DAIRYING

IN

NEW ZEALAND AND AUSTRALIA

BY

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DAIRY AND COLD STORAGE BRANCH

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INTRODUCTION

During the years in which Canada was the principal source of supply in the world's market for cheese of the cheddar type, the producers of that article took very little interest in what their competitors were doing. The lack of serious competition engendered a false sense of security, and the reiteration of the claim that Canadians were the greatest exporters and best cheesemakers in the world encouraged a feeling of self-satisfaction rather than one of determination to keep on improving. The announcement last year that New Zealand had pushed Canada out of first place as the largest exporter of cheese was rather a shock to Canadian producers, all the more violent because of its suddenness. This change of position between Canada and New Zealand was the most significant event in the international cheese trade since Canada took the lead over the United States about 1890. Quite as important, however, as the increase in the volume of New Zealand cheese available for export, is the marked improvement reported in its quality.

In the case of butter also the conditions prevailing in Canada during the past ten or twelve years have not provided the needful spur to secure the best results. With practically the whole of their butter being marketed at home the Canadian butter-makers lost that touch with the developments in taste and other requirements that comes to those whose products compete with supplies from other countries. The Canadian market is not a very critical one and has its peculiar tastes, as for instance in the preference for highly salted butter as compared with most other countries. Some rather uncomplimentary remarks have been made during the last year or two respecting the quality of Canadian butter, especially in connection with shipments to the United Kingdom. The prices obtained for the exportable surplus very largely determined the price for the 100,000,000 pounds or more of creamery butter alone which was consumed at home.

Statistical information and market reports have revealed both enormous increases in the volume of exports of butter and cheese from Australia and New Zealand, and greatly improved relative standing of their products in the English market.

This knowledge has created a new interest in the progress of the industry in that part of the world, and it was with a view of getting first-hand information as to conditions, methods, and practices, as well as the outlook for dairying in New Zealand and Australia that the Hon. W. R. Motherwell, Minister of Agriculture, decided that the author and Mr. W. A. Wilson, Manager of the Saskatchewan Co-operative Creameries, Regina, Sask., should visit these countries for the purpose of securing as much information as possible along these lines.

Accordingly, we sailed from Vancouver on the 26th January, 1923, and proceeded first to New Zealand and afterwards to Australia, reaching home again on the 26th of April.

During the course of our travels in New Zealand we visited thirty-two dairy factories, seven butter and cheese-grading stores, and a number of farms. We were accompanied throughout our stay in New Zealand by the Director of the Dairy Division, Mr. W. M. Singleton, a Canadian doing credit to his native land, or one of his district assistants. Their thoughtfulness in notifying factories of our intended visits brought out chairmen (presidents), secretaries, and direc-

tors, and thus facilitated our work by multiplying sources of information. The grading stores were mines of information on the general quality and character of the butter and cheese, as well as on the results of some of the special methods and practices that have been adopted in New Zealand factories, and which will be dealt with later in these pages.

In Australia we visited some of the important districts in New South Wales and Victoria. Time would not permit us to see anything of the other States. Australia, like Canada, is a country of great distances. We travelled about 1,800 miles by railway and something like 200 miles by motor-car, saw thirteen factories and the grading stores and dealers' warehouses at Melbourne and Sydney. As in New Zealand, we received invaluable assistance from both Commonwealth and State officials, who helped us to lay out our time to best advantage, and acted as guides in most of our travels. Mr. M. A. O'Callaghan, Commonwealth Dairy Expert, and the State officials were most assiduous in promoting the objects of our visit. Fortunately, the Australian Dairy Council met in Sydney while we were in that city. We were invited to attend, and thus met Government officials and leading representatives of the dairy industry and the trade in dairy produce from every State in the Commonwealth. Finally we had a further opportunity to meet many breeders and producers at the Royal Easter Show at Sydney on the last two days before we sailed for home.

A detailed report, accompanied by documentary data, has been presented to the Minister, and the information contained in this publication is derived from material in that report, together with some personal knowledge of New Zealand conditions acquired during, and since, the time the author was Dairy Commissioner in that country.

NEW ZEALAND

NATURAL CONDITIONS

The climate of New Zealand has been fairly described as "mild, equable and salubrious," with an abundant rainfall well distributed throughout the year. The two main islands extend from north to south about 1,000 miles. Wellington, the capital, which occupies a central position, has a mean annual temperature of 55 degrees F. and an average rainfall of 48 inches. It is a few degrees colder in the south and correspondingly warmer in the north, except at high altitudes in the mountainous districts where the temperatures fall according to the elevation to the point where there is perpetual snow. Dairying is carried on, however, at sea-level or at not more than 1,000 or 1,500 feet above, so that from the standpoint of the dairying industry New Zealand is a country without snow, practically no frost nor extreme heat, plenteous rainfall and grass the year round. No stabling is required for cows. During the colder and more inclement weather some feed is provided to supplement the pasture which grows slowly at that period. There is abundance of good water everywhere.

Owing to the heavy rainfall and the nature of the soil the unpaved yards and lanes are apt to get into very bad condition, especially during the so-called winter months. The cows suffer more or less from exposure to the cold driving rains for a period of two or three months. It is the practice with some dairymen to cover their cows at this time of the year with waterproof rugs or blankets.

MILK PRODUCTION

There were 1,137,055 dairy cows in New Zealand in 1922. The total number of cows, including beef breeds, was 1,494,303. Of this number 17,838 were pure-bred. The total number of bulls was 59,348, of which number 10,268 were pure-bred.

Among the pure-bred dairy cows the Jerseys predominate, with Milking Shorthorns, Friesians (Holsteins), and Ayrshires following in the order named. The Milking Shorthorns are the most numerous among the cross-breds.

From the New Zealand Year Book we learn that in 1920 there were 29,111 holdings classified as "dairying" of an average size of 150 acres. This included all holdings of more than one acre. By way of comparison it may be stated that the holdings classified as "pastoral" (sheep and cattle) numbered 42,335, of an average size of nearly 1,000 acres. The pastoral holdings include much hilly and infertile areas that are unsuitable for dairying, but the fact that the holdings classified as dairying increased by 5,762 from 1917 to 1920, while the pastoral holdings decreased by 343 during the same period, indicates a diversion from sheep farming to dairying.

The average number of cows per herd in 1920 was 39, or nearly four times as large as the average of Canadian herds. Herds of 100 up to 300 are not

Typical scene in newly cleared dairying country, New Zealand.

uncommon. Thirty-nine cows to 150 acres is equal to one cow to a little less than every 4 acres. In the best districts one cow to 2 acres—50 cows on a hundred-acre farm—is not uncommon, and in exceptional cases the land carries one cow per acre during the flush of the season without supplementary feeding.

The milking machine is very generally used except for small herds. It is estimated that at least 65 per cent of the milk produced is machine milked. Some difficulty has been experienced with the flavour of the machine milk, but this is being gradually overcome. It is found that the personal element is an important factor, and that the dairyman who produces good, clean flavoured milk drawn by hand will get good results when using the machine.

Many of the milk producers in New Zealand began without any experience with dairy cattle or farm work of any kind. Partly on this account the production of milk has been characterized by rather crude, if not unsanitary methods and practices. It is only fair to say, however, that the author observed that much improvement had been made during the interval between his term of office in New Zealand (1898-1900) and his visit this year.

COW TESTING

All milk or cream is paid for on the basis of its butter fat content. The cheese factories adopted the "paying by test" plan in the early nineties, using the "straight" fat method. Once the quality of fat in the milk is known the pounds of milk are forgotten. It is the butter fat, not the pounds of milk, that gives the cow rank as a producer. Every producer knows the value of a pound of butter fat, but gives no thought to the value of milk by the 100 pounds, the ton, or the "standard" as is the custom in Canada.

Typical scene in one of the older dairying districts, New Zealand.

This emphasis on butter fat has naturally promoted cow testing. For the season of 1922-23 there were 83,605 cows under test, or 7·35 per cent of the whole number. The work is carried on chiefly through associations.

The associations, under the control of the Dairy Division, included 34,558 cows, while there were 49,047 cows in the associations that were privately controlled. In cases where the Government does the testing there is a charge of two shillings per cow. The Government contributes nothing to the expenses in connection with the privately controlled associations, and the fee above mentioned is expected to cover the cost in the associations under Government control.

The following summary compiled from the records of 21,087 of the cows under test will give some idea of the average yield:—

—	Days Under Test	Pounds Fat
Grand average of all cows	230	239·64
Highest association average	298	385·49
Lowest association average	166	168·43
Highest individual herd	229	514·70
Lowest individual herd	100	63·00
Highest individual cow	326	760·72
Lowest individual cow	104	40·62
Average daily production of butterfat per cow	.....	1·0421

These records include many pure-bred herds and grade herds owned by the most progressive dairymen, and are therefore above the average for all cows.

THE FACTORY SYSTEM

The factory system was established in New Zealand in the early eighties, about twenty years after the first factory was started in Canada.

There are now 686 factories, many of which are equipped to make either butter or cheese. The manufacture of dried milk, casein and milk sugar is carried on at some of the larger factories. In 1921 the average outputs were approximately 800,000 pounds of butter and 500,000 pounds of cheese per factory. The largest creamery claims an output of over 5,000,000 pounds of butter per year, and a record of 812 boxes of 56 pounds each in one day. Another factory's output last year was 1,576,960 pounds of cheese, 47,000 pounds of creamery butter and 42,560 pounds of whey butter, with only sixty-three suppliers, none of whom are more than three miles from the factory. Another factory made 952 tons (2,000 pounds) of cheese last year.

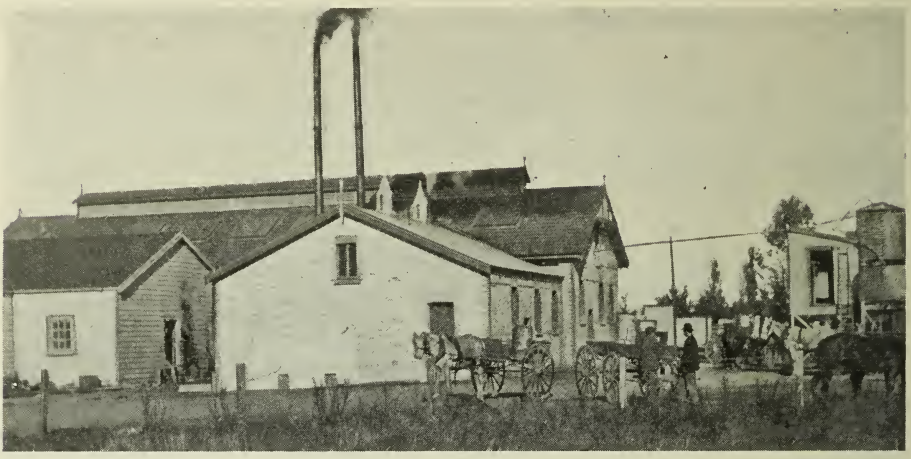
Mixed herd in one of the best producing districts, New Zealand.

The factories are generally well built, the newer ones being constructed of reinforced concrete or brick with no wood in the walls or floors. The equipment is first-class and up-to-date. No expense is spared to have the very best machinery that can be obtained. A considerable proportion of the pasteurizing and butter-making machinery is imported from Denmark. The factories have been greatly improved since the author left New Zealand in 1900. Many of the factories then in existence have since been rebuilt, and the show places of that period are now looked upon as out of date.

Whey butter is made at the cheese factories. Provision is made for handling the whey before separation as carefully as cream is handled for buttermaking. For instance, the latest equipment in the way of whey tanks is a concrete tank lined with white glazed tile and the gutter or trough leading to the tank is constructed in a similar manner. No wooden tanks are used and the tanks into which the whey goes before being separated are cleaned like cream vats. Under these conditions the quality of the whey butter is of the highest grade. The machinery and equipment, except for the pasteurizing apparatus, used in New Zealand cheese factories is very similar to what is used in Canada and calls for no special comment.

Many of the co-operative and proprietary companies operate more than one factory, either as branches or as separate units. When cheese is made at

the branches it is in some cases brought to a central curing room daily. The temperature in these central curing rooms, as well as in some of the factory curing rooms, is controlled with mechanical refrigeration. There is no natural ice in New Zealand.



Rear view of a North Island factory, New Zealand.

SOME FACTORY STATISTICS

The turnover of some of these companies is very large. The following examples are taken from Annual Reports and Balance Sheets:—

1. The New Zealand Co-operative Dairy Company, the largest in New Zealand and I believe also the largest in the world, operates thirteen creameries and sixteen cheese factories, with combined outputs for the year ended May, 1922, of 40,797,320 pounds of butter, 10,427,840 pounds of cheese and a large quantity of dried milk and casein. This company operates its own butter box and cheese crate factory, and announces that it will shortly operate its own coal mine.

2. The Kaupokonui factory has seven branches. The following statistics appear in the Annual Report and Balance Sheet for the year ended June 30, 1922:—

Milk received	65,149,047 pounds
Average test	4·026
Cheese madek	5,879,757 pounds
Pounds of mils for 1 pound cheese	9·55
Pounds cheese to 1 pound butter fat after allowing 2½ per cent for shrinkage	2·61
Butter made	508,413 pounds
Whey butter made	120,232 "
Pounds of milk to 1 pound of butter	20
Patrons received per pound butter fat	31·6 cents
Cost of manufacturing and placing f.o.b. per pound of butter fat	8·42 cents

The value of the buildings and machinery owned by this company is given in the last Balance Sheet as $351,476.

Riverdale factory, New Zealand, probably the largest cheddar cheese factory in the world.

3. The Hawera Co-operative Dairy Factory Company operate five factories, four branches and a central cool curing room. The Annual Report and Balance Sheet for the year ended June 30, 1922, contained the following information:—

Total milk received	51,559,915 pounds
Average test	3·96
Cheese made	5,025,301 pounds
Average test cheese milk	3·90
Pounds of milk to 1 pound of cheese	9·644
Pounds of cheese from 1 pound butter fat	2·652
Cost of manufacturing cheese	1·54 cents
Butter made	193,575 pounds
Average test milk used for butter	4·80
Pounds milk for 1 pound butter	17·49
Overrun	18·91
Total charges (including repairs and depreciation) up to f.o.b. steamer, butter and cheese worked out at per pound of butter fat	8·28 cents

4. Eltham Co-operative Dairy Factory Co. This company operates a butter factory, ten cheese factories and a central cool cheese curing room. The Annual Report and Balance Sheet for the year ended June 30, 1922, gives the following information:—

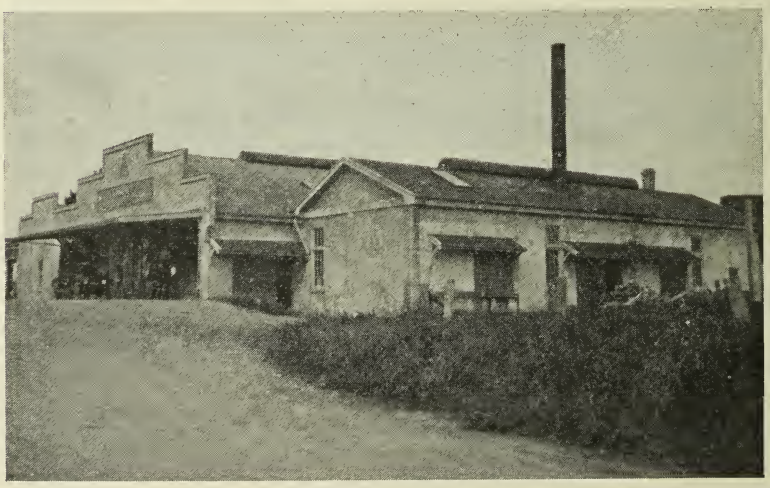
Milk received	59,857,144 pounds
Cream received and purchased	98,466 "
Average test of milk	3·946
Total butter fat	2,406,105 pounds
Cheese manufactured	2,163,840 "
Butter manufactured	1,879,360 "
Whey butter manufactured	49,280 "
Pounds of milk for 1 pound of cheese (factory weights)	9·54 "
Pounds of cheese to 1 pound butter fat (London weights)	2·60
Average cost of manufacturing butter and cheese (f.o.b. at shipping point) per lb. of butter fat	6·552 cents
Total number of suppliers (patrons) at all factories	257

The Eltham factories are located in one of the very best milk-producing districts in New Zealand. If the average yield of butter fat per cow is assumed to be 160 pounds, it works out that the 257 patrons of these factories must have had an average of something like fifty-eight cows each.

These factories are organized under "The Companies Act," the share capital being subscribed by the suppliers. Dividends on shares for 1922 varied from 6 to 8 per cent.

There are co-operative factories operated as single units, and the proprietary factories are also owned and operated both in groups and as single units.

One of the large New Zealand factories.



A New Zealand factory, built of reinforced concrete.

The majority of the factories are co-operative (joint stock). The farmers in New Zealand are inclined to control their own business in this way. There are, however, some very successful proprietary concerns who hold their own in competition with the so-called co-operative companies. Success or failure under either system seems to be largely a matter of management, and generally it depends on some single individual.

One great advantage attached to these large operations is that it makes it possible to secure capable management. The chairman, or president as he would

be styled in Canada, usually occupies the position year after year. He devotes a good deal of time to the affairs of his company and becomes well informed on the general dairy situation. Thus he is in a position to formulate and direct policies with intelligence. The office of secretary is an important one and generally speaking, the secretary is the chief executive officer. The manager is the expert who is responsible for the working of the factories and the quality of the products.

I would say that apart from the matter of size and volume of output the most striking difference between New Zealand and Canadian dairy factories is in this matter of management, which in the average Canadian factory is a very slipshod business compared with the way in which it is done in New Zealand.

There is another point of difference between what we found in New Zealand and what prevails in Canada that may be noted here. In New Zealand all milk condensing and milk powder factories fall into the same category as the cheese factories and creameries. They are simply "dairy factories" like the others.

We did not find any evidence of the aloofness which marks the attitude of the condensaries and milk powder factories in Canada, nor did we notice any of the antagonism such as exists in Canada against these factories on the part

One of the smaller New Zealand cheese factories constructed of brick and concrete with tile roof.

of those engaged in the cheese and butter branches of the industry. The Government officials in New Zealand have the same relations with all the factories no matter what line of manufacture they may be engaged in. There are reasons for these differences which need not be gone into here, but we are bound to say that we think the New Zealand way is the best.

BUTTERMAKERS AND CHEESEMAKERS

The position of men who actually make the butter and cheese and the conditions of such employment in New Zealand make for permanence as an occupation, especially in the larger factories where the pay is good. It is the rule to provide comfortable homes for the employees, in which they live the year round.

The maker is not required to "guarantee" his work by paying the "cuts" on inferior cheese or butter. Not that he is relieved of responsibility for the

quality of his cheese or butter, because his services would not be retained if he paid two or three times the amount of the claims and continued to make a poor article. Producers as a class in New Zealand are not satisfied to turn out inferior butter and cheese, even though they may be paid full price for it. The result of this is that there is no tendency on the part of the maker to cover up defects. If anything is wrong with the quality he is ready to acknowledge it and seek the necessary remedies. The producers or management do not rely on the maker's guarantee to save them from losses arising from inferior quality. It is recognized that the patrons have some responsibility for defects of quality in the product. Much greater care and discrimination is exercised in the engagement of cheese and buttermakers under this system.

The New Zealand butter and cheesemakers, despite the fact that they have no dairy schools and no general system of instruction such as there is in Ontario and Quebec, are well posted in the technique of their art and are generally capable men.

Fortunately for the industry, in New Zealand there are not the same opportunities for commercial employment with dairying experience as there are in Canada, and good men are not tempted away by the offer of more congenial or better paid service with cheese exporters, produce dealers, etc. This makes for permanency, and cheese and buttermakers are more apt to settle down to the work for life. The advantage of the accumulated experience of these men as compared with the conditions in Canada, where good makers are constantly being drafted into other lines of employment, is obvious.

A small New Zealand factory.

The Butter Industry

QUALITY OF CREAM DELIVERED AT CREAMERIES

Home separation is now almost universal in New Zealand. The cream is all graded as received, on a voluntary basis, by an employee of the creamery. There is no law or regulation covering this. The butter graders' reports constitute a check on the cream grader. For instance, if the cream received is graded 90 per cent first grade and 10 per cent second grade, the butter made

from it is expected to grade the same percentage of first and second grade. If there continues to be a discrepancy between the grading of the cream and the grading of the butter, the district inspector is called in and the cream grading is adjusted.

The cream is, of course, paid for according to quality. Frequent deliveries are made, in many cases daily, and rarely less often than three times a week. Under these conditions a superior quality of cream is received. A large part of it is fit for table use. The average acidity is from ·3 to ·4 per cent. It is not uncommon at some creameries for all the cream to be first grade for weeks at a time.

The large production on individual farms, making frequent deliveries worth while, and the fact that the producers for the most part have comparatively little work apart from that connected with the milk or cream, are undoubtedly contributing factors in securing cream in good condition, but the fact that it is good is the important thing, because that is what Canadian producers have to compete with.

METHODS OF BUTTERMAKING

New Zealand buttermakers have departed considerably from what might be called standard methods in other countries.

Churn room in a large New Zealand creamery, capacity each churn 3,000 lbs.

Bi-carbonate of soda is used to reduce acidity in the cream. They carry this so-called neutralization to an extreme point, reducing the acidity to ·1 per cent and even lower. One of the Government officials made the remark, "We have reached the conclusion that acidity in buttermaking is an evil," and that expresses the general opinion.

All cream is pasteurized. The flash system is used. The usual arrangement is to have two machines through which the cream passes one after the other, each raising the temperature a certain number of degrees. The most surprising part of the practice is that the standard adopted for temperature is around 200 degrees F. It was claimed that a temperature of 210 degrees F. was frequently reached. The cream is at once cooled over surface coolers to 40 or 46 degrees. All creameries are equipped with mechanical refrigerating

machines. Brine circulation is used for cooling in some instances, while in others a "direct expansion" cooler is used. The tendency seemed to be in the direction of the general adoption of the latter system.

No starter is added to the cream. The cream is held in insulated tanks or vats after cooling. These vats are in most cases fitted with direct expansion or brine coils to hold the temperature. The churning is done the following morning at a temperature of about 46 degrees F. The butter is well worked.

Both the short-barrelled type open at the end, and the long-barrelled churn with the fixed rollers are used. Some prefer the short type for ease in handling the butter. It is claimed also that it gives a more even distribution of moisture. We visited one creamery in which four of the long-barrelled churns of Danish make were installed, each with a capacity of 3,000 pounds.

Half of one per cent of preservative is generally used in New Zealand butter.

The butter is packed or printed direct from the churn. A power packer has been introduced in some of the larger creameries.

There is no trouble with "cooked" flavour from the high pasteurizing temperature. The two steps in the heating as above noted is thought to avoid it.

CHARACTER AND QUALITY OF THE BUTTER

It will be easily understood by buttermakers that cream treated as outlined above produces a very mild type of butter, especially when it is salted lightly, as is the practice, and that it will have good keeping qualities. It is thought in some quarters that the New Zealand buttermakers are rather overdoing the matter of mildness in flavour, and that their butter approaches the character of neutral fat. That is the view held in Australia, where a somewhat different type is aimed at.

PACKING AND BRANDING

The butter for export is packed in oblong shaped boxes made of native timber very suitable for the purpose. It may be of interest to state that the parchment paper liners and print wrappers are always used dry. Every creamery is required by law to brand the boxes with the words "Pure Creamery Butter, New Zealand Produce," and the registered number of the creamery. (All dairy factories are registered). The name of the creamery or brand may be added. The universal practice now is to print on both ends of each box, in large letters covering the whole end, something like the following:—

This gives a finish which is distinctive and attractive, and it has the advantage that the creameries become well known in the trade and sell very largely on the brand. The large outputs of uniform quality help to make the brand known and sought after.

The Cheese Industry

The manufacture of cheese has developed very rapidly in New Zealand during the last few years. The exports now exceed those from Canada. Concurrently with the growth in volume there has been a great improvement in quality, which is to be attributed largely to the practice of pasteurizing the milk before it is used for cheesemaking. About 70 per cent of all the cheese milk is now so treated. This is one of the outstanding features of the cheese industry in that country. The process is simple, but the equipment is rather expensive. A regenerative pasteurizer of Danish make is used. The milk is heated as it is received to 160 or 165 degrees F., and immediately cooled to about 90 degrees F. One to one and a half per cent of starter is then added and the process carried out in the usual manner. It reduces the art of cheesemaking very much to a matter of routine set by the clock. It enables the cheesemaker to turn out cheese day after day practically identical in flavour and texture. The flavour is mild and the texture has that meatiness which is now so much in demand.

A milk powder factory in New Zealand.

An equipment consisting of the heater, two pumps and a cooler, with a capacity of 15,000 pounds per hour, costs erected between $2,000 and $2,500, plus cost of connections, extra steam supply if such is necessary, and provision for a cooling medium. In New Zealand brine circulation from the refrigerating machine is used, but if water had to be depended on it would require a volume of the coldest well water considerably in excess of the quantity of milk treated. On the other hand there is a distinct gain of 2 to 3 per cent in the yield of cheese due to the higher percentage of water retained in the cheese.

The cheese crates are all required by law to be branded in the same manner as the butter boxes. The practice is to print the same style of brand on each end of the crates. These crates are wired and make a strong, if not attractive, package. They do not require to be opened for inspection of the cheese, as a cheese tryer can be inserted between the slats of the crates.

It is obvious that there are advantages in marketing such large lines of cheese of uniform character and quality.

CHARACTER AND QUALITY OF NEW ZEALAND CHEESE

How do New Zealand cheese compare in quality with Canadian? is a question frequently asked. There may be differences of opinion on this point, but in the judgment of the author the best Canadian is a better flavoured cheese than any New Zealand. However, there are less really poor New Zealand cheese than there are of Canadian. New Zealand cheese are more uniform than Canadian.

New Zealand cheese does not suffer injury from excessive heat as Canadian does. The fear of the effect of hot weather on his cheese impels the Canadian maker to produce far too many of those stiff, rough, crumbly cheese that nobody wants to-day. The New Zealand cheesemaker does not have to give much consideration to weather conditions. Extremely high temperatures are unknown.

At one time a rather dirty flavour was common in New Zealand cheese. This has been largely eliminated by the practice of pasteurizing the milk for cheesemaking. The flavour now is inclined to mildness and is not very pronounced. In fact it is more or less neutral.

The Canadian standard for texture, or rather "closeness," is a cheese from which a solid plug, showing no openings of any kind, can be drawn. It causes

Home for a cheesemaker in New Zealand.

the New Zealand cheesemaker no worry if every plug drawn shows one or two ragged or mechanical holes. Apparently no one else seems to worry about it either, for such cheese are not objected to if they are New Zealand. That is what is expected, for they have always been so. On the other hand Canadian cheese of the best type are, and always have been, "close" in texture, and if any are found to be "open" it is something to object to. We in Canada have probably over-emphasized this matter of closeness.

There appears to be something in the natural conditions in Canada that permits of a cheese being made which more nearly approximates the type of the English Cheddar than any cheese made in New Zealand does. On the whole the author would say that the best of the Canadian cheese is of a more desirable type than any that is made in New Zealand or likely to be. Quality is not, however, the only factor in gaining favour for produce on the British market. Reliability and uniformity of the quality, and facility of trad-

ing in are important considerations, because the merchant likes to handle, and naturally recommends the particular brands on which he is surest of making a profit. The large outputs of uniform quality, well packed and carefully marked and branded with the name of the factory, which is a feature of the New Zealand cheese, will probably do as much to popularize it in the British market as any question of quality.

THE GRADING OF BUTTER AND CHEESE

The grading of butter for local markets, as for instance at Cork, Ireland, was begun many years ago, but New Zealand was the first country in the world to establish a national system of grading dairy produce under Government auspices in 1894.

All butter and cheese must be sent to one of the gazetted cold storages, which are located at or near one of the overseas ports. On arrival at the store one box of butter from each churning, or one crate of cheese from each vat, is set out and these are graded as a lot into "First," "Second" or "Third" grade, as the case may be. A mark is placed on each box of butter and each crate of cheese, showing the grade in which it is placed. After the butter or cheese is graded it remains under the eye and control of the grader until it is shipped overseas.

SCALE OF POINTS FOR SCORING CREAMERY BUTTER

Flavour	50
Body, moisture, texture	25
Colour	10
Salting	10
Finish	5
Total	100

SCALE OF POINTS FOR GRADING CHEESE

Flavour	45
Body and texture	30
Colour	15
Finish	10
Total	100

Some of the dairy companies have established an unofficial "Superfine" grade for butter scoring over a certain number of points. It has been proposed to recognize this classification in the grading. It would be comparable to the "Special" grade in Canadian practice.

The Government makes a charge for grading butter and cheese which is sufficient to cover the cost of the service, including the salary and expenses of an Inspector of Dairy Produce in London. These charges, or fees, amounted to £12,000 last year.

The District Inspector has access to the grader's notes, and he at once gives his attention to any factory whose output gets a low grading, or in the case of butter if there is any discrepancy between the grading of the cream and the grading of the butter.

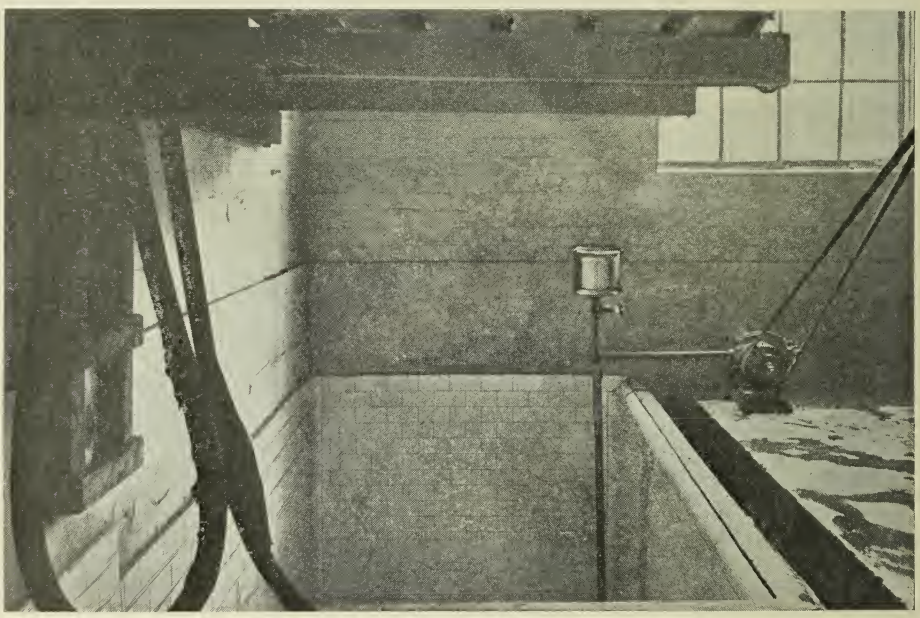
The grading is universally credited with having been the corner stone on which the quality of New Zealand cheese and butter has been so rapidly built up.

MARKETING

There is no settled policy or practice in the matter of marketing New Zealand dairy produce, except that it is customary to make a deal at the beginning of the season for the disposal of the season's output.

Until recently every factory, or at least every company, disposed of its own output either by definite sale or agreement to consign on various terms at the opening of the season. An attempt has been made to organize co-operative marketing, and a group of factories have entered into an arrangement by which they have some kind of connection with the Wholesale Co-operative Society in Manchester. A representative of this group of factories is stationed in London. No information was available as to what success has been met with so far.

There is also a certain quantity of both butter and cheese disposed of under a sort of confidential agreement between the factories and some importer in the United Kingdom. These are large factories whose products have become well known for their uniformly high quality. The importer in the United Kingdom has special customers for these particular factory outputs to whom they go direct without appearing on the market. They supply a demand where quality



Whey vat lined with white tile in a New Zealand factory.

can always make a good return. It is a limited business and is not to be confused with the ordinary open "consignment" in which case the goods are offered for sale on arrival.

That the producers are not fully satisfied with existing methods of disposal is evident from the agitation which is now going on for the creation of a pool through which all the export surplus of butter and cheese would be handled. Some favour this plan, while others prefer a plan to have monthly auctions at stated places in New Zealand. The pooling plan seems to be the most popular.

Distance from market as compared with Canada and European countries introduces problems in the marketing of New Zealand produce which are peculiar to Australasia. In these days of violent fluctuations in price no dealer could afford to purchase dairy produce in New Zealand for export to the United Kingdom except at a relatively wide margin. At one time, when the quantity of New Zealand butter and cheese was small and came on to the market when the bulk of the produce in the northern hemisphere had passed

into strong hands, insuring stability of price, it was a safer business to buy the New Zealand cheese and butter outright. Conditions of the present day rather encourage the shipping of the produce to England for sale on arrival, thus having the advantage of a spot market. One thing that can be said is that producers take a very keen interest in the marketing of their products, and are not influenced by the opinions of exporters or others connected with the trade in dairy produce, whose views may be biased by selfish interests. They are determined to have their butter and cheese landed in the best possible condition.

THE GROWTH OF THE DAIRY INDUSTRY IN NEW ZEALAND

New Zealand milking shed.

In New Zealand there is approximately one cow for every person in the country. In Canada the ratio is one cow to 2·3 persons. It follows that the proportion of the total production available for export is much larger than it is in Canada. As the population of New Zealand has increased less than 200,000 in ten years the record of the exports gives a closer approximation to the actual growth of the industry than such figures applied to the Canadian exports do. Anyhow, it is the exports that are of chief interest to Canadian dairymen.

The following is the record of exports from New Zealand since 1883. (Years ended March 31):—

Year	Butter	Cheese
	Lbs.	Lbs.
1883	993,326	282,128
1885	2,791,376	1,707,440
1890	3,899,392	4,030,512
1904	35,203,728	9,691,920
1915	47,056,128	91,532,896
1921	72,894,752	151,588,304
1922	91,662,256	152,933,648
1923	142,577,568	145,411,392

PROBABILITIES FOR FURTHER INCREASES IN PRODUCTION

The last three seasons have been abnormally favourable for milk production in New Zealand. The season that was drawing to a close during our visit was almost phenomenally so. The increase for these years is partly due to these circumstances. It is not likely that such extremely favourable conditions will occur every year.

No very definite opinion could be found on the probable rate of growth in the future, or the extent to which the industry may eventually develop. It is expected that the present rather low average yield per cow will be materially raised through cow testing, which is being taken up in earnest by the milk producers. Scrub and bush land is being cleared and laid down in permanent pasture for dairying. There are considerable areas of such land yet available. Sheep runs when they come into the market are usually cut up into smaller holdings for dairy farms. This may be checked somewhat by the improved conditions in the sheep raising industry. The financial difficulties of some of those who paid the high prices for land ($500 to $700 per acre) during the war boom may also prove a check on development, but it is safe to say that the exports of dairy produce from New Zealand will yet show a very substantial increase.

The Director of the Dairy Division thinks there may be an increase of 50 to 100 per cent in the next ten years, and all the indications point to that possibility.

GOVERNMENT SERVICES

In New Zealand there is only one Government. All Government services related to dairying, such as grading, instruction, inspection and administration

New Zealand butter graders at work.

of laws are under the one authority and one official head. All the functions which in Canada are divided constitutionally between provincial and federal authority are performed by a single department of government in New Zealand. This is a decided advantage. All the laws relating to dairying are

uniform in every part of the country. It eliminates provincial prejudices and jealousies. It avoids apparent differences of opinion even where none is intended, which tend to confuse people and beget lack of confidence.

Our impression is that producers have more self reliance and initiative than the same class in Canada, and are not so much inclined to lean on government. At the same time they support any law or policy which is calculated to benefit the industry as a whole, even though it be irksome to the individual. Private or selfish interests are not allowed to interfere as much as they are in Canada.

LEGISLATION

The dairy legislation of New Zealand is not comparable to Dominion legislation in Canada, because it covers the whole field of operations. The field is divided in Canada between the Dominion and the provinces.

Full authority has been taken by statute to protect the industry in every particular. It is generally conceded that reason and persuasion are the best methods of securing results, but if these fail the means are available to protect the industry as a whole from the carelessness, slackness, or greed of individual factories or producers.

The regulations with respect to certain matters have particular significance for Canadian dairymen. For instance, no cheese may be offered for grading until it is fourteen days old. All butter and cheese for export must be sent to one of the designated cold stores for grading. No butter may be placed on shipboard before it has been three full days in cold storage. The ship will not receive butter the temperature of which is not below 32 degrees F.

AUSTRALIA

GENERAL

Australia is too vast a country, too diversified in natural conditions, and too little developed for any one to reach very definite opinions or conclusions respecting the future of the dairy industry in the short space of three weeks. Although we had exceptional opportunities for gathering information we feel that our views as to efficacy of some of the methods and policies pursued, or on the future possibilities of the dairying industry in that country, must in the nature of things be rather superficial.

There are large districts in Australia in which milk production reaches as high a level as it does in New Zealand. One cow to the acre with good weather conditions is said to be possible in places. On the whole, however, the production in Australia will always be irregular and uncertain, owing to climatic conditions. During our visit many important dairying sections were suffering from drought, and it was expected that the present season's surplus of butter for export would be less than half that of the previous season.

The manufacture of cheese has not been developed on a large scale, nor does there seem to be much prospect that it will be.

Curiously enough, it is in the State of Queensland with its sub-tropical climate that the greatest development is expected in the future. With modern appliances and mechanical refrigeration hot climates are less inimical to the dairy industry than has generally been supposed. A Queensland official with whom we discussed this point remarked that the relatively high temperature which prevails in that state was likely to work to their advantage, because producers never depended on weather conditions to help them out.

We found that the Australians are just as keen as the New Zealanders in their determination to allow nothing to interfere with the production of the very highest quality in their produce. The quality of the butter that we saw in Australia made it very clear that they are succeeding. There is no finer butter produced anywhere than what we saw in some of the creameries and in the warehouses of Sydney and Melbourne.

Dairy farm near Kiama, N.S.W.

DAIRY PRODUCTION

A glance at a map of Australia which gives the disposition of existing primary industries shows that intensive farming, including dairying, is confined to a comparatively narrow strip of country bordering on the southeast and eastern coast line, where the rainfall is more favourable than it is in the interior, which is devoted more to sheep and cattle.

The total number of dairy cows in Australia in 1920 was 2,055,638. With a population of 5,510,229 the ratio is one cow to 2·6 persons (1 to 2·3 persons in Canada). The distribution of dairy cows by states in 1920 was as follows:—

State.	Number of Cows.
New South Wales	757,534
Victoria	620,005
Queensland	448,634
South Australia	117,536
West Australia	47,719
Tasmania	63,681
Northern Territory	70
Federal Territory	459

The average annual production per cow for the Commonwealth is given at 3,140 pounds.

The following extract from "The Official Year Book of the Commonwealth of Australia" is a concise statement of production by states:—

Butter and Cheese.—The butter output shows, in general, a tolerably steady increase since the drought year 1902, the most marked development being in Queensland. During

the past five years the production of butter was severely hampered by droughty conditions, and the output during 1918 and 1919 fell considerable. The 1920 season, unlike the two previous ones, was markedly favourable for dairying, uniformly good conditions conducive to high production existing throughout the dairying districts of the Commonwealth, with the result that the production of butter in 1920 was over 40,000,000 pounds in excess of that for 1919.

The manufacture of cheese has been steadily increasing throughout the Commonwealth during recent years, the 1917 production being the highest yet recorded. A sharp decline was noticeable in 1918, followed by a satisfactory increase, despite droughty conditions, in 1919. The relatively higher prices ruling for butter was probably responsible for a decline in the output of cheese during 1920. Particulars for the past four years are as follows:—

PRODUCTION OF CHEESE AND BUTTER, COMMONWEALTH, 1917 TO 1920

Cheese

State	1917	1918	1919	1920
	Lbs.	Lbs.	Lbs.	Lbs.
New South Wales	7,799,676	5,982,120	6,762,467	6,407,209
Victoria	5,285,003	6,055,964	7,735,023	3,636,571
Queensland	11,142,114	8,636,700	8,296,318	11,512,262
South Australia	2,449,716	2,412,388	2,540,183	1,804,696
Western Australia	100	200	821	354
Tasmania	754,196	702,868	861,460	799,432
Commonwealth	27,430,805	23,790,240	26,196,272	24,160,524

Butter

State	1917	1918	1919	1920
	Lbs.	Lbs.	Lbs.	Lbs.
New South Wales	80,460,225	65,991,738	63,127,160	84,259,641
Victoria	64,405,711	66,240,403	60,218,945	64,938,458
Queensland	38,930,690	32,371,575	26,213,514	40,751,373
South Australia	10,482,895	10,444,789	9,810,335	11,897,279
Western Australia	1,361,484	1,789,390	1,980,273	2,212,311
Tasmania	4,848,227	4,947,560	4,290,724	4,014,402
Federal Territory	7,782	17,220	7,840	8,400
Commonwealth	200,497,014	181,802,675	165,648,791	208,081,864

Concentrated Milk.—"Condensed" or "concentrated" milk denotes milk the bulk of which is reduced by evaporation. Small quantities of such milk were made prior to 1911, in which year the output for the Commonwealth was nearly doubled. Increasing quantities were annually manufactured until 1915, when a substantial falling off was in evidence in each of the three contributing states. During the next five years, however, the condensed milk industry developed considerably, particularly in Victoria, where the output for 1920 was 25,953,445 pounds greater than that for 1915. There is still an import of milk, but the exports in each year far outweigh the quantity imported, as will be seen from the tables hereunder. No condensed or concentrated milk is made in South Australia, Western Australia, or Tasmania. In New South Wales, Victoria, and Queensland the following are the returns for the last five years:—

CONDENSED, CONCENTRATED, OR POWDERED MILK MADE, 1916 TO 1920

Year	New South Wales	Victoria	Queensland	Commonwealth
	Lbs.	Lbs.	Lbs.	Lbs.
1916	5,829,990	33,280,635	6,584,272	45,694,897
1917	8,973,916	37,805,070	9,409,059	56,188,045
1918	10,680,409	45,251,710	6,845,610	62,777,729
1919	12,969,679	44,219,389	9,170,034	66,359,102
1920	14,938,147	42,643,871	13,362,464	70,944,482

INTENSIVE PRODUCTION

In some parts of Victoria and along the south coast of New South Wales we were shown farms where it was claimed that one cow to the acre could be pastured during the flush of the season. Land prices have risen in these districts as they have in New Zealand. At least one farm was pointed out which had changed hands during the period of high prices at $500 per acre.

We had an opportunity to see some of the cattle on the farms and also some of the best of the herds at the Royal Easter Show at Sydney. Milking shorthorns predominate, both in the grades and pure-breds. In the south coast district of New South Wales what is recognized as a new breed has been established. The foundation was milking shorthorn, with crosses of Ayrshire and

In the Jamberoo Valley, N.S.W.

Devon. They are registered as the "Illawarra Milking Shorthorn." The "Illawarra" are rather finer in the bone than the shorthorn, are almost universally red in colour, and are of a good milking type. They have all the placidity of the Shorthorn and some of the ability of the Ayrshire to rustle for feed. The specimens of Freisians (Holsteins) which we saw at the Show were only fair, and the same may be said of the Ayrshires. The Jersey is apparently not as popular in Australia as it is in New Zealand.

CHEESE FACTORIES AND CREAMERIES IN AUSTRALIA

The establishment of the factory system dates back farther in Australia than it does in New Zealand, and the first factory was said to have been started in New South Wales. Quite recently a strong movement has taken place to improve the construction and equipment of factory buildings. The State officers have the power, which they exercise, to condemn factories considered out of date or unsanitary. The average output is large. There are only 563 dairy factories in Australia, including butter, cheese and condensed milk factories. About 75 per cent of the butter and cheese is now produced in co-operative factories, that is to say joint stock factories, the shares of which are held by the producers themselves. As an instance of the rise and influence of some of these factories the one at Byron Bay in New South Wales is often quoted. It was established in 1895 at a cost of $15,000. In spite of great difficulties the farmer promoters persisted and finally triumphed over all obstacles. The turnover now amounts to over $10,000,000 a year. In addition to the manufacture of butter the society operates a bacon factory and a canning factory, and claims to have the largest creamery in the world, with an output running as high as 80 to 90 tons of butter per week.

We saw some very large factories in the western district of Victoria, and were much struck by the character of the men who were managing them. It is worthy of note that they are well paid for their services, the manager at one factory receiving a salary of $6,000 a year. It was also interesting to find that quite a number of the factories, especially in the neighbourhood of Sydney, are being operated very much along the lines of the Finch dairy station. That is

An "Illawarra" Milking Shorthorn, N.S.W.

to say they are equipped to manufacture either butter or cheese, and also do a considerable business in the sale of milk or cream. The milk supply for the city of Sydney is secured very largely through the factories instead of from individual farmers.

The following statistics have been compiled from the published reports of factories:—

Camperdown Cheese and Butter Factory Company, Camperdown, Vict., operating a central plant and two branches: Year ended June 30, 1922.

Pounds of butterfat received	2,203,386
Average test in milk received	4·04 per cent
Average test in cream received	39·002 "
Average price for one pound butterfat, inclusive of skim-milk	37·50 cents

All cream is hauled free, and milk at approximately half cost.
This company makes milk powder and casein at the central plant.
The turnover in all departments has grown from £1,320 in 1892 to £234,229 in 1922

The Colac Dairying Company, Colac, Vict., operating two factories, Year ended June 30, 1922.

Butter produced	40,002,134 pounds
Milk and cream sold (Butter equivalent)	34,720 "
Cheese produced	2,151,915 "
Pounds of milk to 1 pound cheese	9·9
Average milk test	3·8 per cent
Average cream test	35·0 "
Average price per pound of butter fat	33·58 cents
Dividend on shares	7 per cent

Maleny Co-operative Co., Queensland, for half year ended December 31, 1922.

Total butter produced	393,824 pounds
Cost of manufacture	2·82 cents per lb.
Cost of transport	·74 "
Cost of administration	·42 "
Cost of selling	3·44 "
Sundries	0·6 "
Depreciation	·36 "
Total	7·84 cents

The Stanley River Co-operative Butter Company, Queensland, give the distribution of proceeds of sales of butter for the year 1922 as follows:

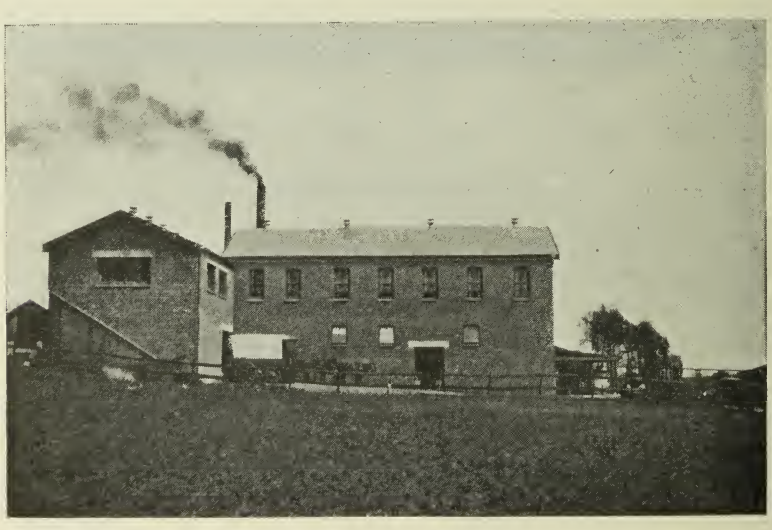
To suppliers (patrons)	83 per cent
Selling Charges	7·8 "
Wages	3·5 "
Boxes, etc	3·6 "
	97·9

No information is given as to the disposal of the other 2·1 per cent.

GRADING OF DAIRY PRODUCTS

Practically all the butter in Australia is made from home separated milk.

The grading of butter and cheese is a State (provincial) function in Australia, although the Commonwealth Government through the Department of Trade and Customs have control over exports and the right to check the grading. The system of grading is somewhat different from that which prevails in New Zealand or in Canada. Every creamery must employ a cream grader who is licensed by the State. All cream is graded as it arrives at the creamery. The different grades are kept separate. It is against the law to mix or blend them. When the butter is manufactured from these different grades of cream it is packed into boxes bearing the same grade mark, that is to say, the No. 1 cream is manufactured and packed into boxes branded No. 1 quality. The butter then goes to the grading store where it is examined by the State grader. If it is not up to the mark the brand is surcharged with a lower grade mark. The Inspectors then look into the grading of the cream, and if the cream grader does not eventually adjust his work so that his grading of the cream agrees with the grading of the butter, his license is cancelled. No creamery can operate without a licensed cream grader on the job.



Australian factory at Morpeth, N.S.W.

It is claimed that the grading of the cream and butter during the last three or four years has almost revolutionized the buttermaking industry in Australia. The climatic conditions under which the cream is collected are not nearly as favourable as they are in New Zealand, but with frequent deliveries and the care which is encouraged by the cream grading, and the differential in pay which the producer gets, the cream supply has been improved to such an extent that very little difficulty is now experienced.

THE EXPORT TRADE

Australia's chief market for dairy produce is the United Kingdom, but considerable quantities are marketed in the Orient. The following figures are total exports for years ended June 30:—

Year	Butter	Cheese	Condensed Milk
	Lbs.	Lbs.	Lbs.
1916–17	74,844,778	10,500,421	14,846,394
1917–18	72,268,916	8,381,122	24,917,676
1918–19	41,098,325	2,289,405	27,387,004
1919–20	38,969,530	7,496,285	34,492,331
1920–21	92,387,233	9,459,200	36,778,390

EXPORT TO UNITED KINGDOM ONLY FOR YEARS ENDED JUNE 30

Year	Butter	Cheese
	Lbs.	Lbs.
1916–17	62,746,880	4,959,360
1917–18	60,630,080	6,800,960
1918–19	36,606,080	10,577,280
1919–20	35,288,960	8,406,720
1920–21	81,119,360	7,293,440
1921–22	115,781,120	12,152,000

AUSTRALIAN VS. NEW ZEALAND BUTTER

There is a sharp difference in type and character between the butter made in Australia as compared with the New Zealand product, due partly to different methods in the handling of the cream. The Australian buttermakers receive a higher acid cream than the New Zealand buttermakers do. They use bicarbonate of soda as a neutralizer, but do not reduce the acidity lower than about ·2 per cent. The butter has a higher aroma and a fuller, quicker flavour. The salting is comparatively light, to meet the taste in Great Britain. The butter is not worked quite as much as it is in New Zealand. The Australians think that the New Zealanders are carrying the matter of mildness to the point of neutrality. We have been unable to secure any evidence as to the relative keeping quality of the two butters. If we were to express an opinion, based on general knowledge, we would be inclined to put New Zealand first.

The New Zealand butter is quoted highest in the London market. That may be partly due to the fact that a large percentage of the best Australian is shipped to Great Britain under a confidential arrangement, and supplied by the importer direct to special customers without being known or quoted on the market.

GOVERNMENT SERVICES

The Government services in Australia are mostly under State authority. The Commonwealth Government has no Department of Agriculture, but the Department of Trade and Customs has control over exports and employ an official who is known as the Commonwealth Dairy Expert, who has an assistant in each State. In addition to supervising exports they act in an advisory capacity with State officials, and aim to correlate the work of the different services throughout the Commonwealth.

SPECIAL LEVIES ON THE DAIRYING INDUSTRY

The dairying industry is expected to contribute through special levies to the cost of the various government services. In the State of Victoria, where there are approximately 600,000 cows, the total levies or special taxes on the dairying industry amount to about $100,000 a year.

Australian factory at Colac, Vict.

There is a tax of 12 cents per cow to cover dairy supervision. There is a further charge of 2 cents per 100 pounds on all butter and cheese manufactured. There is a federal tax of 2 cents per box of butter and 2 cents per crate of cheese, and 1 cent per case of condensed or dried milk.

These fees vary somewhat in the different States, but are approximately the same throughout the Commonwealth.

LEGISLATION

State legislation affecting the dairying industry has been much revised and stiffened during the last two or three years, and as it stands to-day is probably the most drastic of any dairy legislation in the world, as will be seen by a perusal of the section of this report which deals with legislation in New Zealand and Australia. There is no federal dairy law except that which relates to export.

A good deal depends, of course, on the manner in which these laws are administered, but we did not hear of any serious objection and we made special inquiry on that point. The attitude of the producers is expressed by the answer of the manager of a large factory when we inquired as to how these drastic laws were viewed generally by the factories. He said, " We feel that some things are a bit irksome and of no particular value to us, but we support them because we believe they are good for the industry as a whole "; and that is the spirit which seems to prevail. The attitude of the Government and its officers is always sympathetic towards the industry.

THE AUSTRALIAN DAIRY COUNCIL

While State jealousies and lack of cohesion or co-operation has probably hindered the development of the dairy industry of Australia as a whole, there are signs that the States are getting together to work for the common good. An instance of this new spirit is found in the newly organized Australian Dairy Council.

This Council, unlike the Canadian National Dairy Council, is semi-official, including as it does among its members all the principal federal and State dairy officers. The State Ministers of Agriculture are members forming a sort of super-committee. The producers, manufacturers and factory managers are

The Camperdown dairy factory in Western Victoria. Rebuilt since photograph was taken in the style of the left hand corner.

represented by carefully selected men. The total membership is about twenty-five.

The objects of the Council are to promote uniform methods, standards and laws throughout the Commonwealth; to develop policies that will be of assistance to the industry in a national rather than a sectional sense; and to act generally in an advisory capacity to both federal and State governments.

We were privileged to attend a general meeting of the Council which was held at Sydney during our visit.

COMPARATIVE COST OF PRODUCING MILK IN AUSTRALASIA AND CANADA

We could find no reliable data as to the actual costs of producing milk in either New Zealand or Australia, so it is only possible to deal with this point in a general way.

There are advantages and disadvantages on both sides. In New Zealand and in the intensive dairying districts of Australia the price of land is two or three times as high as it is in the best districts in Canada. Thus if the interest charge for land is, say, $7 per acre in Canada, then it may be put down as $14 to $21 per acre in Australasia. The manufacturing and marketing of butter and cheese costs more than it does in Canada, and because they have no export

bacon trade the number of hogs raised is only sufficient for home consumption. The result is that a large percentage of the skim-milk and whey is more or less wasted. As against these disadvantages they have little or no winter feed to provide, and as the cattle run on pasture the year round the milking of the cows is the chief outlay in connection with the production of milk. The intensive production and large herds permit of the profitable use of the milking machine. The large outputs of the factories is an advantage to marketing. On the whole the advantages and disadvantages fairly balance each other.

An Australian factory which has been condemned by the authorities and must be rebuilt.

In case of extreme competition New Zealand would probably be the last country to give up dairying for the reason that the milk producers would be hard put to find anything else to do. Nevertheless, it does not seem to us that Canada has reason to fear the competition, provided always that the quality of our butter is improved, and the standard of our cheese is kept up to that of the best of the Canadian outputs at the present time.

DIGEST OF DAIRY LAW IN NEW ZEALAND

Compulsory registration.

All dairies or any specified class thereof; persons carrying on the manufacturing or sale of dairy produce; all marks, stamps, brands, and labels used for dairy produce must be registered. The number allotted to manufacturers must appear on all packages containing cheese or butter.

Authority to inspect or examine.

Any inspector may enter any dairy, creamery, or cheese factory, or any building, conveyance, or ship used for the storage or carriage of dairy produce. Anywhere examine any dairy produce; may detain and open any package containing or supposed to contain dairy produce in any place.

Authority to order remedied, condemned, destroyed or removed, by notice in writing.

Any inspector may condemn any unwholesome, or otherwise unfit dairy produce; any unclean dairy utensil, machinery, apparatus, building conveyance, or ship used for storage or carriage of dairy produce.

Owner, or person in charge of a dairy shall supply from time to time any information requested by the Minister. Compulsory reports or statistics.

Pigs, fowl. manure heap, cesspool, drainage, closet, or enclosed yard or buildings where cows are kept must be outside specified limits from dairy. Nuisances.

No person can export or sell any dairy produce affected or infected with disease, or which has been in contact with disease affected persons or stock; or is marked with weight other than true net weight; or contained in package bearing any grade, mark, or brand not properly pertaining to contents. Certain ports are specified to be the only ones from which dairy produce may be exported. Dairy produce must be in good condition before loading on ship, and must be properly chilled before being placed on shipboard. Ships must be suitable and equipped with proper appliances for safe carriage to destination. Export or local sale forbidden. Compulsory grading of cheese and butter for export.

All butter and cheese for export must be graded and the grade thereof stamped on the box or package. It is not compulsory to grade butter for domestic sale. Voluntary grading of cream.

Cream is paid for according to grade, but it is not compulsory.

Grade marks and stamps are cancelled if dairy produce is withdrawn from storage. Withdrawal from storage.

The charges for grading are expected to cover the cost and pay the salary and expenses of an inspector in Great Britain. In 1922-23 the charges for grading were 1·07 d. per box of butter, and 1·41 d. per crate of (two) cheese. Fees.

The appropriation for the dairying service in New Zealand 1921-22 was £43,000. Against this there were credits, as fees for grading, cow testing, etc., of £24,853. Appropriation for dairying services.

DIGEST OF DAIRY LAW IN AUSTRALIA

NOTE.—Certain provisions in the following summary do not apply in all the states, but the laws of the principal dairy states, New South Wales, Victoria, and Queensland are practically uniform.

The following establishments must be registered annually:— Compulsory registration.

Cold Storages.—Premises must be approved as a cold store or for the examination, grading, marking, weighing, storage, and delivery of dairy produce—Annual registration fee, £1.

Depots.—The building, structure, or place where milk or cream is deposited for the purpose of weighing, sampling, testing or grading, pending consignment—Annual registration fee, 5s.

Factories.—Any building, structure, or place where butter, cheese, dried milk, condensed milk or other product of milk is prepared or manufactured—Annual registration fee, £1.

Dairies.—Any premises or buildings used in connection with the production of milk or cream. No registration fee charged.

Milk Shops.—Any building, or structure, or place, or any stall or conveyance, in which milk or cream is sold by retail. No registration fee charged.

Authority to inspect or examine.

Any inspector may enter for the purpose of inspection any dairy, or dairy premises, any conveyance, shop or store. May examine any live stock, dairy produce, ingredients, or material used in the making, packing, or preparation of dairy produce; utensils, machinery, apparatus used in the manufacture of dairy produce. Any inspector may enter any cooling chamber, or cold storage, open any package containing or suspected to contain dairy produce or any ingredients used in the preparation or manufacture of same. In the case of new dairy premises an inspector may specify dimensions and kind of material to be used in construction of same.

Authority to condemn or have removed by notice in writing.

Any inspector may condemn any dairy situated on property less than one acre in area within the fences of the property; any unclean or unwholesome, or otherwise unfit dairy produce or dairy produce premises, creamery, cheese factory, cooling chamber, conveyance, utensil, machinery, or apparatus; any ingredient or material used in connection with the manufacture of dairy produce, or any impure or unwholesome water or feed supplied to live stock.

Compulsory reports or statistics.

The owner, or person in charge of a dairy, must supply from time to time any information requested by the Minister.

Official control of storages for dairy produce.

No milk, cream, butter, cheese, condensed milk, dried milk in any form, or any other product of milk or cream shall be deposited or kept in any room used for domestic purposes or in any place where it is likely to become contaminated or to deteriorate.

Nuisances.

Calves, pigs, fowl, manure heap, drainage, or any general nuisance must not be within specified limit of dairy.

Compulsory grading cream.

Cream must be graded, and the various grades thereof must not be blended or mixed either as cream or butter.

Compulsory grading of butter for export.

Dairy produce cannot be exported beyond the Commonwealth unless inspected, graded and marked; official certificates are given to shipper and manufacturer. Three clear days notice must be given by shipper to the grader of intention or desire to export. The grade certificates are withheld until the dairy produce is on shipboard and the ship's master produces the manifest showing that it is on board. Butter must be kept at 15 degrees F. for 72 hours before shipment, and must not be higher than 25 degrees F. under a three minute test when loaded. Cheese must be at a temperature not less than 38 degrees or more than 48 degrees F.

Penalty for removing or changing marks, etc.

Any person who alters or obliterates wholly or partially, or causes same to be done, any inspector's marks or factory marks; counterfeits any such mark; empties or partially empties any package marked after inspection; uses in packing dairy produce any old package previously used, without effacing all previous marks, is liable to a penalty not exceeding one hundred pounds.

Labour restricted.

Persons who cannot read and write fifty words in the English language shall not be employed in, or take part or work in any registered dairy produce premises, under penalty of £1 for each such person for every day employed.

Control of construction of dairies. Safeguarding of quality of dairy produce.

The situation, construction, material and equipment of dairies must be approved. The dairy house, milk shed, factory, or depot must have impervious, water tight floors. Dairies on farms must be built to a certain size according to the number of cows. The specification, location and material must be approved.

The owner of a dairy must provide clean water, receptacles and cloth at milking time. Hands, teats, and udders must be washed. Smoking or expectorating is prohibited in dairy. Lime washing of the milking shed is required twice a year, and it must be renovated, cleansed, disinfected, or painted when the inspector requires same to be done. Compulsory treatment of over-ripe cream.

Over-ripe cream must be denatured with some harmless colouring matter, or have kerosine added thereto to make such cream easily identifiable. Compulsory method of maturing cheese.

Cheese must be kept in room with temperature not over 70 degrees for at least ten days before shipment . Compulsory method of payment for milk and cream.

All milk and cream must be paid for on the basis of its butter fat content. Fees.

	£	s.	d.
Cost of license to sell dairy produce (except milk) from a vehicle—each vehicle..	—	5	—
Registration of a mark or brand..	—	10	—
Transfers..	—	2	6
Examination of tester or grader..	—	5	—

Grade marks and stamps are cancelled if dairy produce is withdrawn from storage. Withdrawing from storage.

IN CONCLUSION

The foregoing statement of the conditions under which cheese and butter are produced in New Zealand and Australia is submitted to Canadian dairymen not with the idea that they should attempt to blindly follow along similar lines, but rather to indicate the nature of the competition that they will have to meet in the future. It would be folly to ignore this competition, and it is hoped that the publication of these facts and impressions may be the means of stimulating a greater interest in improved methods and practices to put the industry in this country in a position to meet competition from any quarter. Canadian dairymen must solve their own peculiar problems in their own way, because the conditions of the industry in Canada are so different from what they are in New Zealand or Australia that the one does not serve as a model for the other. Nevertheless, a study of the conditions of the industry in New Zealand and Australia, or in any other country for that matter, cannot fail to be suggestive to those who are desirous of seeing the industry kept up to the mark in this country. The fact that conditions are different does not lessen the keenness of the competition one iota.

There are features of this competition which at first glance may be discouraging to some dairymen, but it should not be overlooked that the advantages are not all on one side. Canadian dairymen have the advantage in:—

(*a*) greater experience in breeding and handling dairy cattle;
(*b*) a more profitable use of the by-products of the dairy, such as skim-milk and whey;
(*c*) lower cost of manufacturing cheese and butter;
(*d*) nearness to market and lower cost of marketing;
(*e*) the existence of what is probably the best competitive primary dairy market in the world at Montreal;
(*f*) a well established and economical export business;
(*g*) an established reputation for cheese; and
(*h*) excellent dairy schools and systems of field instruction.

With these substantial advantages it is fully within the power of Canadians to meet these new conditions, but it cannot be done by sticking to obsolete and often makeshift methods of the past. Attention must be given to the following points:—

1. There must be keener appreciation of the supreme importance of quality.

2. The apathy engendered by the lack of competition in the past must be dispelled and a new spirit aroused to meet the remarkable change of situation that has come about in the last two or three years.

3. The universal grading and more frequent deliveries of cream for buttermaking, and the proper maturing of cheese in suitable temperatures before shipment, should be put into effect as soon as possible.

4. Some reorganization of the factory end of the business is imperative. The old ramshackle building with its poor equipment, of which there are too many, no matter how well it may have served in the past, must give way to something more in keeping with the modern needs of the business. Every factory must have sufficient revenue to provide efficient equipment, including cool curing rooms, and decent salaries for competent cheese and butter makers. This will cost some money, but it is worth while and will pay in the end.

It may appear that the importance of the large output has been over-emphasized in these pages. Large factories are not essential for the manufacture of high grade butter and cheese, but under present day conditions the chances are greatly in favour of success in a factory with a reasonable annual output, say at least half a million pounds of butter

or cheese. The records of factory outputs in New Zealand and Australia are quoted more for the purpose of showing the kind of competition we shall have to meet rather than as the ideal which we should attempt to reach. After a factory reaches a certain size it becomes more an economic question than one affecting quality. The ideal size would be smaller in Canada than it is in New Zealand or Australia because of the less intensive milk production, but the conditions to-day demand larger factories than those which have served in the past.

5. There must be the fullest co-operation between all the elements that make up the dairying industry in Canada. Private or selfish interest must not be allowed to stand in the way of any improvement that has for its object the general good of the industry. The making of butter and cheese should be recognized as an important manufacturing business, which it is, and should be treated accordingly.

6. Finally, I would insist with all the emphasis possible that the unfair and demoralizing practice of holding cheese and butter makers financially responsible for "cuts" in the sale price of butter and cheese on account of defects in quality should be dropped as quickly as possible.

It is unfair, because nine times out of ten the fault lies either with the owner of the factory or with the patrons who supply the milk. With such a guarantee in the contract both the owner and the patrons become more or less indifferent and put the whole responsibility for quality on the man who as a rule is least to blame and who is the least able to bear the cost.

It is demoralizing, because under such a system there is a tendency on the part of the maker to cover up defects in ways that are not always creditable. If the losses arising from inferior quality in cheese or butter were to fall on the patrons or owner, much greater discrimination would be exercised in the engagement of a maker. His record, training and ability would be much more carefully enquired into and good men would be at a premium, as they should be. A man who was known as a careless or indifferent maker would find it harder to secure employment. The patrons would deliver a better quality of milk. The owner would in many cases find it advisable to improve the equipment and sanitary conditions. Thus the standard would be raised all around.

The anxiety of the maker to avoid losses on cheese that are to be exposed to high temperatures often leads him to such extremes in the handling of the curds that he produces a cheese with such a stiff, rough texture that it is doing untold harm to the reputation of Canadian cheese, and yet under the present system he can hardly be blamed for thus trying to protect himself.

I do not wish to create the impression that the foregoing criticism of Canadian factories and their management is of universal application. There are many factories in Canada which are well built, well equipped and well managed, and which turn out cheese and butter of the highest quality; but these factories cannot maintain the reputation of Canadian cheese and butter while any large proportion of the factories fall within the other category. The good factories are carrying the poor ones, and it is a load with which they have no right to be burdened. The proportion of inferior cheese and butter need not be large to create a bad impression and injure the reputation of the whole output.

The Imperial Food Journal in a recent issue commending the grading regulations, etc., said:—

> "Canada will always be up against formidable competition both within and without the Empire, and her dairy policy will have to be well nigh faultless to regain lost ground and to gain fresh ground."