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SOME ASPECTS OF THE NEW ZEALAND DAIRY INDUSTRY

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New Zealand is a country heavily dependent on a large volume of imports to meet the everyday requirements of her population and to provide raw materials for use in the expanding manufacturing industries which employ the bulk of her labour force. As living standards continue to rise and as the population continues to grow, the demand for goods and raw materials from overseas will expand, and in order that this flow of imports can be sustained it is imperative that there should be an increasing volume of overseas funds available to finance them. As these overseas funds can only accrue from the sale of locally produced goods in markets abroad, the export industries of New Zealand hold an important and very responsible position in the country's economy.

The export industries of New Zealand are founded on agriculture, the production of meat, wool and dairy produce being the principal activities, and the various products of these industries make up practically the whole of the Dominion's export trade. Naturally, in any one year the share of each in relation to receipts from exports will depend upon the volume available for export and the relative levels of overseas prices, but proceeds from the sale of dairy produce, including dairy meats and by-products, normally account for over one-third of the total.

STRUCTURE OF THE INDUSTRY

There are two distinct branches of the dairy industry in New Zealand, that concerned with the manufacture of dairy products, and that responsible for the supply of liquid milk for human consumption on the local market. These two sections are quite distinct, both from the viewpoint of administration and farming practice. Whereas the latter calls for a flow of milk from the farm to the liquid milk selling organizations throughout the twelve months of the year, the supply of milk or cream for manufacture into dairy products follows a distinct seasonal pattern. The starting and finishing points of the season vary slightly as between the northern and southern districts of the country, but generally the production season can be said to start in August, rise to a seasonal flush during October, November, December and January, and then fall off to finish in May. Production does continue during the remaining months but this is largely through the overlapping of seasons as between the different districts. However, the manufacturing section of the industry is by far the most important, the liquid milk sector accounting for less than nine per cent of the total volume of milk produced, so that, in effect, dairy production in New Zealand is geared to this seasonal pattern. Not only does it affect the pattern of farm management and the capacity of dairy manufacturing plants, but it also has an important bearing on the size of storage facilities and the arrangement of shipping programmes. It is with the manufacturing section of the industry that this article is concerned.

The dairy industry in New Zealand is firmly based on co-operation. There are approximately 42,000 dairy farmers in the Dominion who supply milk or cream to dairy companies for manufacture into various dairy products and, with five

exceptions, one of which is a major manufacturer of condensed milk, all of the companies are farmer-owned co-operatives and produce all the butter, cheese and casein and virtually all of the other dairy products manufactured in the Dominion. Nearly all of the share capital in these co-operative companies is held by farmers who supply their produce to the companies, with shares held on a basis according to the amount of butterfat in milk or cream supplied. This is an important feature of the dairy industry in New Zealand and quite different from most overseas systems where farmers supply milk to dairy companies and receive payment for the milk as such rather than for the butterfat content thereof. In this country butterfat has become the standard denominator used for the assessment of the volume of supply received from the supplier and the measurement of costs as well as forming the basis of payments made by dairy companies to their suppliers.

Supplying dairy farmers elect directors from their own colleagues to administer the affairs of their company and the companies in turn elect their own delegates to industry conferences or organizations which play a major part in shaping industry policy. The principal organizations directly concerned with the affairs of the industry are the New Zealand Dairy Board, as administrative head, the New Zealand Dairy Products Marketing Commission, which sells the produce, and the Dairy Products Prices Authority, which is the body responsible for price fixing. Producers elect their representatives to each of these organizations so that it can truly be said that from the factory upward the industry is a co-operative—co-operatively owned and co-operatively organized through the democratic pattern of election of personnel who are prepared to place themselves above sectional interests and work in harmony for the good of the other shareholders in this important undertaking.

STOCK AND FARM PRODUCTION

Ninety per cent of the two million cows used for dairying are found in the North Island with the heaviest concentration in the area surrounding Hamilton, 100 miles south of Auckland. In this district, along with the coastal strip of the Bay of Plenty, are found nearly 40 per cent of the Dominion's dairy cow population. A further 23 per cent are in the area north of Auckland, while the other two districts where dairying predominates are in Taranaki on the West Coast of the North Island, and the Manawatu, about 100 miles north of Wellington. Each of these areas accounts for a further 12 per cent of total dairy cow numbers. These are all districts where the land is reasonably level and where the rainfall is fairly high and well distributed over the year.

The combination of a climate free of extremes and an adequate rainfall lead to practices which make dairy farming in this country different to systems carried on elsewhere. In the first place, feed supplies are almost entirely from pastures, and, secondly, the climate is sufficiently mild to render unnecessary the housing of cattle in the winter months. Very dry periods in the summer months can cause difficulties, but generally drought conditions are not prolonged so that with the well distributed rainfall and the application of artificial fertilizers, particularly phosphates, pasture growth is continuous for most of the year. In times of feed shortage, supplements in the form of hay and silage conserved during the months when surplus feed is available are fed out as required.

Most of the dairy farms are between 50 and 150 acres in size, carrying from 30 to 80 cows. Jerseys are the dominant breed accounting for 85 per cent of the total dairy stock, this breed being favoured because of its high efficiency as a producer of butterfat and milk solids. While there is considerable variation as between the performance of individual cows and an average of over 500 lb. of butterfat per cow in herds is regularly recorded, the Dominion average, based on the amount of butterfat which the dairy farmer sells to his factory (*i.e.*, excluding quantities held back for his own use, calf rearing or wastage) is around 270 lb. of butterfat per cow. This figure has advanced steadily over the years, reflecting to some extent the increasing dominance of the Jersey breed but also the general overall improvement in the standard of the national dairy herd through the selection methods available under the herd improvement programme and the introduction of artificial breeding. Over 20 per cent of dairy cows in milk are tested each year while at the present time a similar percentage are inseminated artificially. Artificial breeding has made rapid strides in New Zealand, and, whereas in 1950 a total of 4,000 cows were inseminated by this means, the number this year will be about 425,000. It is expected that the spectacular growth of this service will continue. Its further expansion will ensure a further continuing improvement in the overall standard of the Dominion's dairy herd.

MANUFACTURE

Dairy companies in New Zealand range in size from small units operating a single butter or cheese factory with an output, in a very few cases, of less than 100 tons per year, to large scale enterprises operating factories manufacturing a variety of dairy products. Easily the largest company is the New Zealand Co-operative Dairy Company, the biggest undertaking of its type in the world. Last year this company with its 9,300 suppliers and 52 factories manufactured 78,000 tons of butter, 10,200 tons of cheese, 38,000 tons of milk powders and 8,600 tons of casein, besides smaller quantities of condensed milk and special products.

Over the years there has been a steady drop in the number of dairy factories as smaller units have combined to form larger ones, or as uneconomic factories have merged with their more efficient neighbours. This trend has been brought about by the development of modern methods of transport and the vast improvement in roads which has greatly extended the area of efficient operation for dairy companies. The movement has been accentuated by the increased importance of products other than butter and cheese, so that whereas in earlier years butter companies were collecting only their suppliers' cream and leaving the skim milk for use on the farm, they are now collecting whole milk by tanker and, after separating for butter-making, are themselves using the skim milk for the manufacture of the various ancillary products. This has led to the emergence of the large company, based on a butter manufacturing unit, which operates branch factories for the manufacture of these other products. Naturally, topography and density of available milk supply is a key factor in the economics of tanker collection, but this important development is continuing to force the smaller companies to expand their activities through amalgamation with their neighbours.

Last season manufacture of butter and cheese totalled 220,000 tons and 85,000 tons respectively, but the industry has plant capacity to allow considerable

variation in the output level of these two products. Skim milk powder, casein and buttermilk powder are the other major products manufactured, last year's output totalling 41,000 tons, 27,000 tons and 16,000 tons respectively.

Here again plant capacity is sufficient to allow for changing production patterns to meet market requirements. The expansion in manufacture of these ancillary products has been a feature of the production pattern of recent years and is a reflection of the growth of the system of whole milk collection by butter manufacturing companies. At the present time about 40 per cent of total butter manufactured is made from cream in milk which is separated at the factory and there is scope for further expansion in this field. Switches in production as between butter and cheese and between skim milk powder and casein occur from time to time in response to market changes. The pattern of production as between butter and cheese is also influenced through the pricing system, which, while related primarily to anticipated realisations, is also aimed to ensure a certain balance of production. Pricing procedure and its influence on the production pattern is covered more fully later.

INTEREST IN WORLD TRADE

Local consumption of dairy products accounts for about 20 per cent of total production measured in terms of butterfat. As compared with other countries, local consumption of dairy products is high, and for butter, the highest in the world. However, the bulk of dairy produce is exported and as the world's largest exporter of butter and a major exporter of cheese, milk powders and casein, New Zealand is vitally interested in ensuring that world trade in dairy produce is subject to the rules of fair competition. When one remembers her heavy dependence on receipts from overseas sales of primary products, New Zealand's concern is readily appreciated.

By tradition the United Kingdom is New Zealand's principal market for dairy produce. For many years the Dominion has supplied increasing quantities of produce to the United Kingdom until to-day she stands as the largest and most regular supplier. For her part too, the United Kingdom recognises the position of New Zealand as her principal source of supply and for the period of the war and for nine years afterwards, while British agriculture was being rehabilitated, ensured her supply position through bulk purchase contracts with this country. One of the conditions imposed in these contracts was a limitation placed on the quantity of produce which New Zealand could sell on markets outside the United Kingdom. In the years before the war the Dominion had established trade in dairy products in a number of countries and in the later years of the contract sales her representatives continuously pressed for relaxation of this limit so that these other avenues of trade could be re-established. Over the past five years the New Zealand Dairy Products Marketing Commission, as the marketing authority, has conducted an extensive programme to rebuild this trade and to establish trade in other markets outside the United Kingdom. The industry recognises that ultimately there is a limit to the volume of produce that the market in the United Kingdom can absorb, and as dairy production must be expanded to provide for our own growing population, so too must exports to countries outside the United Kingdom. Hence, New Zealand's very keen interest in ensuring that world trade in dairy products is kept open to fair competition.

PRICING ARRANGEMENTS FOR DAIRY PRODUCE

Recently there have been important changes in pricing arrangements for dairy produce in New Zealand. Up until a few years ago dairy farmers supplying milk and cream to dairy companies for manufacture into butter or cheese were paid a price, on the basis of the butterfat content of their milk or cream, based on costs of production. These costs were assessed on the basis of a set of standards prepared by a specialist committee and costs were kept up-to-date by applying ascertained annual movements. During the time that the produce was sold under contracts with the United Kingdom the scheme worked satisfactorily as the export prices negotiated annually under the contracts more than covered price increases in New Zealand. With the return to free marketing in 1955 and with the various selling countries each disposing of their produce independently instead of through the United Kingdom Ministry of Food, operating as a single seller, prices started to fluctuate so that it was soon apparent, even to those who had not already appreciated the fact, that prices paid to farmers would, in the long run, have to be related to what the produce was fetching abroad. During the years from 1944 the industry had accumulated considerable reserves and it was intended to make use of these to iron out price fluctuations as between one year and another. Had it not been for the catastrophic drop in butter prices in the United Kingdom in 1958 it might have been possible to do this, but the complete exhaustion of the reserve funds, which in 1956 stood at £ 27 million, and the need to secure temporary accommodation from the Government to meet the price paid to producers forced a new appraisal of the situation.

To-day all parties concerned recognise that, while costs of production must be taken into account, in the long run prices paid to producers must be geared to overseas realisations. At the same time the value of certain features of the earlier pricing arrangements have been recognised and are retained as an essential part of the present price system. One of these is the principle that the price announced at the beginning of the season shall be paid throughout the season. This price can be increased to allow for any increase in costs that arise, but it cannot fall below the announced figure. This means that the dairy producer is guaranteed a minimum return for his produce for the whole of the succeeding twelve months. The other important principle is that the price is guaranteed by the Government. This guarantee was originally written into legislation covering price fixing in 1936 when the Labour Government, with its strongly socialist policy, took over the marketing of dairy produce and fixed the prices to be paid to producers and, at the same time, guaranteed that the prices fixed would be paid. Although the producers have now won back an increasing measure of control over their own industry the Government still retains an active interest, particularly as far as prices paid to producers are concerned, and so the Government guarantee covering the price still forms part of the legislation governing the industry. Another important feature which has been retained and which is made possible due to the fact that all dairy produce is marketed through the one organisation, is the provision of overdraft accommodation for marketing purposes at a low rate of interest through the central bank. The Reserve Bank of New Zealand advances money to the Dairy Products Marketing Commission for the purchase of dairy produce which may not be sold until several months have elapsed.

Recognising that ultimately realisations must decide prices but in order to preserve the principle of an announced price guaranteed for the season, the industry has accepted the system of a basic minimum price, fixed having regard to costs and the possible level of realisations, assessed on a conservative basis, to be supplemented by an additional payment at the end of the season when the actual surplus arising through the excess of realisations over the basic minimum price has been arrived at. At the same time the industry has recognised the need for reserve funds as a bolster against short-term price fluctuations, and is setting aside a portion of any annual surplus to rebuild the reserve account. A portion of the surplus earned over the last year has been used to repay the amount advanced by the Government to the industry.

Butter and cheese are the only products paid for under the system outlined above. The procedure followed is that the Dairy Products Marketing Commission purchases from the manufacturing companies the butter and cheese at prices which cover the basic minimum price for producers plus a standard margin for the costs incurred by the factory in the manufacturing process. To the extent that the factories are more or less efficient than the standard manufacturing costs allowance, and depending upon their policy as to allocating reserves and writing off depreciation, returns to producers are greater or less than the basic minimum price. The effect of this is to maintain at all times a degree of competition and incentive as between factories. The system is not without its faults but, in practice, has been found to work very well. Cheese manufacturing costs are higher than those for butter and allowance is made to cover this. In addition, the price paid to the producer takes account of the fact that the farmer supplying cream for butter-making still has his skim milk, whereas the supplier of whole milk for cheese has no additional source of revenue.

Returns to companies from casein and milk powders manufactured are related directly to realisations. The Dairy Products Marketing Commission sells the produce on behalf of the manufacturing companies through a pool in respect of each product. Initially, companies are paid a conservative advance price, and then after each season's produce has been sold the pools are wound up and the balance held from realisations is then distributed. No industry reserves are held for these products so that companies receive realisations, less marketing costs. Once again the return to producers is dependent on company policy. Most companies have created their own reserves to even out annual fluctuations in realisations, while some companies, particularly those who have only recently undertaken the heavy capital expenditure necessary to commence manufacture of these products, set aside a high proportion of their returns by way of depreciation.

Thus returns from the major products, butter and cheese, are subject to an assured minimum return with the possibility of a further increment at the end of the season, depending upon the level of realisations, while returns from the other products are completely dependent on realisations. This difference in the basis of paying the producer can have an effect on the annual pattern of production. As previously stated, there is within the larger companies with their various branch factories scope for switching manufacture as between products. For example, the directors of one of these large companies, seeing the market for, say, casein at a high level (and their company's return would be related to these high reali-

sations) could switch whole milk going into the production of butter and milk powders to the manufacture of butter and casein. To a lesser extent this also applies as between milk used for butter plus ancillary products and cheese. While the pattern of production is to a certain degree fixed by the existence of companies with plant to manufacture either one or other of the main products, there remains this flexibility so that, over any one season, the premium paid for milk to be used for cheese must not only cover the higher costs of cheese manufacture but must also bear some relationship to anticipated returns from casein and milk powders. This premium, or "differential" as it is called, is fixed at the beginning of the season and remains unchanged throughout the year in the same way as the basic minimum price.

While this differential is the basic factor in achieving any desirable pattern of production as between butter and cheese, changes may be encouraged or swings corrected during the season by the promise of end of season payments. If, for example, there were a swing from cheese to butter because of the high returns from casein or milk powder, provided that cheese was selling at a profit, the Dairy Products Prices Authority could announce at any time during the season that an additional end of season payment would be made on butterfat going into cheese-making. In effect, this would be an increase in the differential announced at the beginning of the season.

CONCLUSION

Thus the pricing system is to be used as an incentive to guide the pattern of manufacture in such a way as will ensure the maximum return of much needed foreign exchange and to take advantage of market opportunities as they arise. Unlike a large proprietary concern organised under an administrative board of directors, the co-operative dairy industry of New Zealand cannot be ruled and directed from the top. By preserving the system of competition as between factories and the incentives given in the pricing arrangements, along with the spirit shown throughout a completely co-operative undertaking, it is confidently expected that the New Zealand dairy industry can meet any challenge from local expansion of dairying and from its competitors on the free markets of the world. All that is asked is the opportunity to offer New Zealand dairy produce in those many markets under a system of fair competition.