also of such vitamins and mineral salts as are specially required for body building. These valuable food properties, taken with its appeals of sweetness and flavour, justify the belief that consumers in the United Kingdom, like those of the United States and Canada, would, once its manufacture had been developed on modern lines, compare ice cream favourably with other foodstuffs.

235. As a branch of the dairying industry the manufacture of ice cream would provide an important outlet for milk and milk products in the United Kingdom, particularly during the summer when the production of milk exceeds the demand. If a popular taste for ice cream of high food value were cultivated in the United Kingdom the dairying industry would be assisted by an increased demand for its products and a consequent

stabilisation of the milk market during the period of maximum output. It would provide an outlet for that surplus milk production which in the Home country is made into butter of relatively low quality, and would thus provide an opportunity for an extension of the sale of butter imported from the Overseas Dominions.

236. To safeguard the consuming public against such abuses of having served to them ice cream or so-called "ice cream" which has little or no food value, definite legal standards relating to the food constituents of the product and the conditions of its manufacture and sale would necessarily have to be prescribed. This procedure has been adopted in some of the Overseas Dominions and the industry has greatly benefited thereby At the present time the manufacture of ice cream in the United Kingdom is largely the business of the individual small confectioner. This system does not make for economy, efficiency, or high quality. This same system existed in Canada and the United States, but has now been superseded by centralised manufacturing on a large scale under technically qualified men using modern equipment designed for efficiency and cleanliness. This permits the measuring and combining of the food ingredients in exact quantities and the sale of a properly prepared foodstuff beneficial from the standpoint of health. In those countries small manufacturers have repeatedly found it profitable to discard their obsolete equipment and to purchase their requirements from the centralised manufacturing plants, thus becoming distributing agents for the big centralised undertakings.

237. During the past few years the centralised manufacture of ice cream has been started in several large centres in the United Kingdom. The development of these businesses confirms the view that once ice cream of high food value, manufactured under conditions of efficiency and cleanliness, is established in the United Kingdom, it will become just as popular as it is in the United States and in Canada, and confer not only an advantage on the consumer, but provide an outlet for much of the surplus milk produced, particularly at that period of the year when the output is at its maximum. *We commend this to the attention of the dairying interests of the United Kingdom.*

XXV.—Identification.

238. In our previous Reports we recommended the adoption of legislation in the United Kingdom requiring imported meat and fruit, when exposed for retail sale, to bear an indication of "Empire" or "Foreign" origin. We added that, where the producer so desired, the name of the country of origin should be added. In our Fruit Report we referred to the Merchandise Marks Bill which had been introduced into Parliament at Westminster shortly before that Report was signed. That Bill has now passed its Committee stage. Its provisions have not been

finally settled, but its ultimate form is becoming apparent. It proposes the establishment of statutory committees to which application will be made for the marking of imported goods. These committees will make recommendation to the appropriate Departments of His Majesty's Government. Orders will be made, where considered necessary, on the strength of these recommendations, prohibiting the sale or exposure for sale of the imported goods concerned unless they bear an indication of origin. The indication of origin to be applied may be either the word " Empire " or " Foreign," or the name of the country in which the goods were produced or manufactured, this option being exercised by the person applying the indication.

239. This will undoubtedly provide a basis whereby the " Empire " or " Foreign " indication may be attached by the retailer to all goods in regard to which Orders are made. In making our recommendations regarding the marking of meat and fruit we satisfied ourselves that the retailer was in a position to attach the " Empire " or " Foreign " label to the produce which we included within the scope of our recommendations. We have similarly satisfied ourselves that in regard to unblended butter and to cheese offered for retail sale in the United Kingdom the retailer is always in a position to state whether the butter or cheese in question is of Empire or Foreign origin. *We, therefore, extend the recommendations we have made in regard to the marking of meat and fruit to all unblended butter and to cheese.*

240. We recognise that the indications of origin prescribed in the Merchandise Marks Bill cannot be applied to any produce until the question of marking such produce has been referred to the statutory committees proposed in the Bill and a recommendation on the subject obtained. It is obvious that considerable time must elapse before the inquiries into the marking of the many classes of products which will be referred to the Committees have been completed. In our investigations into the marketing of the foodstuffs produced in the Overseas parts of the Empire we have given close attention to the whole question of marking, seeing that it is closely connected with the recommendations we make on the subject of a publicity campaign. *We therefore trust that our recommendations in regard to the marking of the particular foodstuffs on which we report from time to time may be taken into consideration at an early date and that they may be regarded as establishing a prima facie case for early reference to the committees.*

241. In regard to blended butter we have not been able to devise any means of satisfactorily indicating whether the product contains Empire and/or foreign butter or butter of different countries. The most satisfactory system would obviously be for

the wrapper in which the blended butter is sold to bear a statement showing the percentage of Empire and foreign butter, respectively, included in the blend. We are, however, informed that the blender may vary his supplies of butter from different sources from week to week in order to secure that uniformity of quality and appearance which blended butter claims to be its outstanding characteristic. *We recommend therefore that all blended butter shall be required to bear prominently on the label the word "BLENDED."* This would maintain the system of labelling we have recommended and would indicate to the consumer that the butter was a mixture of supplies from various sources. We may add that, in evidence given before us by a representative of the English Butter Factory Association, we were told that there would be no practical objection to such a requirement.

242. We would add, with regard to the indication of origin to be attached to imported goods under the requirements of the Merchandise Marks Bill, that the Empire Marketing Board has it largely in its power to secure that the labelling adopted is in general conformity with our recommendations and is appropriate to the publicity campaign which it will be undertaking. In our Fruit Report we recommended that assistance should be given to retail fruiterers in the marking of fruit by the distribution of labels bearing the words "Empire Produce" or "Foreign Produce" with a space in which the name of the actual country of origin could be inserted. *We recommend that this proposal shall apply equally to dairy produce which is brought within the scope of the marking requirements of the Merchandise Marks Bill, and we would suggest that assistance should be given from the Empire Marketing Grant for the issue of such labels.* In this way the Empire Marketing Board need not limit the form of marking adopted for its labels to the legal minimum prescribed by the Bill. It will be possible for it to incorporate the words "Empire" or "Foreign" in all cases and to add the name of the country of origin where it is so desired. It would thus be in a position to give a lead to the trade with the object of ensuring the adoption of a form of label which could be used in regard to most foodstuffs, and which would become familiar to the public throughout the country. Thus it will be possible to link very closely the advertising campaign we have recommended on behalf of certain Empire foodstuffs and the method of marking prescribed.

243. There is a further matter in regard to blended butter to which we wish to draw attention. Blended butter is at present sold under various proprietary brands. In certain cases these brands embody the names of counties or districts which are known to be important agricultural or dairying areas in the Home country. The suggestion inevitably conveyed in such cases

to the bulk of the consumers must be that such butter is of English origin. We have been informed in evidence of an instance in which butter is blended at one of the great ports of the United Kingdom, very largely from imported supplies, and sold under a label which bears in a prominent position the name of a well-known agricultural town in a dairying district. The appearance of this name must suggest to the casual buyer of such butter that it consists of butter of English origin. *We commend this matter to the administration authorities with a view to action being taken under the law in suitable cases.*

244. It has been suggested that Empire producers, desiring that their best butter should be marketed under the name of the country of production, should exclude their highest qualities from the blender and insist that they are marketed in their original condition as Empire butter only. *While we entirely agree that the Empire producer should do his utmost to ensure that his butter is marketed in its original state we doubt whether he would be well advised at the present time, at any rate, to exclude his butter from the blending factories in the United Kingdom.* British blenders are among the best customers of Empire butter and large quantities of the best qualities are used in the manufacture of the best known blends on the United Kingdom market.

XXVI.—Publicity.

245. In our First Report we recommend the inauguration of a campaign of educational publicity with the object of increasing the consumption of Empire foodstuffs in the United Kingdom. In our Fruit Report we pointed out that this campaign fell into two main divisions. In the first place the campaign would point out the importance from an economic point of view to the United Kingdom, as a country exporting manufactured goods, of purchasing its food requirements from the Overseas parts of the Empire rather than from foreign countries. This we developed at length in our Fruit Report and we propose to say little further on the subject here. In the second place we contemplated the advertising of such Empire foodstuffs as were found to be in sufficient quantity and of adequate quality. We recommended that the advertising of these foodstuffs should be undertaken so soon as the necessary legal requirements regarding the identification of Empire and foreign produce had been prescribed.

246. *We are satisfied, as the result of our present inquiry, that butter and cheese of Empire production are already available in sufficient quantity and are of adequate quality to justify their participation in such an advertising campaign.* We are convinced that the consumption of butter and cheese could be

increased in the United Kingdom to the great advantage of the population.

247. While Empire countries are much larger purchasers per head of their populations of the manufactured goods of the United Kingdom than are foreign countries, it must not be forgotten that the Home farmer is an even larger purchaser than is the producer in the Overseas Dominions. We contemplate that this will be brought to the notice of the public of the Home country in the publicity campaign which we have recommended, so that the Home consumer may realise the importance in his own interest of purchasing Empire produce, whether from Home or Overseas, rather than foreign produce. This is very relevant in regard to the consumption of dairy produce in the United Kingdom. Apart from Denmark and the Netherlands, which are established suppliers of butter to the United Kingdom, the foreign competition to which Empire butter will be increasingly exposed in the near future will come, in the main, from Russia and Siberia, the Baltic States, and Argentina. The following figures give the purchases of British goods per head of the populations of these countries in 1925 as compared with similar figures for the butter producing Dominions of the Empire.

Foreign Countries.	*Per capita purchases of British Produce and Manufactures*, 1925.
	£ s. d.
Russia and Siberia	11
Estonia	11 4
Latvia	17 6
Finland	1 2 8
Poland	2 7
Argentina	2 18 9
Empire Countries.	
	£ s. d.
Canada	2 19 9
Australia	10 0 10
New Zealand	17 3 2
South Africa	4 2 4
Irish Free State	12 13 11

We are unable to give a similar figure for the Home farmer, but his annual purchases must be at least twice or three times as great as those of the average New Zealand producer.

F. CONSUMPTION IN THE UNITED KINGDOM.

XXVII.—Distribution to Ports in United Kingdom.

248. The following figures show the quantities of butter and cheese imported through the main ports of the United Kingdom during 1924 :—

Ports.	Butter.	Percentage.	Cheese.	Percentage.
	Cwts.		Cwts.	
London	2,500,000	47·31	2,018,000	69·90
Grimsby	467,000	8·83	2,000	·07
Newcastle	401,000	7·58	46,000	1·59
Leith	386,000	7·30	46,000	1·59
Hull	335,000	6·34	42,000	1·46
Harwich	220,000	4·16	36,000	1·25
Fishguard	196,000	3·71	—	—
Liverpool	195,000	3·69	258,000	8·94
Southampton... ...	191,000	3·61	19,000	·66
Goole	153,000	2·89	5,000	0·17
Glasgow	77,000	1·46	70,000	2·43
Holyhead	43,000	·81	—	—
Bristol	34,000	·64	132,000	4·57
Manchester	23,000	·44	74,000	2·56
Folkestone	—	—	78,000	2·70
Other ports*	66,000	1·23	61,000	2·11
Total	5,287,000	100·0	2,887,000	100·0

249. It will be seen from this Table that nearly half of the butter and considerably more than half of the cheese imported into the United Kingdom enters by the port of London and that the remainder is scattered in relatively small quantities among various other ports. Imported supplies of butter and cheese are distributed by rail from London into distant parts of the Kingdom, being thus consigned, frequently at a considerable cost, to the neighbourhood of local ports. It is obviously undesirable to land butter and cheese at a port where there is no adequate market to which buyers are in the habit of resorting from the surrounding region. We are, however, informed that one of the main reasons why such markets do not develop at provincial ports is that the cargoes from the Dominions, owing to various circumstances, do not arrive at regular intervals.

250. Danish butter holds its prominent place in the north of England because the buyers at ports such as Newcastle and Hull can depend upon regular consignments weekly throughout the year. Weekly supplies from the distant Dominions can perhaps hardly be expected, nor are they essential for the development of a market. Fortnightly or monthly consignments would suffice if they ould be depended upon for regularity. No service of such a character could, it is clear, be established at a large number of provincial ports, *but it appears to us that an effort might be made to build up markets with regular supplies at three or four ports, say Liverpool or Manchester, Glasgow, Avonmouth, and Hull.*

* Including trade across the boundary into Northern Ireland.

XXVIII.—Consumers' Preferences.

251. The people of the different parts of the United Kingdom appear to prefer different kinds of butter and cheese. In the northern counties and in the south of Scotland the consumer has been taught to prefer a pale butter, such as that produced in Denmark, with the result that butter from Denmark and the Baltic States obtains a ready market there. In the south of England a butter of deeper colour but of milder flavour is preferred, and it is here that supplies from Empire sources have gradually replaced Danish butter. In the matter of cheese, London and the southern counties prefer a pale cheese, whereas in sections of the north and in Scotland coloured cheeses are in greater demand.

252. We do not, however, see any reason why Canadian and Irish butter should not successfully compete with Danish butter in the northern markets of the United Kingdom. The proximity of Canada permits the delivery of her butter in a fresh condition, and the refrigeration accommodation available for transport both by rail and ocean are unsurpassed. The Irish supplier is even nearer to the market than is his Danish competitor. With the improvement which has recently shown itself in the quality, grading, and packing of Canadian and Irish butter we look to see the produce of these Dominions make great strides in the northern markets of the Home country.

253. The popularity of Danish butter in the northern counties is unquestionably due in part to the conservative attitude of the consumer. The Dane has made the most of his advantage by devoting the greatest possible attention to the quality of his produce and to improving his methods of grading and packing. Whereas butter packed in boxes is the most popular in London and the south of England, the north is accustomed to and prefers butter packed in casks. Danish butter is supplied in the latter form of package; butter from the Dominions is marketed in boxes. It has been suggested that Empire suppliers would be considerably assisted in obtaining a footing in the northern markets by selling their butter in the same form of container as is adopted by Denmark. The evidence we have taken is conclusive that the consumer, accustomed to buying butter from the cask, looks askance at butter packed in any other form. *We think, therefore, that the Empire suppliers might usefully consider the desirability of shipping certain quantities of cask-packed butter to the northern markets of the United Kingdom with the object of developing their sales there.*

G. RESEARCH.

XXIX.—Research.

254. We have had the advantage of consulting three distinguished experts on the scientific problems involved in the dairying industry—Professor Stenhouse Williams, of the National

Institute for Research in Dairying, Reading; Professor J. C. Drummond, of University College, London; and Dr. Orr, of the Rowett Research Institute, Aberdeen. We desire to place on record our indebtedness to these gentlemen.

255. It would appear that the more important problems of research in connection with the dairying industry may be grouped under the following heads :—

(1) Methods of improved production;
(2) Food values, including vitamins;
(3) Utilisation of milk residues;
(4) Refrigeration;
(5) Economic research.

256. There are important institutions conducting research into the problems of production in at least two parts of the Empire—the United Kingdom and Canada. The central institution for this purpose in the former is the National Institute for Research in Dairying at Reading. There are similar institutions at Guelph and Ottawa in Canada. *We think it very desirable that the Governments of all the Dominions should assist in the establishment of such centres of research.* We understand that the dairying interests in Australia and New Zealand have approached their respective Governments with requests for the establishment of dairy research institutes. In each principal part of the Empire where dairying is undertaken there should be at least one such establishment co-operating with the sister establishments in the Home country and the other parts of the Empire.

257. Where foodstuffs are produced in one of the Overseas parts of the Empire and shipped to the United Kingdom for consumption there it is especially important that there shall be close co-operation between the institutions in the producing and the consuming country, with the object of following the progress of particular consignments of produce from the point of production to the point of consumption. We have been told that great variation in condition is often found in different samples of produce when they reach the United Kingdom although they may have been subject to exactly the same treatment in the factory Overseas and on board ship while in transit. We would suggest that research institutions Overseas and in the United Kingdom should arrange for a continuous supervision of particular consignments. The institution Overseas would compile a complete record of the produce from the dairy to the port of shipment. Indeed, we think that the record might usefully begin at an even earlier stage than the dairy. The conditions pertaining to the cattle and their feeding ought also to be recorded. A copy of the dossier so prepared would follow the produce on to the ship where the details of the voyage would also be recorded. Finally, it would reach the institution in the Home country where it would be completed by a record of the

conditions to which the sample was exposed in the United Kingdom and the changes which it was found to have undergone. *We commend such interlocked investigation as being suitable for assistance from the Empire Marketing Grant. We have received from Professor Stenhouse Williams proposals for co-operation in such a scheme of research, and we are passing this to the Empire Marketing Board for consideration by them.*

258. Professor Drummond's researches into the vitamin content of various classes of foodstuffs are too well-known to need comment on our part. According to his evidence vitamins may be divided into two main groups—Vitamins A, D, and E, which are soluble in fat, and Vitamins B and C, which are soluble in water. Vitamin A promotes growth, vitamin D prevents rickets, and Vitamin E, the most recently discovered of the series, is known as the " antisterility " vitamin. Vitamin B is the preventive of beriberi, and Vitamin C the preventive of scurvy. The vitamins in milk are of the fat soluble group; the vitamins in fruit mainly of the water soluble group. Professor Drummond has told us that all these important substances are of plant origin, and only pass into animal tissues when the animal is fed on plant foods.

259. Vitamins in milk under existing conditions in England are highest in June and lowest in January. We have been impressed with the fact that there is still much to be learnt before we have full and dependable knowledge in regard to the conditions which govern the generation and destruction of vitamins. Much research will be necessary and much experience in the application of its results before it will be possible to answer such questions as the following :—

What are the most efficient and economical means of feeding and housing cows so that their milk may be rich in vitamins?

What are the best methods of drying fodder so that it may conserve its vitamins?

Under what conditions are the products of milk, such as butter, cheese, and ice cream, best manufactured so as to preserve the vitamin content of the milk?

To what extent can the vitamins be preserved in condensed and dried milk and milk residues?

260. A convincing proof of the importance of research in regard to the vitamins in dairy produce has recently been furnished by the result of an investigation, extending over four years, which has been conducted by Dr. H. C. Corry Mann, on behalf of the Medical Research Council of the United Kingdom. Some two hundred boys have been fed continuously in groups on contrasted diets. They all received a basic diet which by itself was enough to satisfy the appetite of growing boys. But some of them received, in addition, a pint of fresh milk daily, others rations of sugar, of butter, of watercress, of

casein, or of vegetable margarine. It was found that the boys who received the basic diet only had an average annual gain in weight of 3·85 lbs. per boy and an average annual increase in height of 1·84 inches. Those who received the milk in addition to the basic diet gained on the average in the year 6·98 lbs. and 3·63 inches. Those who had the other rations put on varying intermediate growths of weight and height. In the case of all the additional rations, including the milk, the calorific value of the extra food was practically identical. It is thus clear that milk has specific qualities as a food which are not to be accounted for by the ordinary assessment of the calorific content.

261. There are two interesting matters in regard to which research may yield important and far-reaching results. According to the evidence of Professor Drummond there is an idea that some connection may exist between the colour of butter and its vitamin content. And according to the evidence of Dr. Orr it would appear that an exact estimate has still to be made of the nutritive properties contained in the residue of milk after the butter fat has been separated. *We would commend both these problems to the Empire Marketing Board as being important matters in regard to which further research is necessary.*

262. With regard to the utilisation of milk residues we have received from the Scottish National Milk and Health Association a memorandum, which has also the support both of the Scottish Board of Agriculture and the Ministry of Agriculture of Northern Ireland. In this memorandum the proposal is made that there shall, in the first place, be a survey of the work which has already been done in America and on the Continent on the nutritive value to children of milk and milk products. The survey would also include an account of the research which has been undertaken into the methods of drying milk and whey, the manufacture of ice cream, caseins, and lactose from milk and milk residues, and the utilisation of dry or liquid milk products in the manufacture of human foodstuffs. When this survey is completed it is proposed that practical experimentation shall be carried out with drying or other plant already in use, or which may be devised for drying milk or milk residues or otherwise treating them to yield a product of commercial value. *We commend this scheme also as one deserving of assistance from the Empire Marketing Grant, and we would recommend that it should be put into operation after examination of the financial details by the Empire Marketing Board.*

263. The proposal which has been made by Scotland and Northern Ireland in connection with research into the utilisation of milk residues might, we think, usefully be treated as a precedent. It is neither possible nor desirable to concentrate the whole of the research along any particular line of advance into a single central institution. Originality will appear in

different parts of the Empire and should be encouraged wherever adequate equipment can be supplied. But it is most desirable, in order to prevent unnecessary duplication and to stimulate advance, that some one institution in the Empire in each of the main departments of research should make a business of collecting results, of keeping and comparing records, and of making such records known; in other words, of becoming the basic institution so far as that research is concerned. The Rowett Research Institute, and other institutions in Scotland and Northern Ireland, propose in the first instance to collect such a record in regard to the utilisation of milk residues, although the work will be done not only at these institutions but elsewhere in the Empire also. Other institutions such as those at Cambridge and Reading in England, and at Guelph and Ottawa in Canada, might play a similar part in regard to other lines of research connected with the dairying industry. *We think that assistance might well be given from the Empire Marketing Grant for the collection and maintenance of such records.*

264. We have, at various points in this Report, mentioned certain matters where further research is necessary into the conditions under which dairy produce is carried in cold storage. In this connection we would refer to the recommendation made in our Fruit Report that further research should be conducted into the conditions under which foodstuffs are carried in the refrigerated holds of vessels. Very heavy losses have been experienced in recent years owing to the " tainting " of eggs, butter, and other produce with the flavour of fruit and other commodities previously carried in the same chambers. The problem of " taint " is one of great importance to the dairy producer. We have further been advised that there is by no means uniformity of practice as to the maximum temperature at which it is safe to maintain butter in storage, both aboard ship and ashore. This raises both scientific and economic questions. The cost of cold storage obviously increases the lower the temperature. *We recommend that assistance from the Empire Marketing Grant should be given for the carrying out of further research into these questions.*

265. In regard to economic research we have already made a separate recommendation to the Empire Marketing Board for an investigation of the possibilities of the better marketing of Home produce. An investigation of this character into the marketing of produce in the United Kingdom, no matter in whose primary interest it is undertaken, cannot fail to be of assistance to the producer in the Overseas parts of the Empire as well as to the Home farmer. Further, an improvement in the grading and packing of Home produce, and in the methods by which it is placed upon the market will facilitate the task of the better marketing of Overseas produce also.

XXX.—Dairy Produce Intelligence Service.

266. As a special phase of economic research, we recommended in our Fruit Report that the Executive Commission (now the Empire Marketing Board) should, as part of its functions, constitute a Fruit Intelligence Service in the interests of the Home and Overseas producers. Such a Service would, we contemplated, collect, through existing channels, early and reliable information of the prospects of crops in competing countries and also their probable exports. *We consider that similar information would be of the greatest assistance to the dairy producer in all parts of the Empire.* This is particularly important in view of the increased production to which we have already referred in northern European countries and in Siberia. If reliable estimates could be obtained as to the probable output of these countries the Empire producer would be in a better position to decide what portion of his output he should convert into butter and what into cheese. Information regarding improvements in other countries in the matter of feeding stuffs, output, and quality would also be of great assistance to the Empire producer.

267. We may say here that we do not contemplate that such a service as we have proposed in regard to fruit and now suggest with reference to dairy produce should necessarily develop into a general purveyor of information in regard to all foodstuffs. Certain trades are already adequately organised and full information is collected and published. In the less organised trades, however, there is not the same amount of statistical, economic, and scientific information available, and we think that the Empire Marketing Board would be performing a great service to the Empire if it endeavoured to collect such information for dissemination amongst producers.

268. As we stated in our Fruit Report, we do not think that this work would involve any great expenditure. A considerable amount of the information desired is no doubt already available in such bodies as the Ministry of Agriculture and Fisheries, the Department of Overseas Trade, and the International Institute of Agricultural Statistics at Rome. What is necessary is that there shall be some officer or officers of the Marketing Board whose duty it would be to collate the available information from these sources, to arrange for additional information to be collected through these same channels where such information is found to be required, and to arrange for its dissemination to producers. This could presumably be most readily done through the Commercial Officers in the United Kingdom of the High Commissioners of the Dominions and India and the equivalent officers of the Colonies and Protectorates. Further, such information would, no doubt, be made available to the representatives in the United Kingdom of the producers' organisations and possibly even sent direct to Overseas producers where other channels of communication were not readily available.

F.—CONCLUSIONS.

XXXI.—Summary of Conclusions.

269. We summarise our main conclusions and recommendations in regard to the marketing and preparing for market of dairy produce as follows :—

(i) The grass lands of the Empire support 200,000,000 cattle and 200,000,000 sheep. In 1924 the value of the imports into the United Kingdom from Empire countries of the products of the grass crops (mainly meat, wheat, hides, and dairy produce) was no less than £157,000,000.

(ii) The produce of the dairy cows of the Home country itself is sold mainly in the form of liquid milk, with the result that only 17 per cent. of the butter and 31 per cent. of the cheese consumed in the United Kingdom are produced at Home.

(iii) The total payments for butter and cheese imported into the United Kingdom in 1924 from all sources amounted to £63,000,000. Of this £33,000,000, or 52 per cent., was paid to Empire countries.

(iv) The demand for liquid milk in the United Kingdom is likely to increase rather than to diminish, as is evident from the fact that in 1923 the consumption per head of the population was about 19 gallons, whereas in the United States it is at present double, and in Denmark and Sweden three times that quantity.

(v) The annual consumption of butter per head in the United Kingdom has increased from about 15 lbs. to 16 lbs. during the last twenty years, as compared with a present-day consumption of 28 lbs. per head in Canada and 27 lbs. in Australia. In the same period the consumption of cheese in the United Kingdom has increased from about 7½ lbs. to 10 lbs.

(vi) While it is thus evident that the market for butter and cheese in the United Kingdom is expanding and is likely still further to expand, it is also the case that in regard to cheese, and in a less degree to butter, that the Empire already supplies a considerable proportion of the consumption. There are indications, however, that foreign countries are making considerable efforts to recover and improve upon the relative positions which they held before the war. It is, therefore, likely that within the next few years competition in the United Kingdom market will become more severe.

(vii) This competition is coming from two main sources—on the one hand from Argentina and on the other hand from the northern countries of Asia and Europe, especially Siberia, Russia, and the Baltic Lands.

(viii) In the northern countries which are supplying butter to the United Kingdom the rates of wages and the standards of living are relatively low.

(ix) The marketing and preparing for market of Empire dairy produce has greatly improved of recent years, and while there is still room for further improvement we are of opinion that it will be necessary to look in other directions for the economies necessary to meet the competition which we foresee.

(x) Our main conclusion resulting from the present enquiry is that both at Home and in the Overseas Dominions it will not be practicable to maintain the present standards of living among those dependent on the dairy industry unless the farming interests, without loss of time, prepare to meet such cutting of prices as may come from increased competition by the adoption of more efficient and cheaper methods of production.

(xi) Fortunately there is room for such improvement by means of an increase in the output without any great increase in cost. The quantity of milk and butter fat supplied by the individual cow and the number of cows supported on each acre can be greatly increased. Such methods as cow testing, both for quantity of milk and for percentage of butter fat, are already practised on a relatively small scale. They should be applied generally throughout the Empire. By attention to breeding and also to the improvement of pastures and fodder crops a greatly increased output can be obtained without an equivalent additional cost.

(xii) The distribution of supplies throughout the year is a matter of importance second only to their total quantity. Owing to the distance of the southern Dominions from the United Kingdom the bulk of their supplies do not reach the market until the beginning of the year, whereas the northern supplies, being on the spot or relatively close at hand, are marketed in greatest quantity during the spring or within three or four months after the arrival of the southern supplies.

(xiii) Prices follow supplies in sympathy, there being two periods when prices are usually lowest, the one in January and February, and the other in April and May. During the latter half of the year there is, as a rule, a steady rise in price.

(xiv) One country, Denmark, has, by means of winter dairying, succeeded in regularising her exports to the United Kingdom, so that the quantities received each month vary but little with the season.

(xv) The United Kingdom demand in the latter part of the year is, under these circumstances, necessarily met in part by the holding over in cold storage of the excessive supplies received in the late winter and spring.

(xvi) Though serious damage may not be suffered by the best butters when held in cold storage for a reasonable time it is yet certain that no butter is improved by storage. Moreover, there is always a temptation for speculative selling or withholding from sale when there are large supplies in the United Kingdom held off the market.

(xvii) We strongly urge that in all parts of the Empire the practicability of more winter dairying shall be carefully considered.

(xviii) Where winter dairying is impracticable and storage must be resorted to in order to regularise supplies, we recommend that such storage should, as far as possible, be in the country of production and that only so much should be stored in the United Kingdom as may be necessary to counterbalance the irregular arrival of ships, and similar incidents.

(xix) We would reinforce the recommendation which has already been made both by the Linlithgow Committee and by the Royal Commission on Food Prices that the statistics of produce held in cold storage should be published. In New Zealand and certain other countries such statistics are already issued.

(xx) We would draw attention to the fact that retail prices, especially of butter, have a far reaching influence on consumption, and thus indirectly on supply. The British housewife appears to attach a high value to butter as an article of consumption in her household. According to the evidence which we have taken, a fall in the retail price at once produces an increased consumption. The retailer naturally objects to too frequent changes of price and claims that by a few changes only he can on the average convey to the consumer the net effect of the many ups and downs in the wholesale price. This may be so, although it is held by many observers that there is often an undue lag of retail prices when wholesale prices are falling. A quicker response of retail prices, especially at the end of the year when wholesale prices are falling owing to the arrival of stocks from Overseas, should result in a definite increase in consumption at that period with the result that large accumulations of stock would not take place, and wholesale prices would be steadied at the beginning of the year. The total winter consumption of butter in the United Kingdom would be increased by such a quicker response of retail prices to the advantage of the health of the community, and there would also be a lessening of the opportunity for speculation, with steadier returns to the Overseas producer.

(xxi) Having regard to the constitution of the retail trade of grocers and provision merchants in the United Kingdom we think that such a more rapid adjustment of retail prices to available supplies lies very much within the power of the

multiple shop companies and co-operative societies whose lead is largely followed in such matters by the individual grocers.

(xxii) We have examined the position of the new Control Boards for Dairy Produce which have been set up in certain of the Overseas Dominions, and we have summed up our opinion on this subject in paragraph 216 of this Report.

(xxiii) In the past the Irish dairying industry has particularly suffered from the lack of any effective machinery for orderly marketing. Ireland has especially to face the competition of Denmark in the United Kingdom market, and we think that the Irish Free State Government and Irish producers would do well in this respect to follow the lead of the distant Dominions.

(xxiv) In regard to cheese there is comparatively little to be said. No less than 90 per cent. of the United Kingdom demand is already met from within the Empire.

(xxv) In regard to the minor products of dairying, we especially commend, for the consideration of enterprise and capital within the Home country, the scope which appears to exist for a great extension of the manufacture of ice cream as a foodstuff on a legally defined basis. The development of such an industry in the United Kingdom would, particularly in the disposal of surplus milk and cream during the summer months, provide an opportunity for an increased return to the dairying industry of the United Kingdom.

(xxvi) We need not repeat the recommendations which we have made in previous Reports in regard to identification of origin and publicity. The schemes which are being inaugurated by the Empire Marketing Board, in compliance with our previous recommendations, for the promotion of the trade in meat and fruit from Empire countries, may very conveniently be extended so as to embrace dairy produce also. There is, in our opinion, special scope for such action in the case of liquid milk produced by the Home farmer and of butter supplied by the Dominions.

(xxvii) Our previous recommendations on the subject of research apply also to dairy produce. Indeed, there is no department of food supply in which there is greater scope for research than there is in dairying. Bread and meat must remain the staple foods of the population of the United Kingdom but modern science is making more and more evident the special significance of fruit and dairy produce for the health of the community and especially for that of growing children.

270. In the course of our investigations there have come before us a number of cases in which we were agreed that definite recommendations of a more or less detailed character might usefully be made for the attention of various bodies—either

Governments or producing or trading associations. These recommendations will be found printed in italics at various points in this Report.

271. This is the fourth Report which we have presented in eighteen months and is the last to be issued before the Imperial Conference. We desire once more to express our indebtedness to Mr. Herbert Broadley, who has been our Secretary during the whole period. The work thrown upon the Secretary of such a Committee is very heavy and Mr. Broadley has performed his duties with great zeal and marked ability.

272. We also thank our Assistant Secretary, Mr. W. J. Galley, for his efficient services, particularly in connection with the supplementary Report on Margarine.

H. J. MACKINDER (*Chairman*).

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H. BROADLEY (*Secretary*).
W. J. GALLEY (*Asst. Secretary*).

5th August, 1926.

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Countries whence consigned.	Average for quinquennium ending 1904.		Average for quinquennium ending 1913.		1923.		1924.		1925.	
	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.
Irish Free State		Not recorded.			492·4*	9·7*	461·4	8·7	403·1	6·9
Australia	256·7	6·8	621·0	14·9	532·9	10·4	657·5	12·4	1,161·2	19·8
New Zealand	206·8	5·3	303·7	7·3	1,130·8	22·2	1,081·9	20·5	1,255·6	21·5
Canada	218·7	5·6	20·4	0·5	39·8	0·8	131·4	2·5	163·1	2·8
Other British Possessions	1·2	—	1·3	—	5·3	0·1	4·9	0·1	6·2	0·1
Total, Overseas Empire	683·4	17·7	946·4	22·7	2,201·2	43·2	2,337·1	44·2	2,989·2	51·1
Russia	393·5	10·2	651·8	15·7	30·2	0·6	282·6	5·3	292·2	5·0
Finland					116·1	2·3	134·9	2·6	169·7	2·9
Estonia					8·7	0·2	22·3	0·4	21·3	0·4
Latvia					86·0	1·7	32·3	0·6	26·3	0·4
Sweden	197·4	5·1	337·1	8·1	39·2	0·8	57·7	1·1	81·4	1·4
Norway	26·1	0·7	26·4	0·6	0·8	—	4·7	0·1	3·8	0·1
Denmark	1,653·4	42·7	1,704·4	40·9	1,837·9	36·1	1,734·1	32·8	1,658·1	28·3
Netherlands	314·2	8·1	134·9	3·2	174·5	3·4	92·1	1·7	76·0	1·3
Belgium	75·7	1·9	0·1	—	0·3	—	0·1	—	0·3	—
France	374·6	9·7	288·2	6·9	94·4	1·8	13·7	0·3	31·0	0·5
United States	74·4	1·9	5·5	0·1	10·6	0·2	35·0	0·7	12·0	0·2
Argentina	56·4	1·4	60·7	1·5	491·2	9·6	538·5	10·2	484·5	8·3
Other Foreign Countries	22·5	0·6	11·5	0·3	4·4	0·1	2·2	—	7·4	0·1
Total, Foreign Countries	3,188·2	82·3	3,220·6	77·3	2,894·3	56·8	2,950·2	55·8	2,864·0	48·9
Total Imports	3,871·6	100·0	4,167·0	100·0	5,095·5	100·0	5,287·3	100·0	5,853·2	100·0
Re-exports	59·2	—	100·2	—	141·9	—	191·2	—	350·8	—
Net Imports	3,812·4	—	4,066·8	—	4,953·6	—	5,096·1	—	5,502·4	—

NOTES.—The particulars for the quinquennium ending 1904 relate to "shipments," for later periods the particulars relate to "consignments" from the countries specified.

From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

* Nine months, April—December only.

Governments or producing or trading associations. These recommendations will be found printed in italics at various points in this Report.

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5th August, 1926.

APPENDIX I.

TABLE I.

BUTTER.

Summary statement showing the fluctuations in the Imports of Butter, 1900–1925, distinguishing the principal and other sources of supply so far as the particulars are available.

Countries whence consigned.	Average for quinquennium ending 1904.		Average for quinquennium ending 1913.		1923.		1924.		1925.	
	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.
Irish Free State		Not recorded.			492·4*	9·7*	461·4	8·7	403·1	6·9
Australia	256·7	6·8	621·0	14·9	532·9	10·4	657·5	12·4	1,161·2	19·8
New Zealand	206·8	5·3	303·7	7·3	1,130·8	22·2	1,081·9	20·5	1,255·6	21·5
Canada	218·7	5·6	20·4	0·5	39·8	0·8	131·4	2·5	163·1	2·8
Other British Possessions	1·2	—	1·3	—	5·3	0·1	4·9	0·1	6·2	0·1
Total, Overseas Empire	683·4	17·7	946·4	22·7	2,201·2	43·2	2,337·1	44·2	2,989·2	51·1
Russia	393·5	10·2	651·8	15·7	30·2	0·6	282·6	5·3	292·2	5·0
Finland					116·1	2·3	134·9	2·6	169·7	2·9
Estonia					8·7	0·2	22·3	0·4	21·3	0·4
Latvia					86·0	1·7	32·3	0·6	26·3	0·4
Sweden	197·4	5·1	337·1	8·1	39·2	0·8	57·7	1·1	81·4	1·4
Norway	26·1	0·7	26·4	0·6	0·8	—	4·7	0·1	3·8	0·1
Denmark	1,653·4	42·7	1,704·4	40·9	1,837·9	36·1	1,734·1	32·8	1,658·1	28·3
Netherlands	314·2	8·1	134·9	3·2	174·5	3·4	92·1	1·7	76·0	1·3
Belgium	75·7	1·9	0·1	—	0·3	—	0·1	—	0·3	—
France	374·6	9·7	288·2	6·9	94·4	1·8	13·7	0·3	31·0	0·5
United States	74·4	1·9	5·5	0·1	10·6	0·2	35·0	0·7	12·0	0·2
Argentina	56·4	1·4	60·7	1·5	491·2	9·6	538·5	10·2	484·5	8·3
Other Foreign Countries	22·5	0·6	11·5	0·3	4·4	0·1	2·2	—	7·4	0·1
Total, Foreign Countries ...	3,188·2	82·3	3,220·6	77·3	2,894·3	56·8	2,950·2	55·8	2,864·0	48·9
Total Imports	3,871·6	100·0	4,167·0	100·0	5,095·5	100·0	5,287·3	100·0	5,853·2	100·0
Re-exports...	59·2	—	100·2	—	141·9	—	191·2	—	350·8	—
Net Imports	3,812·4	—	4,066·8	—	4,953·6	—	5,096·1	—	5,502·4	—

NOTES.—The particulars for the quinquennium ending 1904 relate to "shipments," for later periods the particulars relate to "consignments" from the countries specified.

From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

* Nine months, April—December only.

Table II

Cheese (except Margarine Cheese).

Summary statement showing the fluctuations in the imports of Cheese, 1900–1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence consigned.	Average for quinquennium ending 1904.		Average for quinquennium ending 1913.		1923.		1924.		1925.	
	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.	1,000 cwts.	Per cent.
Irish Free State	Not recorded.				5·6*	0·2*	5·1*	0·2*	5·0	0·2
Australia	Negligible		5·3	0·2	40·4	1·4	46·8	1·6	80·9	2·6
New Zealand	70·0	2·7	462·3	19·6	1,368·7	48·2	1,479·3	51·2	1,392·9	44·9
Canada	1,703·6	65·1	1,458·6	61·8	1,001·6	35·3	1,004·5	34·8	1,254·0	40·5
Total, Overseas Empire	1,774·5	67·8	1,926·2	81·6	2,416·3	85·1	2,536·7	87·9	2,732·4	88·2
Denmark	Negligible		Negligible		30·6	1·1	11·0	0·4	5·3	0·2
Netherlands	292·7	11·2	257·1	10·9	207·0	7·3	144·0	5·0	142·0	4·6
Belgium	71·6	2·7	0·8	—	1·2	—	1·6	0·1	1·5	—
France	35·8	1·4	18·7	0·8	18·9	0·7	18·3	0·6	16·6	0·5
Switzerland	Negligible		11·6	0·5	15·1	0·5	11·3	0·4	16·8	0·5
Italy	1·9	0·1	86·1	3·6	104·9	3·7	137·9	4·8	161·2	5·2
United States	439·4	16·8	57·4	2·4	40·9	1·4	18·1	0·6	17·9	0·6
Total, Foreign Countries ...	843·0	32·2	434·0	18·4	422·2	14·9	350·8	12·1	366·3	11·8
Total Imports	2,617·5	100·0	2,360·2	100·0	2,838·5	100·0	2,887·5	100·0	3,098·7	100·0
Re-exports	53·5	—	61·9	—	41·4	—	47·9	—	138·9	—
Net Imports	2,564·0	—	2,298·3	—	2,797·1	—	2,839·6	—	2,959·8	—

Notes:—The particulars for the quinquennium ending 1904 relate to "shipments"; for later periods the particulars relate to "consignments" from the countries specified.

From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

*This figure refers to Hard Cheese only; information in regard to Soft Cheese not available. The particulars for 1923 relate to the nine months, April–December only.

TABLE III (A).

MILK, CONDENSED: UNSWEETENED.

Summary statement showing the fluctuations in the imports of Milk, Condensed, Unsweetened, 1909-1925, distinguishing the principal and other sources of supply, as far as the particulars are available.

Countries whence Consigned.	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.
Canada	201	0·4	37,532	8·8	51,173	12·2	40,943	11·5
Other British Possessions			816	0·2	124	0·1	30	—
Total, Overseas Empire	201	0·4	38,348	9·0	51,297	12·3	40,973	11·5
Norway	43,504	76·2	14,115	3·3	11,158	2·7	2,337	0·6
Denmark	*	*	19,166	4·5	10,383	2·5	2,716	0·8
Netherlands	5,250	9·2	13,849	3·2	12,411	3·0	24,895	7·0
France	985	1·7	3,683	0·9	1	—	5	—
Switzerland	6,281	11·0	2,089	0·5	2,026	0·5	2,250	0·6
United States	*	*	334,319	78·4	329,361	78·7	281,489	79·1
Other Foreign Countries	891	1·5	959	0·2	1,530	0·3	1,297	0·4
Total, Foreign Countries	56,911	99·6	388,180	91·0	366,870	87·7	314,989	88·5
Total Imports	57,112	100·0	426,528	100·0	418,167	100·0	355,962	100·0
Re-exports	13,228	—	20,319	—	27,646	—	28,782	—
Net Imports	43,884	—	406,209	—	390,521	—	327,180	—

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* Details not available from published returns. Included with "Other Foreign Countries" below.

TABLE II

CHEESE (EXCEPT MARGARINE CHEESE).

Summary statement showing the fluctuations in the imports of Cheese, 1900–1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence consigned.	Average for quinquennium ending 1904.		Average for quinquennium ending 1913.		1923.		1924.		1925.	
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Denmark	Negligible		Negligible		30·6	1·1	11·0	0·4	5·3	0·2
Netherlands	292·7	11·2	257·1	10·9	207·0	7·3	144·0	5·0	142·0	4·6
Belgium	71·6	2·7	0·8	—	1·2	—	1·6	0·1	1·5	—
France	35·8	1·4	18·7	0·8	18·9	0·7	18·3	0·6	16·6	0·5
Switzerland	Negligible		11·6	0·5	15·1	0·5	11·3	0·4	16·8	0·5
Italy	1·9	0·1	86·1	3·6	104·9	3·7	137·9	4·8	161·2	5·2
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Netherlands	5,250	9·2	13,849	3·2	12,411	3·0	24,895	7·0
France	985	1·7	3,683	0·9	1	—	5	—
Switzerland	6,281	11·0	2,089	0·5	2,026	0·5	2,250	0·6
United States	*	*	334,319	78·4	329,361	78·7	281,489	79·1
Other Foreign Countries	891	1·5	959	0·2	1,530	0·3	1,297	0·4
Total, Foreign Countries	56,911	99·6	388,180	91·0	366,870	87·7	314,989	88·5
Total Imports	57,112	100·0	426,528	100·0	418,167	100·0	355,962	100·0
Re-exports	13,228	—	20,319	—	27,646	—	28,782	—
Net Imports	43,884	—	406,209	—	390,521	—	327,180	—

NOTES.—From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

* Details not available from published returns. Included with "Other Foreign Countries" below.

TABLE III (B).

MILK, CONDENSED: SWEETENED, WHOLE.

Summary statement showing the fluctuations in the imports of Milk, Condensed, Sweetened, Whole, 1909-1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence Consigned.	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.
Irish Free State	Not recorded.		3,219*	0·8*	1,062	0·3	1,356	0·5
Canada	†	†	20,956	5·2	29,656	9·4	22,795	7·9
Other British Possessions	†	†	6	—	14	—	104	—
Total, Overseas Empire	177	—	24,181	6·0	30,732	9·7	24,255	8·4
Norway	35,067	7·6	2,704	0·7	10,811	3·4	1,249	0·5
Finland	†	†	5,385	1·3	1,42	0·4	863	0·3
Germany	1,226	0·3	177	—	—	—	4	—
Netherlands	103,208	22·2	191,272	47·7	165,189	52·1	145,086	50·1
Belgium	6,777	1·5	215	0·1	28	—	362	0·1
France	3,316	0·7	848	0·2	469	0·2	12	—
United States	654	0·1	15,842	4·0	3,760	1·2	667	0·2
Denmark	979	0·2	22,725	5·7	25,725	8·1	31,607	10·9
Switzerland	311,681	67·2	136,692	34·1	76,483	24·1	84,023	29·0
Other Foreign Countries	716	0·2	666	0·2	2,385	0·8	1,415	0·5
Total, Foreign Countries	463,624	100·0	376,526	94·0	286,271	90·3	265,288	91·6
Total Imports	463,801	100·0	400,707	100·0	317,003	100·0	289,543	100·0
Re-exports	28,556	—	2,840	—	3,398	—	1,617	—
Net Imports	435,245	—	397,867	—	313,605	—	287,926	—

NOTES.—From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

* Nine months, April-December only.

† Details not available from published returns. Included with "Total Overseas Empire" or "Other Foreign Countries," as the case may be.

TABLE III (c).

MILK, CONDENSED: SWEETENED, SEPARATED OR SKIMMED.

Summary statement showing the fluctuations in the imports of Milk, Condensed, Sweetened, Separated or Skimmed, 1909-1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence Consigned.	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Cwts.	Per Cent.	Cwts.	Per Cent.	Cwts.	Per Cent.	Cwts.	Per Cent.
Irish Free State ...	Not recorded.		22,659*	1·6*	26,899	1·8	62,128	3·9
Other British Possessions.	81	—	18	—	282	—	6	—
Total, Overseas Empire.	81	—	22,677	1·6	27,181	1·8	62,134	3·9
Norway	1,737	0·3	4,509	0·3	1,229	0·1	1,600	0·1
Denmark	30,267	5·0	358,905	25·1	404,114	27·3	390,635	24·5
Germany	5,768	0·9	—	—	—	—	133	—
Netherlands	547,666	90·5	1,030,314	72·0	1,020,559	69·0	1,122,516	70·3
France...	5,324	0·9	23	—	393	—	—	—
Italy	9,999	1·7	12,179	0·9	23,321	1·6	18,564	1·2
United States... ...	2,168	0·4	1,419	0·1	1,755	0·1	84	—
Other Foreign Countries.	1,977	0·3	392	—	661	0·1	463	—
Total, Foreign Countries.	604,906	100·0	1,407,741	98·4	1,452,032	98·2	1,533,995	96·1
Total Imports	604,987	100·0	1,430,418	100·0	1,479,213	100·0	1,596,129	100·0
Re-exports ...	2,467	—	3,614	—	1,384	—	999	—
Net Imports ...	602,520	—	1,426,804	—	1,477,829	—	1,595,130	—

NOTES :—From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

* Nine months, April-December only.

TABLE IV.

MILK POWDER: UNSWEETENED.

Summary statement showing the fluctuations in the imports of Milk Powder, Unsweetened, 1909-1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence Consigned.	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.
Australia	*	*	2,393	2·8	2,585	2·5	4,689	3·4
New Zealand	*	*	56,527	67·1	54,267	53·0	73,572	53·5
Canada	*	*	3,453	4·1	18,931	18·5	18,769	13·7
Other British Possessions	*	*	45	0·1	258	0·3	1,233	0·9
Total, Overseas Empire	4,368	14·8	62,418	74·1	76,041	74·3	98,263	71·5
Sweden	2,683	9·1	—	—	—	—	—	—
Denmark	1,213	4·1	10,457	12·4	8,151	8·0	696	0·5
Germany	902	3·0	—	—	923	0·9	186	0·1
Netherlands	10,921	37·0	7,529	8·9	11,080	10·8	31,863	23·2
Belgium	*	*	—	—	—	—	456	0·3
France	3,877	13·1	2	—	1	—	401	0·3
United States	792	2·7	3,590	4·3	5,411	5·3	3,618	2·6
Other Foreign Countries	4,770	16·2	280	0·3	730	0·7	2,005	1·5
Total, Foreign Countries	25,158	85·2	21,858	25·9	26,296	25·7	39,225	28·5
Total Imports ...	29,526	100·0	84,276	100·0	102,337	100·0	137,488	100·0
Re-exports	1,121	—	23,209	—	18,154	—	42,832	—
Net Imports	28,405	—	61,067	—	84,183	—	94,656	—

NOTES.—From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

*Details not available from published returns. Included with "Total Overseas Empire" or "Other Foreign Countries," as the case may be.

TABLE V.

MILK, CREAM.

Summary statement showing the fluctuations in the imports of Milk, Cream, 1909-1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence Consigned.	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.	Cwts.	Per cent.
Irish Free State	Not recorded.		34,243*	75·5*	48,487	83·0	65,572	73·8
Total, Overseas Empire	—	—	34,266	75·6	48,487	83·0	65,596	73·8
Norway	1,075	12·3	1,641	3·6	1,552	2·7	2,781	3·1
Denmark	Negligible.		3,746	8·3	3,852	6·6	7,267	8·2
Netherlands	448	5·1	3,870	8·5	4,512	7·7	12,189	13·7
France	7,229	82·3	1,726	3·8	—	—	696	0·8
Other Foreign Countries	31	0·3	109	0·2	13	—	325	0·4
Total, Foreign Countries	8,783	100·0	11,092	24·4	9,929	17·0	23,258	26·2
Total Imports... ...	8,783	100·0	45,358	100·0	58,416	100·0	88,854	100·0
Re-exports	541	—	211	—	818	—	725	—
Net Imports	8,242	—	45,147	—	57,598	—	88,129	—

NOTES.—From 1st April, 1923, the particulars exclude the direct imports, if any, into the Irish Free State from countries outside the British Isles.

* Nine months, April–December, only.

TABLE VI.

CASEIN.

Summary statement showing the fluctuations in the imports of Casein, 1920-1925, distinguishing the principal and other sources of supply, so far as the particulars are available.

Countries whence Consigned.	1920.		1923.		1924.		1925.	
	Tons.	Per Cent.	Tons.	Per Cent.	Tons.	Per Cent.	Tons.	Per Cent.
British India	743	19·6	309	6·7	288	5·2	238	4·1
New Zealand	1,009	26·7	1,254	27·2	1,767	31·9	1,576	27·2
Other British Possessions	74	2·0	326	7·1	125	2·2	261	4·5
Total, Overseas Empire.	1,826	48·3	1,889	41·0	2,180	39·3	2,075	35·8
France	1,141	30·1	1,558	33·8	1,650	29·8	1,814	31·3
Argentina...	298	7·9	807	17·5	1,533	27·7	1,513	26·1
Other Foreign Countries	519	13·7	356	7·7	180	3·2	390	6·8
Total, Foreign Countries.	1,958	51·7	2,721	59·0	3,363	60·7	3,717	64·2
Total Imports ...	3,784	100·0	4,610	100·0	5,543	100·0	5,792	100·0
Re-exports ...	881	—	1,079	—	1,123	—	1,771	—
Net Imports ...	2,903	—	3,531	—	4,420	—	4,021	—

NOTES:—The imports of Casein were not separately recorded in the Trade Returns of the United Kingdom prior to 1920.

From 1st April 1923 the particulars exclude the direct imports, if any, into the Irish Free State, from countries outside the British Isles.

APPENDIX II.

Cost of production of 1 lb. butter fat on the basis of assumed costs of £20, £25 and £30 for maintaining a cow for a year and on annual yields of from 4,000 to 8,000 lbs. milk (approximately 400 to 800 gallons).

Butter Fat.	Cost of Keeping Cow—Per Annum.	Annual Yield of 4000 lbs.	Annual Yield of 5000 lbs.	Annual Yield of 6000 lbs.	Annual Yield of 7000 lbs.	Annual Yield of 8000 lbs.
Per cent.	£	s. d.	s. d.	s. d.	s. d.	s. d.
3·5	20	2 10¼	2 3¼	1 10¾	1 7½	1 5
	25	3 7	2 10	2 4½	2 0½	1 9¼
	30	4 3½	3 5	2 10¼	3 5¼	2 1½
3·75	20	2 8	2 1½	1 9¼	1 6¼	1 4
	25	3 4	2 8	2 2½	1 11	1 8
	30	4 0	3 2¼	2 8	2 3¼	2 0
4·0	20	2 6	2 0	1 8	1 5	1 3
	25	3 1½	2 6	2 1	1 9½	1 6¾
	30	3 9	3 0	2 6	2 1½	1 11½
4·25	20	3 4	1 10½	1 6¾	1 4	1 2
	25	2 10	2 4	1 11½	1 7½	1 5½
	30	3 6¼	2 10	2 4	2 0¼	1 9
4·5	20	2 2½	1 9¼	1 5¾	1 3	1 1
	25	2 9¼	2 2½	1 10	1 7	1 5
	30	3 4	2 8	2 2½	1 10¾	1 8
4·75	20	2 1¾	1 8	1 5	1 2¼	1 0½
	25	2 7½	2 1¼	1 9	1 6	1 4
	30	3 2	2 6¼	2 1¼	1 9½	1 7
5·0	20	2 0	1 7	1 4	1 1½	1 0
	25	2 6	2 0	1 8	1 5	1 3
	30	3 0	2 5	2 0	1 8½	1 6

SUPPLEMENTARY REPORT

ON

MARGARINE

SUPPLEMENTARY REPORT ON MARGARINE.

CONTENTS.

I.—The Margarine Industry.

1. Vegetable oils have long been used in the preparation of food in the warm latitudes where oil-bearing seeds and nuts are indigenous. In colder climates animal fats were more readily available and were the natural fatty constituent of the diet. Between these two regions is interposed the temperate climate of southern Europe, where for many years animal and vegetable oils (chiefly olive oil) have alike been used.

2. During the past half-century, however, a substitution of vegetable for animal fats has taken place throughout Europe, at first gradually, as developments occurred in the meat industry of which fats are a by-product, and then more rapidly, as improvements occurred in the processes by which vegetable fats were extracted and converted into attractive and palatable products.

3. Margarine, as first produced in France under the stress of the Franco-Prussian War, was composed wholly of animal fats. Towards the end of the nineteenth century came a change. The home production of meat in countries such as Great Britain was inadequate and imports from abroad increased. The development of the meat-canning industry, while it stimulated the consumption of meat by the growing populations of Europe, deprived the trade of the carcasses which had previously been boiled down for the supply of fats and oils. None the less, the demand for edible fats continued to increase, and for the first time cotton-seed oil was used in the frying of fish consumed by the poorer classes in England.

4. With the turn of the century we enter upon yet another phase. Cold storage facilities were perfected, leading to the importation and marketing of whole carcasses and a still further reduction in available supplies of animal fats. It was, therefore, fortunate that simultaneously with this decrease in the supplies of animal fats, rapid improvements were made in the processes whereby vegetable oils were extracted and refined. As the demand for oil-bearing seeds and nuts increased, cultivation responded and increasing supplies became available.

5. The position at the outbreak of war in 1914 was that vegetable oils had become firmly established as a basis of margarine manufacture. It has been stated by experts that at that time British margarine consisted of seven parts animal to three parts vegetable products. During the war the shortage of animal fats, and the value attached to them for the manufacture of glycerine, still further restricted their use for human consumption. By the end of the war an average quality of margarine consisted of animal and vegetable products in the ratio of three to seven—an inversion of the pre-war proportions.

6. At the present time certain qualities of margarine do not contain any animal fats at all, while in others the proportion is quite high, amounting to about 40 per cent., the average for the whole being in the neighbourhood of 10 per cent.

II.—Methods of Manufacture.

7. Stated briefly, the process of making margarine is somewhat similar to that of butter-making, the main difference being that in the case of the former varying mixtures of hard and soft oils are manipulated to obtain a product which has the consistency, appearance, and taste of butter.

8. The animal fats most generally employed in the industry are lard, oleo, premier jus, and stearine. The vegetable oils used are either hard oils, such as coconut and palm kernel oils, or soft oils, such as ground nut, soya bean, and cotton-seed oils. Moreover, the soft oils can, if necessary, be hardened by a process in which they are caused to combine directly with hydrogen under pressure. The proportions in which hard and soft oils are used vary with the season of the year. Naturally, during warm weather a stronger textured product is desired.

9. The raw materials are carefully refined with a view to the removal of free fatty acids and other impurities. They are also deodorised, in order to remove obnoxious flavours, and are then mixed in the proportions necessary to give a product of the right consistency. The butter flavour is imparted by the addition of milk which has been pasteurised and subsequently inoculated with the lactic acid bacterium or other suitable organism. Artificial colouring matter is also employed. The mixture is churned until thoroughly emulsified and is then cooled, kneaded into a homogeneous mass, and packed ready for sale. It is in the proper mixing of hard and soft oils in order to produce a compound suitable for table and other purposes that the skill of the manufacturer is shown.

III.—Margarine Trade in the United Kingdom.

10. Under the Food and Drugs Act, 1889, all margarine manufacturers are required to keep records of the consignments of margarine and margarine cheese sent out by them. Nevertheless, information showing the annual output over a series of years in the United Kingdom is not readily available. It is understood that in 1907 production amounted to approximately 44,000 tons, while an estimate of the production in 1913 has been given at 84,000 tons. In the course of our inquiry several figures have been quoted to us from which the conclusion has been arrived at that the production at the present time is in the neighbourhood of 150,000 tons a year. These figures indicate the growing importance of the industry in the United Kingdom.

11. At the same time the demand for Home consumption has increased very rapidly, and it has only been possible to satisfy it by increasing imports from abroad. In 1907 these amounted to 43,800 tons, and in 1913 to 75,500 tons. During the war, and again during the slump which followed the post-war boom, imports fluctuated considerably. They amounted to 62,200 tons in 1925. Exports are small and have only amounted in recent years to about 2,000 tons a year.

12. A rough estimate of the consumption of margarine in the United Kingdom can be obtained by adding to the quantities produced the amounts imported. On this calculation, consumption has increased from 87,800 tons in 1907, and 159,500 tons in 1913, to over 210,000 tons at the present time. This increase has not been steady, but, owing to the war demand and later the post-war slump, has been subject to fluctuations.

13. The serious fluctuations of price which are so prevalent in the butter trade of the United Kingdom are fully described in our Dairy Produce Report. In contradistinction to butter, margarine prices have in recent years been remarkably steady. According to the figures given in the Ministry of Labour Gazette, which cover only the cheaper grades offered to the public, the retail price of margarine has gradually risen since the slump of 1922-23 from 6¾*d.* a lb. in July, 1923, to 8*d.* per lb. at the present time.* Superior qualities are also on sale at 10*d.* and 1*s.* per lb. Our attention has been drawn to the change which has taken place in the quality of margarine in chief demand. In 1922, 62 per cent. of the total sales of margarine effected by one important organisation consisted of the cheaper grade of margarine and 38 per cent. of the superior grades. By 1925 the sales of high-grade margarine had so increased that they represented 66 per cent. of the total, while the lower grades had fallen to 34 per cent.

14. The tendency in the margarine industry has been for the manufacturers to dispose of their product direct to the retailer or direct to the public through their own shops, any surplus being disposed of to wholesalers or for export. The margarine is packed by the manufacturers ready for sale and is sold usually under the manufacturer's brand with quality standardised and at a fixed price.

15. On the question of the relative popularity of margarine and butter some witnesses have expressed the view that the consumption of margarine has probably reached its maximum. It has also been suggested that should the price of butter rise above 2*s.* 6*d.* per lb., the consumer would probably prefer to buy what butter he could afford rather than turn to margarine, and that, on the other hand, if the price of butter fell below 1*s.* 6*d.* per lb. the demand for margarine would probably contract. While we do not necessarily accept this view as final, we recognise that price is an

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* *See* Appendix I.

important factor and that the relative demands for the two commodities depend chiefly on the purchasing power of the public. All previous calculations would, however, need to be reconsidered in the event of research providing a cheap and palatable oil rich in vitamin content and suitable for incorporation in margarine.

16. Margarine in its original form was produced solely as a substitute for butter. At the present time not only is it used by large sections of the population for this purpose, but in the form of " compound lard " it is also widely used in the preparation of food. We consider, however, that margarine, as at present constituted, can only be regarded in the light of an auxiliary foodstuff and should not be considered as an effective substitute for butter or lard.

IV.—Margarine Trade on the Continent and in America.

17. Parallel with the increase in the demand for margarine in the United Kingdom there has occurred a considerable increase of consumption on the Continent. The following figures have been supplied by an authoritative witness as representing the consumption of margarine per head of the population, in 1913 and 1924, in the countries mentioned.

Consumption of Margarine per Head of Population.

Year.	United Kingdom.	Holland.	Germany.	Belgium.	France.	Denmark.	Norway.	Sweden.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1913 ...	7·76	4·40	7·93	3·32	0·88	33·06	24·03	9·92
1924 ...	11·77	15·69	12·34	7·42	1·54	45·63	35·27	12·27

These figures show remarkable variations between one country and another. In France the consumption is very low, while in both Denmark and Norway it is high.

18. In the United States, according to official returns, the production of margarine was 174,700 tons in 1920, 85,200 tons in 1922, and 90,500 tons in 1925. As the exports of margarine from the United States have rarely exceeded 1 per cent. of the total production, these figures give a reliable indication of the trend of consumption in that country.

V.—Food Values of Butter and Margarine.

19. There is but little difference in the fat and protein contents of margarine and butter, and the calorific equivalents of the two substances are approximately equal. It is in regard to vitamin values, however, that these two food-stuffs differ so widely. In our Dairy Produce Report we refer to the impor-

tance of the vitamin content of butter and cheese in relation to growth and health. Here it is sufficient to say that, while butter manufactured from the milk of cows which have been suitably pasture-fed, is rich in the growth-promoting and antirachitic (*i.e.*, the fat soluble) vitamins, margarine, as at present manufactured from vegetable oils, is almost entirely devoid of both.

20. The small amount of sour milk which is added during the manufacture of margarine is of no significance from the point of view of vitamins. The chief vegetable oils used, palm kernel, cotton seed, ground nut and coconut, and the whole class of hardened oils are deficient in the fat soluble vitamins, and the same is consequently true of margarines prepared from them. Margarines prepared from animal fats, such as oleo oil and premier jus, carry a higher vitamin value. This value is at its highest in the case of fats derived from pasture-fed beasts.

21. During the later years of the war, when it was first known that margarine prepared from vegetable oils was relatively deficient in vitamins while that prepared from animal fat was in this respect superior, the Ministry of Food made an order that a certain proportion of animal fat should be incorporated in margarine. This order was revoked in 1920. After the war there was considerable competition between margarine and jam, large quantities of the latter having been left over from war stocks. In 1923 there was a growing world shortage of animal fats, and prices rose, and as it was not practicable to raise the price of margarine the use of animal fats was curtailed.

22. The question of improving the food value of margarine by the inclusion of ingredients rich in vitamins in order to produce a substance equal in food value to butter, is one of considerable importance from the point of view of national health standards. *This is a matter to which research could very profitably be directed.*

VI.—Legislation.

(a) *Control of Manufacture and Sale of Margarine.*

23. The principal legal provisions concerning the manufacture and sale of margarine are contained in the Sale of Food and Drugs Acts, 1875 to 1907, and in the provisions of the Public Health (Preservatives, etc., in Food) Regulations, 1925.

24. In the Butter and Margarine Act, 1907, margarine is defined as " any article of food, whether mixed with butter or not, which resembles butter and is not milk-blended butter," while the definition for margarine cheese, as given in the Sale of Food and Drugs Act of 1899, is " a substance, whether compound or otherwise, which is prepared in imitation of cheese and which contains fat not derived from milk."

25. The composition of margarine is in certain directions subject to official control. Under the Acts above referred to, not

more than 10 per cent. of butter fat may be added to the substance, while the percentage of water present in margarine, when prepared for sale or consignment, must not exceed 16 per cent., the figure also prescribed for the maximum water content of butter. Under the Public Health (Preservatives, etc., in Food) Regulations, 1925, which come into force on the 1st January, 1927, the use of any preservative substance, with the exception of salt, will be prohibited.

26. The marking of packages of margarine for sale and the use of fancy names are regulated by the same Acts. All margarine manufactories must be registered with Local Authorities and are subject to inspection by officers of the Ministries of Health and Agriculture. Records of all consignments of margarine sent out are also prescribed.

27. It has been suggested to us that a higher legal maximum of butter content should be permitted in place of the 10 per cent., which is now the legal limit. It has been urged upon us by authoritative witnesses that it is important that margarine should contain as high a proportion as practicable of butter, since it is only from the butter blended with margarine that a considerable number of the population can obtain the vitamins necessary for health. In view, however, of the possibility that means may be found of enriching margarine with vitamins from other sources than butter, *we do not feel that we should be justified in recommending at the present time a reconsideration of the existing statutory limit imposed on the admixture of butter with margarine.*

(b) *Use of Sesame Oil.*

28. Several European countries have enacted that all butter substitutes shall contain sesame oil, which reacts to a very characteristic and simple colour test, in order to prevent their fraudulent sale as butter.

(c) *Prohibition of Manufacture.*

29. In Canada the manufacture and importation of margarine is entirely prohibited. In South Africa no table margarine may be manufactured or imported. Its manufacture for culinary purposes only is, however, permitted.

(d) *Use of Colour.*

30. The question of the use of colour in foodstuffs has been reviewed from time to time. The Select Committee on Food Products Adulteration, 1896, was of opinion that there was no justification for the compulsory use of a special colour, such as pink or green, to distinguish margarine from butter, but they recommended the absolute prohibition of any artificial colouring of margarine to resemble or imitate butter. This recommendation, however, did not pass into law. We have been informed that

there is no objection on health grounds to the colouring matter at present used in margarine.

31. Our attention has been called to the use of special colouring matters in other countries and also to the prohibition which is enforced in Australia of the use of colour in butter and margarine. *We do not think that the introduction of some distinctive colour should be compulsorily required in regard to margarine manufactured in the United Kingdom, and we see no reason for any alteration in the present requirements of the law.* This decision must, however, be reconsidered if at any future time it be proved that the natural colour of butter is definitely associated with its vitamin content. We have recommended, in our Dairy Produce Report, further research into this matter. If and when a definite relationship is established between pigmentation and the presence of the fat-soluble vitamins it may be necessary to prohibit the introduction of artificial colouring matter into butter. It is clear, therefore, that when this research has been completed the whole subject will require careful reconsideration. If the artificial colouring of butter is prohibited, the same prohibition should also apply to margarine.

VII.—Raw Materials.

(a) *Animal Oils and Fats.*

32. From the various grades of fatty tissue, a number of animal fats and oils of varying quality are produced, many, but not all, of which are suitable ingredients for margarine. In recent times hardened whale oil has also come into use for edible purposes. It would appear also that the refining of fish oils is likely to open up a new source of supply. The following are the more important of the animal oils and fats known to the trade :—

Premier jus,	Refined tallow,
Oleo margarine and oleo oil,	Neutral lard,
Oleo stearine,	Hardened whale oil.

33. When selected fats from the slaughtered animal are melted down, the first oils which rise to the surface, and are run off, are known as *premier jus.* For the best qualities of margarine, premier jus is remelted and cleared and kept at a temperature suitable for the separation of *stearine.* This is remixed and the whole placed in presses, and thereby the *oleo margarine* (or "*oleo oil*") is extruded. *Neutral lard* is prepared by "rendering" selected pig fats at a moderate temperature.

(b) *Vegetable oils.*

34. The number of different vegetable oils now available for the manufacture of margarine has considerably increased in

recent years and the following list, while not pretending to be exhaustive, enumerates the chief oils now employed for this purpose :—

Coconut,	Soya bean,
Palm kernel,	Sesame,
Palm,	Sunflower,
Babassu,	Rape seed,
Ground nut,	Mowra,
Cotton seed,	Kapok.

35. As already explained in paragraph 8 of this Report, the proportions in which hard oils, such as coconut, palm kernel, and palm, are blended with the soft oils to produce the right consistency in the finished product vary with the season. Subject to this primary consideration, the selection of a suitable oil largely depends on questions of available supplies, their price and quality. An important factor is the percentage of free fatty acids which must be removed before conversion into margarine. Although these and other by-products can be used in the manufacture of soap and for other industrial purposes, their presence lowers the value of the oil as a raw material for margarine. The smaller the proportion of free fatty acids present in the oils from which margarine is made, the more valuable are those oils.

36. So far as the United Kingdom is concerned, the hard oils most commonly used are coconut and palm kernel oils, and the most commonly used of the soft oils are ground nut, cotton seed, soya bean, and sunflower seed oils. Rape seed oil is used on the Continent, particularly in Germany, but in the United Kingdom its use is chiefly confined to industrial purposes.

(c) *Oil Cake.*

37. A large part of the vegetable oils and fats used for edible purposes in the United Kingdom are obtained by crushing imported nuts and seeds. The residues take the form either of hard compact cakes, or, where extraction has been by solvents, of a fine meal. These by-products are a useful asset to the farmer, who uses them for feeding cattle.

38. A problem of considerable importance, and one which still awaits a satisfactory solution, may be referred to here. In many producing countries, such as India, the value of oil-cake, both as a foodstuff for cattle and as a manure, is increasingly realised. As the local demand for oil-cake extends, the result must be to encourage the development within these countries of the oil-crushing industry, and the export of seeds and kernels will tend to diminish. At the same time, the local crushing industry can only develop successfully so long as it can find a satisfactory market for both cake and oils.

39. In these circumstances, it is important that India, and other producing countries in which this problem may present

itself, should be able to fall back on overseas markets for the vegetable oils produced in excess of local demands. Bulk transport by tankers to Europe may afford the best solution of the difficulty. We understand, however, that scientific knowledge has not yet advanced sufficiently to ensure the arrival in good condition of oils thus transported from India in bulk. A solution of this problem would offer satisfactory results both to India and to the consuming countries of Europe. *We recommend that further research work on this question should be undertaken.*

VIII.—Chief Sources of Supply.

(a) *Animal Oils and Fats.*

40. The chief sources of supply of animal oils and fats are naturally those countries in which cattle are reared for the production of meat on an extensive scale, namely, North and South America, Australia, and New Zealand. The United Kingdom imports largely from South America—particularly Argentina—and the United States while considerable quantities of tallow are received from Australia and New Zealand. Consignments are also received from Norway, Holland, and Belgium. The following table indicates the dependence of the United Kingdom on countries not within the Empire for its supplies :—

Imports into the United Kingdom of Animal Oils and Fats during 1924.

—	Total Imports (in 1,000 tons).	Percentage from British Countries.	Percentage from Foreign Countries.
Refined—			
Lard—Refined	124·5	12·6	87·4
Lard—Imitation	4·1	17·5	82·5
Oleo margarine and oleo oil ...	31·0	8·0	92·0
Other sorts	2·2	13·6	86·4
Not Refined—			
Tallow	50·2	46·6	53·4
Other sorts	4·0	22·5	77·5
Whale oil	32·5	22·5	77·5
Stearine	3·2	12·5	87·5

(b) *Vegetable Oils and Fats.*

41. The raw materials from which vegetable oils are obtained are, for the greater part, the products of either tropical or sub-tropical countries. The following table gives the proportion of the principal vegetable oil-bearing materials imported into the United Kingdom from the Empire for purposes of margarine manufacture :—

Imports of Vegetable Oils and Fats into the United Kingdom during 1924.

—	Total Imports (in 1,000 tons).	Percentage from British Countries.	Percentage from Foreign Countries.
Seeds—			
Cotton	558·3	39·6	60·4
Rape	68·6	98·8	1·2
Sesame	7·8	10·2	89·8
Soya bean	111·5	—	100·0
Sunflower	33·3	1·9	98·1
Nuts and Kernels—			
Copra	86·1	74·4	25·6
Ground nuts (undecorticated)	66·0	53·0	47·0
Ground nuts (decorticated) ...	33·3	71·5	28·5
Palm Kernels	297·0	81·1	18·9

42. From a comparison of the two tables just given, it will be seen that while the greater part of the animal oils and fats are derived from countries not within the Empire, vegetable oil seeds and kernels, with the exception of soya beans and sesame and sunflower seeds, are dominantly of Empire origin.

IX.—The Main Problem.

43. From the preceding paragraphs certain facts stand out as demanding special examination from the point of view of Empire demands and supplies. In the first place, the production of animal fats is obviously insufficient for the needs of the industry. It must be remembered that the quantities of animal fats available are determined not by the demand for them but by the demand for the meat of which they are a by-product. Secondly, such supplies of animal fats as are necessary from overseas to supplement Home production, are drawn chiefly from sources outside the Empire. Thirdly, the growing importance of vegetable oils makes it essential to inquire whether the Empire supplies of vegetable, no less than of animal oils and fats, cannot be augmented and improved. We will pass in review from these standpoints the different Empire supplies and will consider what measures may be practicable for their improvement and extension.

X.—Animal Fats.

(a) *Oleo Margarine and Oleo Oil and Refined tallow.*

44. The pastoral industry, in its early days, was carried on principally for the production of wool and hides, while fat, the only by-product of importance, was obtained by the boiling down of the carcass. The development of the meat-canning

industry enabled a use to be made of parts of the carcass for food, but a utilisation of what was previously considered to be waste and the inclusion of small amounts of fat with the canned meat resulted in a reduction in the amount of fat obtained from the digester. With the subsequent introduction of refrigeration, a still larger portion of the fat was disposed of with the meat for food. Thus the development of the meat-producing industry has involved a falling-off in the recovery of fats for edible and industrial purposes.

45. The main source of supply of oleo is Argentina, from which country more than 40 per cent. of the imports into the United Kingdom are received. Other exporting countries, of less importance from the point of view of the United Kingdom market, are the United States, Norway, and Holland. Supplies from Australia and New Zealand have declined in the last few years. In 1921 imports from these two Dominions amounted to 3,500 and 2,500 tons respectively, but in 1924 the quantities received were under 1,000 tons in each case. Small quantities are also obtained from Canada and the Irish Free State.

(b) *Unrefined Tallow.*

46. Imports into the United Kingdom of foreign produced tallow in 1913 were principally drawn from South America, China being the next important source. In recent years there has been a considerable increase in the supplies from South America, mainly from Argentina, and a falling-off in those from other sources. The quantities of unrefined tallow imported in 1913 into the United Kingdom from Australia and New Zealand were 45,764 tons and 21,215 tons respectively, while the figures for 1924 were 5,624 tons and 17,405 tons respectively.

(c) *Whale Oil.*

47. To a slight extent hardened whale oil enters into the composition of margarine. The principal countries supplying this oil are Norway, Holland, and Spain, while considerable quantities are also obtained from South Africa, the Falkland Islands, and Canada. In 1920 (the first year for which detailed information of the imports of whale oil into the United Kingdom are available) the imports from the Falkland Islands were larger than the total from all other sources of supply. At the present time, however, Norway is the most important source of this oil.

XI.—Cotton Seed and Cotton Seed Oils.

48. The greater part of the cotton seed oil used in the manufacture of margarine in the United Kingdom is obtained by crushing imported seed, only small quantities of the oil being received from overseas. A very large proportion of the cotton

seed so used comes from Egypt and India, but important supplies are also received from Brazil and Peru, and from the British Possessions in Africa.

49. The following table shows, so far as information is available, the total exports of cotton seed from the more important sources in the British Empire and the quantities sent to the United Kingdom.

Exports of Cotton Seed (in 1,000 Tons).

From	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
India	240·0	233·2	149·9	148·4	161·3	152·1	197·2	192·5
British East Africa.	5·3	5·1	10·4	10·1	22·3	22·2	26·5	25·7
British West Africa.	3·8	3·8	2·2	2·2	5·4	5·4	8·1	*
The Sudan ...	3·7	2·1	9·2	9·2	17·7	17·7	13·7	*
Union of South Africa.	—	—	0·6	0·5	1·0	0·9	2·1	2·0

* Not available.

India.

50. No accurate statistics of the production of cotton seed in India are available. The figures which have been submitted for the pre-war period and for the year 1922-23 indicate a production of approximately 2,000,000 tons a year, but of this production only a comparatively small part is available for export. The seed retained is mainly used for sowing, but it is also used for feeding cattle, when it is given in the raw state, and for the local extraction of oil, large quantities of which are used for cooking purposes. It is also valuable as a manure, but in this case it is necessary to treat the seed to prevent germination. The amount available for export varies from season to season and depends considerably on the supplies required locally for conversion into fodder.

51. The export trade of India in cotton seed oil is very small. The possibility of expressing the oil by improved mechanical methods in India must not be overlooked. The establishment of such an industry would not only provide increased quantities and improved qualities of oil, but the disposal of the residue cake for cattle feeding would no doubt release for oil extraction large quantities of the seed at present used as fodder. These considerations are important in view of the extension of cotton

cultivation which has occurred in India during the past five years and the possibility of further extensions as irrigation facilities are increased.

British East Africa.

52. Owing to the successful development of the cotton-growing industry in British East Africa, the supplies of East African cotton seed have increased. According to official returns, in Kenya there has been an increase in the cotton area from 6,000 acres in 1923 to 40,350 acres in 1924, while in Uganda the figures for the same years are 429,600 acres and 584,379 acres respectively. Exports of cotton seed have also increased to the extent shown in the table in paragraph 49. We are informed that transport difficulties have to some extent interfered with this trade, but we are given to understand that these difficulties now have the attention of the local authorities and are less serious than they were.

British West Africa.

53. The increasing importance of cotton growing in Nigeria is reflected in the increasing quantities of cotton seed exported, particulars of which are shown in the table above. Cotton is also grown in the Gambia, but the industry is not of any size at present and considerable quantities of cotton seed oil are imported to satisfy the local demand. In Sierra Leone such cotton seed as is grown is consumed locally.

The Sudan.

54. The measures which have and are still being taken in the Sudan to improve the water supply and to provide additional transport facilities have already resulted, with developments in the cultivation of cotton, in the export of increased quantities of cotton seed, and are likely to lead to a further increase in this trade.

Union of South Africa.

55. Supplies of South African cotton seed for export are at present comparatively small, but there is every probability that they will increase in the course of the next few years as the area under cotton increases.

XII.—Copra and Coconut Oil.

56. United Kingdom manufacturers draw three-quarters of their supplies of copra from Empire sources (chiefly from the

Straits Settlements, Australia, Samoa, and Ceylon) and only one-quarter from without the Empire. Of the foreign countries interested in this raw material, the Dutch East Indies and the Philippine Islands send considerable quantities to the United Kingdom, and, in 1922 and 1923, were second only to the Straits Settlements in order of importance. It appears that the copra exported from the Straits Settlements is that obtained from the Malay States and other countries in the immediate neighbourhood. The following table shows the exports of copra from the various parts of the Empire.

Exports of Copra (in 1,000 tons).

From	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
British Malaya ...	89·0	4·7	153·7	30·3	159·0	25·0	153·2	23·9
Ceylon	42·6	0·4	50·8	3·6	88·5	3·5	113·6	1·9
India	30·7	1·0	4·0	1·7	0·4	0·3	0·1	—
Fiji	13·3	0·8	24·2	2·7	23·1	*	*	*
British East Africa.	10·9	—	21·4	—	25·5	—	*	*
Western Samoa	10·0	—	13·5	2·2	13·2	3·2	14·5	3·6
Seychelles ...	2·6	0·2	3·4	1·6	3·2	1·9	*	*
British West Indies and British Guiana.	1·0	0·7	8·6	6·1	7·5	5·7	*	*
Australia ...	0·8	0·6	27·0	6·2	23·0	8·2	21·9	5·0
British West Africa.	0·8	0·1	1·9	0·1	1·3	0·1	1·3	*

* Not available.

57. Imports of unrefined coconut oil in 1924 into the United Kingdom from Empire countries were less than one-third of what they had averaged during the period 1909-1913 and formed considerably under 30 per cent. of the whole, as against practically 60 per cent. in the earlier period. The chief sources of supply within the Empire are India, Ceylon, and Australia. With regard to foreign countries, the bulk of supplies are now received from Holland and Java, in place of those from Belgium, France, and Germany, which have practically ceased. The imports of refined coconut oil, although considerable before the war, fell in 1925 to under 8,000 tons. Of these supplies, those from Empire sources are negligible, small quantities only being received from India and Ceylon.

58. The following table gives the exports of coconut oil from the various parts of the Empire :—

Exports of Coconut Oil (in 1,000 tons).

From	Average for Quinquennium ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
Ceylon	24·2	9·6	24·0	7·7	27·6	4·7	31·8	6·9
India	7·2	1·4	0·7	0·3	0·5	0·3	0·5	0·3
British Malaya	6·1	—	6·0	—	6·1	—	7·6	—
Australia ...	4·4	3·4	0·9	0·3	0·2	—	0·2	—

Southern Pacific.

59. The bulk of the copra exported from Australia has its origin in Papua and New Guinea. The area under coconuts in Papua is given as 46,798 acres and the value of the crop exceeds that of all other crops together. The yield of copra for the year ending 30th June, 1924, was 7,315 tons. There are three Government plantations, consisting of 1,150 acres. Both smoke-dried and kiln-treated copra are also shipped from Papua, but the Government plantations are not at present equipped with drying apparatus.

60. The output of copra from the territory of New Guinea is more important than that from Papua. Planting was commenced in 1883 and plantations have increased steadily in area and production, until 95 per cent. of the value of the total exports of the territory now consists of copra. The quantity exported in 1913 was 14,000 tons; in 1923-24 it was 34,974 tons.

61. The export of copra from the British Solomon Islands Protectorate and from the Gilbert and Ellice Islands Colony is also carried on mainly through Australia, and is subject to export duties amounting to 12*s.* 6*d.* per ton in the Protectorate, and to £1 a ton in the Colony. Labour in these areas is difficult to obtain and storage and transport facilities are inadequate.

62. We have been informed that the quality of South Sea copra is at present so unreliable that many margarine manufacturers hesitate to buy it. Our attention has been called to the effect of the Ordinance, brought into force in 1923, which regulates the copra trade of Western Samoa. This Ordinance prohibits the production of or trade in copra made from other than matured coconuts. The sale of undried, improperly dried, sweated, or rotten copra is prohibited, and the trade generally is rigidly controlled. The Ordinance further requires the inspection of all shipments of copra before export. *We are of opinion that the application of a similar Ordinance throughout*

the South Sea Islands under the administration of the British Empire would eventually benefit trade throughout the Island groups, as has undoubtedly been the case in Samoa.

India.

63. A considerable change has occurred, during and since the war, in India's copra trade. Before the war, India exported annually some 31,000 tons of copra and $1\frac{3}{4}$ million gallons of coconut oil. Latterly, however, considerable developments have occurred in the local crushing industry and in the local consumption of coconut oil in various forms. As a result, India's exports of copra and coconut oil are now negligible: her imports of the former amounted in 1925 to over 3,000 tons and of the latter to over one million gallons. In other words, India has changed over from an exporting to an importing country.

British Malaya.

64. The bulk of the exports are in the form of dried copra. The export of oil, although at present insignificant, is increasing. The problem of estate labour in this area presents certain difficulties, to the extent that it is predominantly immigrant. Immigration, however, is organised and labour from India is recruited under Government supervision.

65. Research in all branches of agricultural science is continually carried on by the local Department of Agriculture. Although in the Federated Malay States an export duty of $1\frac{1}{2}$ per cent. *ad valorem* is levied on coconuts and copra (but not on coconut oil), no similar duty is levied on the export of these products from the Straits Settlements.

66. The present system of collection and marketing is the ordinary open market method common to the handling of all agricultural and forest products in Malaya. The produce is sold locally and shipment to other countries is in the hands of produce merchants in Singapore and Penang. We understand that a scheme to establish co-operative societies in the Protected States for the marketing of the produce of small holdings is being considered, and this scheme, when developed, will probably have a beneficial effect on the production of copra.

Ceylon.

67. The collection of coconuts on the Ceylon estates is usually done by contract and the products are transported by bullock cart or motor lorry, where railway facilities are not available, and also by canal, to Colombo, where they are shipped overseas. Export duties are levied on coconut oil and on coconuts and copra amounting to 75 cents per cwt., Rs.3 per 1,000 lbs., and 60 cents per cwt. respectively.

68. The extraction of coconut oil for domestic use is in many parts still carried out by means of the bullock mill, but for com-

mercial purposes hydraulic presses and expellers are used. Large quantities of desiccated coconut are also produced.

69. The question of the establishment of a special coconut research scheme is under discussion. This scheme was agreed to by the Government in 1924, but the Legislative Council found itself unable to provide the necessary funds. The advantages to be derived by the local industry from a scheme of this character are obvious, *and we hope that progress with this scheme may yet be found possible.*

Fiji.

70. We understand that about one-third of the copra exported from Fiji is produced from native plantations belonging to a large number of small owners. Few of these producers have adequate storage accommodation or transport facilities. The local Agricultural Department has suggested the formation of a co-operative organisation of producers to assist them in handling and selling the copra. All copra exported from Fiji is subject to a duty of 2*s.* 6*d.* per ton. During 1922 a crushing mill was set up and coconut oil has since been exported on a small scale.

71. To prevent an extension of the ravages of the coconut moth to other copra-producing islands, a special staff of entomologists are actively engaged in combating this pest.

British East Africa.

72. The production of oil seeds in British East Africa is scattered and is mainly in native hands. The export trade in copra is increasing in importance. In Zanzibar, the produce is usually bought up by middlemen, who own the drying centres. There are steam oil mills in the Protectorate and soap and oil-cake are manufactured locally. In Mauritius, copra is collected at Port Louis from the Dependencies and the greater part re-exported. Local extraction is only carried on to a small extent. In the Seychelles an export duty was formerly levied on copra, but it was abolished at the beginning of 1926 with a view to encouraging the local industry and giving relief to planters.

73. The Zanzibar Government maintains an experimental factory where copra is made from the nuts grown on Government plantations. A study is also being made of the diseases of the coconut and investigation is being carried on regarding the elimination of these diseases and with a view to increasing the yield.

British West Africa.

74. The only exports of copra from this area are from the Gold Coast, and by far the greater quantity is sent to Germany, a negligible amount only reaching the United Kingdom. A certain amount of copra and coconut oil is also produced in Sierra Leone, but none is available for export.

75. The copra industry is being encouraged in the coastal districts of the Gold Coast by the local Government, and three communal plantations, with Singalese instructors, have been started.

British West Indies.

76. Although the production of copra in the British West Indies and British Guiana is relatively unimportant, the areas under the cultivation of the coconut palm in British Guiana, Jamaica, and the Leeward Islands have nearly doubled since the war. In some parts the cultivation of the coconut palm is being encouraged by means of Government loans.

XIII.—Palm Kernels, Palm and Palm Kernel Oils.

77. The commercial exploitation of the oil palm of Africa is practically confined to West Africa, Nigeria being the most important producer of the palm products. The following table shows the total quantities of palm kernels exported from the various parts of the British Empire :—

Export of Palm Kernels (in 1,000 Tons).

From	Average for quinquennium ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
The Sudan (Dom Palm Nuts).	1·7	0·2	0·2	—	2·2	—	5·0	*
British West Africa.	232·4	33·3	286·8	222·4	321·2	234·7	342·0	*

* Not available.

78. Imports into the United Kingdom of unrefined palm and palm kernel oils are obtained mainly from those countries from which the kernels themselves are derived. There is also a trifling importation of refined palm oil and palm kernel oil from Denmark and Holland. The following table shows the progress in the British West African trade in palm and palm kernel oils :—

Exports of Palm and Palm Kernel Oil (in 1,000 Tons).

From	Average for quinquennium ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
British West Africa.	92·0	77·0	104·2	65·7	131·5	73·6	132·6	*

* Not available.

British West Africa.

79. No statistics of the total production of palm kernels and palm oil in West Africa are available, but the export figures afford a rough indication of the large and increasing volume of this trade. There are also indications of an expanding local demand, met from local supplies.

80. The production of palm kernels and palm oil is carried out on primitive lines. The fruit is gathered from wild or semi-cultivated trees, and the oil is prepared in small quantities at a time, usually by women and children. The oil and kernels are collected by dealers from the villages and thence conveyed to local trading centres, where they are sold to traders who forward them to the coast for shipment.

81. The palm forests are for the most part communally owned, and we understand that the question of the revision of the present system of tenure in West Africa is under consideration. Export duties amounting to £1 per ton in Sierra Leone, and £1 2*s*. 6*d*. a ton in Nigeria, are levied on exports of palm kernels, while in the case of Nigeria export duties of £1 10*s*. 0*d*. per ton and £2 a ton are levied on palm oil and palm kernel oil respectively. The effect of these export duties on production cannot yet be definitely estimated. In 1923, the export duty imposed on palm oil in Sierra Leone was removed with a view to stimulate production, but the result has so far been disappointing. Exports, although higher in value, have not increased in volume. The declared policy of the Nigerian Government is the gradual removal of all export duties.

82. In some districts of West Africa care is taken to space out the palms and to clear undergrowth and superfluous roots, with beneficial results to the tree and its productivity. Research is actively carried on by local Departments of Agriculture in connection with the oil palm industry.

83. A careful study is being made of the different varieties of palms and the selection of the best strains with reference to yields of pericarp oil and kernels, and of the possibility of the introduction of improved methods of cultivation and improvement in native methods of making palm oil. Government plantations are being formed in Sierra Leone and the Gold Coast to demonstrate to native farmers the improved results possible by cultivation on modern lines.

84. Experiments have been made in Sierra Leone and the Gold Coast as to the effects on production of the introduction of a plantation system, and in Nigeria by the adoption of a licensing system designed to check undue competition between the various power-driven mills treating oil palm fruit. The whole question has been the subject of inquiry by a Committee appointed by the Secretary of State for the Colonies.

85. In view of the Report of that Committee we feel it is unnecessary for us to make further recommendations, but we wish to draw attention to the danger to which the native industry in West Africa is liable from competition from the Dutch East Indies, where the oil palm receives scientific attention and is grown under a definite plantation system. It is only necessary to remember the way in which the introduction of the rubber industry into Ceylon and Malaya entirely altered the balance of production and gravely undermined the former predominance of Brazil.

86. The extraordinary yields of fruit obtained from cultivated trees in Sumatra show distinctly that the oil palm readily responds to care and that such care is amply repaid. *We recommend that the Empire Governments concerned should give most careful attention to the possible application of some modified plantation system suitable to the needs and conditions of West Africa.*

87. The policy of erecting large mills in West Africa for the local crushing of palm kernels raises many questions of importance to which satisfactory solutions have yet to be found. The chief difficulties are those experienced in obtaining regular and adequate supplies of the raw material within easy reach of the mill, in training local labour, in providing for the expense of a European supervisory and technical staff, and in disposing of the by-products of the industry. The last point is one of considerable importance. It will be recognised that little or no saving of freight charges is effected if, instead of shipping the kernels to be crushed in Europe, the oil and the by-products are separately shipped. For the present, progress must be slow and must tend to concentrate on improved methods of cultivation and of extraction for local requirements only.

XIV.—Ground Nuts and Ground Nut Oil.

88. The imports of unrefined and refined ground nut oil into the United Kingdom are small, amounting to less than 5,000 tons in 1924. Practically all the unrefined oil comes from China, heavy imports from Japan from 1920 to 1922 having dwindled away in 1923 and disappeared altogether in 1924. The Netherlands are the chief suppliers of the refined oil, small quantities also coming from France and China. The margarine industry is now supplied chiefly by the importation and local crushing of the nuts. The bulk of the supplies of ground nuts are received undecorticated, but there appears to be a tendency for supplies of decorticated nuts to increase more rapidly than the undecorticated. The Empire supplies of undecorticated nuts are received mainly from the Gambia, the next country in order of importance being the Sudan. In the case of the decorticated nuts, the most important Empire sources are India and Nigeria. Of the foreign sources, French West Africa is by far the most

important supplier of undecorticated nuts, while China has of late developed the same line of trade. The following table gives the exports of ground nuts from the various parts of the Empire :—

Exports of Ground Nuts (in 1,000 Tons).

From	Average for quinquennium ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
India	211·8	1·9	266·6	16·5	242·7	12·9	462·8	30·3
British Malaya	3·3	—	1·0	—	0·9	—	2·8	—
British West Africa.	63·4	4·4	85·5	35·0	137·3	48·0	175·9	*
British East Africa.	0·5	—	17·1	0·9	19·0	0·1	*	*
The Sudan ...	0·8	—	5·9	2·0	10·2	5·4	11·6	*

* Not available.

89. There are certain special features of importance in regard to the production of ground nuts to which we wish to draw attention. Cultivation of this crop is possible practically throughout the tropical area. Further, the ground nut is a leguminous plant and is therefore to a certain extent a renovator instead of having an exhausting effect on the soil. *Where consideration has to be given to the serious problems which soil exhaustion creates in portions of the tropics, it is difficult to exaggerate the significance of a balanced system of crop rotation and the importance of an extension of the cultivation of the ground nut not only on account of its effect on the soil, but also by reason of the value of the plant as fodder, of the nut as a foodstuff, and of the residue cake as food for animals or as a manure.*

India.

90. The production of ground nuts in India has increased materially during the past 20 years, both for local consumption and for export, as the following figures show :—

——	Average of five years 1909–10 to 1913–14.	1919–20.	1923–24.	1924–25.	1925–26.
	1,000 tons.	1,000 tons.	1,000 tons.	1,000 tons.	1,000 tons.
Production (in shell)	695	822	1,084	1,450	1,908
Export (decorticated).	212	112	257	376	455

Cultivation is carried on chiefly in the Madras and Bombay Presidencies, in the Province of Burma, and in the State of Hyderabad. There have also been recent extensions of cultivation into Northern India and to the United Provinces and Bihar.

91. The yields per acre of ground nuts grown in the Presidencies of Bombay and Madras averaged over a period of five years 1,800 lbs. and 1,030 lbs. per acre respectively. In Burma the yield per acre (741 lbs. in 1925-26) is slightly smaller, while that of Hyderabad is very low, being in 1925-26 only 248 lbs. per acre. Witnesses have not been able to give us any reason for this low yield per acre, but a hopeful sign is to be found in the increase which has taken place since the year 1923-24, when it was as low as 132 lbs. per acre.

92. The Agricultural Departments in India have done considerable research on this crop and have issued improved seed with satisfactory results. In the Review of Agricultural Operations in India for the year 1924-25, it is stated that :—

> " The introduction of quick-growing varieties of high oil-content in Bombay has led to the expansion of ground nut cultivation, especially in Khandesh and North Gujarat. In 1912-13 the area under ground nut in these two districts was about 4,500 acres; the acreage has increased to 180,000. This increase means that a crop worth Rs. 40 per acre has been replaced by another worth Rs. 80-100.
>
> " The selection work at Ranchi in Bihar and Orissa has yielded a type called Kanke 17 which is being distributed in the Chota Nagpur plateau. The cultivation of ground nut is spreading in the Patna and Bhagalpur Circles where it has proved a valuable crop on poor sandy soils. As remarked in the annual report of the Nawada Central Co-operative Bank, ' the yield fetches an average income of Rs. 100 per acre on land which the cultivators used to grow only kurthi, etc., the yield of which has never exceeded Rs. 16 per acre.' The search for a more prolific variety of the erect type has yielded three strains which are considered suitable for general distribution."

93. Our attention has been called to the varying conditions in which supplies are received in the United Kingdom from India. The best grade is that known as " dry machine-decorticated." Unfortunately the practice of damping the nuts to facilitate whole decortication is prevalent in India, as a preliminary both to machine and hand decortication. The humidity reaches the kernels and sets up fermentation which results in the formation of free fatty acids, with a consequent lowering of the edible oil contents and a reduction of the market value. The humidity is to some extent counteracted by artificial drying before export. *We have, however, received ample evidence to*

convince us that dry decortication is the best method to adopt and one which will lead to higher prices being obtained on the London market.

94. So far as the local demand in India is concerned, this has tended to concentrate chiefly on the uncrushed nut, which is a valuable food, rich in proteins. It is not unlikely, however, that the demand for ground nuts for crushing purposes in India will expand in the near future as the dietetic value of the oil is realised and the local demand for the cake for cattle food increases. Up to the present time, while local consumption has considerably increased, it has not yet overtaken the increased supplies resulting from extended cultivation, with the result already shown in increased exports.

British West Africa.

95. Although the cultivation of ground nuts is carried on in all parts of British West Africa, the production of nuts and oil in Sierra Leone and the Gold Coast is insufficient to satisfy the local demand, and it is necessary to obtain additional supplies from other parts of West Africa. The general importance of the production of ground nuts in Nigeria and the Gambia is indicated by the exports from these two countries, which amounted in 1925 to 127,200 tons and 48,700 tons respectively. There is in the Gambia an export duty of £1 per ton on ground nuts; and screening has been made compulsory in order to improve the condition of the nuts for export. Large numbers of immigrant farmers enter the Gambia from the adjoining countries to plant ground nuts, and it is to a great extent upon their presence and energy that the prosperity of the Colony depends.

96. The methods by which the crop is harvested vary slightly. In the neighbourhood of Kano it is usual to detach the nuts by hand and to use the rest of the plant as fodder or to burn it and use it as a manure. In the more remote districts the plants are uprooted and placed in heaps to dry and then beaten lightly with sticks. The nuts are then winnowed in calabashes. Decortication is carried out by means of a large wooden pestle and mortar. The nuts are sold either direct to the exporter in Kano or to petty traders. From Kano the nuts are despatched by rail to the exporter at Lagos.

97. A number of seed farms and depots for ground nuts are being established in the Gambia to raise large quantities of special varieties of seed nuts of improved quality and in order to ascertain the cultural requirements of each district and the suitability of new varieties.

British East Africa.

98. The remarkable increase in the quantities of ground nuts exported from British East Africa during 1923 and subsequent

years, as compared with pre-war years, is not altogether accounted for by the inclusion of Tanganyika exports, which, in 1913, amounted to approximately 6,000 tons. The increased trade is due chiefly to extensions of the acreage under this crop. In Mauritius, attempts are being made to grow ground nuts on a commercial scale. Insufficiency of funds unfortunately hampers research. From the evidence before us, we are satisfied that there is a good market for the best types of ground nuts, and *we strongly urge that the agricultural departments concerned should pay special attention to the production and distribution of improved strains.*

XV.—Sesame.

99. Although considerable supplies of sesame are available within the Empire, the greater part of the seed used in the United Kingdom has in the past been obtained from China. The principal producing country of the Empire is India, but supplies are also available from British East and West Africa and the Sudan. So far as the United Kingdom is concerned, the trade in this seed is relatively unimportant. The following table shows the exports from the various parts of the Empire :—

Exports of Sesame (in 1,000 tons).

From	Average for Quinquennium, ending 1913.		1923.		1924.		1925.	
	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.	Total.	To United Kingdom.
India	119·2	0·2	11·0	—	25·4	—	46·8	—
The Sudan ...	59·0	—	10·4	0·3	9·0	0·5	9·8	*
British East Africa.	3·7	0·1	6·8	—	8·2	—	*	*
British West Africa (Nigeria).	0·5	0·5	3·0	1·8	4·2	0·2	1·9	*

* Not available.

India.

100. India is one of the principal sources of sesame, of which she produces between 400,000 and 500,000 tons annually. Before the war one-quarter of the crop was exported and the remainder retained for local consumption. Local demands have since, however, considerably increased and now account for 90 per cent. of the output. The exports, which have increased materially during the past three years, are chiefly consigned to Italy, France, Holland, Germany, and Belgium. As already

explained in paragraph 28 of this Report, the introduction of certain quantities of sesame oil in the manufacture of margarine is required by law in certain Continental countries. The demands thus enforced tend to enhance the price, which is usually too high for manufacturers in the United Kingdom. It is unfortunate that while sesame oil is undoubtedly a valuable ingredient of margarine the crop itself is exhausting to the soil. *For this reason we recommend that no active measures should be taken to extend its cultivation.*

The Sudan.

101. Until 1924 sesame was the most important oil seed exported from the Sudan, but, in that year, it was displaced by cotton seed. Further extensions of the sesame crop will have to be carefully watched, and special measures taken, if necessary, to secure a suitable rotation.

British East Africa.

102. Sesame oil, or " Sim sim," as it is called in East Africa, is a very popular article of diet and the plant is to be found in every village *For the reason which we have already given we do not recommend any extension in cultivation for export purposes.*

XVI.—Soya Beans and Soya Bean Oil.

103. Soya bean is indigenous to China, Manchuria, Korea, Japan, and Indo-China, and it is from these countries that the demand of the English manufacturer is met. Supplies were at one time also received from Russia, but these have now ceased. Attempts have been made to introduce the cultivation of the soya bean into many parts of the British Empire, but it does not appear that, at least for some time, it will be possible to establish any considerable export trade, as in most cases a local demand has sprung up leaving little or no surplus for export. *As the soya bean can be cultivated in regions of very wide climatic differences we consider that these efforts to introduce a new and profitable crop into the Empire should be given all possible assistance and that a rapid increase in the acreage should be encouraged.*

XVII.—Sunflower Seed.

104. Sunflower seed oil is only used to a limited extent for the manufacture of margarine. The main source of this seed is South Russia, whence, in 1924, a remarkable increase occurred in the imports of sunflower seed into the United Kingdom. In that year, Russia accounted for over 30,000 tons out of a total of 33,300 tons of the sunflower seed imported. After Russia, Argentina and South Africa are the chief sources of supply, but their exports are small and irregular.

105. Although the sunflower is widely distributed and is to be found in practically all countries, it is not generally cultivated on a commercial scale. We understand that efforts are being made to increase the cultivation in South Africa and that experimental crops have also been grown in several other parts of the British Empire. *We recommend that these attempts to introduce the commercial cultivation of a new and valuable crop should be encouraged.*

XVIII.—Mowra, Kapok, and Babassu.

Mowra.

106. Mowra, or mahua seed, is obtained from trees of the *species bassia,* which is widely distributed in Central and Western India. The seed contains a rich oil highly prized in India as a substitute for butter. Statistics of production are not available, but consumption in India is apparently increasing, to judge from the reduced quantities now available for export :—

Exports of Mowra (in 1,000 *tons).*

From	Average for quinquennium ending 1913.	1923.	1924.	1925.
India	29·2	12·7	2·0	1·0

The crop is a valuable one, but regular and continuous supplies cannot be counted upon in view of the strong local demand.

Kapok.

107. The Kapok tree is grown mainly in the British and Dutch East Indies for the sake of its well-known fibre, but the seed yields an oil which is almost identical in character with cotton seed oil. Although this oil is used to some extent by margarine manufacturers in the United Kingdom, it is at present unimportant. No statistics either of the imports into the United Kingdom or of the exports from Empire producing countries are available.

Babassu.

108. The babassu nut is the product of a forest tree indigenous to Brazil. The use of babassu oil for the manufacture of margarine was practically unknown until 1914, but at the present time fairly considerable quantities of the nuts from which the oil is derived are shipped from Brazil, the exports from that country having risen from 6,582 metric tons in 1920 to 35,281 metric tons in 1923. The exports in 1924 were 18,314 metric tons. The supplies available in the United Kingdom are, however, very limited, the greater part of the kernels being sent to Germany.

XIX.—Demand in Producing Countries.

109. In the foregoing survey, sufficient has been said to show how important is the effect of local demands, not merely on the production of oil seeds but also on the quantities available for export. The production of cotton seed in India has been estimated to represent an annual crop of nearly 2,000,000 tons, but of that quantity only 197,000 tons were exported during the year 1925. In the case of ground nuts, out of a production of nearly 2,000,000 tons there was left available for export during the same year, after meeting local needs, a surplus of less than 500,000 tons. Should the local demand for ground nut oil and cake increase materially, a development which is by no means improbable, the position of India as one of the chief sources of supply would be greatly affected. A transformation of this kind has taken place during the past ten years in India's trade in copra and coconut oil.

110. Our attention has also been called to the experience of those areas of Central and East Africa where the cultivation of cotton has been introduced. The African cultivator, observing the financial advantages resulting from the growing of cotton, has neglected other crops, including even his natural food crops, in favour of cotton cultivation. In other words, vicissitude of price as well as of local demand may easily lead to the transfer of attention from indigenous oil seeds to extraneous crops of greater value.

111. It is clear, therefore, that the world supply of vegetable oils and fats is likely to be subject in the future to increasing demands from the producing countries themselves. These will arise from (*a*) the natural growth of population, (*b*) the growing appreciation in producing areas of the food value of nuts and their oils, for both human beings and for cattle, (*c*) the tendency to devote increased attention to more immediately remunerative crops at the expense of locally grown foodstuffs, (*d*) the development of local industries consuming vegetable oils in processes of manufacture (such as soap-making), and (*e*) the development of the use of vegetable oils as fuel for transport purposes. Against these factors must be set the natural extensions of cultivation called for by increased demands, local or foreign, improvements of cultivation leading to higher yields per acre, and the perfection of processes which eliminate waste in handling, refining, transport, and storage. *Having in view all the considerations set out above, we feel it is of great importance to the Empire as a whole that continual research and experiment should be directed upon the methods of production and that every effort should be made to educate the native to an appreciation of the importance of these crops. We further consider that the advancement of research will be assisted by co-ordination of effort between the various Colonies interested.*

XX.—Demand in the United Kingdom.

112. The following table shows the imports into the United Kingdom of the most important oils and oil seeds during recent years :—

Imports of Vegetable Oil Seeds and Oils (in 1,000 tons).

——	1913.	1923.	1924.	1925.
Copra	30·9	86·5	86·1	102·7
Coconut oil (unrefined) ...	31·1	19·5	17·2	24·6
Palm kernels	*	261·5	297·0	243·9
Palm oil (unrefined)	78·1	64·3	74·0	80·3
Ground nuts	*	96·6	99·2	133·3
Cotton seed	615·3	548·3	558·3	605·7
Cotton seed oil (unrefined) ...	1·0	3·3	2·0	1·6
Soya beans	76·5	113·1	111·5	162·0
Soya bean oil	*	23·6	29·5	29·5
Rape seed	53·1	60·9	68·6	36·8
Sesame	*	6·3	7·8	1·2

* Not separately available.

113. These oils are all largely but not entirely utilised in the manufacture of margarine. The chief competition comes from the soap manufacturer, whose demands, however, tend to concentrate on the lower grades of oil unsuitable for edible purposes, and also on those materials recovered as by-products in the preparation of refined oils for manufacture of margarine.

114. The great importance to the margarine industry of regular and sufficient supplies of vegetable oil seeds and oils is shown by an estimate, which has been submitted to us, indicating that approximately 10 per cent. of the vegetable oils available in the United Kingdom is consumed in the manufacture of soap and that, while an additional 15 per cent. is used for various other industrial purposes, the remaining 75 per cent. is taken by the margarine industry. There is a large and growing trade in the manufacture of cake and other foodstuffs for cattle which absorbs many by-products of the industry.

XXI.—Demand in the United States.

115. Several witnesses have called our attention to the great increase in the consumption of coconut oil and cotton seed oil in the United States, a development which has had no little effect on the general position of the industry. Before the war, 16,000 tons of copra and 22,100 tons of coconut oil were imported into that country, while in 1925 the imports of these two substances were 162,500 tons and 104,100 tons respectively. A similar increase is shown in the imports of cotton seed, which rose from an average of 845 tons in the years 1909-1913 to 42,400 tons in 1924, and 29,000 tons in 1925. The importation

of ground nuts and ground nut oil rose from an annual average of 8,700 tons during 1909-1913 to 39,100 tons in 1925. Considerable increases are also shown in the imports of other oil seeds and oils.

116. The greater part of the supplies of copra are obtained from the Philippine Islands, to which a preference is given under the United States tariff. The duties on foreign raw coconuts is ½ cent each, on prepared coconut meat 3½ cents per lb., and on coconut oil 2 cents per lb. In all cases supplies from the Philippine Islands are admitted duty free. The great benefit which has accrued to the Philippine Islands owing to the operation of this preference is indicated by the increase which has taken place in the export trade from the Philippine Islands to the United States. In 1913 this trade amounted to £3,424,000. In 1925 it had increased to £22,028,000.

XXII.—Demand in other Foreign Countries.

117. In addition to the competition from the United States for the available supplies of vegetable oils, a considerable and increasing demand comes from France, Germany, Holland, Italy, Norway, and Denmark. For example, the imports of ground nuts into France have increased from 231,000 metric tons (undecorticated) and 200,000 metric tons (decorticated), the average for the quinquennium 1909-1913, to 334,000 metric tons and 232,000 metric tons respectively in 1924.

118. In Germany there appears to have been a change over from sesame and cotton seed oils to ground nut and soya bean oils. Imports of sesame seed and cotton seed have fallen from 107,000 metric tons and 158,000 metric tons respectively for the pre-war period 1909-1913, to 21,000 metric tons and 47,000 metric tons respectively in 1925, while the imports of ground nuts have increased from 71,000 metric tons pre-war to 324,000 metric tons in 1925; and of soya beans from 86,000 metric tons to 537,000 metric tons.

119. The most important increases in the supplies of oil bearing materials imported by Holland have been with regard to copra, ground nuts, and soya beans. The average annual imports of these three commodities during the pre-war period 1909-1913 amounted to 90,000 metric tons, 56,000 metric tons, and 5,000 metric tons respectively, while the figures for 1925 are 133,000 metric tons, 104,000 metric tons, and 38,000 tons respectively.

120. We have already called attention to the large consumption of margarine in Denmark. In this case the quantity of soya beans imported has increased from 34,400 metric tons for the pre-war period 1909-1913, to 110,000 metric tons in 1925. The imports of copra have also more than doubled, having risen from 24,300 metric tons to 49,200 metric tons in 1925. Increases

have also taken place in the imports of sesame, ground nuts, and sunflower seed. On the other hand, the demand for animal oils has remained steady with a tendency to fall.

XXIII.—The United Kingdom Market.

(a) *Organisation.*

121. The principal markets of the United Kingdom for vegetable oil seeds and oils are London, Liverpool, and Hull. Some crushers import their own supplies of the raw material while others purchase from importers through brokers. The trade thus passes through comparatively few hands and there is no evidence that middlemen secure an undue share of the ultimate price. Manufacturers of margarine either purchase and crush the seed or secure their supplies of oil in the open market.

(b) *Prices of Raw Materials.*

122. In contrast with many other staple commodities handled in the world's markets, the prices of the principal oil seeds and oils have remained comparatively steady during the past few years. A chart appended to this Report* indicates a general tendency of the prices of these materials to rise from the middle of 1922 to the end of 1924, and thence to fall gradually during the past eighteen months.

123. In this connection, it is of interest to compare the returns received by the original growers or up-country dealers in the various producing countries for products which compete on the United Kingdom market. An instance of such competition and the varying results to the grower, due chiefly to differences in the cost of transport, is afforded by a comparison of the returns secured on the one hand by a West African producer of ground nuts, and on the other by an Indian producer.

124. We have in both instances started our investigation from typical United Kingdom market quotations for the competing articles. We have followed the quotations back to their respective sources, deducting transport, handling, and other incidental charges, and we have arrived at the following results, as percentages of the United Kingdom price.

125. In the case of West African ground nuts :—

> From a c.i.f. Liverpool price of £21 per ton we arrive at a f.o.b. Lagos price of £18 13*s.* 9*d.* per ton, and a price at Kano of £11 13*s.* 7*d.* per ton, affording a return to the grower of £8 3*s.* 7*d.* per ton, or 41·3 per cent. of the Liverpool price.

126. The great difference between the prices at Kano and Lagos is due to the cost of railway freight between the two towns. For this journey of 700 miles, a special railway rate (which includes

* *See* Appendix II.

terminal charge of 5*s*.) of £4 11*s*. 3*d*. a ton is charged, which is equivalent to a fraction under 1½*d*. per ton per mile. It has, in this connection, been pointed out to us that a fall in the United Kingdom price might reduce the price to the grower to such an extent that it would be unprofitable for him to cultivate ground nuts for export. *We suggest that this rate of freight be reconsidered by the local railway authorities and that the possible effect of a reduction of freight in stimulating the local industry and traffic in ground nuts be examined.*

127. The same calculation in the case of Indian ground nuts shows very different results to the grower or primary dealer in India :—

> From a c.i.f. London or Hull price of £23 per ton we arrive at a f.o.b. Bombay price of £20 per ton, a Bombay market price of £18 17*s*. per ton, and a price to the grower, say 200 miles up-country, of £16 17*s*. per ton.

128. In other words, the Indian producer receives a sum which represents 73·3 per cent. of the London or Hull price. The advantage he derives is due almost entirely to cheap railway freights, amounting to approximately one penny per ton per mile, and cheap steamship freights.

XXIV.—Conditions of Sale in United Kingdom.

129. Our attention has been drawn to certain differences in the conditions of sale of different classes of oil seeds and oils in the United Kingdom. While the valuation of palm kernels is made on a basis of 49 per cent. of fat, allowances in the case of copra are estimated on appearance. We are given to understand that contracts for the sale of crude oil usually specify definite allowances above or below an agreed percentage of free fatty acids. Thus palm kernel oil is bought on a basis of 5 per cent. of free fatty acid content.

130. The price received by the oil crushers for their products naturally depends on the purity of the oil content of the seeds. A suggestion has been made to us that ground nuts should be sold on a basis of 5 per cent. of free fatty acid with allowances " on " or " off " in accordance with the percentages actually obtained. For the manufacture of margarine, the removal of all free fatty acids and other impurities is essential and requires fully as much attention as do the actual processes of manufacture. As the amount of free fatty acids present is to a large extent due to careless methods of preparation for the market, it is only right that a premium should, so far as possible, be secured for supplies coming forward with a minimum free fatty acid content. It appears, therefore, that the contemplated reform would mark a definite step forward towards purity of supplies.

XXV.—Conclusions and Recommendations.

131. The main conclusions and recommendations to which we have come in regard to the production and marketing of margarine may be summarised as follows :—

(i) The production of margarine is to-day dependent in the main on vegetable oils produced in tropical and sub-tropical climates. It is, therefore, the basis of an important natural trade, the interchange of primary tropical produce for the manufactured products of the temperate zones.

(ii) There is but little difference in the fat and protein contents of margarine and butter, and from that point of view they are foods of equivalent value.

(iii) The vitamin content of butter is high when it is made from the milk of meadow-fed cows, but the vitamin content of margarine made from vegetable oils is almost negligible. It follows that margarine is a useful food for adult persons, especially for muscle workers, but because of its vitamin deficiency inferior to butter even for adults and very definitely for growing children.

(iv) These statements may be modified in some degree in respect of margarine which contains a proportion of butter and other animal fats.

(v) The chief problem of research in connection with margarine is the discovery of some palatable oil rich in vitamins and suitable for mixture with the other ingredients.

(vi) We recommend that funds should be made available for research with the view to the conversion of fish oils and fats into an edible form.

(vii) It is likely that the supply of vegetable oils from the tropical and sub-tropical lands will increase with the greater employment of the residues locally as food for cattle and for manure. This is especially the case in the densely peopled land of India, and the problem for research in this connection is in regard to the transport of oil in bulk in tanker ships from India to Europe.

(viii) We make the following recommendations with a view to increasing the production of vegetable oils in certain regions of the Empire :—

India.

We consider that the action which is being taken by Agricultural Departments in India to discover and distribute improved strains of ground nuts should be continued and, where possible, extended.

A consideration of the importance of keeping at a minimum the formation of free fatty acid in ground nuts in storage and transit, and thus of eliminating waste, has convinced us that the adoption of the dry method of decortication will in the long run lead to higher prices being obtained on the United Kingdom market.

Southern Pacific.

We suggest that regulation of the copra trade in the Southern Pacific on lines similar to those adopted in Western Samoa would eventually benefit the trade through-

out the Island Groups. Every effort should also be made to ensure the arrival of raw materials at the loading port in a good condition, especially during the wet season.

Africa.

We commend to the Governments of those parts of British East and West Africa interested in the oil palm products a most careful consideration of the competition which is arising from the East Indies, and we recommend that they should continue research with a view to improvement in methods of cultivation and extraction. We further recommend that they should guard against the possibility of undue competition between local mills, and that consideration be given to the introduction of some modified plantation system suitable to the needs and conditions of those parts of Africa.

We urge that the Agriculture Departments in East Africa should pay special attention to the production and distribution of improved strains of ground nuts, a need to which we have also called attention in the case of India.

General.

We consider that the efforts which have been made to introduce the cultivation of the soya bean within the Empire should be given all possible assistance and encouragement, with a view to increasing the acreage at present under this crop.

H. J. MACKINDER (*Chairman*).

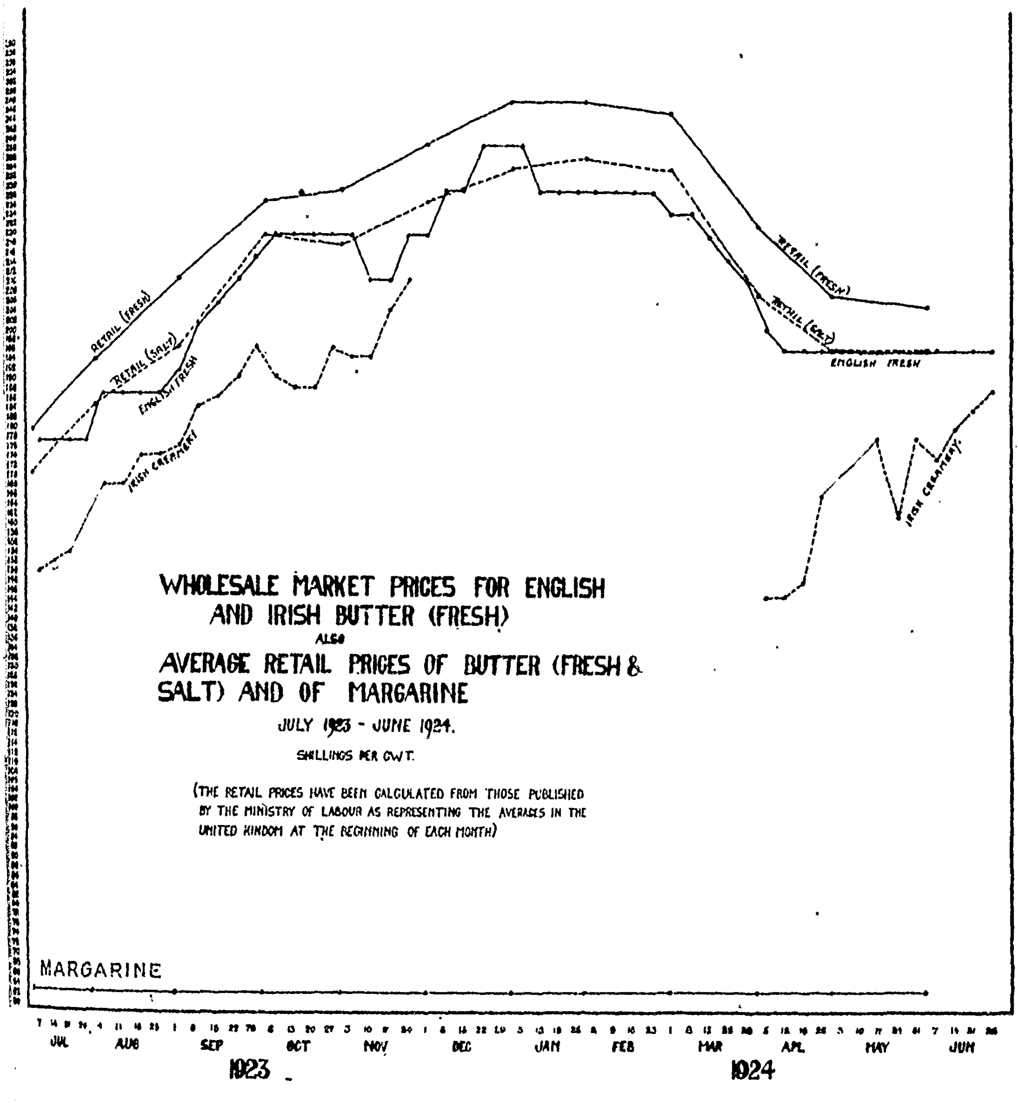
ALGERNON F. FIRTH THOMAS ALLEN W. S. CRAWFORD F. N. BLUNDELL	United Kingdom.
F. L. McDOUGALL W. H. CLIFFORD	Commonwealth of Australia.
J. ALLEN R. S. FORSYTH	New Zealand.
J. H. DIMOND	Union of South Africa.
JAMES McNEILL A. POOLE WILSON	Irish Free State.
VICTOR GORDON	Newfoundland.
F. NEWTON	Southern Rhodesia.
ATUL C. CHATTERJEE M. M. S. GUBBAY	India.
G. GRINDLE S. H. H. HENN	Colonies and Protectorates.

H. BROADLEY (*Secretary*).
W. J. GALLEY (*Assistant Secretary*).
5th August, 1926.

(8/26) (59552) Wt. 13717—125 5000 10/26 H. St. G 71.

APPENDIX I.

(THREE CHARTS.)



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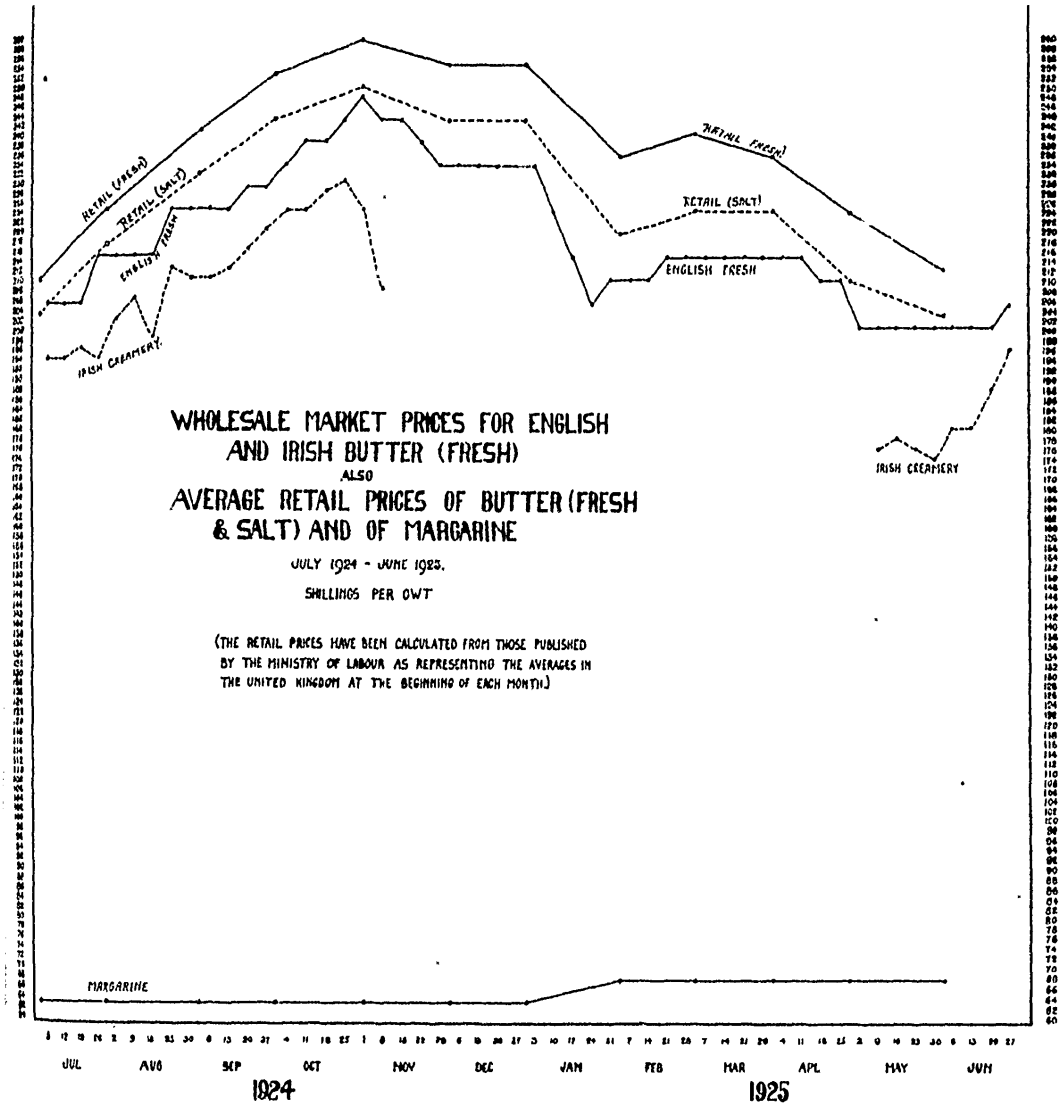

WHOLESALE MARKET PRICES FOR ENGLISH AND IRISH BUTTER (FRESH)

ALSO

AVERAGE RETAIL PRICES OF BUTTER (FRESH & SALT) AND OF MARGARINE

JULY 1924 - JUNE 1925.

SHILLINGS PER CWT

(THE RETAIL PRICES HAVE BEEN CALCULATED FROM THOSE PUBLISHED BY THE MINISTRY OF LABOUR AS REPRESENTING THE AVERAGES IN THE UNITED KINGDOM AT THE BEGINNING OF EACH MONTH.)

C7635

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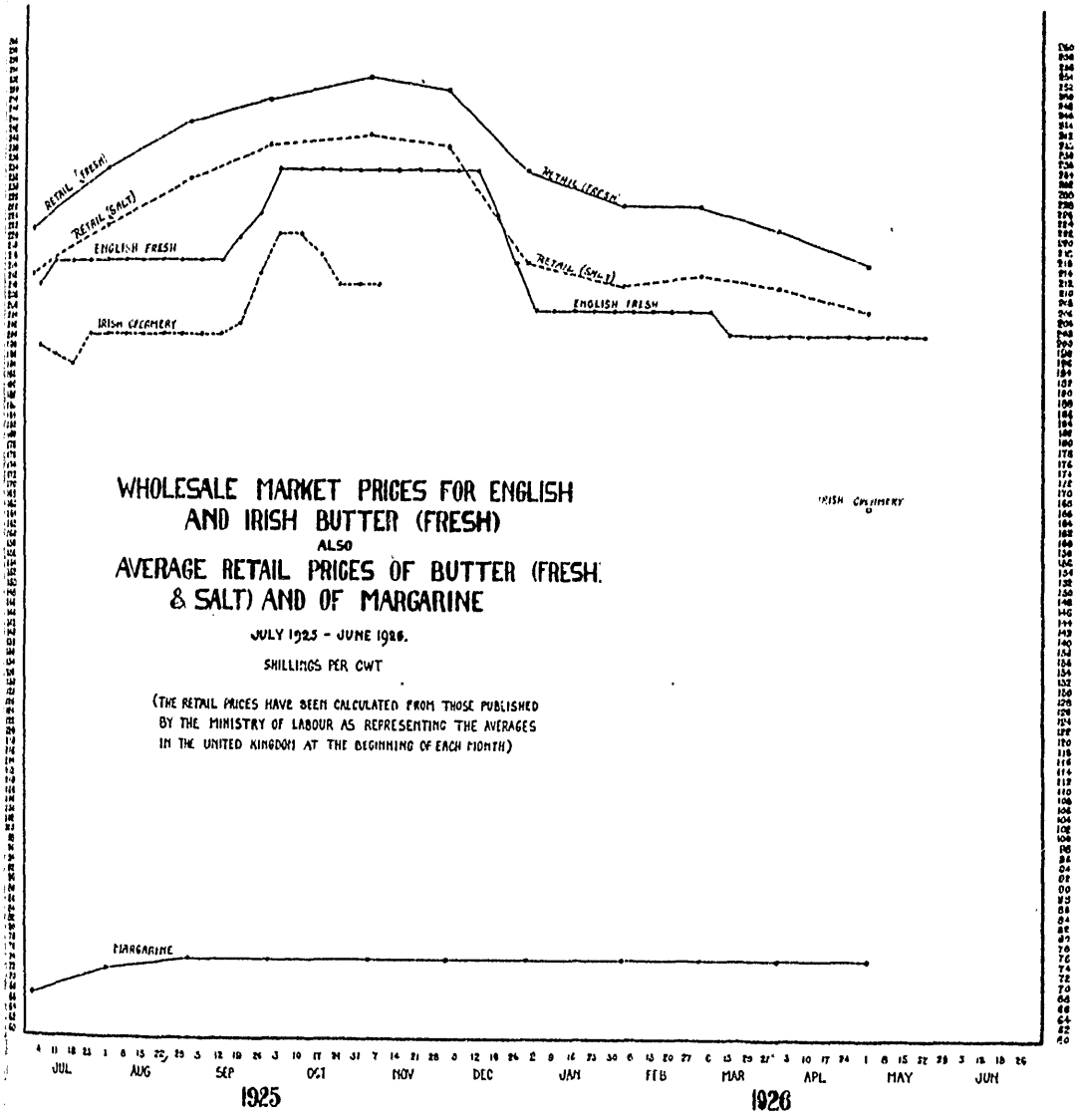

WHOLESALE MARKET PRICES FOR ENGLISH AND IRISH BUTTER (FRESH)

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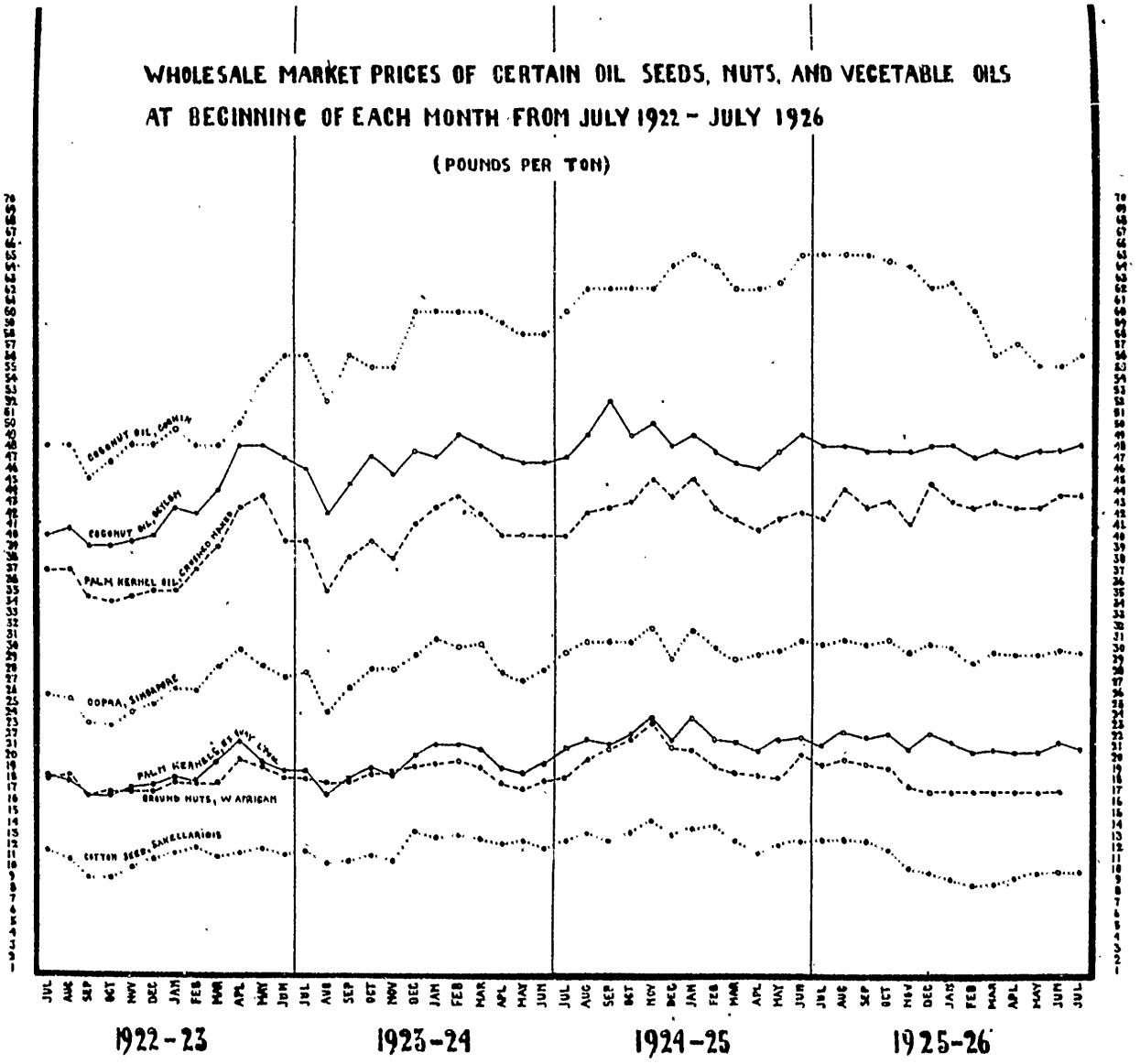
P 7834

Malby & Sons. Photo-Litho

APPENDIX II.



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