1944

NEW ZEALAND

MILK COMMISSION

REPORT ON THE SUPPLY OF MILK TO THE FOUR METROPOLITAN AREAS OF AUCKLAND, WELLINGTON, CHRISTCHURCH, AND DUNEDIN

Presented to both Houses of the General Assembly by Command of His Excellency

Majority Report signed by —
WILLIAM ROBERT TUCK, Chairman.
ARTHUR HUGH WARD, Member.

Minority Report signed by —
GEORGE WILLIAM DELL, Member.

TABLE OF CONTENTS

REPORT

To His Excellency Marshal of the Royal Air Force Cyril Louis Norton Newall, Knight Grand Cross of the Most Honourable Order of the Bath, Member of the Order of Merit, Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, Commander of the Most Excellent Order of the British Empire on whom has been conferred the Albert Medal of the First Class, Governor-General and Commander-in-Chief in and over His Majesty's Dominion of New Zealand and its Dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

Your Excellency's Commission, dated the 10th day of March, 1943, with which you were pleased to favour us directed us to inquire into and report upon the then present circumstances of the supply of milk to the four metropolitan areas of Auckland, Wellington, Christchurch, and Dunedin, and to such other areas as might be directed from time to time by the Minister of Agriculture and upon other specified matters.

Your Excellency's further warrants dated respectively the 30th day of June, 1943, and the 4th day of August, 1943, extended the time within which we were required to report to the 16th day of August, 1943.

The Commission decided that the most satisfactory procedure to adopt would be to invite submissions in writing from the persons, firms, companies, and the local bodies in the four metropolitan areas who were engaged in the liquid-milk industry and from organized bodies of consumers and to hold public sittings for the purpose of hearing evidence tendered by witnesses in support of such submissions.

Sittings for taking evidence were held in Wellington, Christchurch, Dunedin, and Auckland, and a large number of witnesses were examined. The Commission held conferences with the Stabilization Commission and with the Price Tribunal and with representatives of the Armed Forces and of the Joint Purchasing Board. Valuable information was obtained from Government departmental officers and from the Director and staff of the Dairy Research Institute.

Visits were paid to the two agricultural colleges and to a number of dairy-farms in the districts supplying each of the metropolitan areas. All the processing plants in the four cities were inspected. The information gained on these visits proved to be of valuable assistance to the Commission in the conduct of its inquiry.

The Commission has enjoyed the co-operation of the interested parties and of their counsel and witnesses in each of the areas. It acknowledges with thanks the assistance rendered by the officers of the Government Departments and particularly by those of the Department of Agriculture, who devoted much time to conveying members of the Commission around the supply districts and in preparing data. The Commission desires also to record its appreciation of the helpful evidence and advice given to it by Professor Riddet and Dr. Whitehead.

In preparing its report and making its recommendations the Commission has followed the order in which the several matters of inquiry are set out in the order of reference supplied to it, except that it has found it convenient to consider under the separate headings of "Organization" and of "Prices and Margins" some of the questions arising under the specified headings of "Methods of Supply," "Methods of Collection," "Methods of Treatment," and "Methods of Distribution."

The Commission is satisfied that there is need for alteration and reorganization in many of the methods now established in the industry and that in some important respects that need is one of urgency.

The Commission regrets that it has not been possible to reach unanimous decision in all the matters raised in its inquiry. Two of the members are in agreement on all matters and submit a majority report. The third member finds himself in complete agreement with the report made on the present circumstances of the industry in each of the four metropolitan areas and in substantial agreement with all the recommendations save that upon one matter. Upon that one matter, however, he is of opinion that further recommendations for reorganization of a fundamental nature ought to be made, and he has set forth his views on this matter.

The Commission wishes to express its appreciation of the co-operation and valuable assistance rendered to it by Mr. W. A. Cowell and Mr. L. C. Nisbet, who were attached to it as Technical Officer and Investigating Accountant respectively, and of the services of the Secretary, Mr. B. Sinclair-Lockhart, and of the efficiency, diligence, and ready assistance of Miss Scott, Miss Richardson, and the other young ladies who acted as stenographers and typistes.

Our detailed report and recommendations are as follows: —

INTRODUCTION

THE Commission was appointed on 12th March, 1943, to inquire into and report upon the following matters:—

(*a*) The present circumstances of the supply of milk to the four metropolitan areas of Auckland, Wellington, Christchurch, and Dunedin, and to such other areas as may from time to time be directed by the Minister of Agriculture:

(*b*) The alteration and reorganization in methods of supply, collection, treatment, and distribution that may be necessary in such areas to ensure at reasonable prices adequate supplies of milk of high standard:

(*c*) The supply of milk for the Armed Forces, including Allied Forces, in such areas.

The problems presented by this order of reference are complex and of considerable magnitude. It is not possible to state exactly what is the total annual value of the milk distributed to consumers of all classes in the four metropolitan areas, but it appears to be not less than £2,500,000. The number of dairies licensed for the supply of milk within the four metropolitan areas approaches 2,000, with a cow population of over 60,000.

The problems are problems of greatest moment. All the medical evidence presented to the Commission emphasized the fact that milk is at once the most valuable of all articles of diet and the most dangerous means for the spread of disease. New Zealand has been developing the milk industry with a view to securing adequate supplies to meet the increasing needs of a growing population with an increasing *per capita* consumption. It has also directed attention to ensuring that that milk shall be safe and of good quality. The Health Department has endeavoured, and is endeavouring, to increase consumption per head of the population, and it has control of the scheme to provide a free issue of milk to all children in kindergartens and primary and secondary schools. The Department of Agriculture has devoted attention to securing the most sanitary conditions in dairies producing for town supply and insists on the observance of regulations as a condition of the issue of a license to supply milk for consumption in its liquid form. The Health Department has been endeavouring to enforce the provisions of the Sale of Food and Drugs Act to ensure the maintenance of the approved standards of quality and purity.

The purpose of the policy expressed in these provisions and administration is at present threatened with defeat. During part of the time occupied by our inquiry in three of the areas the provision of school milk was almost entirely suspended because supplies were not available. Supplies to the Armed Forces were cut down. Deliveries to wholesale purchasers such as milk-shops and milk-bars were reduced. In one area even supplies to household consumers were severely rationed. Even more serious is the fact that milk was being drawn from suppliers outside those whose equipment for town milk-supply has been developed through years and who have been licensed for the purpose. Milk was drawn from suppliers to factories situated up to 100 miles from the centres, and, though in some cases the supplies were satisfactory, such a state of affairs can only be described as dangerous. It means that the organized control of quality is being defeated. And it must be remembered that the rationing of supplies took place only after the resources of the factory suppliers in an area extending up to 100 miles from the centre had been extensively utilized. It is true that special circumstances contributed to this state of affairs. There had been, on the one hand, a heavy demand for the defence Forces, and, on the other hand, a falling-off in production due to lack of fertilizer and of adequate efficient labour. In the Auckland district a long drought seriously reduced production. But all these influences, save the drought in Auckland, were foreseen. They all are still operative, and there is no reason to expect that they will be less serious in their operation during the coming year. The demand for the Armed Forces must be anticipated, and it must be borne in mind that approximately 10 per cent. of the population of New Zealand is under arms and must ultimately be absorbed in the civilian population. Only in Auckland was the effect of the drought very serious, and there the frequency of dry seasons is a fact that must always be noted in planning the supply of milk for the metropolitan area.

The Commission has regarded the metropolitan milk-supply as one part of the liquid-milk industry of the country, and the liquid-milk industry, in turn, as a division of the great dairy industry. The production of milk on the dairy-farm involves the same kind of activity and is subject to the same influences whether it is sold for consumption as liquid milk within the Dominion or is manufactured into butter or cheese either for internal consumption or for export. And the two parts of the industry are inter-related in important practical ways. As the demand for liquid milk increases, the sources of increased supply must be found largely in the herds supplying the factories. Not only so, but slight influences may readily cause a change-over from one form of farm economy to another. A difference in price between milk for town consumption and that for the cheese or butter factory may be too narrow to induce the dairy-farmer to maintain the drudgery of all-the-year-round milking; and, as has often happened and is happening to an increasing degree, he may quickly change over to seasonal milking for the factory. This fact alone is sufficient to make it impossible to consider the town milk-supply as a completely separate industry.

The Commission has studied the supply to the four metropolitan areas as a part of the liquid-milk-production section of the dairy industry. The population supplied in these areas probably exceeds 600,000. That means that another 1,000,000 draw their supplies outside this area. Many of the problems of the metropolitan areas are problems of the smaller cities and towns. The Commission is not entitled to extend the inquiry beyond the areas specified in its order of reference, but it has recognized the wider implications of the various proposals considered; and it has been compelled to recognize that already at times resort is had to the same sources of supply by the populations of different centres, and that competing interests may need to be reconciled in the not distant future.

The Commission has particularly considered the features of a long-term policy, but has had regard also to the need of short-term adjustments. Had the circumstances of the present time been normal we still would have adopted this attitude. Fixed methods have been developed in the city milk-supply industry in each of the metropolitan areas. In our opinion some of these methods need to be modified and some radically altered in order to meet expanding needs and to satisfy the rising standards of life in New Zealand without necessitating undue increases of price to the consumer. But the industry

has been organized and personal interests have been created in such a way that serious personal hardships would be inflicted if far-reaching changes were effected suddenly. Moreover, production of milk is sensitive to economic changes and sudden changes, no matter how well justified they may be on social grounds, may readily defeat the object they were intended to attain. The fact is that the present is not a normal time, and every consideration against seriously disturbing change is reinforced by the need to achieve the maximum co-operation in every vital service. We think, therefore, that we should regard the present stage in the milk industry as one of gradual transition from an old order to a new one.

Closely related to this distinction between a long-term policy and a short-term policy is the policy of establishing conditions such that they themselves will bring about a progressive improvement in the conduct of the industry. This is to be regarded not merely as a method of transition, but rather as part of the long-term policy itself. As an example, it may be possible to alter in a definite way both producer and consumer prices and so meet a present need. On the other hand, it may be possible to prescribe a method of ascertaining producers' and vendors' costs from time to time and to prescribe a rule of varying prices in accordance with changing costs. Again, some particular method of treating milk might be made compulsory in all cases. On the other hand, conditions may be established that not only make such treatment possible on terms that are fair to all producers, but advantageous to them as well. These are two examples only of a number of matters that call for consideration, but they serve to illustrate a distinction. In the opinion of the Commission the policy of ensuring and shaping development by direction of the forces operative within the industry is the right one to adopt whenever such a policy is open. There are cases in which we think definite change should be made immediately, but such cases are only apparent exceptions and the necessity for prescribed changes arises mainly as part of the policy of establishing conditions of progress.

In considering the conditions of progress, prominence must be given to the importance of making conditions such that the persons directing any operation of the industry will best advance their own economic interests when they render the best service to the community. For example, the Commission was impressed in several of the centres by the evidence of an increasing dependence on accommodation milk for supplies in winter. The production of milk in the winter means heavier cost because of heavier feeding. This is an important item when any attempt is made to approximate to a level supply. Except where the conditions for the production of winter feed are favourable, this in itself encourages seasonal milking with dependence on accommodation supplies for winter. And this tends to dependence on stripper milk, milk from late calvers, and from cows that have aborted. It also means, in practice, dependence on supplies produced at a distance and under conditions that are below the standard normally required for a town milk-supply. The result is the double evil of constant threat of shortage and growing dependence on supplies drawn from unsatisfactory sources. Obviously the conditions to be established in the industry ought to be such that it will be unprofitable to those responsible to develop that dependence, and profitable to encourage the development of an even supply, or, where it is more economic to develop it, the extension of the normal area of supply to include districts where winter production is less costly.

At the very outset of its inquiry the Commission was faced with the necessity of considering the fundamental organization of the industry. The questions arising in connection with the alteration and reorganization of methods of supply, collection, treatment, and distribution are questions with implications much deeper than would appear on a superficial interpretation of that phrase. The methods of supply, for example, include methods of controlling the organization of that supply, and those vary in the several metropolitan areas. In the opinion of the Commission it is impossible "to ensure at reasonable prices adequate supplies of milk at a high standard" unless reorganization of the fundamental methods is effected. Our recommendations and the reasons for them will be found in Part II of this report. It should be stated here that, in the opinion of the Commission, the guiding principle to be adopted in organizing each operation in achieving a satisfactory supply is that, as far as practicable, the authority and the responsibility for the operation should be conferred upon the group that must perform it. This applies with particular force to the question of supply. The farmers or dairymen who produce the milk generally have their activities regulated by the vendors. This is true to an extent even in Wellington. We know of no good reason why the farmers who do the work should not be called upon to organize the supply and be made responsible for doing so. The dairy-farmers have proved beyond question their capacity to direct and control their industry to their own advantage and to the good of the community. There is no reason to doubt that the farmers concerned with the supply of milk to the four metropolitan areas will, within their own sphere of operations, prove themselves equally capable and reliable.

In the limited time at our disposal we have not been able to obtain in all matters particulars as full and as accurate as ought to be collected and tabulated. Neither dairy-farmers and their organizations, nor treatment houses and other large vendors, nor the small vendors and producer-vendors, nor, indeed, local authorities, have kept records in anticipation of such an inquiry as we have conducted. As a result we have been unable to ascertain exactly many facts that would have enabled us to present a full account of the industry in each centre or to make final recommendations in respect of all details of importance. By way of illustration of incompleteness, but not as supplying an exhaustive list, we may mention the proportions of milk produced in the different seasons; the way in which sales have been distributed between retail quantities, wholesale quantities, and quantities sold under special contract; between the rates or prices charged for the different classes, the quantities of milk used for sweet cream, ice-cream, and for other purposes; the true cost of the several items for which a margin must be allowed to vendors.

The Commission has had the co-operation of nearly all parties, and is particularly indebted to the Auckland Metropolitan Milk Council and to the Milk Department of the Wellington City Council for the assistance given. The records kept by the Auckland Metropolitan Milk Council are much fuller than those kept elsewhere, and the Council and its officers went to considerable trouble to assist the Commission. The officers of the Milk Department of the Wellington City Council, who were called upon at very short notice, lent every assistance. In Part II of this report we make certain recommendations in reference to records. It is hoped that the records of the future and their compilation will enable each developing and changing situation to be studied and comprehended readily and with certainty. In the meantime, with the co-operation we have enjoyed, we have managed to obtain approximate results and to reach conclusions that we believe will assist the discovery of immediate solutions of the more important and more urgent problems presented by the industry.

PART I. PRESENT CIRCUMSTANCES OF THE SUPPLY OF MILK TO THE FOUR METROPOLITAN AREAS

CHAPTER 1. INTRODUCTION

The first matter for inquiry and report is prescribed by our order of reference as:—

> "The present circumstances of the supply of milk to the four metropolitan areas of Auckland, Wellington, Christchurch, and Dunedin, and to such other areas as may from time to time be directed by the Minister of Agriculture."

No direction extending our inquiry has been given to us by the Minister of Agriculture, and the inquiry, therefore, is limited to the circumstances existing in the four metropolitan areas.

The essential conditions of the production and distribution of an adequate supply of milk of a high standard at reasonable prices are fundamentally the same in all areas, and the ultimate problems presented by the industry are fundamentally the same. Under the pressure of the growth of population and of social enlightenment the demand everywhere is for greater quantities of liquid milk for immediate human consumption and for a progressive improvement in its quality. In every area the questions of cost and of price are raised by every increase in demand, and even by the necessity of maintaining the level of supplies under changing conditions. The price must always be high enough to call forth the supply demanded and it must always be low enough to make adequate quantities of milk available to all groups in the community. The area from which supplies are drawn has not only to be maintained, but to be enlarged in competition with other uses for which the land is required.

Though the essential conditions of a satisfactory supply are fundamentally the same everywhere there is a marked diversity in the circumstances attending the operation of the industry in the several areas. Natural conditions are more favourable in one place than in another. Particular events occurring at intervals through the years in particular areas have exercised a determining influence on the development of the industry there. Guidance by men of foresight and resolution at particular crises has given to the organization of the industry in one area a form and character not to be found in other areas. As a result of these differences in natural conditions, events, and personal influences the set-up of the industry in each area is peculiar to that area, and the problems presented vary to such an extent as to demand separate consideration and in certain matters different solutions.

A survey of the circumstances in each of the four metropolitan areas is contained in separate chapters of this Part of the report. The purpose of this introduction is to direct attention to the more important features of the industry in each of the areas and to the significance of those features in relation to questions of adequacy, standard, and price.

Demand

In considering the problem of the supply of milk to any area it is necessary to ascertain the present demand and estimate prospective requirements. In the metropolitan areas the volume of liquid milk and of sweet cream demanded varies from area to area. The prime factor in determining that volume is the size of the population and the consumption of milk per head. The consumption per head of the population does not vary greatly, and in all cases is well below the amount recommended by doctors and nutritionists. But the numbers and rate of increase of the population do vary considerably. It is not possible for the purposes of this report to state with precision the vital statistics for any of the metropolitan areas; but the approximate figures given provide a reliable guide. The numbers that are relevant are the numbers of men, women, and children who draw upon the one source of supply of milk. These do not correspond exactly with the numbers of persons living within separate local-body areas. In every case there is a number living in outer suburbs and on the fringe of the aggregations recognized as suburbs whose demand is met from the same source as the demand from the city. In the more rapidly-growing centres changes take place that reduce the number of persons living in the more congested parts and increases those living in the outer areas.

The number of persons supplied with milk varies from area to area. According to the figures published in the Year-Book, the estimated population in the urban areas on the 1st April, 1941, was as follows:—

Auckland	223,700
Wellington and Hutt Valley	160,500
Christchurch	135,500 (or excluding Lyttelton, 132,440)
Dunedin	82,200

The rate of increase of population in the North Island centres appears to be still much higher than that in the South Island centres. The total daily quantities of milk at present required, including that demanded by the Armed Forces, are approximately as follows:—

	Gallons.
Auckland	28,000
Wellington and Hutt Valley	20,000
Christchurch	13,000
Dunedin	8,800

In all centres two factors have in recent years affected the demand in a major degree. The first, the supply of milk to children in schools, is a permanent one; and the second, the demand by the Armed Forces, is a temporary one. The demand for milk for school-children can be estimated with some degree of accuracy, but it is not a regular all-round-the-year demand. It is broken by week-ends and holidays, and from the nature of the case involves the creation in these periods of a supply surplus to the regular requirements. The demand from the Armed Forces is an irregular one. It calls for a substantial increase in supply. That increase must be sufficient to meet peak demands; and this means that when the demand fluctuates downwards there are substantial surplus quantities that cannot be absorbed as liquid milk and that must be diverted to the cheese or butter factory at a reduced price. How great is the difference made to the total demand by the Armed Forces it is impossible to say. It has to be remembered that it is not only the quantities of milk supplied to ships, air stations, and Army camps that have to be considered, but also the increase in sales by milk-bars and restaurants. And, on the other hand, it has to be remembered that approximately 10 per cent. of our population is at present in the Armed Forces at home or abroad and will eventually return to civilian life. Their requirements must be added to that of the present civilian population in estimating the probable demand when hostilities cease.

Attention must also be directed to the possibility of an increase in the demand per head of the population. At present in the four areas the daily consumption per head appears to be about $\frac{7}{8}$ pint. But this includes consumption in camps and in the cities by members of the Armed Forces, and the estimate of civilian consumption per head stated in the Year-Book is only $\frac{5}{8}$ pint. The optimum daily consumption per head as stated by health authorities is $1\frac{3}{4}$ pints per day. According to the findings of the recent Food Conference held in the United States of America a minimum dietary standard of slightly more than 1 pint of milk per head of the population must be included in judging the sufficiency of the diets of all peoples. It seems reasonable that the very moderate consumption of 1 pint per head per day should be anticipated and achieved. If this modest standard could be reached there would be a substantial increase over the present demand that includes the high *per capita* consumption of the Armed Forces. The Health Department aims to educate the community so that the consumption will increase.

Natural Conditions

Natural conditions inevitably play an important part in determining the policy and the administration best fitted to meet the demand and to ensure an adequate supply of good-quality milk at reasonable prices.

The Auckland area has such natural advantages that there ought not to be any serious difficulty in ensuring for very many years an adequate supply from an area extending not more than from 20 miles to 30 miles from the centre. The land is not so fertile as the land of the Taieri Plain or that of the flat country around Christchurch, but it is good dairying country and the climate is not rigorous. At the present time within some 20 miles or so of the city there is a cow population of over sixty thousand. In Wellington within the 30-mile area the natural conditions are less favourable. A great part of the land is less fertile than is the land around Auckland, and the pressure of population is being increasingly felt in the Hutt Valley. The production of winter feed is difficult and its importation is costly. There is an abundance of good land up the west coast, and an increasing dependence on the supplies from that more productive area must, apparently, be a feature of the policy for the future. Christchurch has a belt of good land in close proximity to the city, and this land is abundantly supplied with fresh cold water. Adequate winter feed is produced on the dairy-farms. In the Taieri Plain, Dunedin has a source of supply which, if it can be effectively organized, will be sufficient for many years. Heavy soil and wet conditions with consequent "pugging" of the land in the winter creates a difficulty, but the soil ranks in fertility with the best in the Dominion.

The varying natural conditions give prominence to the question of policy in production. It must be determined in each case whether the maintenance of an approximately level supply throughout the year is economical or whether other lands must be included as an integral part of the supply area either for the supply of milk in the winter or for an all-the-year-round supply. The question whether the added time and added cost incurred by going out to a greater distance for an added supply is more economical than intensifying cultivation on less fertile lands near to the area of distribution is of particular importance in the case of Wellington.

Organization

In every area the liquid-milk industry has developed some kind of organization. Production, collection, treatment, and distribution of the commodity is proceeding in each case with a degree of regularity in its main functions and methods. Producers, producer-vendors, and vendors are operating in each area and operating in accordance with settled practice. But there has not been uniformity in the processes of development, and there are striking differences in the present situation in the several areas. At certain times and in certain cases the industry has developed simply under the pressure of economic forces and of the interests of particular parties. In other cases it has been determined by the disturbing effect of particular conditions and events. In others, again, it has been inspired and guided by men of foresight, enterprise, and resolution. In the result each area has developed a distinctive set-up and its own methods of control.

Auckland has a metropolitan Milk Council created by statute with power to exercise control over the industry. It has a unique system of tight pools, each of which has a membership limited and controlled with the assistance of the Milk Council. One of the pools has a substantial surplus of milk on which the other pools depend for considerable portions of their supplies. A factory owned and operated by the New Zealand Co-operative Dairy Co., Ltd., is used as a balancing station. The Wellington Metropolitan Area is divided into two parts. One of these parts comprises the City of Wellington and its immediate environs. The other comprises the Hutt City and its environs. Wellington City has a Municipal Milk Department controlling 80 per cent. of the milk supplied to the city; and the department controls and operates a balancing station. There is a powerful Producers' Association, the Wellington Dairy Farmers' Co-operative Association, Ltd., which acts for its members and which is responsible for the supply of a large part of the milk used by the Department. The Hutt City and its environs has a well-organized association of vendors and producer-vendors and, apart from milk produced by the producer-vendors, supplies for the Hutt Valley are drawn from the Wellington Dairy Farmers' Association, Ltd. In Dunedin the vendors and producer-vendors are united in an association. Until recently the producers were unorganized. Recently a Producers' Association has been formed and is building up an organization to protect the interests of the dairy-farmers and to discharge the functions of a City Milk Supply Association. Christchurch cannot be said to have any planned or directed organization. The vendors are divided into two groups, one of which is identified with the pasteurization of milk and the other of which determinedly identifies itself with the supply of raw milk. So far the producers have failed to form any one organized body or to group themselves in any effective way.

The particular developments in Auckland, Wellington, and Dunedin were provoked by special events. In Auckland a severe price war in the town-milk trade was waged in the early "thirties." Prices were forced down so low as to create a fear that the city liquid-milk supply might fail. The new Council was created by statute in 1933–34, and at once applied itself energetically to the task of creating order out of chaos and of establishing conditions that would assure an adequate supply of milk of good qualtiy. In 1918 the milk-supply to the City of Wellington was in a deplorable condition, and a complete reorganization became imperative. Fortunately, at that time the citizens of Wellington

had on their Council men of foresight and determination and the producers had among their leaders men of capacity. The Municipal Milk Department of the City Council and the Wellington Dairy Farmers' Association were established, and these two bodies, by their enterprise and co-operation, have guided and controlled the development of the industry since that date. In Dunedin the Dairy Farmers' Co-operative Milk Supply Co., Ltd., has been called into existence because of the really deplorable condition into which the work of production had fallen and the consequent danger of collapse to which the town supply was exposed. Christchurch conditions have never been so bad as they became in Wellington in 1918 nor so depressed as they have been in Dunedin. In spite of the open hostility between sections of the industry, the milk-supply of Christchurch has not been exposed to the same danger of ruinous competition as that that developed in Auckland, and no special development of organization has taken place.

The conditions under which any important reorganization takes place may be expected not only to determine the nature of that reorganization, but to exercise a controlling influence over future development. In Auckland the principal determining influence was exercised by the apprehension of the ill results of unrestricted competition and the Milk Council, and the industry to-day adhere to the principle of tight pools. In Wellington the urgency of securing an assured supply and of maintaining a high standard possibly accounts for the Council's adherence to the system of control of supplies and to the butterfat-content standard for all milk, whether that milk is purchased in summer and autumn from its regular suppliers or in winter from factory suppliers with fortuitous milk. In Dunedin there has not been sufficient time to permit the new supply association to develop distinctive characteristics, but it may be expected to concern itself with the maintenance of unity and co-operation of all suppliers and with the effective control of supply. The characteristic of Christchurch at present is its state of disorganization.

One feature is common to all systems at present in operation. The development of productive activities is determined by commercial considerations as interpreted by the vendors. It is to and through the vendors that the demand for milk is made. They organize the industry to meet the demand. They call for the supply. They determine the times and quantities of that supply; and they shape the conditions. In Auckland, though two of the pools are formed on the co-operative principle and one has introduced a co-operative principle into its constitution, the most powerful of these pools does not retail milk in the Milk Council's area; and in the other two cases, as well as in the cases of the two proprietary companies, the commercial interests of the vendors as vendors shape and order the policy. In Wellington the general statement requires modification because of two facts. The City Council does not operate primarily for profit and the Dairy Farmers' Association is sufficiently powerful to protect the interests of the producers. But even in Wellington the Milk Department avows a policy of freedom to control supplies and to shape its policy so as to receive profit from its undertaking as well as to protect its capital rather than to ensure adequate supplies of milk of high standard. In Christchurch suppliers to treating-houses and suppliers to other vendors of milk and cream have had to accept the terms and conditions that the business of distribution dictates. In Dunedin this dependence of the producers on the policy dictated by vendor interests has been pronounced. How far that policy will be modified by the strength of the new association remains to be determined.

Adequacy of Supply

It cannot be claimed that the industry as at present organized has ensured adequate supplies of milk of a high standard to meet present demands at all seasons of the year. Reference may be made to later chapters of this part of the report for particulars of shortages and of supplies drawn from non-licensed or not fully licensed suppliers to factories. In the matter of supply of milk to schools all the areas have suffered. In Auckland in 1942 the supply of milk to high and technical schools was cut off in May and June and on odd days primary schools were rationed. Since the opening of the schools in February of the present year until the latter half of July no school-children other than those attending kindergarten received any milk. In Wellington in 1942 the only cut lasted for three weeks, but in 1943 schools were rationed in February and March, and from April onwards no milk was supplied except to kindergarten schools. In Christchurch rationing of school supplies during the winter months was resorted to during the years 1938 to 1942 inclusive. In 1943 there was no cut. In Dunedin during the years 1938, 1939, 1940, and 1941 supplies to schools were rationed in the early part of winter and were stopped in May, June, and July. In 1942 the Government paid for supplies from Balclutha, but deliveries to schools ceased during July and August. There were no supplies to schools in Dunedin this year from April to July.

There have been further cuts in 1943 in supplies to the Armed Forces and to milk-shops and milk-bars in Auckland and Wellington, and severe rationing of supplies to householders in Auckland. The total cut in Wellington during the period of most acute shortage was 2,500 gallons per day. In Auckland school milk was suspended from secondary schools on 8th June and from 18th June all school supplies ceased. The supply to primary schools was restored on 4th July and to secondary schools on 12th July. On 25th May the supply to the general public was cut 10 per cent. and on 21st June the cut was increased to from 20 per cent. to 25 per cent. Wholesale supplies were rationed in the same way as retail, and the Armed Forces stood the same ration as the civilian population, but hospitals, naval and mercantile shipping were not cut.

This shortage occurred notwithstanding the heavy drainage on the unsatisfactory—in some cases the highly unsatisfactory—supplies from outside factories. According to returns furnished by the New Zealand Co-operative Dairy Co., Ltd., that company supplied as milk or cream computed in its equivalent as milk, in 1938, 42,648 gallons; in 1939, 137,435 gallons; in 1942, 203,393 gallons; and during the months of February, March, April, and May in 1943, 680,576 gallons. The supplies drawn by Wellington from outside factories increased during the period of most acute shortage, this year to 2,700 gallons per day. Christchurch has not drawn supplies from these outside sources as the other centres have done, but during the winter it has had resort to suppliers in the normal supply area whose sheds were not up to standard and to whom the Department of Agriculture has been unwilling to grant anything more than temporary licenses. Dunedin has drawn on suppliers to the factory in the Stirling district for three years in succession, and on occasions from factories as far distant as Edendale.

It is recognized that adverse factors have operated to produce the shortages. The state of war has caused a marked increase in demand and has also operated to restrict production. The demand for the Armed Forces has been a heavy demand and an irregular one. The Forces have not only

required supplies for camps and ships and hospitals, but they have also increased the demand through milk-bars and restuarants. At the same time 10 per cent. of our population has been withdrawn from civilian life into the Armed Forces. On the other hand, the reduction in fertilizer and the labour shortage have directly affected the productive capacity of our dairy-farms. In Auckland a prolonged dry period in autumn and winter of 1943 has accentuated the effect of these factors. But it must not be overlooked that factors are operative that would have been operative even had there not been an outbreak of war. The population in the centres is a growing population. That of Dunedin has not grown lately, but in the other centres the increase has been continuous, and in Auckland and Wellington it has been considerable. The pressure of population has increased the competitive force of other uses of the available land. An increasing population demands an increasing supply of milk, and this has been the position in New Zealand irrespective of war conditions. Instead of a proportionate increase in the number of cows used for town milking there has been a relative and, in several cases, an absolute decrease. As will be seen on reference to the description contained in Chapter 2, the exact particulars of the movement in Auckland is not known. Six hundred and forty-nine dairies with 25,206 cows were registered by the Department of Agriculture this year, and these show an increase of 863 cows over the figures for April, 1942. But the Milk Council licensed only 417 permanent and 43 temporary suppliers, and the Commission has no return of the number of cows on the dairy-farms in respect of which these licenses were granted. In Wellington the number of dairies licensed by the Department of Agriculture in 1943 was 502, and the number of cows on the dairy-farms affected was 19,086. This represented a reduction in twelve months of 7 licenses and on 468 cows. As not all licensees supply milk the Department states that not less than 75 per cent. supply milk regularly—the exact movement cannot be computed, but the figures supplied are significant and create misgiving concerning the adequacy of future supplies. In Christchurch the number of permanent licenses in April, 1942, was 508, with a cow population of 9,522, and twelve months later these figures were 497 and 9,364 respectively. In April, 1943, there were 27 temporary licenses with 714 cows. Though the total of the two kinds of licenses and the cows carried has increased, the permanent licenses show a decline, and temporary licenses are granted by the Department to dairies that are not qualified for permanent licenses. In Dunedin there was a reduction of 1,695 cows on dairies with permanent licenses between April, 1938, and 1942, and a further reduction in the following year of 368 cows. About 50 temporary licenses were issued each year. On these figures it is clear that not only is there a failure to meet exceptional circumstances from approved sources, but that even in relation to the continuance of the normal demand at a normal rate of increase the position is deteriorating. As the season of plenty is now opening this deterioration is not likely to be manifested for some time; but unless the autumn and winter of next year are exceptionally bountiful or a radical alteration is effected in the situation, the winter of 1944 is likely to prove disastrous. The development of temporary licenses in itself is highly significant, not in its origin due to war conditions. They were first officially recognized in 1939. Prior to that date some vendors were augmenting off-season supplies from unregistered dairies, and new regulations were introduced to give the Department some measure of control. Now with this assistance supplies are insufficient, and resort is had to emergency supply from factory suppliers. And this practice dates back to the pre-war period.

New Zealand is fortunately situated so far as dairying is concerned, and the number of cows being milked within convenient distances of the four metropolitan areas is greatly in excess of the numbers required for town-milk supply. Remembering this it is impossible to avoid the conclusion that the organization of the liquid-milk industry ought to have proved sufficiently adaptable to have met all requirements, even including the requirements arising out of the war. The cows are being milked for the factory, and two things seem to be required:

(1) That an increased number should be secured for town milk under proper conditions; and
(2) That all-round-the-year milking or an appreciable proportion of true winter milking ought to have been secured.

An alternative to this course was to rely on supplies from farm dairies qualified for temporary license only and on stripper milk and milk from late calvers and aborted cows largely supplied by factory suppliers at a distance. This latter alternative, unfortunately, has been adopted in Auckland, Wellington, and Dunedin. In Wellington it has been advocated as a permanent feature of Council policy. In Christchurch there has been a much nearer approach to a level supply, and one result has been that, though relatively to the total supply the demand for the Armed Forces has been heavy, there has been no purchase of milk outside the regular area of supply and, except for rationing of school milk during the winter months of the years 1938 to 1942 inclusive and a mild form of rationing of milk-shops and milk-bars in 1942, there has been no failure in supply to consumers. But even in Christchurch the position has not been satisfactory in two respects. There has been some rationing and there has been too free a use of temporary licenses.

Standard of Supply

Everything that happens in connection with the production and distribution of milk must be taken into consideration if a high standard of the supply is to be maintained. In all areas it is recognized that the best attainable results are assured only when milk of a high quality is produced from disease-free cows; when that milk is cooled immediately after being drawn; when it is treated while fresh and in such a manner as to destroy all harmful bacteria or to restrict their growth; when it is adequately protected against all sources of contamination; and when cleanliness is secured at every stage of production, collection, treatment, and distribution. In the survey that follows conditions obtaining in these respects in the different areas is examined. In this section attention is directed to certain matters more fully represented later.

Quality

It is impossible to state accurately the average butterfat content of any milk other than that pasteurized by the Milk Department of the Wellington City Council. The only guide in other areas is the report by the Health Department on samples taken by its officers. The average butterfat content shown by these returns is as follows: Wellington, 4·6 per cent.; Auckland, 4·31 per cent.; Christchurch, 4·12 per cent.; Dunedin, 3·98 per cent. It should be added that a representative of one of the largest vending companies in Christchurch gave in evidence 3·85 per cent. as the percentage of butterfat in milk treated and vended by it.

These differences are due to the different breeds of cow used for milking. In Auckland and Wellington Jersey and Jersey crossbred cattle predominate. In Christchurch and in Dunedin the Friesian is prominent. The selection of breed in any metropolitan area seems to follow to some extent the practice prevailing in the district to which the area belongs. But the choice made is also influenced by the basis on which the price is calculated. In Wellington milk is purchased mainly on its butterfat content. This is not the rule in any other centre, but in Auckland two of the five pools pay on butterfat. It should also be noted that the minimum butterfat content allowed is raised in Auckland from 3·25 per cent. to 3·5 per cent. In Christchurch and Dunedin, where payment is wholly on gallonage, the minimum remains at 3·25 per cent. These bases of computing price encourage, in one case, the selection of cows giving a rich milk and, in the other case, a selection assuring quantity. As a result of payment on gallonage only difficulties have been and are being experienced with milk testing below the minimum legal standard, and supplies from several straight Friesian herds in Christchurch have created a serious problem for at least one large distributing firm. On the other hand, the effect of continuing to pay on the basis of butterfat content, accentuated by the purchase of high-testing milk from accommodation sources was illustrated by the statement made on behalf of the Milk Department of the Wellington City Council that had they last year paid on a test of 5 per cent. only for all milk testing above 5 per cent. they would have saved £3,000 in the one year.

Freshness and Cleanliness

The questions of freshness and cleanliness are closely connected and arise at every stage of the activities associated with supply. Cleanliness is a question of the health of the cows in milk and the condition of the milking-sheds. Freshness depends upon the absence of delay in collection and distribution. The Commission visited a number of dairies and depots and examined plants installed. Some cow-sheds are still in use that were modern and well equipped when erected, but which now need replacing. Other sheds have never been up to standard. The Inspectors of the Live-stock Division of the Department of Agriculture are continually pressing for improvement and, as the large number of a modern type of shed evidence, great advances have been made in recent years. In this connection it is noteworthy that the personality, interest, and diligence of the Inspectors is of extreme importance. It was made clear to the Commission that the industry is exceptionally fortunate in the officers of the Department selected as Inspectors. The difficulty and cost of rebuilding and re-equipping during the war period have checked progress. Reasonable cooling systems are in use in most dairies, and in some few cases refrigerating equipment is provided. But the practice is not uniform.

In the systems of collecting there is room for considerable improvement. Three features are noted in our survey: First, there is often much too long an interval between the time of milking and the time of collection. The attention of the Commission has been directed to cases in which a night's milking and the following morning's milking have not been collected until the afternoon, and then has been uplifted from the gate instead of from a cool room. In the cases of some dairy-farms covered stands are provided at the gate, while in other cases the milk has stood in cans exposed to the direct rays of the sun as well as the dust raised by traffic. In an least one case there was reason to believe that persistent complaints concerning pasteurized milk were due to the milk being stale before being treated. Secondly, the milk has been carried in uncovered vans, often along dusty roads in the heat of the day. Thirdly, the distances over which milk is conveyed frequently are great enough not only to increase cost unduly, but also to allow the milk to become stale.

Probably the matter calling for the strongest comment in this connection is the condition obtaining in some depots and the conditions under which the milk is distributed. The Commission has inspected depots that were models of cleanliness and coolness. They have been shown over others where the conditions obtaining ought not to be tolerated. Again, while some employers and roundsmen exercise all the care that can reasonably be expected, the vehicles and containers used in loose milk delivery by others do not show any appreciation of the ease with which such a commodity as milk can be contaminated and become a source of danger to the consumer.

Pasteurization and Bottling

The purpose of pasteurizing milk as explained by medical authority is to render milk safe for consumption by destroying the pathogenic organisms contained in it. There is only too good reason to believe that the main purpose of some treating-houses is solely to improve keeping-quality. A number of the plants inspected by the Commission are out of date; little, if any, attempt is made to ensure that only clean, fresh milk is treated; and the conditions under which they are operated expose the milk to immediate recontamination. Perhaps the most striking evidence that the purpose is the maintenance of keeping-quality rather than ensuring a safe supply is provided by the fact that after pasteurization large quantities of milk are delivered to households loose by can and dipper. The readiness with which milk can be and is contaminated by human contact, through insanitary conditions of utensils and vehicles and by the atmosphere, suggests that safety of milk is not the determining consideration in the installation and operation of expensive pasteurizing plants. This comment does not apply to the Milk Department of the Wellington City Council, and there are other treating-houses that do make an endeavour by testing to ensure that milk that goes into the pasteurizer is good milk and that the pasteurizing is efficiently carried out. But the distinction between efficient pasteurization and pasteurization as frequently carried out is marked. And the criticism that the methods of treatment adopted too often justify the lack of public faith in pasteurized milk has much basis in fact.

There are striking differences in the percentages of milk pasteurized and of milk bottled in the four areas. Detailed information is not available, but reasonably reliable approximations have been made on the data submitted. The following position is disclosed: In Auckland 84 per cent. of all milk (including retail milk, wholesale milk, and milk sold under special contract) is pasteurized and 70 per cent. of milk delivered retail is pasteurized. In Wellington the corresponding figures are 86 per cent. and 77 per cent; in Christchurch, 37 per cent. and 15 per cent.; in Dunedin, 50 per cent. and 31 per cent. Of milk delivered retail in Auckland 46 per cent. is bottled; in Wellington, 77 per cent.; in Christchurch, 21 per cent.; and in Dunedin, 22 per cent. In Wellington, as already indicated, pasteurization and bottling is a method of ensuring that the high standard of the milk delivered is maintained until it reaches the consumer. No raw milk and no loose pasteurized milk is distributed retail by the Milk Department of the City Council. All such milk distributed is distributed by the nearby farmers. As already indicated, there are treating-houses that are endeavouring to ensure

that pasteurization is effective as a means of safeguarding the health of consumers. But the methods at present employed by a number of houses leave much to be desired and fail to maintain that standard of cleanliness, freshness, and safety that pasteurization was designed to protect.

Costs and Prices

It is obvious that accurate knowledge and a clear appreciation of the cost of any form of service or supply is necessary to the determination of prices to be paid and as a guide to the organization of an industry. Unfortunately, the records heretofore kept by producers and vendors alike have not been such as to provide the information required. The need for an alteration in this respect forms the subject of a recommendation in a later part of this report. In the absence of satisfactory returns the Commission has conducted an investigation that has enabled it to collect sufficient information to form a basis for judgment on the questions as to the prices that ought to be paid to producers and those that ought to be charged to consumers respectively. In this investigation it has had the ready co-operation of all parties and the skilled assistance of an experienced costing accountant.

In an Appendix to this report, the seasons into which the year is divided in the several districts, the prices paid to the producers, and the prices charged to the consumers will be found set out in detail. The table distinguishes between the prices charged for milk retailed, for that sold in wholesale quantities, and for that sold under the various classes of contract. Various features of this return will be discussed in the following Chapters of this part of the report, and certain of the recommendations contained in Part II are based on the facts set out in the table. At this stage attention is directed to certain features that may assist an understanding of the relative position in the several areas.

(1) *Prices to Producers*

These are remarkable for their variation both in respect of the periods into which the year is divided and in respect of the prices paid during the several periods. They are remarkable also for the lack of correspondence between these variations and the varying costs of production in the different areas. Doubtless the variations within each area are due in part to the need to encourage production in the periods when production is the more expensive. But even in this matter there does not appear to be an adequate appreciation of the need for, or any close approximation to, a correspondence between the prices actually fixed and those needed to provide sufficient inducement to achieve the result. No doubt the differences in prices are affected by the differences in the quality of the milk produced. In Wellington, where payment is made on the butterfat content, tests show that the average of that content throughout the year is 4·6 per cent. These tests are not taken elsewhere with the same regularity as they are taken in Wellington, but, as stated above, the samples taken by the officers of the Health Department and tested by the Government Analyst show an average butterfat content for Auckland of 4·31 per cent., for Christchurch of 4·21 per cent., and for Dunedin of 3·98 per cent. If allowance is made for this difference in quality, the disparity in producer prices based on gallonage alone would not be nearly so marked. But it must be remembered that the farmers in the Dunedin supply area have not been asked to produce a high-quality article; and it is not certain that the lower quality implies anything like a corresponding reduction in costs.

(2) *Price to Consumers*

A marked disparity in prices to consumers in the four areas is disclosed by the table. Not only do the prices themselves vary, but there are noticeable differences in the margins allowed to vendors. The figures quoted need to be studied with care, and notice must be taken of the explanatory notes to the table. The difference in costs between pasteurized and raw milk and bottled and loose milk is apparent and must be allowed for. And it is to be expected that in cases in which a large proportion of the supply is pasteurized and bottled retail prices generally will reflect the influence of the costs of the treating-houses. But here again there is a lack of correspondence between differences in cost and differences in price. Two other influences have to be appreciated. The first is a difference in costs of different vending-houses, both in treating costs and costs of distribution. It is not thought proper to include details of the costs of particular persons or companies; but differences do exist in this respect and justify a requirement that appropriate costing accounts be kept in all cases in the future. The second influence to be appreciated is that of organization. Where the producers are a well-organized body, as in Wellington, they have been able to protect their own interests much more effectively than the hitherto disorganized dairy-farmers in Dunedin have been able to protect theirs. And this difference is reflected in the prices the farmers have received and in the margin obtained by the vendor.

(3) *Retail, Wholesale, and Special Contract Prices*

Liquid milk is sold at retail rates to the household consumer. Large quantities are sold at wholesale rates to hotels, restaurants, shops, and milk-bars. Other quantities are sold under special contract rates to institutions such as hospitals; to shipping companies; to manufacturers of ice-cream, chocolate, and other milk products; for milk in schools; and for the Armed Forces. Considerable quantities are separated to supply the market with sweet cream. The Commission has endeavoured to ascertain how in each area the milk produced is divided between these different purposes, and the relation between prices charged in the several cases. The result of the inquiry is shown in the table in the Appendix. Its importance can be readily appreciated. Obviously there ought to be a correspondence between the scale of prices and the costs of production. If the wholesale price is too low relatively to the retail price, then either the household consumer or the producer suffers unfairly. Equally important is the possibility that special prices under contract may be cut and unduly depress the price to the producer or raise the price to other classes of purchasers. There does not appear to be any consistent or just relation between the prices to the different classes and consideration has been given to the question of adjustment of the scale, and recommendations on the matter are contained in Part II of this report.

Utilization of Surplus

Intimately connected with the question of price is the question of utilization of surplus milk. The matter of concern to the farmer is the total return that he receives for his total production. For part of that he receives the specified town-milk price. For part, he receives factory price. The part for which the factory price is paid is supposed to be the part which is surplus to town-milk requirements, and which must, therefore, be sent to the factory. But in some of the places in which a "winter quota" or "declared quantity" contract is adopted, any amount in excess of that adopted quota or quantity is

surplus, and, whatever may be the use that is made of that surplus, factory price only is paid for it. The Commission was assured, however, by the representative of the largest treating-house in Christchurch that all milk in winter, even any excess over the quota or declared quantity, is paid for at town-milk rates. Whether in practice any particular vendor gains appreciable benefit from this practice the Commission has not been able to ascertain. Where a truly co-operative basis of supply is adopted and strictly operated the gain will be reflected in the greater pay-out to the producer at the end of the year. But this basis is not generally adopted. Another question of still greater importance is the use of milk for the production of cream and other purposes. In one district it was found that one of the vendors who purchased large quantities of milk for town supply, and by whom factory prices were paid for substantial surpluses, imported large quantities of cream from sources at a considerable distance beyond the normal town-milk-supply area. Had it been established that the surplus milk brought into the area from dairy-farms licensed for that purpose should provide the primary source of all cream required by the area a use might have been made of the surplus more profitably than that of sale to a cheese or butter factory. The same consideration applies to every other use to which the surplus milk may be put, whether it be in the manufacture of ice-cream, of chocolate, or of any other marketable product. A rule that the surplus milk available from the town milk-supply must be exhausted before resort is had to outside supplies would be a valuable means of protecting the producer and, possibly, of guarding the consumer against the increases in price or even of securing a reduction. No such rule exists, though, as indicated above, the operation of the co-operative principle does, at least partially, effect the same object.

At the present time no care is taken to ensure that cream for consumption in the metropolitan areas is drawn from licensed farm dairies. As cream comprises approximately 60 per cent. milk, the same danger of infection exists as in the case of milk and the same necessity arises for control over the conditions of production and distribution. If this principle were applied, the suggested rule that all town milk-supply should be exhausted before cream was imported from outside sources would become effective.

CHAPTER 2.—PRESENT CIRCUMSTANCES OF THE SUPPLY OF MILK TO THE METROPOLITAN AREA OF AUCKLAND

In the Year-Book return of the population of urban areas the Auckland area is treated as comprising the City of Auckland, twelve boroughs (comprising four on the north shore of the harbour and eight on the south shore), and certain other urban areas (including adjacent town districts and parts of counties). This area contains nearly the whole of the population depending on the area milk-supply and does not include any appreciable number of persons not depending on that supply. Though widespread, the area is well situated for the purpose of convenient distribution of any commodity in universal use. The land is not flat, but the hills are not difficult and good roads radiate from the centre in all directions.

Demand

Population

The population within the metropolitan area is stated in the 1942 Year-Book as being 223,700 on 1st April, 1941. This is the population to which milk is supplied in the one supply area. In addition to their requirements, large quantities are required for shipping, for the Armed Forces, and for children who attend schools outside the area but are supplied from the treating-houses within the area. The quantities required for shipping and for the number of men in the Armed Forces for whom provision might have to be made cannot be exactly computed, but the number of children outside the area for whom provision is supposed to be made at half a pint per day per child is 29,412.

In anticipating future requirements regard must be had to the growth of the population. The Year-Book for 1942 gives the figures for the Auckland urban area for the period from 1911–1936 inclusive as follows: 1911, 115,750; 1916, 133,712; 1921, 157,757; 1926, 192,223; 1936, 210,393. To this can be added the figures given above namely, 1941, 223,700. These figures show considerable variability in the rate of increase. This variability is probably due, in the main, to the growth in the population affecting the relation of outlying districts that are gradually built up outside the urban area until further changes bring them into the area. Even at present such places as Papatoetoe and Manurewa, though outside the recognized urban area, draw their liquid-milk supplies from part of the same supply area, and their populations are steadily growing. It seems reasonable to anticipate an annual increase of demand equivalent to consumption by, say, 3,000 persons and unsafe to plan for less. The changes in the volume of shipping cannot be foreseen or estimated with any accuracy, but in normal times a rough correspondence to changes in the population may be anticipated. The number of the Armed Forces in the area is likely to be reduced to relatively small proportions after the end of the war. But as repatriation of men now in camps near the area takes place the New Zealand men at home and abroad will return to civilian life, which probably will mean an increase in the civilian population in this one area of approximately one-tenth part of the total population.

Present Consumption

The consumption of milk within the area varies from month to month and from year to year, but the highest daily gallonage purchased in any one month in each year is the only safe guide for future requirements. That is the maximum amount that is required and ought to be provided. In the Auckland Milk Council's area the average daily consumption for the year 1934-35 onwards has been returned by the Milk Council, and the months of highest daily sales are November, December, February, and March. Taking the highest average for any one month we get the following:—

Season ending 31st March,	Average Total Daily Gallonage sold.
1934–35 (December)	17,767
1935–36 (December)	19,139
1936–37 (December)	19,417
1937–38 (March)	20,578
1938–39 (March)	20,744
1939–40 (December)	20,780
1940–41 (December)	21,568
1941–42 (December)	22,936
1942–43 (March)	27,751

The consumption of milk in the schools is much heavier in March than it is in December, and since the full effect of the milk-in-schools policy was first felt in the 1937–38 period there has not been much difference in the total volume of sales in the area in those two months. In the 1942–43 period the daily consumption in March exceeded that of December by 1,748 gallons, but this, no doubt, was abnormal. Until March, 1937, the highest daily average for any one month supplied under the milk-in-schools scheme was 375 gallons. In March, 1937, it was 1,123 gallons, and since that date it has risen to as high as 1,350 gallons. Since the milk is used only on school days, the consumption on any one day may appreciably exceed this quantity. The figures for consumption seem to indicate that the increase in consumption has not kept pace with the increase in population, or, perhaps, that the ordinary per-head consumption has to a marked degree adjusted itself to the provision of milk in schools.

Future Expansion of Demand

If the standard of 1 pint per person per day, which is well below the standard set by health authorities, were observed, the daily consumption by a population of 223,700 would be 27,962 gallons, and to this would have to be added the consumption by shipping, by the Armed Forces, and that at the schools outside the metropolitan area. The quantity of milk consumed on school days by school-children in the outside districts at the rate of ½ pint per day each would amount to, approximately, 1,800 gallons.

For the time being the daily consumption by the civilian population, the needs of shipping, the requirements of the Armed Forces, and the supply to children of schools in outside districts is the measure of the demand. In anticipating the demands in the future regard must be had to the growth in the population, including the school population, the normal increase in supply, and the stimulus to milk-consumption by the activities of the Health Department and other health authorities. Against this must be placed whatever reduction there may be on repatriation when the members of the Armed Forces are dispersed and our own men return to civilian life.

Organization

The two outstanding features of the organization of the milk-supply to the Auckland area are the control exercised by the Metropolitan Milk Council and the existence and operation of the tight pools.

Milk Council

The Milk Council was constituted under legislation passed in 1933 and commenced operations in 1934. In order fully to appreciate its policy and administration it is necessary to bear in mind the conditions in which it was born. For some time there had been an abundant supply of milk, and a vigorous price war was waged between various companies. There was much complaining about the chaotic condition of the industry and of the poor return being obtained by the dairy-farmer for his product. Fears were entertained that a continuance of the unrestricted competition would, by impoverishing the farmers, imperil the supply.

The new Council took up its duties and applied itself energetically to its task of organizing the industry and protecting the consumers in respect both of adequacy of supply and of high quality. It has discharged a variety of duties, but four features of its administration have been conspicuous.

It has controlled the issue of licenses to dairy-farmers. This was, from the outset, part of the policy of bringing order out of chaos, and has been continued as part of a policy of maintaining order in the industry. In order to supplement the supply in the autumn and winter months without increasing the summer surplus it has devised a system of temporary licenses which authorize the holders to supply milk during a part of the year only.

It has rationalized the distribution of milk. Before the zoning system was introduced it took steps to reduce the waste caused by duplication of services; and when the zoning system was adopted it organized a scheme of zoning that left little to be desired.

It has adopted its own system of testing directed to raising the standard of the milk sold and to maintain the higher standard. With the same object in view it has limited the hours of delivery by requiring all milk supplied to households to be delivered before 7.30 a.m. The explanation of this early hour is that the atmosphere in Auckland is very humid and that consumers should be able to depend for their milk at breakfast on that morning's delivery and not on the supply of the previous day.

It has controlled the issue of licenses to milk-shops so as to bring about the elimination of uneconomic duplication of selling agencies. Shops already holding licenses were allowed to continue them, but new licenses have been granted only in cases in which the additional agencies were justified on economic grounds. And this control has extended to cases in which licenses have lapsed and application made for new licenses to replace them.

The powers of the Council are limited. They cannot prosecute in all cases of breach of the law. They can refuse to issue licenses and they can cancel licenses. But cancellation is a severe penalty, and in periods of shortage it is difficult to apply. The prospective effect on the city's supply would prevent its application to any really large vendor.

Tight Pools

In the Auckland area there is a system of what are described as tight pools. These are groups of suppliers associated with particular treating and vending houses. Licenses are granted to dairy-farmers by the Milk Council not to supply milk to the town generally, but to supply a particular house. The Council cannot compel a treating-house or a pool to accept a particular supply. It authorizes, but does not oblige. The number of licenses in each pool is controlled by the Council with the object of preventing the creation of too large a surplus with a consequent low pay-out to the licensees. A further feature of the system is the grant of temporary licenses under which dairy-farmers are licensed to supply milk for limited periods only. Apprehension is felt lest if licenses are freely granted an excess quantity of milk will come on the market, an increasing proportion will have to be supplied as surplus milk to the cheese-factory, the payment per gallon to the dairy-farmer will fall, and the supply to the metropolitan area will be endangered.

An examination of certain features of this system in operation is illuminating. There are five tight pools in Auckland, which for the purpose of this statement are designated Pool A, Pool B,

Pool C, Pool D, and Pool E respectively. The council has supplied returns which show the following facts with regard to surplus and payout of these pools:—

	1940.		1941.		1942.	
	Surplus.	Pay-out.	Surplus.	Pay-out.	Surplus.	Pay-out.
	Per Cent.	d.	Per Cent.	d.	Per Cent.	d.
Pool A	15·025	10·94	7·741	11·21	2·08	11·69
Pool B	11·284	10·76	2·34	10·78	2·349	12·24
Pool C	21·17	11·33	8·69	11·96	7·4	12·15
Pool D	14·856	10·91	14·003	10.85	6·62	11·21
Pool E	38·557	9·55	38·395	9·57	24·28	10·15

On the face of it this return seems to indicate success on the part of the first-mentioned pool in securing a good price for its suppliers and a failure on the part of Pool E to do so. But this return needs to be considered in relation to another one showing the use by the respective pools of milk drawn from each other and outside factories. So far as drawings from and supplies to each other are concerned the information supplied by the separate pools for the year ending 31st March, 1943, show that during the twelve months Pool A drew from other pools 255,377 and supplied 65,502, a balance of drawings over supplies of 189,875; Pool B drew 126,255 and supplied 301,290, giving a balance of supplies over drawings of 175,035; Pool C drew 59,966 but did not supply any; Pool D drew 207,715 and supplied 25,713; Pool E supplied 409,808 and did not draw any.

Returns for the same period show that Pools A, B, C, and D also drew from suppliers to outside factories nearly 450,000 gallons. Other returns show that milk supplied (including cream computed as milk) to these pools from the factories as follows:—

	Gallons.
1938	42,648
1939	437,435
1942	203,393
1943, February to 31st May (inc.)	680,576

From this it will be seen that the pools that had the smallest surpluses and the highest pay-out depended most on milk that they could draw from other pools and outside factory suppliers; and that all four Pools A, B, C, and D draw directly or indirectly on Pool E; and that so far as Pools A, B, and D were concerned these drawings were heavy except in the year 1940–41, a year of altogether exceptional productivity and the best in the history of the Dominion. Evidently those pools have needed more milk than their pool suppliers could supply. It is to be noted that the producer-vendors did not meet all their own requirements, but also drew upon the pools for portion of their supplies. Of the 3,721 gallons per day they sold in 1942 they purchased 1,427 gallons. An attempt has been made to adjust the position by the issue of licenses to supply during the off season only. Strenuous efforts have been made to obtain more, but these efforts have met with partial success only. One of the company's managers stated in evidence that 75 per cent. of those approached wanted permanent licenses. Despite the efforts to obtain new suppliers, the heavy drawings from other pools has continued.

The truth is that owing to irregularities in demand and to seasonal variations in production a surplus must be provided. Some authorities put the necessary surplus over anticipated demand at 20 per cent., and a surplus of not less than 10 per cent. over requirements in winter seems necessary if the needs of the community are to be adequately met. It is clear that that surplus has been necessary in Auckland. The surpluses mentioned in the table above do not mean a month-by-month surplus, but only a total surplus, including the flush production. A winter surplus of 10 per cent. would involve even under conditions of reasonably level production an annual surplus of 20 per cent. The figures quoted indicate by how great a percentage all the pools other than Pool E failed to achieve self-sufficiency in supply. Had the surplus not been provided by Pool E the shortage in Auckland would have been disastrous in all years save 1940. Each of the other pools depended on a surplus, but did not provide it. They protected their suppliers at the expense of Pool E. As Pool E is fully co-operative it is not certain that the suppliers in that case were worse off than suppliers to other pools, but the fact remains that Pool E supplied a surplus to meet the needs of consumers drawing from all pools, and that in four out of the last six years even that drawing has proved insufficient to meet requirements.

As Pool E has consistently had a large surplus the Milk Council has repeatedly refused to grant licenses to applicants who wished to supply it, though they have been willing to grant the same applicants licenses to supply the other pools. Where suppliers have refused to supply other pools their supplies have been lost to the city. A moment's reflection will discover serious possible effects of this policy unless they can be countered in some way. A surplus is necessary. The first reserve on which any pool can draw is the surplus that it itself arranges. Its next reserve is any excess over their needs arranged by the pools other than Pool E. In Auckland Pool E provides the last reserve of a duly licensed supply. With that supply limited as a matter of policy some other reserve must be established if disaster is to be avoided. There are at least three changes that appear to be urgently needed—

(1) More licenses to supply milk must be granted;
(2) Winter production must be stimulated; and
(3) The cost of the surplus necessary to ensure adequate supply must be spread fairly over all producers.

Supply

Natural Conditions

The climate is mild, and in no part of the year are the conditions rigorous either for farmers or cattle. There is an abundant rainfall, but in normal years the distribution of that fall leaves a difficult dry autumn period, and in exceptional years, as in 1943, the dry period is sufficiently

prolonged to impose conditions approaching a drought upon farming operations. There is a large area of good dairying country in close proximity to the metropolitan area. The carrying-capacity of most of the dairying land to the north of the city is less productive than that to the south, but even in the north a cow to 2 acres is maintained while one cow to 1½ acres indicates the average quality of that to the south.

There is sufficient dairying land within a short distance of Auckland, if it is properly utilized for the purpose, to ensure adequate supplies of milk for an indefinite future; and, provided that the supply is properly organized, the cows grazing within 20 miles to 25 miles of the city are sufficient to meet all the needs of a considerably greater population without recourse to outside sources. There seems no reason for doubting that this statement applies even to a prolonged period of low rainfall. The adjacent counties of Eden, Waitemata, and Manukau return a total of 66,368 dairy cows in milk. In the County of Franklin, which adjoins Manukau and extends for some distance from Auckland, there are 85,044 cows. According to Connell's survey there are 13,612 cows within the immediate city supply area being milked not for town requirements, but for factories. According to the evidence given by a witness called by the producers' representative the average production per cow per annum can be estimated at 500 gallons. This was confirmed from other sources. Connell's survey estimates the production at 507 gallons per cow. The herds contain a fair proportion of Friesians, but Jersey and Jersey crossbreds are numerous.

Cow Population

Only a small proportion of the cows in the adjoining counties are milked for town supply. On the 30th April, 1943, 649 dairies, with a cow population of 25,206, were registered by the Department of Agriculture for town supply. These include all herds licensed to supply the whole of the metropolitan area. But this does not mean that this number of cows is being used for the town supply. Though a dairy-farmer complies with all the requirements of the Department as to the condition of his sheds, he cannot sell his milk for distribution in the area within the jurisdiction of the Metropolitan Milk Council until he obtains a license from the Metropolitan Milk Council entitling him to supply it to some particular pool. The Milk Council restricts the issue of licenses where the supplier wishes to supply a pool which already has a considerable surplus. The result is that, according to the figures supplied in evidence by the Milk Council, the number of dairy-farms licensed by them on 1st February, 1943, was 460 only, and of these, 43 were holders of temporary licenses that entitled them to supply for a limited period in the year only. We have not been able to ascertain the number of cows on dairy-farms that are licensed by the Council. Certain facts, however, are significant. The return from the Department of Agriculture shows a decrease of two licenses, but an increase of 863 cows between 30th April, 1942, and 30th April, 1943. The return from the Milk Council shows a drop of 8 in the permanent licenses between 1st February, 1942, and 1st February, 1943, but the addition at the latter date of 43 temporary licenses not previously returned as such. The number has steadily increased year by year since 1937, but, as already stated, the movement in cow population on licensed dairy-farms is not known. In evidence submitted by the Milk Council emphasis was laid on the number of dairy-farms that have gone off town supply.

Volume of Production

According to the return of milk available from all dairymen and dairymen-vendors licensed by the Council during the period from 1st August, 1937, to 31st July, 1942, the annual returns were as follows:—

1937–38	.. .. ..	8,990,703 gallons per year or	24,632 per day.
1938–39	.. .. ..	8,380,051 ,,	22,959 ,,
1939–40	.. .. ..	9,588,274 ,,	26,198 ,,
1940–41	.. .. ..	10,840,848 ,,	29,701 ,,
1941–42	.. .. ..	9,811,914 ,,	26,882 ,,

It must be borne in mind that the production is not uniform throughout the year and that the consumption demand, apart from variation in demands for the Armed Forces, approaches much more nearly to uniformity than does the production. If attention is paid to the months of lowest production in each year, we find the following facts:—

Period 1st April to 31st March,—	Total.	Daily.
1937–38 (July)	.. 591,292	19,074
1938–39—		
April	.. 455,920	15,197
July	.. 558,029	18,001
1939–40 (August)	.. 613,510	19,791
1940–41 (June)	.. 697,511	23,250
1941–42—		
March	.. 560,119	18,068
June	.. 652,088	21,736

During the month of lowest production the average quantity produced daily is less than that averaged throughout the year by 5,558, 7,762, 6,407, 6,451, 5146 gallons respectively.

The tables in the next preceding paragraph show the facts necessary to relate the supply to the demand. In considering these facts it is necessary to bear in mind that the demand for some days will exceed the average daily consumption for the month and the supply for some of the days will be less than the average daily supply for the month. If the demand is to be met the supply ensured must provide a margin over the average daily consumption even when the average is taken over so short a period as one month. It is essential that a surplus be budgeted for, and too small a surplus over a year shown in the returns of any milk pool may, having regard to the public interest, be a greater evil than an overlarge surplus.

The question of the daily surplus required reveals the importance of so arranging production as to ensure as even a supply throughout the year as it is possible to obtain. The return of supplies

divided into three-monthly periods during the period from 1937-38 to the period 1941-42 show the following:—

	August–October.		November–January.		February–April.		May–July.	
	Gallons.	Percentage of Total.	Gallons.	Percentage of Total.	Gallons.	Percentage of Total.	Gallons.	Percentage of Total.
1937–38 ..	2,385,265	26	2,692,937	30	2,082,292	23	1,830,108	20
1938–39 ..	2,253,068	27	2,750,182	33	1,831,976	22	1,544,825	18
1939–40 ..	2,270,563	24	2,884,691	30	2,404,855	25	2,028,165	20
1940–41 ..	2,978,364	27	3,200,933	30	2,457,575	23	2,203,976	20
1941–42 ..	2,944,951	30	2,993,859	30	1,778,081	19	2,018,023	20

Level Supply

A recognized method of adjusting supplies is to encourage all-round-the-year production instead of seasonal production only. It is obvious that any organization that, through price-adjustments or otherwise, could encourage an increase in the Auckland area in the percentage of production in the May–July period and a corresponding reduction in the percentage of the November–January period would tend to even the supply. Such organization adjusted for all periods with a reasonable percentage surplus in the period of lowest production would tend to reduce the amount of the surplus in the periods of peak production and best regulate the supply to ensure adequacy. In the Auckland area conditions of soil and climate should make an approximation to a level supply possible. The alternative would appear to be to extend the area of supply to districts where autumn and winter production is economical. The production of a level supply is encouraged by seasonal variation in prices. A price not much above the factory price is usually a sufficient inducement to attract town supply in the spring and summer, but an appreciable increase is usually necessary to induce an adequate autumn and winter supply. The Milk Council has adopted the seasonal variation in prices, and the dairy-farmer now is allowed 10¼d. for the six months from September to February, both months inclusive, and 14¼d. for March to August inclusive. These prices, while attractive to the seasonal milker, do not appear likely to attract a level supply. The seasonal producer is assured of 10¼d. for six months, 14¼d. for three months and a half, and 14¼d. for milk fortuitously produced in the winter. One of the months of poor supply is February, and an examination of the returns suggests the desirability of three periods, providing a summer price for, say, the present summer period of six months, an autumn price for February, March, and April, and a winter price for May, June, and July, with a possible reduction in the summer price and a possible increase in the winter price.

Shortage of Supply

It will be seen from the particulars quoted in the section on organization resort has been had to suppliers to outside factories on four occasions and that the amounts drawn were 42,648 gallons, 437,435 gallons, 203,393 gallons, and 680,576 gallons for the years 1938, 1939, 1942, and the period February to May (inclusive), 1943, respectively. 1938 was the year of facial eczema. In 1939 the autumn was dry. The year 1942 followed the outbreak of war with Japan, and there were sudden large increases in demand for the Armed Forces. In 1943 the increased demand has continued, and the supply area has suffered from a prolonged dry period in the autumn. Added to this, the supply has been affected to some extent by the shortage of fertilizer and to a marked degree by the shortage of labour. Whatever could or could not have been foreseen in the past, it is now abundantly clear that provision must be made for the Armed Forces: that the effect of reduced fertilizer and severe labour shortage must be taken into account; and that a dry autumn is always a possibility in the area. Unless provision can be, and is made, for these matters further dependence upon factory supplies is inevitable. Reference to what has been stated above concerning supplies from the factories will be sufficient to justify the verdict that dependence on such supplies ought not to be tolerated.

Not only has there been a dependence on emergency supplies, but, notwithstanding that dependence, the supplies have fallen short of requirements. Cuts were made in the supplies to schools in 1942, and the following extract from a letter from the Auckland Milk Council describes the shortages this year:—

> "*School Milk.*—On 8th June the supply to secondary schools was cut out. On 18th June all school milk was stopped. On 4th July the primary schools were all again supplied, and on 12th July secondary schools were resumed and a full ration to city schools.
>
> "*General Public.*—A 10-per-cent. cut was instituted on 25th May. This cut was imposed until 21st June, when there was a 20-per-cent. to 25-per-cent. rationing. From then on the quantities were reduced according to the quantities available up to 4th July, when the cut was completely taken off.
>
> "*Hospitals and Armed Forces.*—During the whole period hospitals were not cut at all. The Armed Forces took the same ration as civilian trade, but shipping, both naval and transport, was not cut. By arrangement with the naval people, barracks on shore and shore installations stood the extra cut at times to cope with shipping.
>
> "*Wholesale.* The rationing was cut the same as the retail public trade."

Since the Commission concluded its sittings in Auckland advice has been received from the Auckland Metropolitan Milk Council concerning the unsatisfactory nature of recent supplies of accommodation milk. The communication from the Milk Council is quoted hereunder:—

> "You may not be aware that after the Commission left Auckland a serious deterioration took place in the bacterial quality of practically all emergency milk. This was due to alteration in cartage procedure involving a once-a-day collection and was exaggerated by the spell of humid weather. During this period Aka Aka milk was coming in in the evenings, but the deterioration was not so marked as was the case with some of the other factories. The breakdown became so serious that it was necessary to reject very substantial quantities of milk and also to temporarily suspend four factories. This resulted in an increased rationing, and in everything that was done we were in close consultation with the Medical Officer of Health. For a time it looked as though a number of factories would have to be cut out."

This serves to confirm the Commission's general findings concerning the unreliable and unsatisfactory nature of accommodation supplies of milk.

Summary of Results

To summarize, the outstanding facts in the present situation are that the milk supplied to schools has been cut out or reduced on two occasions; that during the present year supplies to the Armed Forces have been drastically curtailed; that heavy cuts have been made in wholesale supplies and in supplies to households; and that recourse has been had in four during the last six years to suppliers to factories in outside districts. There have been conditions that, judged by ordinary peacetime standards, are abnormal. But, apart from the unusually prolonged dry spell, these unusual conditions may be expected to continue and a dry autumn must always be anticipated. In Part III of this report we make recommendations that, if adopted, may to some extent relieve the position so far as the influence of the demand for the Armed Forces are concerned. In Part II we make other recommendations that we hope will assist in other matters. But it is plain that the position in the Auckland area is a grave one. Apart from other matters, the cutting-down of school supplies must be regarded as a serious step. This service is a part of the policy of the country and, moreover, family budgets—especially those of the lower-paid wage groups—are adjusted because of it. And dependence in any degree upon outside factory supplies disregards the policy that has developed of safeguarding the liquid-milk supplies to towns, a policy that, according to the evidence of health authorities, ought to advance to higher standards than any hitherto attained.

Balancing-station

At present the factory owned and operated by the New Zealand Co-operative Dairy Co. acts as a balancing-station for the area. The several vending companies are members of the association and send their surplus milk to the factory and receive factory prices for it. This method of dealing with surplus may be contrasted with one in which supplies to one depot could be treated as a means of balancing the total supply by directing what was required into the vending-houses and using the one surplus for manufacturing purposes and under which a proportionate part of the surplus could be charged against every individual supplier to the area.

Methods of Production

The cows milked in the Auckland area include a number of Friesians, Shorthorns, Ayrshires, and Jersey crossbreds.

The method of replacing stock varies. It is recognized on all hands that the purchase of replacements at saleyards is a dangerous practice, yet the practice is widespread. Some farmers purchase from other herds with which they are familiar, and buying and selling is the business of a number of experienced agents. Some farmers breed their own replacements. It is noticeable in this as in other areas that the best results are obtained by farmers who do breed their own replacements.

The production of winter feed on the farm is not so extensive as it is in Christchurch, though considerable quantities of hay and ensilage are produced. Brewers' grains are in use and concentrates are purchased as avaliable.

Farm Dairies

The majority of the farm dairies that we visited in this area may be described as fair in layout, buildings, and equipment. There are some dairies that may be regarded as quite satisfactory. Some that were built many years ago must have been good in their day. Many leave much to be desired. The Inspectors of the Department of Agriculture are maintaining pressure to secure improvement, but the results have been checked by the lack of material and shortage of labour. The favourable condition of most of the soil to the south of Auckland and in some parts to the north, together with the mild climate, suggest that the farm dairies in this area should be equal to the best in the Dominion.

The temperature during the summer months in Auckland make the cooling arrangements on the farm a matter of first moment. The atmosphere is often humid and the water-supply is often not cold enough to bring the milk down to a sufficiently low temperature. Some farms have refrigerators, and the position will not be satisfactory until such refrigerators are regarded as an essential feature of every farm dairy in the area.

Quality of Supply

The type of cattle in most general use in the area is reflected in the content of the milk. According to tests made by the Health Department the butterfat content averages 4·31 per cent. Though not so high as the average in Wellington, this is higher than the average in Christchurch or Dunedin.

Samples taken of the milk as it comes into the treating-houses are tested by the Health Department and the Milk Council, and these give an indication of the quality and cleanliness of the milk supplied by the dairy-farmers associated with these houses. Samples of raw milk taken from raw-milk vendors and producer-vendors and similarly tested indicate the standard of the milk they distribute. The sampling and testing of milk drawn in the period of shortage from outside sources is mentioned later under the heading of "Treatment."

The following particulars are illustrative and suggestive:

Source.	Number of Samples.	Percentage not complying with Sale of Food and Drugs Act.
Milk delivered to treating-houses	1,305	7·28
Milk distributed raw by vendors	124	4·03
Milk distributed raw by producer-vendors	403	14·39

Prices

For the purpose of fixing producers' prices the year is divided into two periods of six months each, and a winter price and a summer price are paid. The seasons and prices are as follows:

Summer—September to February	10¼d.
Winter—March to August	14¼d.

Collection

An endeavour is made in all parts of the supply area to reduce to a minimum the time between milking and collection and to effect economies in transport. These matters have received the attention of the Milk Council and the co-operation of the vendors. The practice is to collect twice a day. The evening's milk is brought in in the evening, and in most cases pasteurized on arrival. It is delivered next morning and, as the Council's regulations require delivery before 7.30 a.m., is available for many breakfast tables. The morning's milk is brought in early in the day, pasteurized on arrival, and delivered forthwith to hotels, restaurants, milk-bars, and other wholesale purchasers. In many cases producer-vendors are able to deliver raw milk to the consumer immediately after milking—that is, the morning's milk is picked up and delivered before breakfast.

The collection of the milk is under the control of the vendors. Except in the case of the Takapuna Dairies, the suppliers of each vendor are scattered. They are not zoned, but several companies may draw on the same neighbourhood. In order to minimize expense some of the companies co-operate by arranging that one carrier shall draw all the milk for two companies along certain roads and another carrier will draw all that along other roads. That co-operation is limited in its operation, and, unless the collection of the whole milk-supply of the area is controlled by one authority, it will probably not be possible to avoid appreciable wastage of man-power and materials.

There are two other matters that require attention. The first is that all milk ought to be collected from the cooling-room of the dairy, but if in particular cases there are serious difficulties in regard to that, then in such cases it should be collected from properly-covered roadside stands within a short time of being placed there by the dairy-farmer. The second matter is that all milk should be collected and conveyed to the vendors in properly-covered vehicles—that is, in vehicles with an awning stretched over the truck that protect the milk from sun and dust and yet leave air space around the cans. This is not the general practice in Auckland. The only cases in which it is possible to compute the cost of collection are those in which the milk is delivered to the companies. An Auckland cost of 0·68d. per gallon compares favourably with the costs in other areas. Owing to the much smaller quantities handled the cost of collecting must be much higher in the cases of raw-milk vendors and producer-vendors.

Treatment

Approximately 84 per cent. of the milk sold in the Auckland area is pasteurized. The proportion of that delivered retail is lower. It amounts to about 70 per cent. The reason for the difference is that the large companies pasteurize all the milk they distribute, but the producer-vendors sell the milk raw that they produce. If a producer-vendor purchases milk from one of the companies, that milk will be pasteurized. The wholesale trade is a trade exclusively in pasteurized milk.

A considerable proportion of the milk that is pasteurized is also bottled, but there is also a considerable proportion that is distributed to householders by the can-and-dipper method. Exact figures are not available, but, as stated above, probably only from 40 per cent. to 50 per cent. of pasteurized milk distributed to householders is bottled.

The plants at present in operation cannot be regarded as satisfactory. One pasteurizing-plant, but one only, is quite up to date and is operating successfully. One bottling-plant is also up to date. But in no one treating-house is the whole equipment satisfactory. Arrangements are being made by some of the companies to carry out extensive replacement, and if the educative force of the health authorities' representations and the pressure of public opinion continues to be felt a very much improved condition will obtain in the not distant future.

The Milk Council has set a high standard both as regards quality and as regards safety in the milk-supply. It has required that the butterfat content of milk sold shall not be less than 3·5 per cent. It has also prescribed that the bacteria plate count in the case of pasteurized milk shall not be more than 20,000 and in the case of unpasteurized milk not more than 100,000.

In order to secure compliance with the provisions of the Food and Drugs Act and the requirements of the Milk Council and to protect the public health, both the officers of the Health Department and those of the Milk Council take frequent tests of the milk as it comes into the treating-houses and as it is distributed to consumers. Some of the companies also have tests made regularly. The results of these tests cannot be regarded with equanimity. The results of some of the tests are significant, though it must not be concluded that the percentage results of any series of tests or any number of such series correctly represents the average condition of the milk delivered to the purchaser. Every series includes a number of samples drawn from suspected sources and samples taken to follow up unsatisfactory results. But in a progressive community in which the safeguarding of public health occupies a prominent place among social purposes, even allowing for the fact just mentioned, the results now quoted are disturbing. The Health Department handled 4,309 samples from the Auckland Central Health District for the year 1942, and of these, 13 per cent. failed to comply with the statutory requirements. Of 210 plate counts made by the Milk Council's Analyst between 15th and 27th April (inclusive), 1943, 53 samples exceeded the prescribed 100,000.

The combination of high standards and frequent testing, with due warning and occasional prosecution, seems insufficient to ensure a high standard in practice. The Auckland system of inducing a high standard differs from that adopted in Wellington in at least three respects. The Wellington pasteurizing and bottling plant is of higher standard than that which the several plants in Auckland attain. The system of daily sampling of each supplier's milk is carried out in Wellington is decidedly better than the system of testing adopted in Auckland. And in Auckland there is no immediate relation between a low standard and economic loss to the individual supplier concerned as there is in Wellington. If milk is properly graded and the price paid varies with variation in grade, there is a powerful influence continuously operating to maintain a high standard.

One matter requires special mention here. As explained earlier in this chapter, during four autumn and winter periods the Auckland metropolitan area has received a substantial quantity of milk from cheese-factories situated at various distances from the city. What this means so far as quality is concerned may be indicated by reference to the fact that in 1942 a considerable quantity was purchased from one factory, and that source of supply was later condemned by the Health Department. The minimum time required by the Foods and Drugs Act for milk under the reductase test is 4 hours, and the maximum for the bacteria plate count prescribed by the Milk Council for unpasteurized milk is 100,000. The Milk Council's Analyst supplied a return of tests made of 54 samples taken from the supply from one of the outside dairies between 18th March, 1943, and 9th April, 1943. Of the 54 samples, methylene blue discoloured in 15 cases in 15 minutes, 20 in from

15 to 60 minutes, 12 in from 61 to 120 minutes, 4 in from 121 to 160 minutes, 2 in 175 minutes, and 1 in 190 minutes. The plate count ranged from 110,000 to 1,600,000. One was uncountable. Four only were below 200,000. The milk supplied by this particular group of suppliers was probably well below the standard of that received from suppliers to factories generally, but it serves to show what may happen when recourse is had to suppliers from outside the ordered and regulated farm dairies licensed for town supply. The condition of the milk brought in from dairy-factory suppliers in the winter period does not reflect the normal quality of the factory-supply milk. Winter milk from such suppliers is mainly milk from late calvers or aborted cows and strippers, and this accounts for its lower quality.

Distribution

Vendors

The greater part of Auckland's milk-supply is handled by five large companies. There are some fifty-one producer-vendors, or dairymen-vendors as they are called in Auckland. These represent a reduction of sixty-two in the number engaged in 1937, and the reduction has gone on from year to year, though the annual rate of decline is decreasing. The figures for the years are as follows:—

	1937.	1938.	1939.	1940.	1941.	1942.	1943.
Producer-vendors	113	90	79	71	59	52	51
Vendors	120	108	95	85	85	88	88

During 1942 producer-vendors sold on an average 3,721 gallons of milk per day. They produced 2,521 gallons and purchased 1,427 gallons on an average per day, leaving a small surplus in the flush season. The five large companies treated and sold to the public or to other vendors practically all the milk outside that produced by the producer-vendors. The average daily gallonage sold in the area under the jurisdiction of the Council during the twelve months ending 31st March, 1943, exceeded 22,600 gallons. In addition to this supply, 590 gallons are sold daily in the Otahuhu area and 550 in the western suburbs. In the case of Otahuhu 450 gallons and in the case of western suburbs 135 gallons per day are purchased from one or other of the large companies.

Classification of Quantities distributed

It is not possible to state accurately the exact amounts sold during any one year to any particular class, but a return received from the Milk Council shows sales by the companies, vendors, and producers during the year ended 31st March, 1943, in the area under its control as follows:—

	Milk (Gallons).	Cream (Pints).
To Milk-shops	782,440	335,042
Restaurants	1,085,711	251,112
Ice-cream manufacturers	31,065	87,452
Ice-cream mix	351,206	..
Shipping	32,029	4,969
Hospitals	148,348	13,045
Schools	310,068	..
	2,740,867	691,620

Translating cream into milk at 10 gallons of milk for every gallon of cream, we have a total of sales in these forms of 3,605,392. To reach total distribution, sales to retail customers, to the Armed Forces, and to outside areas must be added. The distribution of the quantities quoted above was effected by the companies (3,111,152 gallons), individual vendors (120,499 gallons), and producer-vendors (373,741 gallons).

Shop Dairies and other Agencies

Reference to the figures quoted above show that milk-shops, milk-bars, and restaurants are the agencies by which a considerable portion of the milk supplied in the area is distributed to consumer. Tests are made by the Health Department and the Milk Council of samples taken from a number of the agencies. An examination of a series of tests made on samples taken during the year ending 31st December, 1942, by the Health Department on the south shore shows the following results:—

	Number of Samples.	Percentage not complying with Requirements of Food and Drugs Act.
Restaurants—		
Pasteurized	36	30·55
Raw	20	25·00
Shops and milk-bars—		
Pasteurized	463	8·64
Raw	311	11·25

The results may be compared with the results obtained during the same year by tests on official samples taken on the rounds from the same area:—

	Number of Samples.	Percentage not complying with Requirements of Food and Drugs Act.
Pasteurizing companies—		
Pasteurized	207	0·48
Raw	15	..
Vendors supplied by pasteurizing companies—		
Pasteurized	161	0·62
Raw	73	2·74
Vendors supplied by dairy-farmers—		
Pasteurized	Nil	..
Raw	124	4·03
Producer-vendors—		
Pasteurized	Nil	..
Raw	403	14·39

It is obvious that the results from restaurants, from farmer-vendors, and from milk-shops and milk-bars are much below the average in respect of the condition of the milk sampled and that the conditions under which milk is held and sold in these three classes requires searching examination and correction.

Roundsmen

The milk is delivered to the householders by vans, some of which are horse-drawn and others are driven by motor. For the most part the vans are uncovered. Nearly every one of the companies' roundsmen deliver both loose milk and bottled milk. The loose milk is served by the can-and-dipper method. The other vendors and the producer-vendors sell loose milk, and, except for quantities purchased from the companies, this is unpasteurized.

The hours for delivery are restricted. The roundsmen do not start before 3 a.m., and delivery must be completed before 7.30 a.m. The reason for the early delivery is the humid atmosphere of Auckland and the necessity of the morning's milk being available for breakfast. As the roundsmen have to deliver both bottled and loose milk, and often have to deliver butter as well and have also to give receipts for money, the delivery per round compares unfavourably with the delivery in Wellington. The normal gallonage per round appears to be about 60, though in some cases it is as high as 75. When the restricted hours and the conditions of delivery are considered it is questionable whether there is much (if any) difference in the work done per hour.

Depots

Distribution of milk is assisted in this area by the establishment of depots conveniently situated in the various suburbs. Eight such depots in all have been established by three of the treating-houses. Each depot has a cool room for storing the milk. The milk is conveyed to the depot by vans and is distributed by roundsmen whose vehicles are parked at the depot. A foreman roundsman lives on the premises, regulates the work, and acts as a relieving roundsman. The depot is also used as a milk-shop from which milk is retailed to the public. This system expedites delivery and saves man-hours, petrol, rubber, and maintenance and replacement of carts. It is of special value in a widespread district such as Auckland, and could, with advantage, be adopted in other areas.

Zoning

In 1936 the Auckland Metropolitan Milk Council introduced a form of regulation aimed at reducing the wastage of man-power and material involved in overlapping in distribution. In 1940 a thorough system of zoning was worked out by the Council's officers and put into operation. It is probably the best and most complete in operation in the metropolitan areas and has effected a very considerable saving in man-hours, in petrol, and in the consumption of rubber and other materials. Very little, if any, further economy can be looked for in this connection.

Cost

Cost of distribution in the several areas varies in a remarkable way from 6·43d. per gallon to 10·42d. per gallon. Auckland figures investigated show an average of 9·6d.

Prices

The latest prices prescribed by the Milk Council during the several recognized periods are shown in the Appendix to this report. Attention is particularly directed to the following facts shown by the Appendix:—

For Milk.—(1) The prices to be charged to milk-shops for the period 1st March to 31st August is 1s. 10d. per gallon and 1s. 11d. per gallon, according to whether the quantity is or is not above 10 gallons in any one day, while for the last summer period the corresponding prices were 1s. 6d. and 1s. 7d.

(2) The prices charged to restaurants, tea-rooms, milk-bars, &c., vary according to quantity bought in any one day, and for the period 1st March, 1943, to 31st August, 1943, they are 2s. 3d., 2s. 1d., 2s., 1s. 11d., 1s. 10d., and 1s. 9d. per gallon for quantities ranging from not less than 1 and under 3 gallons to over 100 gallons, the division being made at 3, 10, 40, 75, and 100 gallons respectively. For the last summer period the corresponding prices were 1s. 11d., 1s. 9d., 1s. 8d., 1s. 7d., 1s. 6d., and 1s. 5d. If delivered bottled, all those prices are increased by 2d. per gallon.

(3) The price to be charged for milk supplied to hospitals for the current period is 1s. 7¾d. per gallon, while for the last summer period it was 1s. 3¾d. per gallon.

(4) When quantities of under 1 gallon are supplied, the present winter prices for loose milk are 2d., 5½d., and 7d. for ½ pint, 1½ pints, and per quart respectively; and for bottled milk 2d., 4d., 6d., and 7½d. for ½ pint, 1 pint, 1½ pints, and per quart respectively, while the corresponding prices during the last summer season were for loose milk 6d. per quart for all quantities under 1 gallon, and for bottled milk 2d., 3½d., 5d., and 6½d. for ½ pint, 1 pint, 1½ pints, and per quart.

For Cream.—(1) The prices during the current period are—to milk-shops 14s. per gallon; to fruit-shops 6d. for 4 oz. carton and 11d. for 8 oz. carton; to persons purchasing other than for resale, 15s. or 14s. per gallon, according to whether the quantity purchased is or is not less than 5 gallons and more than 1 quart, and 7d., 1s., and 2s. for ¼ pint, ½ pint, and 1 pint respectively if loose or in sealed bottles, and the same for 4 oz., 8 oz., and 16 oz. respectively if in cartons or other like containers not being bottles. During the last summer season the prices were the same in all these cases.

(2) To shipping companies 9s. 3d. is the price chargeable during the current season for cream containing not more than 30 parts per cent. by weight of milk-fat.

For Manufacture of Ice-cream.—(1) The prescribed prices for milk and cream sold to ice-cream manufacturers were for the summer period, which in this case includes the month of April, for milk, 11½d. per gallon and for cream 10s. 6d. per gallon, while for the period 1st May to 31st August they are 1s. 4¾d. and 12s. 3d. respectively.

(2) For ice-cream mix containing less than 40 parts per cent. by weight of milk-fat the present prices are 2s. 5d. and 3s. 4d. per pound of butterfat throughout the year.

CHAPTER 3.—PRESENT CIRCUMSTANCES OF THE SUPPLY OF MILK TO THE METROPOLITAN AREA OF WELLINGTON

The Wellington Metropolitan Area comprises Wellington City, Lower Hutt City, Petone Borough, Eastbourne Borough, Johnsonville Town District, and some adjoining and closely-related areas. The whole area is divided into two sub-areas, one comprising the City of Wellington and its immediate environs from Seatoun up to Johnsonville, and the other the flat land and surrounding hills in the Hutt

Valley and the bays on the eastern shore of the harbour. Both sub-areas are fairly widely spread. That comprising Wellington City and its immediate environs is for the most part hilly and is not convenient for the purposes of distribution. The Hutt sub-area is for the most part flat and, apart from the limited population on the hills fringing the valley and the bays, presents conditions favourable to expeditious distribution.

Demand

Population

According to estimates published in the 1942 issue of the Year-Book the total population of the metropolitan area on 1st April, 1941, was 160,500, of which 36,020 persons were living in the Lower Hutt City and the Boroughs of Petone and Eastbourne. In addition to this population the liquid-milk industry in this centre has to supply the needs of shipping, of men of the Armed Forces, and of children in schools outside the area which draw milk from the area. The quantities required for shipping are considerable, but neither these quantities nor those for the Armed Forces can be exactly computed. The number of children in outside schools for whom provision is expected is 2,907 and half a pint of milk is required for each child on each school day.

The following figures for the whole metropolitan area taken from the Year-Book indicate the growth of the population:—

1911	82,800	1926	124,527
1916	95,235	1936	149,382
1921	107,488	1941	160,500

These figures show a fairly uniform increase of approximately 2,500 per annum over the thirty-year period. Some variation may be due to the irregular development during some periods of districts just outside the urban area and to the inclusion at other times of such districts in the area. In estimating future requirements the continuance of this growth, with a corresponding increase in attendance at outside schools and an increase in shipping requirements, must be taken into consideration. The requirements of the Forces will ultimately drop rapidly, but against this must be set the demand of a large body of our own Forces returning to civilian life. And, perhaps more important than these movements, may be the stimulus to increased consumption per head of the population imparted by the teachings of nutritionists and the appeals of health authorities.

Present Consumption

The Milk Department of the Wellington City Council has supplied a return of milk sold by the Department year by year during the five years ending 31st March, 1943. This return is as follows:

Year ended 31st March,	Milk, in Gallons.	Cream, in Pints.
1939	2,628,953	419,257
1940	2,917,437	474,664
1941	3,063,021	481,992
1942	3,107,306	530,872
1943	3,883,638	665,145

The nearby farmers have not kept accurate records of their sales, but they supplied an estimate of the daily gallonage sold during the month of August, 1942, at 2,986¼ gallons. This is an estimate only. Probably a general statement that the sales average between 2,500 and 3,000 gallons per day or between 900,000 and 1,000,000 gallons per year is the only one that can be made with any justification. The Milk Department, however, supplied 74,190 gallons of milk and 91,981 pints of cream to nearby farmers during the twelve months ending 31st March, 1943, and as this is included in the total sales of the Department only the balance of the nearby farmers' sales is to be added to the Departments' figures in arriving at the total sales. Computing the daily sales by the Department and adding those by the nearby farmers we have as the total average daily sales during the twelve months under review of something over 13,000 gallons of milk and about 2,000 pints of cream. The Hutt Valley and bays' consumption is distributed by vendors, producer-vendors, and the Wellington Dairy Farmers' Association. The daily output, in gallons, by members of the Hutt Valley and Bays' Milk Vendors Association has been returned to the Commission as 3,371¾ gallons, or 1,230,688 gallons per annum. The greater part of this is supplied by the Wellington Dairy Farmers' Co-operative Association, Ltd., who, in addition, supply 800 gallons per day, or 292,000 gallons per year, to shops for resale and further quantities to camps and shipping. During the year ended 31st March, 1943, the association supplied to the last-named two groups a total of 223,173 gallons. Adding the quantities sold by the association to shops, shipping, and camps to the quantities sold by the vendor members of the association, we have the total of the sales during the year ended 31st March 1943 of 1,745,861, or 4,783 gallons per day. The grand total for the metropolitan area—that is, of the Wellington and Hutt Valley sub-areas combined—when cream is computed as gallons of milk works out at over 7,500,000 gallons per annum, or over 20,548 gallons per day.

Prospective Expansion of Demand

Though complete figures showing the expansion of demand during recent years are not available the returns from the Milk Department of the Wellington City Council for five years and those from the Wellington Dairy Farmers' Association for three years give an indication of the expansion of consumption. The Department's figures are quoted above. The totals from the Wellington Dairy Farmers' Association for the three years ending 31st March, 1943, are as follows:—

Year ending 31st March, 1941	1,073,567
Year ending 31st March, 1942	1,171,019
Year ending 31st March, 1943	1,365,814

As these figures, as well as those of the City Council, include the very irregular supplies to camps the inference to be drawn from the figures must be guarded. But, so far as the Dairy Farmers' Association's figures are concerned, if the supply to shipping and camps were entirely eliminated, the increases between 1941 and 1942 would be 48,260 gallons and that between 1942 and 1943 would be 159,424. But even in this respect the special demands of milk-bars and institutions qualifies the result.

A better guide is probably to be found in the increase in population, both in towns and in schools, with its reaction on other matters such as shipping and visitors. In this connection three factors have

to be noted. One is the dispersal of the Armed Forces at the end of the war; another is the return to civilian life of something like 10 per cent. of the population; while the third is the stimulus to increased consumption per head of the population. If all these factors are taken into consideration any long-term policy must anticipate and provide for a considerable increase in the daily demand disturbed, perhaps somewhat violently, during the period of repatriation.

Organization

Features of Present Organization

The organization of the Milk supply to Wellington is unique in several important features.

Municipal Milk Department and Wellington Dairy Farmers' Association.—The first feature is the co-existence of and co-operation between a Municipal Milk Department and a strong organization of suppliers. Among treating and vending houses in New Zealand the Milk Department of the Wellington City Council is conspicuous in respect of volume of business, the standard of production, and completeness of organization. Among organizations of suppliers the Wellington Dairy Farmers' Co-operative Association, Ltd., is conspicuous in its comprehensiveness of scope, its persistent and successful endeavour to maintain a high standard, and its capacity to conduct successfully the affairs of a large group of suppliers. In co-operation the Milk Department and the Farmers' Association have controlled the major part of the liquid-milk industry of the metropolitan area of Wellington for nearly a quarter of a century. Their ability to meet and negotiate has ensured the smooth and efficient working of the industry during that period. By processes of negotiation and arbitration a higher price per gallon has been secured for the producer than has been secured in any other area and a higher-quality milk has been delivered. The growth of the population and the increasing pressure on the sources of supply is developing a new situation, but it is reasonable to hope that, with certain necessary modifications in organization and relationship, the co-operation hitherto displayed will continue to exercise a guiding and controlling influence over the developing industry to the advantage of all concerned.

Contracts for the supply of milk have been made from time to time between the Wellington City Council and the Wellington Dairy Farmers' Association, Ltd. Features of these contracts that have endured for some time are—

(1) Subject to certain qualifications, the association has a right to supply 50,000 lb. of milk per day from the 30-mile area:

(2) If during the summer and autumn periods the association cannot supply the specified quantity from the 30-mile area, the Council has the right to obtain the shortage from its Rahui Factory, but if it cannot do this the association has the right to supply it from outside the 30-mile area:

(3) If during the winter period the Council requires more than 50,000 lb. of milk per day, it is to give the association the opportunity to supply from the area extending beyond the 30-mile limit up to Levin one-half of its requirements up to 1,700 gallons per day, and two-thirds of its requirement in excess of an additional 3,400 gallons per day.

The specified 50,000 lb. of milk per day has been included in successive contracts for a number of years, though it is understood that an increase to 60,000 lb. in the next contract is contemplated. The continuance of this fixed amount during a period of continuous growth in the population has meant that the contractual rights of the association has affected a decreasing proportion of the city's total consumption. This has not in practice greatly affected the Dairy Farmers' Association, since the orders have exceeded the prescribed amount and the increasing consumption in the Hutt Valley has absorbed a considerable portion of the production of the members of the association. Disputed matters, such as price, are settled by arbitration.

Relation of Vendors in Hutt Valley to Wellington Dairy Farmers' Association.—The second feature of the organization of the supply to the metropolitan area is the relation of the Dairy Farmers' Association to the vendors in the Hutt Valley and the cordial co-operation of these two bodies. This has had a double effect. It has given the Hutt Valley Vendors and their consumers a supply assured by a powerful producers' association, and it has given to the members of the association an assured and growing market for which they were able to organize their resources.

Limit of Contracts.—The policy of the Milk Department of the Wellington City Council appears to be to contract for quantities considerably less than its anticipated requirements and to arrange for additional supplies in the period of the year in which they are called for. It is not suggested that it does not estimate its requirements or that such estimates have been faulty. Nor is it suggested that it overlooks the question of the extent of the resources on which it can rely. The feature is that provision by forward contract is made for part only of its needs and that for the remaining part reliance is placed on its ability to call upon other resources as the need arises. Complaints were made by farmers that the Council would not enter into contracts for a term sufficiently long to justify them in organizing their farm economy for the supply of liquid milk to the area. It certainly appears that many farmers who could undertake city supply have been unwilling to do so because of the uncertainty attaching to the continuance of the demand. It is understood that the Department on one occasion suffered by over-commitment and that it has been careful to avoid a repetition of that experience. It has been urged that a body such as a City Council cannot commit itself with the freedom of a proprietary concern. If this means that a municipality cannot fairly estimate its requirements in respect of so vital a commodity as liquid milk and make contractual agreements for ensuring adequate supplies for the community, then it would be at a serious disadvantage in competition with private enterprise. But the Commission is not satisfied that any such limitation necessarily attaches to a public service of this nature.

When the Milk Department of the City Council commenced its operations in 1919 the liquid-milk supply to Wellington had sunk to a very low level. The Department rapidly improved the position and after taking over retail delivery in 1922 it raised the service to a standard unexcelled in New Zealand and that challenges comparison by any other system in any part of the world. But it is impossible to contemplate with equanimity the introduction of large supplies from outside sources. And it was profoundly disturbing to hear resort to such supplies approved as a permanent feature of the supply policy of the Council. There does not seem to be any valid reason why the Council should not fairly estimate the whole of its requirements with a reasonable degree of accuracy. The present daily demand is known to be approximately 12,700 gallons. Yet the Milk Department has made forward contracts

for next winter's supply amounting to 9,000 gallons per day only. To make contracts that would bind an organization or organizations of supply to have the estimated quantities with a surplus of, say, 10 per cent., available at all times is surely reasonable. With such contracts the supply organization or organizations could organize its or their resources and make its or their plans in such a way as to protect producer members and give reasonable stability to the industry and assurance to the consumers. Any treating and vending body that proceeded on these lines would be entitled to protection in respect of violent fluctuations occasioned by the prosecution of public policy, such as the movement of Armed Forces, and there seems no reason why that protection should not be afforded. In Parts II and III of this report the Commission has made recommendations that it hopes, if adopted, will assist in overcoming the difficulties and ensuring adequate supplies of milk of high standard at reasonable prices. These difficulties must be overcome or the risk of more severe shortage and more extensive reliance upon unsatisfactory supplies must sooner or later be the outcome.

Supply

Natural Conditions

The source of supply for the metropolitan area is unique. It is divisible into several supply areas. First, there is the area within two miles of the city's boundary. This is occupied by the farms of producer-vendor whose function and right is recognized by the Wellington City Milk Supply Act, 1919, and its amendments. This area is very broken and the soil is mostly of poor quality. It has the advantage of immediate proximity to the area of distribution, and this advantage is of importance to the small man who both produces and vends his own milk and is able to eliminate most of the cost incident to collection from a distance. This area produced something in the vicinity of 900,000 gallons of milk last year, or a daily average approaching 2,500 gallons. The next area is that outside the 2-mile area but within a radius of 30 miles of the city and comprises mainly the land in the Hutt Valley and adjacent valleys, the slopes surrounding these valleys and those adjoining the 2-mile area, and land extending up the west coast as far as Paraparaumu. The milk drawn from this area for the City of Wellington and its immediate environs is drawn through the Wellington Dairy Farmers' Co-operative Milk Supply Association, Ltd., while that supplied to the Hutt Valley and associated district is drawn from the same association and from producer-vendors. Though the land in this area cannot be classed as high-class dairying country it includes pockets of good land and produced during the year ending 31st March, 1943, some 1,851,313 gallons, or an average of 5,072 gallons per day. The third area extends up the west coast as far north as Levin, which is 59 miles distant from Wellington, and includes, in addition to Levin, the districts of Paekakariki, Paraparaumu, Waikanae, Te Horo, Manakau, Ohau, and Otaki. The portion of this area that lies nearest to Wellington is hilly and generally of poor quality. As the area extends farther north it includes increasing quantities of flat land of good quality. Outside these normal areas of supply are other territories stretching to Bunnythorpe on the one hand and Pahiatua on the other, from which the metropolitan area has drawn emergency supplies.

Cows

Within the three areas described there were, when the 1940-41 statistics were compiled, 47,534 cows. But the number of dairies registered within the territory for town milk-supply in the five years from 1939 to 1943 inclusive, which includes the farm dairies from which the Hutt Valley supply is drawn, is given by the Department of Agriculture as follows:—

Year.	Registered Dairies.	Number of Cows milked.
1939	.. 459	16,956
1940	.. 494	17,312
1941	.. 500	18,445
1942	.. 509	19,554
1943	.. 502	19,086

A comment on the return conveys the information that not all the registered dairies supply milk to the Wellington City Council, but that fully 75 per cent. of the total are constant suppliers to the city. During the year ended 31st March, 1943, 13,922 gallons of milk were purchased from Shannon, and during the present winter season considerable quantities have been drawn from suppliers holding temporary licenses only. These licensees were scattered over a wide area. There were twenty-six at Levin, fifteen at Shannon, five at Tokomaru, seven at Linton, forty-eight at Bunnythorpe, and, as commented in the official return made to the Commission, in addition to these, Glaxo Laboratories have been receiving for transport to Wellington a considerable quantity of milk from unregistered suppliers.

It is not possible in the case of Wellington to show the monthly variations in the total supplies to the whole metropolitan area as, with the assistance of the returns kept by the Metropolitan Milk Council, it was possible in the case of Auckland. A reliable guide to the position may be obtained from the fact that in 1942, while in the summer supplies from the 30-mile area were sufficient, in the winter months of May, June, and July the Milk Department obtained from the 30-mile area a daily average of 3,278 gallons and from outside that area a daily average of 7,073 gallons per day. A further indication of the trend may be found in the very large quantities of milk that since 31st March last have been obtained from factories outside the three areas of supply.

Balancing-station

A third feature of the organization has been the control and operation by the City Council of a factory at Rahui as a balancing station. This is owned and operated in accordance with an agreement made between the City Council and the Rahui Suppliers Society, Incorporated. Agreements pursuant to this agreement are made with the individual suppliers. Under this agreement the Council augments its supplies and uses any excess for manufacturing purposes.

Seasonal or Level Supply

It is questionable whether an attempt to maintain an all-the-year-round level supply in any of the supply areas would at present be successful, or, if successful, would be economical. As already indicated, the greater part of the land in the 30-mile area is not of high fertility and winter feed is expensive. Much of the land running northward from the 30-mile limit up to Levin and Shannon is of

greater productive capacity. But Levin is 59 miles from Wellington and it is doubtful whether a well-adjusted summer price would be an incentive to the farmers to send milk to the city in the summer-time rather than deliver it to the factory. The winter price, however, may well prove an incentive to many farmers in that area to develop winter production and so meet a real need of the city with appreciable advantage to themselves. In this way summer production in the 30-mile area and winter production farther north by farmers with dairies that qualify them to hold permanent licenses for town milk-supply would together supply all-the-year-round wholesome milk that could be subject to the highest recognized degree of control designed to safeguard quality and standard. But such a supply requires organization and suitable contracts.

Shortage of Supply

The supply to schools was suspended for three weeks last winter. This year the Milk Department imported from factory suppliers outside the normal areas of supply quantities in excess of 2,700 gallons a day, and there was still a daily shortage of 2,500 gallons. As a result of this shortage milk-supplies to school-children were rationed in February and March and, except for a partial supply to children at kindergarten, have since been entirely cut off. Supplies to the Armed Forces and to milk-shops and milk-bars have also been rationed. The milk from outside suppliers has been brought from factories as far afield as Bunnythorpe and Pahiatua.

As in other areas, so in Wellington war conditions have created special difficulties. It has increased the demand, and the increase has been irregular and has fluctuated severely. It has added to the difficulties of production by causing a reduction in the fertilizer available and a serious shortage of labour. Wellington has not suffered as Auckland has suffered from a prolonged drought. The difficulties are real. But in the opinion of the Commission they are not due solely to war conditions. The population has been increasing steadily. A scheme to supply milk for school-children has been developed and put into operation. The value of milk as an article of diet has been urged and is likely to have appreciable effect. Even had there not been an outbreak of war a crisis in the milk industry seems to have been likely. In any case, these difficulties for the current year ought to have been foreseen. The increased demand and the greater difficulty in production have been growing for several years and are still present. Their continuance must be expected and provision made accordingly. In the opinion of the Commission the policy of the Milk Department of the City Council is responsible in no small degree for the shortage. The cows are in the fields and a source of supply more than sufficient to meet all the needs of the area is available within reasonable distance of Wellington. But it cannot be expected that it will be forthcoming unless the dairy-farmer has the assurance that can come only from contracts covering appropriate periods. The regular suppliers at Rahui complain that the City Council persists in refusing to make contracts covering its real requirements.

The worst feature of the situation, in the opinion of the Commission, is not the shortage, though that is serious enough, but the resort to sources of supply beyond the areas in which standards for city milk-production have been established.

Methods of Production

In the Wellington supply areas Jersey and Jersey crossbreds predominate. This is due no doubt to the fact that milk is purchased on the basis of its butterfat content.

There is no systematic attention to the elimination of T.B. and other bovine diseases. A limited test was made when it was required that the raw milk supplied in a military camp should be drawn only from T.B. tested herds, and, as noted later, this showed a percentage of reaction of 5·4 per cent.

The problem of replacement of stock is as urgent in this as in other areas. As elsewhere, the mischief consequent upon purchase from saleyards is recognized, but the urge to keep on the farm only cows that are in or about to come into profit checks the development of breeding one's own replacements, or of limiting purchases to those from well-known and high-standard herds.

The problem of winter feeding is more acute in this area than it is in Auckland and Christchurch, owing to the low fertility of much of the soil. Winter feed must be purchased at considerable expense, and this inevitably checks winter milking.

Farm Dairies

The Commission did not obtain adequate first-hand information of the condition of the farm dairies in the area. One difficulty mentioned in evidence that has to be faced is that of providing satisfactory cooling arrangements. In the summer period the water available is not of a low-enough temperature, and the provision of refrigerating-plant and cool storage must ultimately be insisted upon as a necessary part of the equipment of every dairy used for town milk-supply in this area.

Standard of Supply

In spite of difficulties that have had to be overcome, the milk supplied to the Milk Department of the Wellington City Council is of a uniformly high standard. Tests made by the Milk Department for the year ending 30th June, 1942, on samples taken day by day on all milk brought in from farm dairies show the following results :—

Percentage of non-compliance—	
Reductase test	1·422 per cent.
Sediment	0·12 per cent.
Added water	0·002 per cent.
Tests for other abnormal conditions	0·011 per cent.
Plate count average	92,000

These results compare favourably with comparable tests made on samples of milk in all the other areas. The system of tests and grading and of payment according to standard adopted by the City Council and the full co-operation of the Wellington Dairy Farmers' Co-operative Association, Ltd., have contributed to this result.

The Commission has been informed that the emergency supplies brought from the factory suppliers in outside districts have proved to be reasonably good. In general this appears to be true; but it is also true that a bulk supply from Bunnythorpe comprising the produce of a considerable number of dairy-farms was subject to the reductase test and that it stood under the test for five hours only. This must be regarded as very far from satisfactory for a bulk supply in mid-winter.

Price to Producers

The price to be paid to the Wellington Dairy Farmers' Co-operative Association, Ltd., and the price to be paid to the Rahui suppliers is based mainly on the butterfat content of the milk, and the effect of the agreements entered into each case is to adopt an adjusted average for the guaranteed price for butter and cheese and to increase that by an amount designated the "added value." This added value is obviously intended to compensate the producer for the extra cost incurred by him over that that he would incur in ordinary seasonal factory production. The prices paid to the producer are indicated in the following table supplied by the Milk Department of the Council. Butterfat rates are calculated at 17·25d. per pound butterfat for the summer and autumn periods, but at 17·25d. plus 85 per cent. for the winter period :—

Period.	Average Butterfat Test.	Butterfat Value per Gallon.	Added Value.	Total.
	Per Cent.	d.	d.	d.
16th August to 31st January	4·32	7·67	2·87	10·54
1st February to 15th April	4·74	8·42	4·50	12·92
16th April to 15th August	4·89	16·06	3·25	19·31
Weighted averages	4·59	10·53	3·33	13·86

COLLECTION

The milk sold by the nearby farmers is brought into town and vended by the farmers themselves. The milk drawn by the Milk Department from the 30-mile area is brought in by the Department, which lets contracts for the purpose. The milk is picked up generally at the farm-gate, but in cases in which the dairy-farm is off the main road the milk is brought by the farmer to a point of collection. The milk is placed on stands at the farm-gate or roadside, and these stands are supposed to be covered, but this provision appears to be neglected in many, if not in most, cases. The collecting vehicles are required to have suitable covering from the 1st October to the 30th April in each annual period so as to protect the milk from injury by the sun's rays. When milk is required from outside the 30-mile area it is carted to the station by the suppliers and brought into the city by train. Under their contract either party—that is, the producer or the Milk Department—may call for double daily delivery for the period from 1st November to 30th April, but the producer's right to call for delivery twice a day is contingent on evidence being available that the standard of the milk is suffering by the delay.

In the Hutt Valley the producer-vendors convey the milk they vend into the zoned area and the quantities supplied by the Wellington Dairy Farmers' Co-operative Association, Ltd., are collected by the association from the individual farmers and delivered at the vendor's premises. The quantities supplied to milk-shops and camps is also collected and delivered by the association. The milk is collected once daily after the evening's milking. This milk is delivered in cans, but the separation and identity of supplies from different farms is not maintained in all cases, and the Department of Health states that in many instances it is unable to trace the supply back to its source.

The cost of collection by the Municipal Milk Department is 1·46d. per gallon, and the comparable cost throughout the other areas varies from 0·75d. to 1·126d. The cost to vendors of raw milk and the relevant share of the cost of producer-vendors must vary considerably.

Treatment

The most distinctive feature of the supply of milk to the Metropolitan Area of Wellington is that approximately 80 per cent. of the milk supplied to Wellington—that is, to that portion of the metropolitan area excluding the Hutt—is handled by the Milk Department of the City Council. Of this amount, a quantity comprising between 74,000 and 75,000 gallons of milk and between 11,000 and 12,000 gallons of cream are supplied by the Department to forty-eight nearby farmers in the period of shortage. Three of these nearby farmers received in the year ending 31st March, 1943, 6,487 gallons of raw milk and the other forty-five received 67,703 gallons of pasteurized milk. As all the milk that the Department vends is pasteurized, very little short of 80 per cent. of the liquid milk and cream passing into use in the Wellington City area is pasteurized. All the milk that is retailed by the Department and all that that is supplied to the schools is bottled, while the wholesale supplies and the supplies to the Armed Forces are delivered loose. The testing, pasteurizing, and bottling at the milk depot is excellent, and the system adopted has undoubtedly attained the best results in New Zealand.

The Milk Department of the City Council maintains a laboratory that is under the control of an analyst whose appointment was approved by the Health Department. Each day every supplier's milk is weighed on arrival at the depot and a sample is taken for testing. Part of every sample is subject to the reductase test, and for the year ending 30th June, 1942, 27,444 such tests were made and non-compliance with the statutory standard was established in only 1·422 per cent. of cases. Altogether, 9,914 tests were made for butterfat content in milk and 1,398 for butterfat content in cream and 97 for total solids, and each of these tests was made on a composite sample of separate samples taken each day for ten days. The average butterfat content for the year was 4·486 per cent. and of solids not fat 8·84 per cent. In the same period 4,942 tests were made for sediment and 1,716 for added water. There were 66 micro examinations, 6,038 agar plate counts, and 1,507 for *B. Coli*, 2,105 for fermentations, 448 for pH. values, and 202 phosphatase tests. Sediment was found in 0·12 per cent. of the tests and added water in 0·002 per cent. Other abnormal conditions were found to exist in 0·011 per cent. An important feature of the tests applied to the suppliers' milk is that a financial loss is immediately attached to any milk found to be below standard. If the milk falls below the standard of four hours under the reductase test it is graded as second class. Once the milk of a supplier has been graded as second class succeeding supplies are not again bulked until after the result of the test has been ascertained. Then if it proves still to be second grade it is separated and the supplier is paid for it at 1d. below the rate allowed by the Council in respect of butterfat content. If the milk continues second grade until it has been separated on three days in succession, further supplies are condemned until the trouble is remedied, and the supplier receives no payment but is charged for cartage from the farm to the depot. If a supply does not stand up to the test for more than fifty minutes it is condemned at once and the

supplier receives no payment but is charged for cartage until the standard of four hours is restored. This system of testing, grading, and payment has an immediate and direct affect on the quality of the supply.

Both pasteurizing and bottling are carried through under good conditions. After weighing, the milk is cooled to 38° F. It then flows into glass-lined insulated storage tanks. It is then pasteurized, filtered, and chilled in a unified milk-treatment machine. The bottles are machine cleansed, sterilized, filled, and capped. Every care is taken to avoid danger of contamination of the milk after pasteurizing and the bottles after sterilizing. There is no exposure to the air after the treatment of the milk or the sterilizing of the bottles until the point at which the milk enters the bottles; and filling and capping are carried out automatically by the same machine and as part of one process. All milk after pasteurizing and bottling is held in a refrigerated room until loaded for delivery. It should be stated that tests taken by the Health Department confirm the results found by the Milk Department and, further, that of the 2,215 samples taken in 1942 from all vendors only 75, or 3·5 per cent., failed to comply with the standards set by the Food and Drugs Act, while none of the samples taken from the Council's delivery carts were found to be at fault.

Milk distributed in the Hutt Valley is not pasteurized and none is bottled. This applies to the milk distributed to householders and to that sold in wholesale quantities and also to that supplied to the Armed Forces and to shipping. All the milk supplied to the Armed Forces is drawn from cows in T.B. tested herds. When the test was carried out it showed 5·4 per cent. of reactors. This is very low compared with overseas experience, but it is still appreciable and gives emphasis to the recommendation that milk ought not to be distributed raw unless it is drawn from T.B. tested cows. Generally, the tests taken by the Health Department show that the butterfat content of the milk is satisfactory. Tests taken by the Wellington Dairy Farmers' Co-operative Association, Ltd., of their own milk shows 4·6 per cent. butterfat. The standard in other respects is also high. The average tests of samples taken by the Health Department throughout the three central health districts other than Wellington showed failure to comply with statutory standards in 11·4 per cent. of samples, while the percentage taken on the rounds in the Hutt Valley was 8·6 per cent. only. The Wellington Dairy Farmers' Co-operative Association, Ltd., carry out daily tests on the milk collected by it, and this gives effective control over the standard of the milk. A recent communication from the Health Department directed attention to unsatisfactory features at the Wellington Dairy Farmers' Co-operative Association, Ltd.'s depot at the Lower Hutt and recommended that certain improvements in respect of sterilization and other matters be effected. The Commission was assured that the recommendations of the Department in respect of sterilization were receiving immediate attention.

It is necessary to refer again to the influence of the purchase of large quantities of milk from suppliers to butter and cheese factories outside the regular supply area. Under the administration of the Department of Agriculture and of the Department of Health control over the conditions under which town milk is produced has been effectively exercised and progressive improvement in these conditions has been secured. Use of emergency supplies as a common feature of town supply tends to break down that control and to lower the standard attained. It appears to be the case that the supplies purchased from outside sources in the winter of 1943 by the Wellington City Council was of a fairly good standard for milk so derived, but it was not up to the controlled standards, and the ultimate effect of dependence on such supplies must be such as to break down control and generally to lower the standard. In the opinion of the Commission, such dependence must be regarded as a proof of failure to organize the city milk-supply effectively and ought not to be tolerated. The cost of the Municipal Milk Department for pasteurization is 2·16d. per gallon and for bottling 2·07d. per gallon. The comparable cost in other areas ranges from 0·99d. to 1·87d. per gallon for treatment and from 2·25d. to 3·32d. for bottling.

Distribution

Distributors

In Wellington milk and cream are distributed by the Milk Department of the Wellington City Council and by the nearby farmers. There are ninety-one shop dairies in the city. In the Hutt Valley and eastern bays it is distributed by vendors and producer-vendors and by shop dairies. In Wellington there are forty-five producer-vendors and in the Hutt Valley and bays district there are twelve producer-vendors and twenty vendors.

The quantities of milk delivered by these distributors is indicated by the following returns for the year ending 31st March, 1943:—

Milk Department	3,883,638 gallons milk, 665,145 pints cream.
Nearby farmers	Total sales approximately 950,000 gallons, including 74,190 gallons milk and 91,981 pints cream purchased from the Wellington City Council.
Hutt Valley vendors and producer-vendors	1,230,688 gallons.
Wellington Dairy Farmers' Co-operative Association, Ltd.	To milk-shops, shipping, and Armed Forces, 515,173 gallons.

Classes of Purchasers

As is the case in other areas, the milk supplied in Wellington is divided up between various classes, including retail purchasers such as householders; wholesale purchasers, including restaurants, hotels, milk-bars, milk-shops, &c.; purchasers under special contract, including hospitals and other institutions, shipping companies, and Armed Forces. Sufficient information is not available to enable us to give particulars of the amounts distributed to each of the constituent groups, but the following return from the Milk Department of the City Council indicates the general grouping and the prices charged so far as their supplies are concerned:—

	1940–41.	1941–42.	1942–43.
Bottled milk (retail)	1,994,141	2,068,475	2,277,369
Bulk milk	808,908	788,025	1,345,788
School milk	259,972	250,806	186,291
Pints of cream	481,992	530,872	665,145
Ice-cream mix (1 gallon milk for 3 gallons mixture)	90,456	99,969	108,452

Prices

The prices charged were as follows:

Retail (bottled), average for 1943	27·796d. per gallon.
Wholesale	5d. per gallon below retail.

To regular purchasers of 250 gallons or more per month a rebate of 1½d. per gallon is allowed.

Hospitals, School milk, Armed Forces	Special contract prices.

Zoning

Owing to the fact that so large a proportion of the milk is distributed by the one large vendor the Wellington area was fairly effectively zoned before the system of zoning was officially adopted. The nearby farmers were zoned in 1942 and the Hutt Valley vendors in 1940. A certain amount of duplication of travel between the Milk Department and individual vendors is allowed so as to ensure to purchasers an opportunity to purchase either raw or pasteurized milk. As in other areas, considerable economies have been effected by the adoption of zoning.

Methods of Delivery

The Wellington City Council employs forty-three horse-drawn and eleven motor-driven vehicles on retail delivery rounds. It has four motor-vans employed on wholesale delivery and twenty-one other motor-vehicles used for feeder services, delivery to schools, and for collection from trains, &c. Of the forty-eight producer-vendors some use light vans on delivery. A number of them use private cars adapted for the purpose. In the Hutt Valley delivery motor-vehicles are used by twenty-two distributors, horse and cart transport by four, and other methods by six. It may be said that generally the vehicles and method are well up to the standard of delivery established in New Zealand, but no person watching the delivery in very hot and dusty or in very wet weather and noticing the uncovered condition of the vehicles would be inclined to approve it as ideal.

The roundsmen employed by the Wellington City Council now work 46½ hours per week; they start at 3 a.m. in summer and at 6 a.m. in winter; they travel on their rounds an average of twelve miles; they occupy seven hours on a round; and they deliver on an average 120 gallons per day per round. This high gallonage per day may be contrasted with the delivery at Auckland where the roundsmen deliver milk for 4½ hours per day only and where each roundsman has to handle both bottled and loose milk. The computed cost of distribution by the Milk Department is 6·43d. per gallon, as compared with from 7·65d. to 10·42d. by companies in other areas.

The forty-eight nearby farmers live close to the city and transport the milk they produce straight on to the round. As their average daily delivery is over 60 gallons it is doubtful whether any appreciable economy could be effected by any further rationalization.

In the Hutt Valley there are twelve producer-vendors. Some of them travel considerable distances to and from their rounds. The following examples illustrate the position:—

One producer-vendor travels 40 miles to deliver 62 gallons.

A second producer-vendor travels 30 miles to deliver 69½ gallons.

A third producer-vendor travels 20 miles to deliver 54 gallons.

These producer-vendors do not produce all the milk they deliver, but purchase portion of their milk from the Wellington Dairy Farmers' Co-operative Association, Ltd.

The twenty raw-milk vendors—that is, vendors other than producer-vendors—in the Hutt Valley purchase the milk they distribute from the Wellington Dairy Farmers' Co-operative Association, Ltd., and as it is delivered to their premises there is no wastage in collection. Some of the premises, however, are situated at considerable distances from the rounds. One vendor travels 15 miles to deliver 36½ gallons, while another travels 43 miles to deliver 150 gallons.

Two features of the Wellington system of distribution are unique. Consumers are required to pay for their own bottles and payment for bottled milk is made by tokens. The wastage of bottles is still heavy, but the liability on the consumer acts as an incentive to the exercise of care and saves the vendor considerable expense. It has the merit that the careless bear the whole loss consequent on their carelessness and the careful consumer is not called upon to share that loss. Payment by tokens saves the time of the roundsman, both on his rounds and when making his returns. It also saves a considerable amount of labour in the office, enabling the staff to be much smaller than is customary in businesses of a comparable size, and it eliminates bad debts. The tokens are sold by retail agencies, to whom the generous allowance of 2½ per cent. on all tokens sold is allowed.

CHAPTER 4.—PRESENT CIRCUMSTANCES OF THE SUPPLY OF MILK TO THE METROPOLITAN AREA OF CHRISTCHURCH

The Metropolitan Area of Christchurch comprises the City of Christchurch, the Boroughs of Riccarton and Sumner, and rural parts of the Counties of Waimairi, Paparua, and Halswell. Though the Borough of Lyttelton is named in the Year-Book as part of the urban area of Christchurch, it is separated from Christchurch by the Port Hills and does not draw its milk from the same supply area as the city. The whole of the metropolitan area is flat, is provided with good and convenient roads, and is admirably situated for the expeditious and economical delivery of any commodity in universal and daily use.

DEMAND

Population

The population of the metropolitan area—that is, of the urban area with Lyttelton excluded—for 1941 was stated in the 1942 Year-Book at 133,300. In addition to the members of the civilian population within the area, 9,650 children attending schools outside the area, ships visiting the Port of Lyttelton, and several bodies of Armed Forces draw supplies from vendors operating within the area.

The movement of the population in the area is shown in the following figures published in the Year-Book for the period from 1911–1941:

1911	85,500	1926	115,300
1916	90,200	1936	129,500
1921	103,000	1941	133,300

It will be seen that the population increased throughout the period, but that the rate of increase has slowed down in recent years. For the first fifteen years the average annual increase was 1,986, while for the second fifteen years it was 1,200; and for the last five years it was 760. It is possible that in the last few years the war has had an adverse effect. It is perhaps reasonable to anticipate that by 1960 the population will have grown to 150,000 or, even, 160,000. As in other areas, the number of school-children living outside the area for whom supplies are drawn from within the area and the volume of shipping for which liquid milk is purchased from metropolitan vendors may be expected to develop, in correspondence with the growth of population within the area. Eventually the members of the Allied Forces will be repatriated and at the same time the New Zealand men on service will return to their homes. It is impossible to state the exact effect of the changes from a state of war to a state of peace will have upon the population of any particular metropolitan area, but in the Christchurch area the increase or decrease is not likely to be a substantial one.

Consumption

Particulars of the consumption of milk in the Christchurch area available to the Commission were meagre and unreliable. There were no returns comparable to those that were supplied by the Metropolitan Milk Council in Auckland or to those that were compiled by the Milk Devartment of the Wellington City Council. This, perhaps, was to be expected, but even the Hutt Valley pendors and the nearby farmers of the Wellington area readily furnished particulars that afforded a reliable basis for computation. This criticism does not apply to all vendors, and the assistance afforded in this connection by the largest vending companies is gratefully acknowledged.

According to the particulars that were available it appeared that the average daily consumption of liquid milk supplied within or from the area to the ordinary civilian bopulation, to schools, and to the Armed Forces during the year 1942 was 11,144 gallons. Compared with the consumption in other areas, this is low and the figures cannot be complete. To the quantity consumed as liquid milk in the ways named has to be added the quantity required for cream, for ice-cream and for manufacturing purposes, and also the quantity of liquid milk delivered to shipping at Lyttelton. Judging by the quantities required for all purposes in other areas the total consumption in this area of milk in all forms and for all purposes is probably not less than 13,000 gallons per day or, say, 4,750,000 per year.

Prospective Increase in Consumption

As the particulars of the change from year to year or from period to period in volume of consumption are not available it is impossible to estimate with a reasonable degree of accuracy the prospective increase in demand during the coming years. The only guide is in the anticipated growth in population, taking into consideration changes in the demand for milk in schools and in the volume of shipping, and making allowance for the repatriation of Allied Forces in our camps and the return of the members of our own forces at home and abroad to civilian life. It is clear on the evidence submitted to the Commission that the people of New Zealand do not drink sufficient milk, and a higher consumption per head is being urged by the health authorities. The effect of enlightenment and authoritative appeal cannot be foreseen, but it is hoped that it will result in an appreciable increase in the demand in this and in other metropolitan areas. As the resources of an area ought to be organized in accordance with the prospective development in demand it is a matter of regret that the information available in the Christchurch area is so incomplete. Whatever action is taken, whether by central or local authority, and whether by public control or private enterprise, reliable information is necessary for intelligent guidance. It is probably a reflection of the unorganized condition of the industry in Christchurch that the information is so unsatisfactory.

Organization

The most distinctive feature of the milk industry in Christchurch is its lack of any comprehensive or well-ordered co-operation or guidance. It is organized in the sense that it does supply the area with the milk that it demands, and in recent years has done so with less rationing or cutting-down of supplies than has obtained in other areas. It has its producers who own and control the dairy-farms on which the milk is produced; its treatment houses where a certain portion of the milk is pasteurized and bottled; its vendors and distributors by whom the milk, raw or pasteurized, loose or bottled, is sold and delivered to the consumers; and its milk-shops and milk-bars to cater for special needs. But there is no one organization in which all producers can unite to improve the service they render and to advance their common interests; and there is no one body in which all vendors are united with similar objects. The producers have never succeeded in combining in one association. They have attempted to do so, but they have been divided into two groups according to the affiliation of the individuals with vendor interests. Recently an attempt has been made to induce all producers to unite in one effective organization. The vendors are drawn into two opposing and even hostile groups. There are, on the one hand, the vendors of pasteurized milk and, on the other hand, the vendors of raw milk. The first group (apart from the two partnerships referred to presently as constituting one producer-vendor) consists of three companies who sell pasteurized milk; two of these own treating-houses, while the third has the milk it vends pasteurized by the larger treating company. These three companies do the greater part of the wholesale trade of the area and a substantial part of the retail trade. They co-operate readily and exercise a considerable influence over the whole of the milk industry in the area. The vendors of raw milk have formed themselves into a fairly compact body and now have been joined by the main body of producer-vendors. Each of these two groups has discovered a dominating interest that is common to all its members. In the one case it is the interest in the sale of pasteurized milk and in the other case it is the interest in the sale of raw milk. And the conflict between these two interests is the basis of the organization, or disorganization, of the vendors in the area. There are two partnerships that together occupy a unique position. One partnership produces the milk; the other pasteurizes a considerable portion of it and distributes all the milk that the first partnership produces. The two partnerships are closely related in business, and for the purpose of our examination of the industry we have found it convenient to regard the two partnerships as one producer-vendor not identified in interest with any of the other organized groups.

It has already been stated that in all areas the industry has been and is dominated by commercial considerations as interpreted by the vendors. Christchurch affords the most striking example of this

aspect of the industry. The vendors who ascertain the requirements of the consumers arrange the production and fix the principal terms of the contracts. The producer-vendors, many of whom augment the milk they produce by purchases from other dairy-farmers, find a community of interest with other vendors in purchasing for as low a price as is consistent with obtaining the supplies they need. The largest treating and vending company has two forms of contract that it adopts in its purchases from dairy-farmers. The one form adopts the principle of the "winter quota." Under this form of contract the producer receives throughout the year the town-milk-supply price for quantities equal to those produced during the previous winter months and factory-supply price for the excess. The other form adopts the principle of the declared quantity, under which the dairy-farmer is bound to supply the declared quantity throughout the year and is paid town-milk-supply price for that quantity and factory-supply price for the balance. Though this latter form would entitle the vendor to pay factory-supply rates for the excess in the winter as well as in the summer it is understood that in practice the full price is paid for all winter supplies whether in excess of the declared quantity or not. The latter form has the advantage that it enables the farmer to gain an advantage during the summer from an anticipated increase in the following winter. The "winter quota" contract and the "declared quantity" contract both tend to stimulate winter production and to induce an all-the-year-round level supply.

Experience in Christchurch shows how suspicion, mistrust, and sometimes even antagonism are consequent upon control by commercial enterprise. Instances were brought to the notice of the Commission of feeling sufficiently acute to have very disturbing effects upon the relations of producers and vendors and upon the interests of the industry as a whole. However the responsibility for the disputes may be apportioned, hardship has at times resulted and discontent has been engendered.

One respect in which the disorganized condition of the industry is likely to have serious effects is in the lack of control over the various activities. In its submissions to the Commission the Christchurch City Council made the following observations:—

> "At the present time control is very much divided. The Department of Agriculture is responsible for the production of the milk on the farm. This Department's functions cease at the farm-gate. From then on the Health Department is responsible under powers conferred upon it under the Sale of Food and Drugs Act, and regulations under the Health Act, to ensure that the milk delivered to the consumer complies with a given standard and in such a manner as is laid down by various regulations.
>
> "The Christchurch City Council was responsible merely for the licensing of the actual vendors who distributed within the city area, including both the itinerant milkmen and the shop dairy. Considerable dissatisfaction arose some time ago at the lack of supervision by the Health Department, and the City Council agreed, at the request of the Medical Officer of Health, to loan Council officers for the purposes of collecting milk-samples for the purpose of analysis. This arrangement was on account of shortage of staff at the Health Department. When zoning came into force on the 1st June last year the Health Department withdrew its supply of transport, and to ensure that an adequate number of samples were being taken the City Council bought a motor-car, and detailed an officer for the sole purpose of sampling. The Medical Officer of Health has the whole say as to what action should be taken in the event of a sample not complying. The Council feels that it owes this service to its citizens as consumers, despite the fact that it has no legal obligation to operate under the Sale of Food and Drugs Act.
>
> "The Council administers the regulations within its area as to the structural conditions of dairies, but there is a serious weakness where vendors and producers are living in different areas outside of the city and merely distributing milk in the area under the Council control—that is to say, a vendor could purchase milk from a producer in the Paparua Council, store it in the Riccarton Borough area, and distribute it in Christchurch. It would be necessary for him to hold a producer's license and a distributor's license. There is no license required in the outside local bodies as regards storage. It has been suggested that all local bodies should have by-laws controlling the storage of milk, and this may be desirable, but vendors feel that there are too many licenses required—for example, a Mr. Wright produces milk in the Waimairi County; he holds a license from the Department of Agriculture to produce, he would require another one from the Waimairi County Council to store. He distributes his milk in the Waimairi, Halswell, and Paparua Counties, also in the Riccarton Borough, and probably some in the city. The multiplicity of these licenses, besides being irksome, would not necessarily tend towards efficiency in inspection.
>
> "To overcome this it has been suggested that a Metropolitan Milk District be formed, under the jurisdiction of the Christchurch City Council, with representation from other local bodies within the metropolitan area. This would have the effect of standardizing the control and any by-laws and fees, and it would ensure regularity of inspection, aimed at a high standard of hygiene. It is felt that many methods, appliances, and buildings at the farms are obsolete, and that the time has now arisen when the milk industry should raise the standard of its product. It is considered that persons producing and distributing milk should be subject to some form of regular medical supervision."

Supply

Natural Conditions

The metropolitan district of Christchurch is favourably situated so far as the natural conditions of milk-production is concerned. It is almost surrounded by a broad belt of land eminently suited for dairy-farming. This belt extends approximately 30 miles to the south-west and 35 miles to the north. The greatest distance from the area boundary of any dairy-farm from which town milk is drawn is about 20 miles. The present needs of the area could be fully met from farms situated within a distance of 12 miles. As the city grows and land on its margin is required for housing or for industrial purposes or for growing vegetables, dairying can be extended more deeply into the surrounding belt; and milk to satisfy all the area's requirements for many decades should be readily available.

The soil is fertile, immediately accessible, and easily worked. It produces good pastures and abundant winter feed. In a normal season the spring flush commences about the middle of September and there is good growth until the middle of January. A short period of poor growth follows, but

during March and part of April there usually is an autumn flush. From the middle or end of April until the middle of September there is no growth. The change then is sudden. By the beginning of October there may be ample feed for the cattle. There is a good supply of excellent artesian water. The winters are severe. Frosts are frequent and there are occasional falls of snow. Owing to this severity it is necessary to cover the cows in winter and to house them during the colder spells.

Cow Population

In the supply area there are approximately 23,000 cows. Less than half of these are milked for town supply. The latest returns show that there are 9,364 cows on 497 dairy-farms, with permanent licenses for town supply and 714 on 27 dairy-farms with temporary licenses only. The following table shows the movement on dairy-farms with permanent licenses:—

Year.	Farm Dairies.	Cows.	Year.	Farm Dairies.	Cows.
1934 ..	.. 590	7,973	1939 ..	.. 510	9,000
1935 ..	.. 567	8,300	1940 ..	.. 505	9,000
1936 ..	.. 560	8,244	1941 ..	.. 514	8,860
1937 ..	.. 548	8,000	1942 ..	.. 508	9,522
1938 ..	.. 537	8,935	1943 ..	.. 497	9,364

The number of temporary licenses has remained about the same during the last two or three years. It does not follow that all the cows noted in the table are regularly used for town supply. Some farmers may hold and renew their licenses and yet cease to supply the town. In Christchurch, however, probably there are not many who are in this position.

It will be noted that throughout the period from 1934 to 1943 there has been a steady decrease in the number of licensed dairy-farms and an irregular increase in the number of cows milked on such farms. The latest movement in cows is downward. The decrease in the number of licensed dairy-farms is significant. It means that fewer farmers—the fall is one-sixth in ten years—produce for the town. And it may at any time prove serious. Under existing conditions farmers are finding it increasingly difficult to find the labour for this work. Evidence was before the Commission of farmers who were forced to reduce their herds or who were induced by more attractive prices and conditions to use larger parts of their land for other forms of production. In an area where farmers engage in mixed farming to the extent that is common in Christchurch this movement is a relatively simple one.

Methods of Production

In the herds on the dairy-farms close to the city, Jersey, Guernsey, Shorthorn, and Ayrshire cattle are prominent, with an appreciable number of Friesians. To the north of the city, in the Rangiora district, the herds consist almost entirely of Friesians. The average production of milk per cow is high, approximately 600 gallons per annum.

The methods of replacement of cows were discussed with dairy-farmers. The best results so far as volume of milk and freedom of cattle from disease are concerned are secured by the farmers who breed their own replacements. But the majority of the farmers appear to aim at depasturing and feeding only cows that are in or about to come into milk. They sell off dry stock and purchase other cows. To some extent use appears to be made of the service of stock agents whose business is to acquaint themselves with the needs of particular farmers and buy from one and sell to another. Buying replacements at saleyards appears to be condemned by almost all competent dairy-farmers, yet it is a very general practice. The necessity of approved feeding in winter if milk is to be produced all the year round is recognized. Probably Christchurch is better situated in this respect than any of the other metropolitan areas. It produces an abundance of winter feed and it produces a better winter supply (quantity) of milk than is produced elsewhere. But there is room for improvement; and there is need for improvement if threatening dangers are to be avoided and the standard of the milk supplied is to be raised and not further lowered.

Farm Dairies

The dairies on the town-supply farms in this area may be described as of a good general standard. Taking the supply area as a whole, they probably are the best in New Zealand. Some fall short of modern standards, but many are models of construction and equipment. Before the war checked the development, new standard sheds were being erected at the rate of one per fortnight; and this had continued for several years. The result is that now in every district one may see sheds that attain a high standard and provide a stimulating example to other farmers. This development was acknowledged on all hands to be due to the activity of the officers of the Department of Agriculture. The advice and guidance of these officers was readily given and most warmly welcomed.

These dairies have the advantage of an ample supply of cold, clear artesian water. Advantage is taken of it to reduce the temperature of the milk immediately after milking down to from 60° F. to 62° F. The cooler in general use is the washboard type.

Adequacy of Supply

There is not in this area, any more than there is in any other metropolitan area, any attempt to estimate the total quantity of liquid milk required month by month by the consuming public. It is left to each of the vendors individually to secure a sufficient number of suppliers to meet that vendor's requirements. And it is left to the producer to regulate his supply to secure the best return obtainable over the whole year. The "declared quantity" contract adopted by one of the vendors does introduce the element of estimating, and in this respect is an advance on other forms of which evidence was given throughout the inquiry. But it is only an introduction; and there was no evidence in the Christchurch area, or indeed in any area, of an appreciation of the importance of estimating total requirements and of ensuring by previous planning a supply adequate to satisfy these requirements, with a margin of at least 10 per cent. to meet exceptional developments. To this failure must be attributed in no small measure the increasing dangers that threaten the town milk-supply in respect both of quantity and of quality.

The supply has been maintained better in the Christchurch area than elsewhere. But it has not always been fully maintained. During the period from 1938 to 1942 (both years inclusive) it was usual to ration school milk during the winter months. In such rationing high schools and technical schools

suffered first. In no year was the supply rationed for a lengthy period. In 1943 there has been no rationing of school milk, and this is the only metropolitan area of which this statement can be made.

There is one feature about the supply that is disturbing—that is, the dependence on supplies from dairy-farms holding temporary licenses only. The area has not drawn supplies from a distance as has been done in Auckland, Wellington, and Dunedin. But it has depended on temporary licenses. It was in this area that the attention of the Commission was drawn to the fact that until 1939 there was no authority for the issue of temporary licenses. But the inadequacy of the permanent supply led to the practice of augmenting supplies from unlicensed dairies and the regulations authorizing the issue of temporary licenses appear to have been adopted so as to give some measure of control over these supplementary sources of milk. This development may have been unavoidable at the time, but it is highly unsatisfactory. The regulations governing the conditions under which milk is produced for town supply need to be tightened, not relaxed. If milk of a high standard is to be ensured, then other methods of meeting requirements must be sought and found. A large proportion of the milk that is drawn from these sources is what has been termed "accidental" or "fortuitous" milk, and, apart from the conditions under which it is produced, is not the most wholesome. The significance of the development, however, lies in the proof it affords of failure to provide an adequate supply of milk from approved sources and in the evidence of a progressive deterioration of the situation in this respect.

Level Supply

Christchurch affords an example of a near approach to an all-the-year-round level supply of liquid milk. It approaches such a supply more nearly than does any other area. In some few cases dairy-farmers have no excess in summer over winter. This applies particularly to producer-vendors. Others who are producers only have a very small summer surplus. The relation between the supply for the six winter months to that of the six summer months of a substantial majority of the dairy-farmers who supply town milk is 45 per cent. to 55 per cent.

This result is due in part to the natural advantages that Christchurch possesses. The fertility of the soil and the capacity to produce abundant winter feed are more favourable to the maintenance of a level supply than are the conditions in Wellington and Dunedin. But the terms of the contracts between vendors and producers and the disparity in summer and winter prices are powerful factors. Under these conditions it pays to increase winter production relatively to summer production in spite of the higher cost of feeding. And this identification of financial interest with beneficial service has assisted to secure the desired result.

Though the supply is so much more nearly level in this area than elsewhere there is a summer surplus and its utilization is of importance. A considerable quantity is used for cream and for ice-cream. In the case of both of these commodities the demand is greater in the summer than in the winter. In the case of ice-cream this is particularly the case. And this demand affords one means of utilizing the summer surplus and affording the producers a better return than can be obtained at a cheese-factory. A feature of the industry in the area, however, is the importation of large quantities of cream from the west coast even while part of the summer milk surplus is being supplied to factories. This is the subject of a recommendation in Part II of this report. It is noted here as a special and undesirable present circumstance in the area.

Balancing-station

There is no one recognized balancing-station in the Christchurch area. Some of the surplus is supplied to a factory. Some of it is sold to a purchaser who produces cream for the market on a large scale. One large vendor has submitted argument in support of an application to be allowed to open and operate a former cheese-factory as a balancing-station. There is no one station such as is operated by the Milk Department of the Wellington City Council or even one similar to the cheese-factory at Tamaki that is used by all purchasing vendors in Auckland.

Standard of Supply

One respect in which returns from Christchurch are particularly unsatisfactory when compared with Wellington and Auckland concerns the standard of the supply. We are not able to present a statement that sets forth the position with anything approaching the fullness and clearness that ought to be regarded as necessary.

Two things that affect the standard are—

(1) The breeds of cattle predominating in the supply area; and

(2) The use of temporary licenses.

The circumstances directly encourage production of quantity rather than quality, and the quality is not equal to that of Auckland or Wellington. In Wellington the butterfat content determines the price paid for the milk purchased by the Milk Department of the City Council. In Auckland one of the large companies pays on quality. In Christchurch payment is on a gallonage basis only.

The average value of butterfat and of solids not fat taken over a period of seventeen years have proved to be—

	d.
Butterfat	4·20
Solids not fat	8·93

For the past five years the values were—

Butterfat	4·21
Solids not fat	8·87

The monthly variation in the percentage of fat computed from the samples for the seventeen years shows as follows—

	Per Cent.		Per Cent.
January	4·23	July	4·27
February	4·27	August	4·11
March	4·43	September	4·04
April	4·40	October	3·93
May	4·42	November	3·95
June	4·35	December	4·01

As the minimum standard for butterfat content prescribed by the regulations under the sale of Food and Drugs Act is 3·25 per cent. and that for solids not fat is 8·50 per cent., the tests may seem to be satisfactory. But it must be borne in mind that the prescribed percentages are minimum and ought to apply to every individual producer's supply at every season of the year. An average of 3·93 per cent. of butterfat in an area where there are a number of Jersey cattle and some straight Friesian herds suggests that there must be times when the supply of individual dairy-farmers falls below the legal minimum; and this proves to be the case. Unfortunately, the results of tests that would disclose the bacterial condition of the milk on a satisfactory scale are not available.

Price to Producer

Milk is paid for in the Christchurch area purely on a gallonage basis. The year is divided into three periods, and there are marked differences between the seasonal prices. The periods and prices are as follows:—

	s.	d.
May to August	1	2½
September to February	0	9
March and April	0	11

The average price all the year round is 11·17d., and this is now fixed by the Price Tribunal. In comparing these prices with those paid in other areas the difference in quality should be noted.

Collection

Method of Control

In the Christchurch area the collection of milk is controlled entirely by vending interests. This statement may need modification in the case of the producer-vendors, but this is due solely to the fact that in this case it is not possible to separate completely the interests of the vendor from those of the producer. The contracts made for supply are for supply at the dairy-farm, and the responsibility for collecting rests upon the milk-vendors who purchase from the producer.

The effects of this condition are manifested in a number of ways. Each of the milk-vendors is interested only in that portion of the total supply which he handles; and so each makes his own separate arrangements. There is striking demonstration of the waste involved in the multiplication of units of service. Again, the price paid is paid for milk at the farm, and the interest in avoiding harmful exposure or avoidable time-lag is neither so direct nor so certain as it would be if the farmer were responsible for collection and his financial return depended upon the condition of the milk when delivered at the treating-house or the vendor's depot.

Time, Place, and Manner of Collection

The largest of the treating and vending companies, which with its associated company handles almost half of the total milk-supply of the metropolitan area, engages cartage contractors to collect its milk. It also collects in the same way some of the milk of the smaller treating and vending company. For the greater part of the year one collection only is made daily—the night's and the following morning's milk being picked up at the one time. On days when the atmospheric conditions are particularly bad two collections are arranged. The time occupied in collecting is often much longer than ought to be permitted. As many as three trips with one truck are made by the contractor in one day. As the contractor starts after the morning's milking, this means that the last lot is brought in late, sometimes not until after midday. As the milk collected includes that of the night before, some of the milk is over eighteen hours old before it is delivered at the treating-house. To make matters worse, the milk is frequently picked up at the farm-gate instead of at the dairy. It is placed on a stand at the roadside to suit the convenience of the contractor and remains there exposed to the heat of the sun, sometimes for several hours. Then it is carted into the city in an open truck and, in the summer-time, continues throughout the journey exposed to the heat of the sun and the dust of the highway. It was not surprising to learn that there had been complaints of the condition of the milk even after pasteurization. The time-lag after milking, the fact that while waiting to be collected the cans in which it is contained are exposed to the heat of the sun instead of being retained in a cooler, and the condition under which it is transported are sufficient to cause much of the milk to become stale before it reaches the pasteurizing-plant.

Some of the raw-milk vendors collect their milk twice a day. Many collect the morning's and the evening's milk in the evening and then store it on their premises overnight for delivery next morning. The general rule is for each vendor to collect his own milk only, though in some cases two vendors will combine to make one collection. The general practice is bad for two reasons. In the first place, it delays the delivery of milk too long after milking and exposes it to undesirable conditions. In the second place, it involves serious wastage of man-hours, and of petrol, rubber, and other materials. The practice means that a morning's milk is held for about twelve hours before being collected; that it is then transported with the evening's milk in an open truck, and in many cases over considerable distances; and that it is then held overnight on the vendor's premises, where satisfactory cool storage space may, or may not, be provided. The total distances travelled for relatively small quantities of milk are startling. It is a common circumstance that a vendor travels 10 miles to 15 miles to collect 40 gallons to 80 gallons of milk and brings it to his own premises. He then has to travel the distance to and from his round as well as the distance on the round. One vendor gave evidence of travelling 44 miles each day to collect his own and another vendor's milk.

The practice of producer-vendors varies. Generally the producer-vendor delivers in the morning the milk of that morning and of the night before. He collects it from his own cooling-room. In such cases the milk is fresh when delivered. In the case of the two closely associated companies, which for the present purpose are treated as though they were one society operating as a producer-vendor, nearly half the milk is pasteurized and the pasteurizing is done immediately after each milking is complete. This eliminates the time-lag that is so noticeable a feature in the case of other treating-houses. The wastage due to distances travelled is avoided in some cases, but is serious in others. Some producer-vendors have their dairy-farms close to their zones. Others travel long distances to and from their rounds. One gave evidence of travelling 20 miles to deliver 30 gallons of milk wholesale and 45 gallons retail. Of this 20 miles, 5 miles only was travelled on the round itself.

The significance of the multiplication of vendors and producer-vendors, each with few exceptions, acting as a separate collecting agency, may be appreciated on a consideration of the following facts. There are 153 vendors and producer-vendors in Christchurch. All were asked for particulars of their rounds, but only 56 complied with the request. Of the 56, 23 were producer-vendors and 33 are vendors. Between them they deliver 2,442 gallons of milk per day and travel to and from their rounds 627 miles. The average daily delivery per business is less than 44 gallons and the milk delivered per mile spent on collecting alone less than 4 gallons. One lorry can carry 900 gallons of milk, so that the 2,442 gallons quoted represents less than three lorry loads. Yet fifty-six vehicles were used each with its separate driver. That does not mean that the three lorries carrying one load each would collect the whole daily supply of 2,442 gallons. In any one lorry load many cans would not be full, and the load that any one lorry would carry would largely depend on the distribution of the dairy-farms along the principal roads. What is illustrated is that no less than fifty-six different vehicles are used to collect a quantity that could, so far as quantity is concerned, be carried on *three lorries*. Only seven of the returns showed the total distances travelled on collecting and distribution combined. These seven men travel 128¾ miles and deliver 253½ gallons each day. The average daily delivery per business is thus less than 36½ gallons and the average number of gallons delivered per mile travelled is less than two. And each distributor is equipped with vehicle and cans. In Wellington the roundsmen of the Municipal Milk Department deliver 120 gallons per man per day and travel from 5 miles to 11 miles on the round, in addition to the distance to and from the depot to achieve this.

Cost of Collection

It is impossible to compute the costs of collection by vendors and producer-vendors, but they must be high. The costs of the large companies, however, compare favourably with those in other areas. From the returns available that cost is the same as the lowest cost disclosed in the investigations in Auckland and in Dunedin. The average is equal to 0·68d. per gallon.

Treatment

Proportions of Milk: (1) Pasteurized and (2) Bottled

Both raw milk and pasteurized milk is distributed in Christchurch. The proportion that is pasteurized is much lower than the proportion in Auckland or Wellington. Of the total returned gallons sold daily, both in wholesale and in retail quantities, 4,728, or 37 per cent. of the total, is pasteurized. Of the quantity that is delivered retail 1,169 gallons, or 15 per cent., is pasteurized. Not all the milk that is pasteurized and sold in retail quantities is bottled. All except one of the milk-shops sell only bottled milk. A portion of the milk that is sold raw is bottled. The one large producer-vendor who pasteurizes one-half of his milk, bottles all that he distributes. Three other large vendors and producer-vendors bottle about half their supply and forty-two smaller vendors and producer-vendors bottle small quantities. In addition to that distributed to milk-shops, a small quantity of milk sold at wholesale rates is also bottled.

Plants and Methods

There are three pasteurizing-plants in Christchurch. One is of the most modern type and is thoroughly efficient. One is old-fashioned, but is kept scrupulously clean and the milk is always pasteurized while fresh. The third plant is out of date and has little to commend it. The methods employed leave room for much improvement. In one case an analyst is employed and samples are taken daily and the results of the tests recorded. There is no analyst in either of the other houses. In no case is there any attempt to grade each supplier's milk and to attach to every fall in grade the penalty of a reduction in the rate of payment. Moreover, in at least one case a faulty system of collection results in milk sometimes being stale before being put into the pasteurizer. Pasteurizing ought never be used to cover avoidable defects in milk, and therefore steps should be taken to ensure that milk is clean and fresh when it is pasteurized. If it be true that a purchaser purchasing pasteurized milk is entitled to assume that only fresh, clean milk was pasteurized and that the processing was efficient, then the rights of the purchaser in Christchurch are often defeated. It cannot be said that the bottling is always, or even generally, satisfactory. In the first place, the sterilizing is sometimes neglected and often inefficient. One large producer-vendor informed the Commission that he used his sterilizer only when there was an epidemic. A few large vendors have bottling-machines. A number of the sterilizing units are inefficient. They have no recording thermometers, and in this important respect sterilizing is a matter of guesswork. Some vendors fill the bottles by hand. The Commission saw crates of bottles that had been cleaned and sterilized open and exposed to the atmosphere standing on one side waiting to be filled. Bottling is, or ought to be, used for the purpose of protecting milk from contamination. Unless the bottles are properly cleaned and sterilized and, immediately on sterilization, filled and sealed they may themselves become effective media of contamination.

Distribution

As already stated, 3 vending companies and 153 vendors and producer-vendors distribute a quantity of approximately 13,000 gallons of milk daily, of which 37 per cent. is pasteurized and the greater part of that distributed in retail quantities is bottled.

The scale of prices is as follows:—

Retail	3d. per pint; 6d. per quart.
Wholesale	14d. to 18d. per gallon.
Special contracts	9¾d. to 11½d. per gallon during summer period; 13d. to 14d. per gallon during winter period.

To the sales of milk for consumption as whole milk must be added the sales of milk used to produce cream. No returns are available that give a reliable guide to the quantities utilized in this way. The following show the prices for the milk paid to the producer and the prices for cream charged to the consumer:—

Price paid to producer for milk (average)	11·17d. per gallon.
Price charged to consumer for cream	16s. per gallon.

To compare these prices and to compute the margin to the vendor it is necessary to have in mind that the quantity of milk required to produce 1 gallon of cream will vary with the butterfat content of the milk and that with milk testing 4 per cent. butterfat it would require 10 gallons of milk to produce 1 gallon of cream.

Regard must be further had to the sales of milk and cream for the manufacture of ice-cream. Here again an exact statement is not possible, but the following approximate figures may be used as an indication of the quantities distributed and the prices paid :—

Annual gallonage of milk	100,000 to 120,000
Annual gallonage of cream	40,000 to 50,000

The seasonal distribution is shown in the following proportions :—

Milk		*Cream*	
October to March	Three-quarters of total.	October to March	Three-quarters of total.
April to August	One-sixth of total.	April to June	One-eighth of total.
September	One-twelfth of total.	July and August	One-fortieth of total.
		September	One-tenth of total.

The prices are seasonal and are approximately as follows : -

Milk	s. d.	*Cream*	s. d.
October to March	0 11½	October to March	8 3
April to August	1 1	April to June	7 6
September	0 10	July and August	10 0
		September	7 6

Two features of this return deserve mention—first, the demand is highest in the summer months when the producer has the greatest surplus ; secondly, the price is appreciably above the price that would be obtained at a cheese-factory for the surplus.

Agencies of Distribution

The milk is distributed to consumers through various agencies. The householder and the consumer in offices are served, in the main, by roundsmen. But a large quantity is purchased from shops and dairies or consumed in milk-bars. Other quantities are served in hotels, boardinghouses, and restaurants, while institutions such as hospitals purchase supplies for their patients. Each of these agencies require consideration in regard to the means of ensuring either a high standard or a reasonable price, or both. Reference is made here to two only—shop dairies and roundsmen.

Shop Dairies.—There are 307 shop dairies licensed by the Christchurch City Council. This is much in excess of the number in proportion to population in the other metropolitan areas. The figures given for comparison are :—

Area.	Population.	Shop Dairies.
Auckland	223,700	379
Wellington City (excluding Hutt)	124,480	91
Christchurch	132,240	307
Dunedin	82,200	97

The daily gallonage handled by these 307 shops is indicated in the following particulars :—

82 shops	2 gallons or less.
159 shops	Over 2 gallons and not over 5 gallons.
53 shops	Over 5 gallons and not over 8 gallons.
11 shops	Over 8 gallons and not over 14 gallons.
2 shops	Over 14 gallons.

Each of these shops has to be served daily, but almost all are supplied by one or other of the large vending companies and, it is probable, that the cost of distribution is not high. But there are two facts to be noted, one is that the small quantities purchased do not justify a price much below the price charged to retail purchasers. The other fact, and one of still greater importance, is that the multiplication of small dairies increases the cost of inspection and probably under existing circumstances lessens the efficiency of control.

Roundsmen.—The roundsmen consist of a large number of men and girls employed by the vending companies and a smaller number of men and girls employed by raw-milk vendors and of producer-vendors who control substantial businesses and a considerable number of vendors and producer-vendors who distribute small quantities of milk daily.

The roundsmen employed by the vending companies work seven hours per day six days per week and have an average delivery per man per day of 85 to 90 gallons. From a return provided by 36 vendors and 26 producer-vendors it was ascertained that the daily average number of gallons delivered per unit of labour was vendors 38 gallons and producer-vendors 39 gallons per day.

Zoning

A system of zoning rounds has been adopted in Christchurch, and this has resulted in considerable economies. The saving in petrol alone is estimated at 9,437 gallons per annum. But, despite zoning, it is impossible to avoid wastage when so many persons and vehicles with so much equipment is engaged in the work of distribution. Part, and a considerable part, of the wastage is due to the numbers employed in collecting the milk and bringing it into the area. That has been discussed under the heading "Collection." Another part is due to the division of the actual work of distribution among an unnecessarily large number of workers. The full benefit of zoning cannot be secured unless the size of the rounds as well as their location is adjusted to the service required.

Methods of Delivery

As in other areas, so in Christchurch, a variety of vehicles are employed in the work of distribution. The principal variety is the motor-vehicle. But everything from the pedal bicycle to the large modern truck is in evidence. A convenient form of truck employed by some vendors is one with a running-board on each side extending the full length of the truck. The crates of bottled milk are so arranged that a roundsman standing on some part of one of the running-boards can conveniently reach any of the crates. Some of the vehicles used are covered, but others are not.

Inspection

Samples of milk are from time to time taken from vendors, from producer-vendors, and from roundsmen. They also are taken from the shop dairies. At one time these were taken by an Inspector under the control of the Health Department. As the one Inspector was unable to carry out the necessary amount of work the City Council offered the assistance of an Inspector employed by itself. This assistance was welcomed, and a car was provided to enable the Inspector to do more effective work. Then the Health Department's Inspector was withdrawn. Subsequently the car ceased to be available for the Council's Inspector. Now this officer is the only one employed. He appears to do all that can be expected of him, but assistance is necessary if control is to be reasonably effective.

Between 16th September, 1942, and 22nd April, 1943, the Inspector took 1,480 samples, some from vendors in the city and some from milk-shops. Seventy of these samples, or approximately 5 per cent., failed to comply with the provisions of the Sale of Food and Drugs Act. No returns were available to us to show how the defective samples were distributed as between milk shops, restaurants, vendors, roundsmen, &c.

CHAPTER 5. PRESENT CIRCUMSTANCES OF THE SUPPLY OF MILK TO THE METROPOLITAN AREA OF DUNEDIN

The Metropolitan Area of Dunedin comprises the City of Dunedin, the Boroughs of West Harbour, St. Kilda, and Green Island, and some adjacent districts forming parts of counties. The Borough of Port Chalmers is classed as part of the urban area in the Year-Book return but does not form part of the metropolitan area for the purposes of this inquiry. A considerable portion of the most thickly populated parts of the area is flat and conveniently situated for an efficient milk-supply service, but there are other portions that are hilly and where the approaches are steep.

Demand

Population

The Year-Book for 1942 estimates the population of the urban area on 1st April, 1941, at 82,200. Excluding Port Chalmers, the metropolitan population on that date was 80,180.

The movement of the population in the urban area, including Port Chalmers, is shown in the following figures, also drawn from the Year-Book: —

1911	67,200	1926	85,095
1916	68,716	1936	81,848
1921	72,255	1941	82,200

It will be seen that the population grew at an increasing rate during the fifteen-year period from 1911 to 1926, that it fell during the ten-year period from 1926–1936, and that there was a small increase in the five-year period from 1936–1941. The increase during the fifteen-year period was 17,895, the following ten years there was a decrease of 3,247, and in the last five years there was an increase of 352. To draw accurate as well as reliable conclusions from those figures it would be necessary to consider changes in adjoining areas in close proximity to the city. Growth may take place outside an urban area in districts which at a later date are linked to it. The indications are, however, that after a period of expansion the population has become fairly stable, and a continuance of that condition appears to be a reasonable anticipation.

Consumption

According to returns furnished to the Commission the total sales of milk and cream by the vendors of pasteurized milk, the vendors of raw milk, and the producer-vendors for all purposes during the year ended 31st March, 1943, amounted to 2,456,738 gallons of milk and 56,977 gallons of cream. Assuming that 10 gallons of milk is required to produce 1 gallon of cream, the total gallonage of milk consumed was 3,026,508, or a daily average of 8,292 gallons. This amount included both wholesale and retail quantities and supplies to schools, to the Armed Forces, and to ice-cream manufacturers. Additional quantities are purchased by a chocolate-manufacturing company. Some 10,800 children are supplied with half a pint of milk per school day, and of these, 1,390 attend schools outside the metropolitan area. The demand for the Armed Forces is small and probably much smaller than is the reduction in the civilian demand consequent upon the withdrawal of men from civilian life.

Prospective Consumption.

In view of the relatively small consumption by the Armed Forces an increase rather than a reduction in demand is likely when peace is restored. As the population is stable, the increase for a time is likely to be limited to that consequent upon repatriation. But regard must also be had to the insistence by the health authorities upon the importance of increasing the *per capita* consumption.

Organization

As in the other areas, the industry is conducted by three groups—namely, producers, vendors, and producer-vendors. The vendors again are divided into the three companies that process and distribute pasteurized milk and the vendors that sell raw milk. All the milk sold by the producer-vendors is raw. Of the annual milk sales quoted above 1,229,061 gallons are sold by the three companies, 529,980 gallons are sold by twenty-eight raw-milk vendors, and 697,697 gallons are sold by forty-five producer-vendors. 42,547 gallons of cream are sold by the companies, 7,410 gallons by raw-milk vendors, and 7,020 gallons by producer-vendors.

Until recently the dairy-farmers were quite unorganized, but in 1942 the Dairy Farmers' Co-operative Milk Supply Co., Ltd., was incorporated and it commenced operations in June of that year. A large proportion of the farmers supplying the companies are now members of the Dairy Farmers' Co-operative Milk Supply Co., Ltd., but very few of those supplying milk to the raw-milk vendors had joined when the Commission heard evidence in Dunedin. During the first nine months of operations the newly incorporated supply company sold 854,602 gallons of milk and became the chief supplier of milk to two of the companies and also supplied three of the raw-milk vendors. When it started operating it sold 46,000 gallons per month, but by May of this year had increased its sales to 125,000 gallons per month. It is anticipated that in future almost all the milk supplied to the proprietary companies will be purchased from this organization.

The vendors and the producer-vendors in Dunedin are united in one body, the Dunedin Milk Vendors' Association, Incorporated. There is no such division as exists in Christchurch between the vendors of raw milk and the vendors of pasteurized milk. And the producer-vendors have found their community of interest with the vendors rather than with the producers. This may be due in part to the long disorganized condition of the dairy-farmers. It does not appear to be due in the case of the Dunedin producer-vendors to dependence on a proportion of purchased milk, because they manage to maintain a level supply and their purchases are negligible.

Until the incorporation of the Dairy Farmers' Co-operative Milk Supply Co., Ltd., the effective control of the industry was in the hands of the vendors. As elsewhere, they studied the market and knew its requirements. They studied also the sources of supply and placed their orders to the best commercial advantage. Their contracts for supply were made by the large companies in personal negotiation with the individual farmer. The terms of the contracts were framed in the way best calculated to promote the profit of the companies and to avoid loss. This was understandable and inevitable. An essential term of the contract was that payment was regulated on the winter average — that is to say, on the average supply for June, July, and August. This, of course, was to promote high production in the winter period and to guard the vending companies against loss in handling surplus milk in the summer. It has not been highly successful in promoting a level supply, but it has given rise to misgiving and complaint that some of the milk that in summer is paid for as surplus—that is, at factory rates—is sold for town consumption.

Under control by the Dairy Farmers' Co-operative Milk Supply Co., Ltd., the contracts are negotiated between two strong bodies, and special regard is paid to the protection of the interest of the producers. This is reflected in the terms of the contracts now entered into. Copies of the standard forms of contract used are included in the Appendix. It is also represented in the control of surplus that passes to the farmers' own company. A ground for misgiving and suspicion is removed, and the producer can now manage his own business. He must suffer any loss consequent upon the production of a large surplus or upon an unprofitable disposal of surplus. He now has this satisfaction: that the regulation of percentage of surplus and the utilization of that surplus are matters within his own control. There can be no denial of the fact that the town-milk-supply industry in Dunedin has fallen into a lamentable condition and both the dairy-farmer and the consumer have been victims of the failure. The Commission is of opinion that the existence in the past of a well-organized farmers' co-operative supply association would have avoided much of the mischief that has been suffered and that the maintenance of such a body clothed with adequate powers is a condition essential to recovery and to progress.

Supply

Natural Conditions

The main areas of production for the Dunedin City Milk Supply are the Taieri Plain, the Otago Peninsula, and the hilly country surrounding the metropolitan area. The Taieri Plain consists of first-class land, but many parts of it are heavy, become very wet in the winter, and pug readily. But it is extensive and capable of carrying a cow population sufficient to meet all the requirements of the metropolitan area for many decades. The major portion of the land in the vicinity of the city is hilly and of poor fertility, and is better suited for grazing than for dairying.

The climate in the area is severe, the winters being cold and wet, and falls of snow being frequent. As a consequence of this severity the pasture becomes very sparce in the winter, and winter feeding must be abundant if supplies of fresh milk are to be obtained throughout the year. In this connection it may be mentioned that liberal use of brewers' grains is made by dairy-farmers, and particularly by producers and producer-vendors whose farms are close in to the city. Four thousand tons of those grains are available annually. Covering of cattle is a necessity, and housing is generally adopted. The conditions make the work of the dairy-farmer in the winter both arduous and disagreeable.

Cows

Within the potential area of supply there are 14,053 cows. Of these, only 7,250 are owned by 343 dairy-farmers, who hold permanent licenses to supply town milk. Not all of these are supplying the metropolitan area. Approximately fifty farmers have been granted temporary licenses which entitle them to supply milk in an emergency only.

The Commission was advised by the Department of Agriculture that—

> "In the last five years winter milk-production for town supply on both the Peninsula and the Taieri has shown a marked tendency to decline. On the Peninsula, for example, in this period more than twenty suppliers, on farms ranging from 70 to 200 acres, have gone out of dairying. This involves a reduction of between four hundred and five hundred cows.
>
> "With this decline in dairying, and its consequent effect on winter milk-production, a winter shortage of milk from normal sources of supply has been established, which is increasing each winter."

The decline in the number of cows on licensed dairy-farms in the area is shown by the following figures:—

Year	Number of Cows.
1938–39	8,945
1939–40	7,131
1940–41	7,214
1941–42	7,353
1942–43	7,250

The decrease since 1938–39 has been heavy. A drop of 1,695 represents a high percentage of the total. The returns as at June, 1943, show only 6,882 cows, indicating that the decline is continuing. It must be borne in mind that a number of registered dairies are on farms supplying Port Chalmers and other places as far north as Seacliff. Many of the cows are not milked for town supply in the metropolitan area, but the metropolitan area has suffered its full share of the reduction.

Methods of Production

The herds are mixed. There is a small percentage of Jersey cows in the herds and a fair number of the Shorthorn crossbred cattle, but Friesians are prominent. It is difficult to get accurate figures from which to compute average volume of production. Some dairy-farmers record over 600 gallons per cow, but a fair estimate of the overall average would probably be 500 gallons. The condition of

the herds is affected by the different practices in regard to replacement of stock. A few of the farmers breed their own replacements, and it is noticeable that in this area, as in all the areas, the farmers who do breed their own replacements record the highest yield per cow and that in many cases that yield is substantially above the average. But here, as elsewhere, the majority buy their replacements mainly from the saleyards.

Shortage of Supply

The decline in the number of cows milked for town supply has resulted in a shortage that threatens to become more serious. That shortage has two evil results. In the first place, it establishes a dependence on unsatisfactory sources and, in the second place, in spite of drawing milk from a great distance and from unsatisfactory sources, it results in rationing of supplies to school-children and other consumers. Referring again to the report from the Department of Agriculture, we are informed that, owing to the winter shortage, it is necessary to draw milk from as far afield as Stirling, Goodwood, and Balclutha. Some of it is obtained from dairy-farms at Stirling with unconditional licenses, and some from premises farther afield with temporary licenses. As is suggestively remarked, "Discretion, of course, is exercised in the granting of temporary licenses, but the degree of discretion is governed by the acuteness of the shortage." In 1941, in the months of May, June, July, and August, 21,000 gallons came from Stirling, 60 miles away; in 1942 about 22,500 gallons came from the same district; and in this year the supply started in the middle of April with about 200 gallons per day. In each of the years 1938, 1939, 1940, and 1941 the supply of milk to schools ceased during the months of June, July, and August. In 1942 milk was brought from Balclutha at the cost of the State, but even then no milk was provided for schools in July and August. In 1943 the school supply ceased earlier and there was no supply in May.

Level Supply

The dairy-farms of the producer-vendors are mainly on the hilly country around Dunedin. The land is poor, the climate is rigorous, the conditions are bad. Yet the producer-vendors in Dunedin maintain a remarkably level supply. They produce their own needs, and a steady supply comes into the city all the year round. The producers who supply the raw-milk vendors are mainly men who produce their milk in the same class of country. They generally are bound to maintain a specified gallonage all the year round, and if they fail, the vendor is free to purchase the shortage at his supplier's expense and at such price as the vendor may find necessary. These producers, too, maintain a remarkably level supply.

On the Taieri the results are not as good so far as the maintenance of a level supply is concerned. There, too, conditions are unfavourable because of the heavy nature of the soil. Many of the farmers, too, are engaged in mixed farming and find it more attractive to limit the amount of winter milking. But there are exceptions, and some of the producers have demonstrated that a level supply is practicable even under the conditions obtaining there.

Balancing-station

The cheese-factory at Momona acts as a balancing-station for the suppliers on the Taieri. Though Momona is a considerable distance from Dunedin it is placed fairly conveniently for suppliers whose farms are spread over the Plain. If in time the suppliers from other parts of the area surrounding Dunedin send their supplies through the Dairy Farmers' Co-operative Milk Supply Co., Ltd., it will no doubt be possible to maintain the balancing-station on the Taieri and divert from the Taieri suppliers the total summer surplus. No difficulty would be experienced in adjusting the returns so that each supplier bore his due proportion of that total surplus.

Farm Dairies

The condition of the dairies generally may be described as poor. There are some sheds and milk-houses that must have been of advanced type and equipment when they were constructed, but they are now old, and when conditions permit will be replaced. In some cases where the same building is used both for feeding and milking it is difficult, if not impossible, to attain the standard of cleanliness that ought to be characteristic of every town-milk-supply dairy. The officers of the Department of Agriculture maintain constant pressure to raise the standard, but the present shortage of labour and material retards development. In the years 1940 and 1941 the following improvements were recorded:—

New sheds built	23
New milk-houses built	12
New water-supplies installed	13
Sheds wholly or partially reconstructed	27
Extensive additions to concrete yards, drains, &c., effected	15

Very few farm dairies are equipped with refrigerators. The washboard type of cooler is in common use and the water-supply is reasonably satisfactory. The Dairy Farmers' Co-operative Milk Supply Co., Ltd., has refrigerator space for the storage of milk at its depot in Dunedin.

Quality of Supply

The quality of the milk is affected by the pressure for volume. The Health Department tests show a low butterfat content of 3·98 per cent., and this is lower than that reported from any of the other areas. The standard is low in other respects. A return furnished by Professor Hercus, Dean of the Medical Faculty, of samples of raw milk taken and tested during 1942 shows the following result:—

Month.	Number of Samples.	Percentage Unsatisfactory, *Bacillus Coli*.	Percentage Unsatisfactory, Plate Count.
January and February	28	71	71
March	19	95	42·1
April	25	12	32
May	16	62·5	37·5
June	28	11·8	14·3
July	30	23·3	36·6

Price to Producer

The prices paid to producers in Dunedin for milk are low. They are as follows: —

	Per Gallon. d.
June, July, and August	$12\frac{1}{2}$
September and May	12
October and April	10
November to March (inclusive)	$8\frac{1}{2}$
Average	10·3

Surplus milk is paid for at factory butterfat rates, and this appears to be the case even if the milk is used for the production of cream.

In the opinion of the Commission there is a direct causal connection between these prices and the decline in milking for town supply. No doubt the factors of reduction in fertilizer and shortage of labour contribute to the result as they do in other areas. But the price must be regarded as the principal factor in making the position in Dunedin as disastrous as it undoubtedly is. While these prices prevail an increase in total annual supply or an improvement in providing an all-the-year-round supply cannot be expected. Indeed, in the opinion of the Commission, unless an increase is granted immediately, a further decline is inevitable, and that would be a calamity.

COLLECTION

The Dairy Farmers' Co-operative Milk Supply Co., Ltd., organizes the collection of all milk-supplies on behalf of its members, and the milk is transported to Dunedin by truck. The work is done by a contractor. The Dairy Farmers' Co-operative Milk Supply Co., Ltd., and the Transport Department have collaborated and have zoned the collection on the Taieri Plain. Considerable saving has been effected, though a difference of opinion exists among the parties on the question of whether the milk should be railed from Mosgiel or taken right into the city by truck. Further savings cannot be appreciable, but the Dairy Farmers' Co-operative Milk Supply Co., Ltd., may be expected in the interests of its members to keep the matter under continuous review. The practice is to collect the overnight's milk and the morning's milk in the morning and to deliver it straight to the pasteurizing company. Some of this would, therefore, be from fourteen to sixteen hours old before being pasteurized. The three raw-milk vendors draw their supplies from the depot of the Dairy Farmers' Co-operative Milk Supply Co., Ltd., in Dunedin. The milk collected by the Dairy Farmers' Co-operative Milk Supply Co., Ltd., is picked up at the farm-gate or at the farm dairy, according to individual convenience and arrangement. It is transported on open trucks.

The collection of milk for the raw-milk vendors is unregulated and should be capable of considerable improvement and economy. Though much of the milk is collected from dairy-farms close in to the city some is collected by individual vendors from farms scattered along the high lands of the Peninsula. The practice is to collect the whole of the day's milk in the evening and to deliver it the next morning. This means that the morning's milking is twenty-four hours and more old before it is distributed. Probably most of it is collected from the dairy, though there is no evidence of a uniform practice.

The producer-vendors generally have their dairy-farms on the hilly country immediately adjacent to the area of delivery. Whether any considerable economy could be effected by any system of rationalization is a matter for inquiry and is linked in the case of the producer-vendor with the question of zoning of delivery. The milk is, of course, picked up from the producer's own dairy, and the evening's and the morning's milk goes out on delivery in the morning. A portion, therefore, is delivered within a short time of milking, and the balance is milk that has been kept overnight only.

It is not possible to arrive at an average cost of the collection of all this milk brought into Dunedin. An inwards cartage cost of 1d. per gallon is shown, and this is in excess of similar returns from Auckland and Christchurch, where the comparable cost ranges from 0·68d. to 0·85d.

TREATMENT

As in the other areas, so in Dunedin, both raw and pasteurized milk are supplied to the consumer. Of the total milk delivered apparently about 50 per cent. is pasteurized. But of the milk that is retailed the percentage pasteurized is only 31. Of the pasteurized milk 35 per cent. only is bottled; but of the pasteurized milk retailed 69 per cent. is bottled; and of all milk sold, both raw and pasteurized, slightly over 17 per cent. is bottled. Those percentages are set out in the following table: —

	Percentage Total.	Percentage Retail.
Total pasteurized	50	31
Pasteurized, bottled	35	69
Pasteurized, loose	65	31
Total raw	50	69
Raw loose	100	100

It will be seen that, compared with the position in all other areas, a low percentage of the milk is pasteurized in Dunedin and that the bottling of milk is relatively still lower.

The standard of treatment is low. There is no regular sampling and testing of milk as practised by the Health Department in Wellington and Auckland or even that practised in Christchurch. The buildings are unsuitable, the pasteurizing-plants are old and defective in important respects, the bottle washing and filling facilities and the general standard and method of handling and treatment are not conducive to the production of a quality milk. In each of the three plants the milk is preheated, and in two plants there are no recording thermometers operating, and the unaided judgment of the operator is the sole means of determining whether the milk is kept at a temperature of 145° F. and retained thereat for thirty minutes. At two of the plants after the milk leaves the holder it is pumped over a cooler, and in the third plant the milk is reticulated. One of these coolers is covered by tin metal sheets that are opened at the sides, the other coolers are completely uncovered. From the cooler the milk is, in two instances, run into a can-filler or bottle-filler. In the third instance no bottling is done and all the milk runs into cans. There is a much overworked bottle-washing and bottle-sterilizing plant in one factory; in the one other factory where bottling is done the bottles are washed by hand. In no instance

is there adequate can-washing facilities. The weak point in all these plants is the fact that contamination of the milk is possible at every stage from the time that it leaves the pasteurizer until it enters the container.

A report furnished by Professor Hercus of the tests made in 1941-42 of samples of pasteurized milk supplied to him confirm the opinion that effective pasteurization under such conditions cannot be expected. Tests were made of 1-pint samples and ½-pint samples. The results are set forth in the following table:—

Pasteurized Milk, 1941 and 1942

Month.	Number tested.	Percentage Unsatisfactory, *Coli*.	Percentage Unsatisfactory, Plate Count.
1-pint Samples—			
August to December	60	60	13
January–February	23	95·5	60·8
March	13	100·0	50·0
April	12	50·0	33·0
May	15	40·0	20·0
June	21	14·3	14·3
July	22	18·0	9·0
½-pint Samples—			
January–February	13	100·0	92·3
March	22	95·5	68·5
April	24	58·3	54·2
May	8	87·5	100·0

This table was preceded by the table of results of tests on raw milk that is quoted under the heading "Quality of Supply." The return contains the following comment:—

"The tests in May were done at the beginning of the month, a period of four warm days (two samples done daily). From Table IV it can be seen that there is a seasonal variation in the number of samples unsatisfactory, due to the presence of *bacillus coli*, the number markedly increases in the warm summer months.

"It will be evident from these results that the standard of the raw milks supplied to the firm was generally of a poor hygienic quality, and that after pasteurization the milk was frequently recontaminated before it was received by the consumer. It is observed, from tests done in 1942, that on several occasions samples of pasteurized milk contained more *bacillus coli* per cubic content than the samples taken from the vat before pasteurization.

"This occurs mainly during the summer months, but has been recorded even as late as 21st April."

Extensive alterations to buildings and costly re-equipment is essential if the pasteurizing and bottling of milk is to reach a reasonable standard and become effective for its purpose. Even more important is the establishment of control of the plants and their operation by men and women imbued with a sense of the importance of cleanliness at every stage and in every detail, and qualified by training for the task of ensuring efficiency and effectiveness of the processes carried through. Under existing circumstances the programme of rebuilding and re-equipment may prove expensive. The engagement of trained personnel may also be difficult. But the condition of the milk sold for human consumption is a matter of vital importance. And this also ought to be said, that persons who purchase pasteurized milk are entitled to believe that the pasteurization has been effective, and that people who buy bottled milk are entitled to rely upon the bottling being an effective means of protection against contamination and never in themselves a possible additional source of contamination. If the need of strict regulation of the processes of the treatment of milk ever required emphasis, that emphasis is given by the situation in Dunedin.

According to the report supplied by the Investigating Accountant attached to the Commission, so far as could be ascertained the cost of treatment of milk per gallon in Dunedin is higher than in most of the other areas. The cost of bottling appears to exceed the cost in the other three areas. Apparently high cost of operation does not necessarily reflect the price of efficiency.

Distribution

As already stated, the 2,456,738 gallons of milk and 56,977 gallons of cream consumed in the last twelve months' period in Dunedin were sold by three treating and vending companies, twenty-eight raw-milk vendors and forty-five producer-vendors. The sales were distributed between them in the following manner:—

	Milk (Gallons).	Cream (Gallons).
Three treating and vending companies	1,229,061	42,547
Twenty-eight raw-milk vendors	529,980	7,410
Forty-five producer-vendors	697,697	7,020

Considering the work of the raw-milk vendors and producer-vendors and reducing the annual to an average daily delivery, we have the following particulars:—

	Milk (Gallons).	Cream (Gallons).
Twenty-eight raw-milk vendors—		
Total average daily delivery	1,452	20⅓
Average daily delivery per vendor (approximate)	52	6 pints.
Forty-five producer-vendors—		
Average daily delivery	1,931	43
Average daily delivery per producer-vendor (approximate)	42	3½ pints.

These figures reveal the fact that twenty-eight different businesses with their equipment are engaged in a vending business that enables them to handle on an average 52 gallons of milk and 6 pints of cream in each day and that forty-five other businesses with their equipment are engaged in producing and vending on an average 42 gallons of milk and 3½ pints of cream each day. But among tho whose are so engaged some handle larger quantities than others, and a proportion of the total must be engaged in small and uneconomic activity.

Classes of Sales

The total sales for the twelve months are divided up between retail, wholesale, and special contract services as follows:—

	Milk (Gallons).	Cream (Gallons).
Retail	1,599,440	19,604
Wholesale	651,645	28,704
Schools	78,196	..
Special contracts	98,687	552
Ice-cream	28,770	8,117
	2,456,738	56,977

These different classes are supplied at different rates. The retail rates are somewhat elaborately divided according to quantity purchased. They are as follows:—

Quantity.	Summer (September to May).	Winter (June to August).
	d.	d.
½ pint	2	2
1 pint	3	3½
2 pints	6	7
3 pints	9	10½
4 pints	11	13
5 pints	14	..
6 pints	16	18
7 pints	18	..
8 pints	20	23

The rates charged per gallon for wholesale quantities are as follows:—

Quantity.	Summer (September to May).	Winter (June to August).
2–5 gallons	19d.	21d.
5–10 gallons	18d.	20d.
Over 10 gallons	17d.	19d.
Special contracts	13d. to 16d.	14d. to 19d.

It is to be noted that the difference between the producer price and the average price charged to consumers who purchase from 1 to 2 pints is 14·7d. per gallon (including cost of collection).

In addition to the quantities mentioned above, considerable quantities of milk are purchased direct from the producers by a chocolate-manufacturing company. The purchases by this company and by the ice-cream manufacturers should be of special value to the dairy-farmers in the metropolitan area as the greater part of the purchases could be concentrated in the period of greatest production and so could absorb a considerable portion of the surplus.

Shop Dairies

There are 123 shop dairies within the Dunedin City area. The majority of these shops purchase small quantities of milk each day. The question arises whether this is not an excessive number. That is a question which the local authority granting licenses ought to have power to determine. But there are two questions other than that of mere numbers that are of importance. The first question is that of price. The wholesale quantities quoted above are more than two-fifths of the retail quantities. Where sales are made in the two classes the rates should be adjusted according to the services rendered. The second question concerns the conditions under which milk is stored in the shops. The following particulars, taken from Professor Hercus's report, are significant and show a remarkable variation:—

Milk taken from Shops.	Number of Samples tested.	Percentage Unsatisfactory, *Bacillus Coli* or Plate Count.
1934–35	48	54·2
1935–36	101	9·9

The second lot of tests shows an altogether remarkable improvement, but even they show a sufficiently unsatisfactory result to justify extreme care in regard to the conditions under which milk is stored and handled in milk-shops, milk-bars, restaurants, &c. The Commission has formed the opinion on the incomplete evidence obtained that in Dunedin, as elsewhere, there is urgent need for improvement.

Rounds

A form of zoning is in operation in Dunedin. Towards the end of 1942 the vendors arranged the zoning, and in doing so provision was made for one vendor of raw-milk and one vendor of pasteurized milk to serve in each zone. It is estimated that the saving in petrol alone resulting from this zoning is 746 gallons. In addition to the rounds operated by the twenty-eight raw-milk vendors and the forty-five producer-vendors, twenty-six rounds are operated by the three treating and vending companies.

Both horse-drawn and motor vehicles are used in delivery, while cycles and side-cars are also on the road. Boy labour is extensively employed to assist roundsmen. Some roundsmen are assisted by one boy, some by two boys, and some by three. Wages paid to boys appear to range from 10s. to 30s. per week. The daily delivery per round varies from 50 to 90 gallons. The appearance of many of the vehicles makes it apparent that some form of regulation is required to ensure the utmost cleanliness.

Costs of Distribution

So far as is disclosed by the examination of the books of a limited number of companies the costs of distribution in Dunedin are higher than they are in Wellington or Christchurch, but lower than they are in Auckland.

PART II.—ALTERATION AND REORGANIZATION IN METHODS OF SUPPLY, COLLECTION, TREATMENT, AND DISTRIBUTION

CHAPTER 6.—INTRODUCTION

In the second term of reference the Commission is directed to report on "alteration and reorganization in methods of supply, collection, treatment, and distribution that may be necessary in such areas to ensure at reasonable prices adequate supplies of milk of high standard."

The obligation is thus placed upon the Commission, after examining the existing conditions in each metropolitan area, to determine whether these are entirely satisfactory for the purpose of—

(1) Providing adequate supplies of milk;
(2) Ensuring that the milk is of high standard;
(3) Maintaining prices at a reasonable level to the consumer;

and if unsatisfactory to report on the alterations and reorganization necessary. Part 1 has stated the Commission's views on the adequacy of existing services, and it remains for Part II to deal with the steps necessary to ensure that all three objectives are achieved.

The problems involved are mainly problems of organization and price. In this country for the most part completely adequate supplies of milk are within easy reach of all populated centres. It is remarkable, therefore, that, considering the outstanding success of co-operative organization in the dairy industry, there should exist such a lack of directive organization in so important a national industry as the liquid-milk trade.

New Zealand's dairy industry is organized on a practically 100 per cent. co-operative basis, with the producers controlling the production, supply, and, through their co-operative factories, the processing of practically all butter and cheese produced in the Dominion. The dairy industry can justly claim a leading position for efficiency of production and manufacture, and has achieved this by co-operative organization.

The liquid-milk industry whilst only a small part of the dairy industry—a total of approximately 120,000 to 150,000 of the Dominion's 1,750,000 cows would probably supply the needs of the liquid-milk trade—is nevertheless the most important section from a national health point of view, and for that reason should occupy pride of place in the control, quality, and safety of its product. Unfortunately, it does not occupy that place, and the reason may lie partly in the fact that the influence of the co-operative movement has not extended, either in its type of organization or in the control of processing, to the liquid-milk industry as a whole. In Wellington the existence of a powerful and well-organized co-operative association of city-milk suppliers is an exception which goes far to prove the rule. In neither Christchurch nor Auckland is there a similar co-operative group of suppliers. The association started in Dunedin in 1942 has not been in operation sufficiently long to illustrate likely advantages of co-operative organization.

Nevertheless, despite this lack of unity among city-milk producers and their tardiness in adopting co-operative principles of organization, the firmly-established co-operative movement in the dairy industry as a whole would justifiably resist any attempt to introduce proprietary interests into the industry or other than co-operative control over producers. It is for this reason that the Commission's considerations (as they affect the producers' responsibility) must of necessity take into full consideration the type of organization in the dairy industry generally. Whilst being informed and instructed by the experience of milk schemes in other countries, the Commission must be prepared to adapt any lessons to be learnt from such schemes to the success of typical systems prevailing in New Zealand.

The first part of the Commission's work under this second term of reference falls therefore under three main headings:—

(1) Methods of organization:
(2) Prices to producers, margins to vendors, and prices to consumers:
(3) Problems of supply.

Organization

Central Authority

The outstanding fact which has been forced upon the attention of the Commission is the absence of any national planning in the liquid-milk industry, and the Commission in Chapter 7 outlines its reasons for recommending that a Central or National Authority be set up. Such a Central Authority would act on behalf of the industry in advising the Government on industry problems and would in turn interpret Government policy towards the liquid-milk industry as a whole. It would exercise a controlling and guiding influence over the welfare and future organization of the industry.

There are important reasons why the Central Authority should be an independent and impartial body, and this aspect must be given full weight in its appointment. If the recommendations of the Commission are adopted, price-fixing would be the responsibility of the Central Authority, and it is essential to remove price-bargaining influences from the industry as rapidly as possible. It may be necessary under certain circumstances to allocate funds by way of grants in one form or another, and it should be the function of the Central Authority to see that these are properly used.

The Central Authority should exercise a guiding control over the industry through Dairy Farmers' Co-operative Milk Supply Associations and through Milk Councils (or, as in the case of Wellington, through the City Council).

Milk Councils

The importance of ensuring proper control over the treatment and distribution of milk is a public responsibility, and the Commission cannot ignore the present urgent necessity for recommending some form of local-authority control in each metropolitan area. In the case of Wellington City, where a municipal milk authority operates, adequate provision for control already exists over the treatment and distribution of all milk. But consideration should be given to the setting-up of similar control over milk treatment and distribution in the neighbouring City of Hutt and its adjacent areas.

Auckland is already well served by the Metropolitan Milk Council, but consideration should also be given in this area to the question of control over the adjacent boroughs and areas not at present included within the Metropolitan Milk Council's area.

In Christchurch and Dunedin the setting-up of a Metropolitan Milk Council is an urgent necessity, and the treatment of milk in Dunedin is a matter for urgent reorganization.

Organization of existing treating and distributing facilities is discussed from the viewpoint of gradual change rather than sudden dislocation of existing services in order to impose completely new types of organization. Dunedin, however, is one area in which radical changes must occur in methods of treatment.

Problems of distribution are mainly problems of standard of service and economy of cost. Milk-distribution costs are too high and the standard of service too low in other centres as compared with Wellington. It may be that proper organization, either by better central planning or by the use of depots in outlying areas or by co-operative grouping by the various vending organizations so as to give maximum facilities for ease of distribution, will go a long way towards giving the desired control over both standard of service and economy of cost. The Commission recommends that the organization achieved by the Wellington City Council Milk Department be studied with a view to making its advantages available in other areas.

Dairy Farmers' Supply Associations

The reasons are stated in the appropriate section for the necessity of setting up Dairy Farmers' Co-operative Milk Supply Associations in order that the producers are given the collective responsibility of organizing production and collection and for the purpose of strengthening the position of producers generally so that complete stability and long-term planning will be possible. They should have the power to negotiate contracts with vendors and control their own affairs, with a full responsibility for the supply of adequate quantities of milk of high standard. They should at the same time—and this is part of the Commission's policy—accept full responsibility for quality standards of the milk until it reaches the vendors' premises.

In recommending the setting-up of these Dairy Farmers' Co-operative Milk Supply Associations, the Commission is keenly aware of the fact that the position of producers who regularly cater for the liquid-milk trade must be recognized and safeguarded. Such producers have organized their farming economy on a basis entirely different from that on which the factory-supply herd is organized. Cows are calved at such times as will ensure a full supply of milk throughout the year, thus making the production of city milk one for careful and long-term planning, with the consequent possibility of severe loss to the producer whose supply position for any reason becomes imperilled. The relationship between producer and vendor should be adequately protected, and there must be security of contract and assurance of continuity of supply if the industry is to succeed in its objective of ensuring adequate supplies of milk of high standard.

A Dairy Farmers' Co-operative Milk Supply Association responsible for part of the supply to the metropolitan area already exists in Wellington, and the question arises as to whether its responsibility should rightly extend to the whole of the supply area.

A Dairy Farmers' Milk Supply Association has recently been created in the Dunedin area, and its full development should be a matter for the careful guidance of the Central Authority.

Dairy Farmers' Co-operative Milk Supply Associations remain to be created in both the Auckland and Christchurch areas.

Prices and Margins

The Commission is not directed to fix prices to producers, margins to vendors or treating-houses, or consumer prices, but is directed to ensure adequate supplies of milk of high standard at *reasonable* prices. This direction requires the Commission to examine adequately and in detail methods of assessing reasonable rewards to all interests concerned in the industry, and to recommend how these rewards may best be distributed so as to achieve the final result of a reasonable price to the consumer.

Producer Prices

The Commission's recommendations on producer prices deal chiefly with the method of assessing a reasonable price, and ensuring that the basis for calculation of such prices will be such as to secure adequate supplies of milk of high standard. The Commission has made full use of the costs of production surveys carried out by the Department of Agriculture and of the evidence put forward by producers and other representatives in all metropolitan areas.

It is impossible to avoid the conclusion that costs of production are almost impossible to assess as a strict accountancy cost, and in this connection the Commission finds itself in full agreement with the statement of "The Reorganization Commission for Great Britain, 1936" (Cutforth Report), page 196:—

> "As a matter of long-term policy it is, in our view, impossible satisfactorily to build up a producer's price from average or model production costs and estimates of reasonable profits. The ultimate test must be whether or not, over the long period, the price offers sufficient inducement to producers as a whole to produce the quantity of milk required."

In the chapter "Prices and Margins" the Commission has outlined reasons why the price for liquid milk must be closely associated in general structure with the guaranteed price for butter and cheese. Although a final price of approximately 13d. per gallon to the producer is recommended, the Central Authority is directed to introduce increases in price in such a manner as to ensure, first, that there will be a provision of adequate supplies, and then, when that is assured, to adjust all further increases in price to the producer in strict conformity with improvement in the quality of the product he supplies. The price to the producer must provide him with a fair return for the services required of him, but must not result in a price so excessive as to attract large numbers of suppliers from dairy-factory supply and so flood the liquid-milk market with large quantities of surplus milk. There must, however, be stability in price, and there must be a continuous emphasis on the encouragement of better-quality milk and due regard to the economy of production. While safeguarding the proper economic interests of the producers, the Central Authority should take care to see that costs of production, due to concentration on areas where milk-production costs are unduly high, do not force up producer prices generally. To this end the planning of new supply areas where milk-production costs are reasonable, particularly from a winter supply point of view, should be the function of the Central Authority whenever the liquid-milk market (through the Dairy Farmers' Supply Association) is seeking an expansion of supply.

Vendor Margins

Examination has been made of the cost of treatment and distribution in all four centres. The Commission regards it as important that fair and adequate margins should be allowed to the various interests, but that control of the trade should be so organized as to prevent the pursuance of a profit motive without adequate consideration of matters of public health. The margins set must be such as to encourage the utmost efficiency compatible with service, and at the same time must not be set at such a level as to penalize the efficiency of existing institutions. There must, furthermore, be an assurance of stability within the treating and vending interests so as to encourage efficient existing institutions to provide further modern equipment and plant. The Commission finds that margins to the vendors of bottled pasteurized milk are not unduly high, but that the consumer price fixed by the cost of producing, treating, and distributing bottled pasteurized milk has been adopted (except in Auckland, where the Metropolitan Milk Council has fixed the respective margins) by the vendors of other classes of milk—viz., raw loose milk. The Commission is of opinion that in order to avoid undesirable competition based on inferior-quality milk all milk should be the same price to the consumer, but it is unable to approve the appropriation of what may be described as "unearned" margins by vendors who have not incurred the cost of pasteurizing or bottling the milk.

Goodwill values have increased to a very high figure—viz., £10 to £12 per gallon—and with the introduction of zoning are likely to increase further. Where all competition has been eliminated it is difficult to see why the goodwill value should, in its inflated state, be allowed to accrue to the vendor, and in all areas except Auckland the profit margin on the distribution of raw unbottled milk is out of all proportion to the services rendered. The Commission has indicated the general costs of distribution for private vendors and for companies and the steps to be taken to reduce the cost of distribution to a minimum by the introduction of appropriate measures of economy. Under existing circumstances of zoning, and particularly if the recommendations of the Commission are given effect, action must be taken to regulate the margin allowed to the vendor of raw unbottled milk so that altogether disproportionate profits according to the services rendered are not made. The Commission has recommended the distribution of all retail milk in sealed containers, and if unearned margins of the type described by the Commission are withheld from the vendor it is possible that pressure of economic circumstances alone will gradually bring about the achievement of the Commission's recommendation in this respect.

Reference to the appropriate table in the Appendix will indicate the large number of vendors who are distributing less than an economic amount of milk—viz., 60 gallons. If all unearned margins are retained from the vendor, then consideration will have to be given in each area to the consolidation of small rounds, if and when such are available for sale or transfer. It is not in the interests of effective control over milk quality nor economy of distribution to have a large number of small vendors, and these should be consolidated into larger units as early as possible.

Consumer Prices

On the question of consumer prices the Commission has endeavoured as far as possible to maintain the present standard of prices, but this can only be achieved to the extent that economies are introduced into the supply, collection, treatment, and distribution of the milk.

Whilst the public should be protected against unduly high prices, it should at the same time be prepared to pay a fair price according to the standard of the commodity being delivered. The Commission recommends that steps be taken to increase the consumption of milk, and that educational propaganda work be undertaken to improve the use and treatment of milk in the home.

Now that zoning has been introduced and the consumer no longer has an unrestricted choice of the milk roundsmen from whom he or she may purchase milk, it is essential that steps be taken to ensure that all milk is of a uniform high-quality standard. There would be no justification whatever for the Commission recommending (as it does) the continuance of zoning and its consequent limitation of choice if the milk being delivered by the various roundsmen shows marked variations in quality.

SUPPLY

Under this heading the Commission deals with the general problems of what constitutes a proper standard for the supply of liquid milk and also the quantity of such supply. The reasons are outlined for the establishment of "accredited" standards for all city-milk-supply herds and the necessity for adequate national consideration of the problem of eliminating T.B. from dairy herds.

There has been no proper comprehensive planning in any area to provide a supply in anticipation of the demand for liquid milk in the next period of low production—that is, the ensuing winter period. This, in the opinion of the Commission, is due to the control by vendor interests of the organization of supply. The vending interests are not prepared to accept responsibility for contracting for the full anticipated demand, with the result that in at least three of the metropolitan areas and to a limited extent the fourth there has at some time or other during the past five years been serious shortages of milk.

Consequently, the Commission recommends that the Dairy Farmers' Co-operative Milk Supply Association ascertain from all vending interests their anticipated demand for the following winter. The Supply Association should then organize its membership to meet that demand so as to have at all times a supply available exceeding the estimated demand by at least 10 per cent.

In order that the cost of surplus milk shall not be an undue burden on the producers, the Commission recommends that the proper authority be given to the Supply Association to control the sale of all milk intended for use in milk products. With a proper utilization of liquid milk from licensed herds for the provision of sweet cream it is probable that the greater part of the surplus can be disposed of without serious loss to the producers, but to the extent that the producers, in their efforts to provide a 10-per-cent. winter surplus, fail to secure an adequate return for that surplus, then to that extent will the average price to the producer fall below 13d. The Commission is particularly concerned that no loss should be suffered by producers due to providing surplus milk in the winter, and recommends the Central Authority to take appropriate action in that respect.

The Dairy Farmers' Co-operative Milk Supply Association must of necessity establish a balancing-station in order to organize the daily supply of milk to the city and to dispose of surplus milk in the most economic manner. The Commission discusses proposals with regard to balancing-stations along these lines.

Collection

Collection at present remains the responsibility of the vending interests, except to the extent that in Dunedin and Wellington the Dairy Farmers' Supply Association organizes part of the total quantity required.

The Commission points out that, whilst zoning has been introduced in the distribution of milk, little or no effective attempt has been made to control the zoning of collection of milk. This has led to considerable and wasteful overlapping, and the Commission recommends that collection be the responsibility of the Dairy Farmers' Supply Association so that costs may be reduced to a minimum. This would ensure that the full responsibility for the quality of milk until it reaches the vendors' dairy shall be accepted by one responsible body—namely, the Dairy Farmers' Supply Association. This body will then be in a position to impose proper penalties on any of its members who fail to provide the standard desired.

Treatment of Milk

The Commission is convinced from the evidence placed before it that pasteurization of all milk distributed is desirable as a national policy. While the medical authorities in New Zealand lack complete information on the extent of milk-borne diseases, there is adequate evidence available from both within and outside New Zealand to indicate that the incidence of such diseases is by no means negligible. The Commission is satisfied that milk is not harmed in its quality by pasteurization, and that pasteurization is the only means of ensuring that the milk is perfectly safe for human consumption. The Commission has indicated that considerable reorganization of existing plants is essential, and that changes in organization should be introduced with all reasonable care in order to avoid dislocation of services and harsh treatment of existing interests. This is not intended to divert or impede in any way the introduction of the improvements necessary to achieve the desired objective.

The Commission recommends that as soon as possible the Central Authority should see that producer-vendors have their herds T.B. tested and brought up to approved or "accredited" standards and that the milk be distributed in sealed containers. All other vendors should be required to purchase their milk from treating-houses and to distribute it in sealed containers. Such action will introduce maximum economies both in treatment and in distribution, and is certainly in the best interests of public health. There will undoubtedly be a small section of the public which will continue to demand the distribution of raw milk. This demand may adequately be met by the producer-vendors, but, if not, then the Central Authority (through the local Milk Council or Supply Association) should investigate the circumstances and take the necessary action. Such action must, however, fully accord with the standards laid down for producer-vendors *i.e.*, the source of the raw milk being distributed must be from T.B. tested herds of "accredited" standards.

Whilst much that has appeared in the Commission's report is indicative of an unsatisfactory state in many of the pasteurizing units, this is no argument whatever against the value of pasteurization, and the Commission's recommendations regarding the necessity for pasteurization of all milk are in no wise upset by their comments on the inefficiency of some of the present treating-houses. Such a state does, however, lend added emphasis to the recommendations set out by the Commission regarding the control of all processing-plants and the appointment of fully qualified and fully-trained working managers.

The necessity for improving the standard of milk and for seeing that price to producers is to some extent linked with the quality of the milk they supply requires provision of testing-facilities either by the Dairy Farmers' Co-operative Milk Supply Association or by the treating-houses in co-operation with the Milk Council. It is a recommendation of the Commission that all milk should be sampled for quality daily, and tested for butterfat content on a composite ten-day sample.

Distribution

The Commission's recommendations regarding distribution deal mainly with the organization necessary to ensure maintenance of the high standard of the milk until it reaches the consumer and the securing of maximum economy in costs of distribution.

The distributing of loose milk, either pasteurized or raw, is condemned by the Commission, and a point to which attention should be drawn concerns Regulation 42, section 6 (*a*), of the Sale of Food and Drugs Act, which defines pasteurized milk as

> "Pasteurized milk shall be milk which has been retained at a temperature of not less than 145° F. for at least thirty minutes, and immediately cooled to a temperature of not more than 55° F. *and protected from recontamination*. The milk shall not be so heated more than once and shall not be otherwise treated by heat. It shall not contain any living coliform bacillus in one-tenth of a cubic centimetre."

In the opinion of the Commission this regulation should be so construed as to require all pasteurized milk to be bottled, and not left open to recontamination during the process of distribution. The Commission is satisfied that a considerable danger exists in distributing milk by the can-and-dipper method, and that such milk may be, and in many cases has been, infected with diseases of human origin. The work of the producer in producing milk of high standard can be completely negatived if the milk is distributed loose and infected with disease during distribution.

In the interests of economy the Commission has recommended that consumers should pay for the bottles in which the milk is distributed, so as to avoid unnecessary loss to the treating firm. Practically no objection has been raised to this suggestion by consumers' witnesses or consumers' representatives at any of the Commission's hearings.

In order to avoid accountancy expenses of recording purchases of each consumer and collection of accounts by roundsmen, the Commission recommends the introduction of payment by means of the token system as in Wellington. Supervision of this would be best effected through the local Milk Council.

Other means of rationalizing distribution are also discussed, including the continuance of zoning, front-gate delivery, and so on.

There are many of the Commission's recommendations which will require further consideration as to detail by the Central Authority. Such a course is unavoidable in view of the magnitude of the problems confronting the Commission and the fact that these changes must be adapted in one or more particulars to the local conditions prevailing in each centre.

CHAPTER 7.—METHODS OF ORGANIZATION

The Commission's task on organization is expressed in that section of its second term of reference which directs attention to the alteration and reorganization necessary within the industry in order to ensure adequate supplies of milk of high standard at reasonable prices. The term "organization" is somewhat ambiguous in the sense that every industry which at present is in operation is to that extent organized. The qualification which should be introduced is that organization ought to be directed towards some end, result, or purpose, which in turn represents the achievement of that particular industry in producing a high standard commodity at a minimum of cost and in quantities which will fulfil all demands. Thus the relative value of "organization" is of much more importance in the Commission's mind than the mere physical fact of its existence. The Commission must consider the extent to which the liquid-milk industry is organized in the sense that planned control of its several activities and the co-ordination of those several activities is directed consciously and effectively towards the purpose for which the liquid-milk industry exists. The Commission's recommendations for the setting-up of a National or Central Authority, Metropolitan Milk Councils, and Dairy Farmers' Co-operative Milk Supply Associations are specifically directed towards the achievement of this purpose.

It would, however, be incorrect to say that the liquid-milk industry in the four metropolitan areas is entirely disorganized, but, in our opinion, it would be correct to suggest that very little of the existing organization has been arrived at as a result of conscious planning with a view to fulfilling all the requirements of a highly efficient liquid-milk industry—viz., an adequate supply, a high standard, and a reasonable price.

It is equally true, however, that in Auckland and in Wellington there has been some considerable amount of organized planning on the processing and distributing side, and to some extent on the production side. But the full purpose of this organization has not been achieved. In Auckland this failure is due largely to the lack of necessary power vested in the Milk Council and the absence of a controlling body responsible for organizing the supply and collection. In Wellington organization of processing and distribution has reached a very high peak of efficiency in the activities of the Municipal Milk Department on the one hand and of the Wellington Dairy Farmers' Association on the other. But, due to lack of co-ordination or singleness of responsibility for organizing adequate supplies, the full purpose of planned organization has not been achieved.

Consequently the major question before the Commission concerns the alteration and reorganization necessary in methods of control in order to achieve the objective of a complete and adequate organization in each centre. It would be unwise, however, to treat each centre as a unit, independent and completely separate from all other centres. The liquid-milk industry is national in its importance, and national in most of its problems. The first step, therefore, in dealing with the complete problem of organization is to consider the setting-up of some representative central or national authority to give purpose to the Government's policy in the directional planning of the liquid-milk industry as a whole and to act as the executive body of the liquid-milk industry in the Dominion.

Central National Authority for Town-milk Industry

Reference will be found in various sections of this report to the Commission's expressed opinion of the necessity for establishing a central national authority acting in an arbitral capacity and capable of exercising a guiding control over the town-milk industry as a whole.

The problems of city milk-supply, as examined by the Commission, include such over-riding problems as control over adequacy of supply, prices to producers, margins to treating and vending establishments, prices to consumers, standards of quality, methods of treatment, and the need for research and educational work. All of these require for their final resolution the impartial judgment of an independent Board or Commission.

Further circumstances might arise whereby grants from the Government may be necessary for one or more purposes within the town milk industry, either by way of grants for special purposes or as subsidies to keep down costs, or prices of equipment. The disposal of such moneys on a national basis can best be controlled by one central and independent body.

The Commission has made a number of recommendations, many of which necessitate prior planning and careful practical application in order to avoid any serious dislocation within the industry. Consideration of all interests within the industry is essential to its efficiency, to the planning of its future organization and development, and to its future prosperity. Further, the Central Authority should be the body responsible for advising the Government on industry matters and acting on behalf of all interests for the implementation of national policy in milk-supply problems.

Appointment of Central Authority

The Commission is not called upon, nor is it qualified by virtue of its inquiry, to make recommendations as to the actual constitution of this National Authority. There are, however, certain principles concerned in appointment of the personnel of the proposed Central Authority which the Commission feels it is bound to state. The personnel of such a Central Authority should be qualified to safeguard not only the interests of town-milk producers, of treating and vending establishments, of consumer interests, but also the intimate relationship between the town-milk industry and the dairy industry as a whole.

The personnel of the Central Authority should contain persons who are fully qualified to represent and apply scientific principles applicable to the development of the industry and also to ensure its proper functioning as the national body concerned with the maintenance of an adequate supply of milk of high standard to the population of our cities and towns.

The Central Authority should also include persons of experience in organization, finance, industry, and administration. Technical knowledge should be available to the Authority on specialized problems of nutrition and liquid-milk supply generally. The interests of the producers and vendors should also be adequately represented by personnel with a detailed knowledge of the particular problems of supply, treatment, and distribution.

It is not contemplated that such a Central Authority should consist of a large number of persons. The Commission, as has already been stated, is not fitted by virtue of its inquiry to define the exact constitution of the Authority, and the only opinions it wishes to express can be summed up by stating that whilst the personnel of the Central Authority should comprise as few persons as possible, those persons should be selected for their general and specialized knowledge of the problems involved.

In view of the general organization of primary industries in this Dominion the Commission recommends that full consideration be given to the manner of constitution of the Central Authority before deciding whether it shall be a body appointed by the Government, a body elected by representatives of all interests in the industry, or a combination of both. The Commission has had no opportunity of determining the industry's wishes in this matter and, whilst the appointment of the Central Authority is a matter of urgent necessity, probably requiring Government appointment of the first representatives, provision may have to be made for meeting the general wishes of the industry in this matter.

The liquid-milk industry is, from a national health point of view, our most important primary industry and warrants the most careful selection of the people who are to guide its destinies.

Functions of Central Authority

(1) The Central Authority contemplated by this Commission should report to the Government annually and should advise the Government on all industry matters requiring Government attention or consideration.

(2) On matters affecting the interests of dairy-factory supply the Central Authority should confer with the New Zealand Dairy Board and ensure smooth co-operation between these two branches of the dairy industry.

(3) On questions of education and research the Central Authority should collaborate with the Dairy Research Institute on all matters pertaining to the training of personnel and the research work necessary to assist the progressive development of the production and processing of milk.

(4) The general scope of the Central Authority should be to exercise a jurisdiction over the industry as a whole and over particular interests, but with mainly a guiding authority in local matters administered either by the local authority or by the local Dairy Farmers' Supply Association. Whilst the National Authority would be the responsible body on all the matters stated above, the Commission recommends that as much autonomy as possible be afforded to the activities of the local authorities and the local producers' associations.

(5) The Central Authority should act as an arbitral body in the settlement of any dispute that may arise between a Metropolitan Milk Council and a Dairy Farmers' Co-operative Supply Association, and every such dispute should be referred promptly to the Central Authority.

(6) The Central Authority should be the final price authority on all matters affecting producer prices, margins to treatment and distribution organizations, and price to consumers. The Central Authority should also exercise on behalf of producers generally a guiding control over the conditions for issue of licenses and should assist the Dairy Farmers' Supply Associations in defining new areas of production.

(7) The Central Authority should, through the Supply Association, concern itself continuously and actively with the standards prevailing in the milking-sheds and in the herds supplying milk for liquid consumption. Such a body would determine the standard for "accredited" herds and should encourage all steps taken by the Supply Association in order to maintain and improve the standard of hygiene on town-milk-supply farms.

Control of producer-vendors and the conditions under which producer-vendors should continue to operate would be closely supervised by the Central Authority, and the latter should endeavour to achieve, as a gradual policy, the complete supply of milk from "accredited" and T.B. tested herds in all cases; this is particularly urgent in the case of herds supplying milk to raw-milk vendors.

(8) Methods of processing milk should be standardized and provision made for supervision of such processing by trained personnel. There should be long-term planning, which should include research into improved methods and should also ensure that by proper education of producer, vendor, and consumer full advantage is taken of all available knowledge and that it is usefully applied. There exists the necessity for organization not only of producers as outlined in the section on supply, but also of processing and distributing interests.

(9) The qualification and terms of appointment of analysts in the various centres and the qualifications necessary prior to appointment of working managers of treating-plants should be defined by the Central Authority. The Central Authority should be concerned in the proper definition and maintenance of all standards relating to the collection, treatment, and distribution of high-standard milk.

(10) The Central Authority should have full power, in co-operation with the various interests concerned, to carry out all necessary steps to stimulate a gradually increasing consumption of liquid milk, to find means of reducing the cost of production and distribution, and to seek solutions for the various difficulties that will undoubtedly arise between the different sections of the industry. For such purposes the Central Authority should have power to require the collection of complete statistics from the liquid-milk industry relating not only to costs of production, collection, processing, and distribution, but also to general statistics concerning the industry.

(11) Problems may arise at any particular time necessitating action by a fully informed and properly constituted Central Authority. This would occur, for instance, in the event of circumstances arising either in production or in vending such as to prejudice the maintenance of adequate supplies of milk of high standard. Under such circumstances it may be essential for the Central Authority to organize the introduction of some changed form of control.

(12) The Commission recommends that the Central Authority confer with the representatives of the Health Department, Live-stock Division, Dairy Division, and Dairy Research Institute before defining the standards to be adopted for—

(*a*) Accredited herds:
(*b*) Collection of milk:
(*c*) Treatment of milk:
(*d*) Distribution of milk.

Complete co-operation would be essential between the Health Department, the Live-stock Division, and the Dairy Division in order to smooth out any difficulties of overlapping and to ensure prompt co-operation in the general supervision of all standards.

Nothing that has been said in the foregoing paragraphs should, however, be interpreted as meaning that the Central Authority as recommended by the Commission is intended to police all the activities of the local Milk Council or of the local Dairy Farmers' Supply Association. The Commission suggests that all steps be carefully taken to ensure that no disruption of the city-milk industry occurs and that unnecessary losses due to sudden changes are not forced upon any section of the industry.

Standardization of Accountancy Systems

It is a recommendation of the Commission that the Central Authority should call a conference of representatives from firms engaged in the processing and distributing trade, with a view to establishing standard systems of accountancy and costing and the publication of standard annual accounts in a manner likely to give all the information required by the Central Authority. This would be similar to the position which already exists in the dairy industry whereby all dairy-factories are required by law to publish their annual accounts in a statutory form. The work of the investigating accountant attached to the Commission would be of considerable value to such a meeting, and no doubt full use would be made of the knowledge already obtained.

Finance

The Commission has given attention to the question of how the Central Authority should be financed, and in view of the fact that the nature, powers, and functions of the Central Authority demand independent and completely impartial decisions on all matters it is the Commission's recommendation that the Government consider providing all the necessary finance needed by the Central Authority.

The Central Authority should be given all reasonable latitude in the spending of funds, but, apart from the amount necessary for the cost of running the office and secretariat, the Commission has in mind funds for publicity and research for the benefit of the industry generally, and also funds enabling the Central Authority to grant bursaries to approved students who wish to take courses in market milk-production at Massey College along the lines indicated in the Appendix on education and research. Care should be taken to see that the expenditure of moneys on projects of this nature are not duplicated by the local Milk Councils, but this is a matter to which the Government in setting up the Central Authority would no doubt give full consideration.

METROPOLITAN MILK COUNCILS

All that has been stated on the importance of adequate safeguards in the liquid-milk industry in order to ensure that the proper food value of milk is safeguarded and that its potential danger as a means of spreading disease is insured against to the maximum possible extent, lends emphasis to the Commission's conclusions that some form of organization and authoritative control over the treatment and distribution of milk is essential. The Health Department's activities are chiefly of a policing nature and are not actively concerned with organization of the industry or its guidance. One controlling and guiding body for treatment and distribution is just as essential as a similar body dealing with production and collection. Such a body must, however, be completely divorced from commercial interests in the trade, although under proper circumstances it may need to take an active part in the processes involved. In the absence of a municipal milk scheme, therefore, the Commission recommends that Metropolitan Milk Councils be set up in Christchurch and Dunedin along similar lines to the Auckland Metropolitan Milk Council and with similar powers. The constitution of the Council should adequately provide for direct consumer representation and for the election or co-option to the Council of persons with a technical knowledge of milk and of the nutritional value of milk. The Council should also include persons with business knowledge and capacity, and it may be that at least one member with a detailed knowledge of the production side would also be of considerable advantage.

The general purpose of such a Milk Council would be to apply the policy of the Central Authority on all matters of standards, prices, and margins, and all other matters outlined as being the responsibility of the Central Authority. The Milk Council should direct and guide educational work in the consumers' interests and should actively assist in improving methods of processing and distribution. Its policy would be to co-operate with the processing and distributing interests in their efforts to achieve complete efficiency.

The Milk Council would also be responsible for obtaining estimates from the vendor interests of the anticipated demand for milk so that this information could be passed on to the Dairy Farmers' Milk Supply Association for action in organizing supply. The Milk Council should co-operate fully with the Dairy Farmers' Milk Supply Association in seeing that proper and adequate steps are taken to ensure such supply. The Milk Council must further concern itself as rapidly as possible with organizing daily testing of all milk, and to do this would need to co-operate with both the vending-houses and the Dairy Farmers' Milk Supply Association. The Milk Council should ensure that proper standards were being observed and that all unsatisfactory milk was being rejected from the city-milk supply.

In Dunedin the state of existing processing and distributing facilities is such as to necessitate large-scale reorganization, and it will be necessary for the Central Authority to give careful consideration to the proposals which are advanced by existing institutions in order to ensure that the reconstruction which is so urgent and so desirable is carried out in the best possible manner. In any scheme of reconstruction it is desirable to consolidate existing interests as much as possible so that the cost of processing and distribution can be reduced to a minimum. Consequently the Commission suggests that, wherever possible, the issue of new licenses, particularly for processing plants and to small vendors, should be discouraged in favour of amalgamations.

The Auckland Metropolitan Milk Council has stated a strong case to the Commission in support of its submission for increased powers, similar to those of the Sydney Milk Council, under which the Milk Council would have full power to purchase, process, and distribute milk. The Commission has given careful and detailed consideration to the submissions of the Auckland Milk Council, but the powers sought appear to us to be, in certain important respects, inconsistent with the creation of Dairy Farmers' Milk Supply Associations with powers as set out. For reasons already stated the Commission is satisfied that such a supply association is best fitted to organize adequate supplies of milk of high standard to the metropolitan area, and we can see no advantage in transferring this responsibility to the Milk Council.

Apart from consideration of the request for powers to purchase milk and to organize the supply, the Commission is not qualified, even if it were entitled, to pronounce upon the merits of the application for powers to process and distribute milk. Such an application is, however, one that should receive close examination by the Central Authority whose appointment we have recommended, and particularly would we suggest that that Authority give full consideration to the question of vesting in any of the metropolitan milk councils in whose area a Dairy Farmers' Milk Supply Association, for any particular reason, cannot be created, such powers of purchase and control as are sought by the Auckland Metropolitan Milk Council. In such event, however, completely adequate producer representation

must be assured on the Council. Further, the Commission recommends the Central Authority to give full consideration to a review of the powers of the Auckland Metropolitan Council in order that it shall be able to discharge its functions effectively. This applies to the granting of additional powers where necessary in safeguarding the public against the sale of milk of low standard and poor quality.

In Wellington the functions of a Milk Council are satisfactorily performed in full by the Wellington City Council through its Milk Department and through its power of controlling licenses. In the Hutt City and adjacent areas an entirely different position exists, and it will be necessary to give some attention to the setting-up of local authority control along the lines suggested for a Milk Council. The Commission is unable to decide whether the Hutt City and adjacent areas should have a Milk Council entirely independent of the Wellington City area. The setting-up of two such independent bodies might create difficulties in competition so far as certain aspects of supply are concerned, and the Commission recommends the Central Authority to investigate further the question of whether an independent local authority for the Hutt could be set up to function satisfactorily or whether some joint control should be agreed upon between the authority for the Hutt Valley and bays' area and the Wellington City Council for the purpose of giving unified control over the whole of the metropolitan area.

The powers of the Christchurch and Dunedin Metropolitan Milk Councils will no doubt be similar to those finally approved for the Auckland Metropolitan Milk Council, but the Commission wishes to state certain principles which, among others, should be embodied in the functions of the respective Milk Councils.

Functions of the Milk Council

Without describing in detail all the functions of the Milk Council, the Commission sets out those functions which it considers particularly important in the operations of any Milk Council: —

(1) The Council should be the licensing body for all vendors, processing-plants, milk-shops, milk-bars, &c.

(2) The Council should examine all existing facilities for testing and analysis of milk and, wherever necessary, require adequate improvements to be made. The appointment of all analysts and testing officers by such treating-houses, including those already employed, should be subject to the approval of the Milk Council as well as of the Health Department. Where no facilities exist for the testing and analysis of milk, the Milk Council and the Dairy Farmers' Milk Supply Association should co-operate in establishing a laboratory and the employment of a full-time analyst for the purpose of ensuring that every supplier's milk (other than producer-vendors) coming into the metropolitan area is sampled daily.

(3) The Council should have the right to suspend or cancel the license of any treating-house, vendor, milk-shop, milk-bar, or producer in the event of continued non-compliance with quality standards.

(4) The Milk Council should take chief responsibility for the control and supervision of processing-plants and methods of distribution. In collaboration with the Central Authority, the Milk Council should arrange for their Chief Inspector or some other trained person to be available to the treating-house for advisory purposes on the technique of milk-processing.

(5) The Milk Council should appoint all necessary Inspectors for the routine testing and examination of milk after it reaches the vendor or treating-house. In order to achieve maximum efficiency in the control of the quality of the milk there should be a meeting between representatives of the Health Department, the Milk Council, Live-stock Division of the Department of Agriculture, and the Dairy Farmers' Milk Supply Association in order to work out a full basis of co-operation for maximum control over the quality of the milk from the farm to the consumer.

(6) The Council should control the zoning of all rounds and exercise its powers of purchase of all rounds offered for sale so as to ensure the amalgamation of small rounds in order to give an economic size of round of at least 50 gallons to 60 gallons.

(7) In conjunction with the Central Authority, the Milk Council should actively concern itself in carrying out educational work both with consumers on the hygienic care and treatment of milk and with the treating and distributing houses on the application of scientific methods to all phases of processing and distribution.

(8) The Council should collect all statutory returns from vending companies, vendors, milk-shops, &c., concerning—

(*a*) Returns of milk and cream purchased and sold in each month:

(*b*) Statutory returns of financial statements, including full details of costs of operations:

(*c*) Any other returns which may be required by the Milk Council and by the Central Authority.

Finance

The Milk Council should be financed by a levy of $\frac{1}{8}$d. per gallon on all milk supplied, or such an amount as is determined by the Central Authority as necessary for the financing of the Milk Council's activities. This levy should be a charge on the Dairy Farmers' Co-operative Milk Supply Association for all milk sold for consumption either as milk or as cream. The Milk Council should also have the right to apply to the Central Authority for the proper use of funds held in the Special Fund by the Dairy Farmers' Co-operative Milk Supply Association and representing unearned margins collected from vendors.

Control of Processing-plants

The Commission is gravely concerned at the manner in which, in at least one important respect, the liquid-milk industry is lagging behind the manufacturing side of the dairy industry. Practically all dairy-factories in the Dominion are co-operative in nature and it is required that the manager of a dairy-factory shall have had experience in testing and grading of milk and cream and shall have passed the examinations required by the Dairy-factory Managers' Registration Board, and that he must appear in person before the Board to satisfy them that his qualifications entitle him to a Dairy-factory Manager's Certificate. No provision whatever exists for control of the training or appointment of persons to manage processing-plants for liquid-milk supply. Consequently the Commission recommends that immediate consideration be given to the provision of a regulation for the certification and registration of working managers of all processing-plants. One of the qualifications for future registration should be that the applicant has attended the appropriate course at Massey College on the processing of market milk. The present working managers of such processing plants could, wherever such a course is necessary, be sent to a refresher course at Massey College in order to ensure that they are thoroughly trained in the technique of modern processing of milk.

Dairy Farmers' Co-operative Milk Supply Association

In the following chapter on supply the Commission reviews in full the necessity for setting up a responsible body among producers to organize supply and safeguard the interests of producers as a whole. In this chapter on organization it is necessary, however, to outline the proposals as they affect organization of a Dairy Farmers' Co-operative Milk Supply Association.

The Dairy Farmers' Co-operative Milk Supply Association will in each area be a contractual body representing all producers and acting on behalf of all producers, but not necessarily over-riding the rights of its members as shareholders in co-operative companies or as members of subsidiary groups such as dairy factories or present processing companies. For instance, in Wellington, in the case of the Rahui Suppliers' Association and of the suppliers to the Kuku-Manakau Dairy Factory and the Levin Dairy Factory, such suppliers must still be allowed to retain full rights as members of their respective co-operative companies, and the control over these respective factories would not in any way or in any sense devolve on the Dairy Farmers' Co-operative Milk Supply Association. It should be the duty of the Dairy Farmers' Co-operative Milk Supply Association to co-operate fully with the local dairy factory of which any intending member of the Dairy Farmers' Co-operative Milk Supply Association is an existing member. Such a relationship between dairy-industry interests and Dairy Farmers' Co-operative Milk Supply Association interests is essential in order to ensure harmony and smooth working between the dairy industry and the liquid-milk industry. In no case should the Dairy Farmers' Co-operative Milk Supply Association be given rights which will cause its interests to conflict with the interests of the dairy industry. Consequently, although all city-milk suppliers would be members of their respective supply associations, this would be for the purpose of organization only and should not in any way affect their existing rights as shareholders of a dairy factory or other similar body.

Constitution

The Commission recommends that it be one of the first duties of the Central Authority to organize in the Auckland and Christchurch areas a Dairy Farmers' Co-operative Milk Supply Association. It is desirable that such associations be set up with the full approval of all liquid-milk suppliers in those particular areas, and the executive authority of the association should comprise suppliers properly elected on a democratic basis by the members as a whole. It shall be the responsibility of the Central Authority to supervise the constitution, functions, and powers of such associations and to determine the extent to which the powers of the present organizations in Dunedin and Wellington should rightly be extended or modified.

Functions

(1) All liquid-milk suppliers who have been duly licensed by the Department of Agriculture to supply town milk should be eligible to be members of the Dairy Farmers' Co-operative Milk Supply Association, and it should be a condition of their license to supply liquid milk that they shall be members of the Dairy Farmers' Co-operative Milk Supply Association.

(2) The Dairy Farmers' Co-operative Milk Supply Association should accept applications for membership from suppliers who have been duly licensed by the Department of Agriculture, and it should not be permissible for the Supply Association to refuse membership to any applicant except with the approval of the Central Authority. Such approval should only be exercised by the Central Authority when the Supply Association can show that the total of all quotas allotted for milk-supply indicates at least 10 per cent. surplus over the anticipated demand for the coming winter.

(3) The Dairy Farmers' Co-operative Milk Supply Association should, at its discretion, have power to issue "winter" licenses to future applicants for membership whose "winter" production, comprising the six months of lowest production, is estimated at, say, less than 40 per cent. of their total annual production. Such members would supply the whole of their milk to a factory during the summer, and would only supply to the city the allotted quota of winter milk during the late autumn and winter.

(4) The Dairy Farmers' Co-operative Milk Supply Association should be given the exclusive right to purchase milk from members of the Association.

(5) The Dairy Farmers' Co-operative Milk Supply Association should be given the exclusive right to supply milk and cream to the city area, and milk or cream for any other milk products for which the Central Authority considers that priority of supply is necessary in the interests of disposal of surplus milk.

(6) On the 1st August, or on such date as may be decided by the Central Authority, the Dairy Farmers' Co-operative Milk Supply Association should obtain from the vending companies and private vendors, through the offices of the Milk Council, an estimate of their milk requirements for the following winter. It should then be the duty of the Supply Association to organize a sufficient number of suppliers to ensure at least 10 per cent. supply in excess of that estimated demand. It should be the responsibility of the Central Authority to determine the penalties, if any, to be arranged for short supply or short estimates.

(7) On the incorporation of a Dairy Farmers' Co-operative Milk Supply Association for any area all contracts made thereafter for the supply of milk or cream to that area should be made only with or through such Association. All contracts actually in operation should continue only for so long a period as may be necessary to enable the parties thereto to discharge their legal obligations under such contracts.

(8) All payments for milk should be made to the Dairy Farmers' Co-operative Milk Supply Association, which should in turn arrange the payment to producers on the quota rates finally determined by the Central Authority.

(9) The Dairy Farmers' Co-operative Milk Supply Association should be responsible for and should organize the collection of all milk delivered to the metropolitan area. The Association should ensure, as far as possible, that all necessary steps are taken to maintain an adequately low temperature of the milk during the whole process of collection.

(10) The Dairy Farmers' Co-operative Milk Supply Association should, in co-operation with the Milk Council, organize the setting-up of a laboratory for the purpose of the daily testing of all milk for quality (ten-day composite test for butterfat content), except in those cases where adequate and approved laboratory facilities already exist on the premises of treating and distributing houses.

(11) The Dairy Farmers' Co-operative Milk Supply Association should have power to set up a balancing-station, or, if a balancing-station already exists within the supply area, it should co-operate with that balancing-station for the efficient disposal of surplus milk.

(12) The Dairy Farmers' Co-operative Milk Supply Association should build up an equalization fund so as to level out prices to vendors in the manner prescribed by the Central Authority and to provide for higher payments to producers in the winter months than in the summer months. The Commission intends that the Dairy Farmers' Co-operative Milk Supply Association should be given adequate rights of representation as to how prices to producers should be paid and the level of the payment in the various months (with the exception that summer prices must not be raised above present levels or those prescribed by the Central Authority). Although the Central Authority will have the final right of decision on all matters affecting price it is desired that the producers be given all reasonable autonomy in the method of differentiating the price and to some extent in the method of arranging quotas.

(13) The Dairy Farmers' Co-operative Milk Supply Association should actively foster the development of high standards in sheds and in conditions, and should have power to advance moneys for the purpose of procuring equipment necessary to improve conditions on individual supply farms.

(14) In conjunction with the Central Authority and through the Dairy Board or Dairy Research Institute, the Dairy Farmers' Co-operative Milk Supply Association should actively foster and encourage the development of extension services for improvement of methods of production and animal husbandry.

(15) The Dairy Farmers' Co-operative Milk Supply Association should organize the collection of any data required by the Central Authority for the purpose of securing information on costs of production or any other matters relating to production.

Relationship with Vendors and Vending Companies

It is not the intention of the Commission that the creation of the Dairy Farmers' Co-operative Milk Supply Associations should disrupt in any provocative manner the existing relationships between the producer and the appropriate vending interest. The most satisfactory results will probably be achieved by a gradual transition from present conditions to those ultimately desired, and at the outset the Dairy Farmers' Co-operative Milk Supply Associations would commence to function as a nominal body having vested in it the power to purchase all milk and cream, but controlling this notionally more than physically. They would immediately set about reorganizing the transport system of collection, but it may quite well be that the actual delivery of the milk would proceed much the same as it has done in the past.

As a long-term policy, however, the Commission is of opinion that a proper zoning of milk-supply in order to achieve the maximum benefits of collection will entail the disruption to some extent of existing relations between producer and vendor. Provided milk is of a high standard as a whole this should be of little moment, as the vendor is concerned with vending a standard high-quality milk more than with vending any particular producer's milk. The Commission recommends the Central Authority, however, to consider what powers, if any, should be given to vary the delivery of individual producer's milk to individual vendors. The only exception to which the Commission thinks weight should be attached is the position of the member of the co-operative company who, because of his special shareholding position, must continue to send his milk to the company of which he is a member or else forego the advantage of his membership.

A co-operative company is permitted to avoid taxation provided it returns the whole of the profits earned to the members in proportion to the quantities supplied. All members supplying such a co-operative company must, however, be shareholders, otherwise the company becomes immediately liable to taxation. The Commission in its considerations takes full cognizance of the effect on the co-operative movement as a whole of a policy designed to eliminate co-operative groups, and consequently recommends to the Central Authority that in respect of the delivery of milk from producers to vending and distributing companies special steps should be taken to safeguard the rights of the members of co-operative companies.

Producer-vendors

In order to give complete representation to all groups of producers, producer-vendors should be members of, and should have full rights of membership of, the Dairy Farmers' Co-operative Milk Supply Association, but not special rights on representation.

The Central Authority should see to it that the Milk Councils in each metropolitan area exercise strict control over producer-vendors and ensure that the milk from these herds is tested frequently for quality and their sheds and dairies frequently inspected. Close watch should be maintained to see that milk is vended either from their own farms or from other accredited producer-vendors, or purchased from the Dairy Farmers' Co-operative Milk Supply Association.

In areas other than Wellington producer-vendors travel distances up to 20 miles from their farms to their rounds in the metropolitan area. Such vending becomes wasteful in the matter of transport costs and, as these producer-vendors have no special production-costs as compared with other suppliers to the city area, the Commission recommends that the Central Authority investigate all cases of producer-vendors whose herds are situated more than, say, 5 miles from their rounds with a view to taking over, after appropriate provision for compensation has been made, the vending portion of such producer-vendors' business. In many cases the rounds are small and might well be used for building up other existing rounds to an efficient and economic level.

All such adjustments should be made only after proper investigation of any special circumstances that may apply.

Collection

As has already been pointed out, the organization of collection can best be left in the hands of the producers, and the price paid by vendors should include the delivery charge to the treating-house or the vendor's dairy. In Chapter 10 consideration is given to the general organization of transport and the manner of collection. In dealing with the Dairy Farmers' Co-operative Milk Supply Association we have pointed out that the initial change-over should take into careful consideration the existing relationship between producer and vendor, but as a long-term policy the Dairy Farmers' Co-operative Milk Supply Association should be given full power to move gradually to a stage where zoning, collection, and delivery of milk can be achieved in the most efficient manner possible.

Any discussion of collection cannot be complete without reference to the possible rationalization of transport generally, and, although the Commission has had no opportunity of studying new methods of transport, there does appear to be considerable room for improvement over present methods.

The Wellington City Council are at present considering the possibility of using tanker transport to bring milk from the Rahui balancing-station to the City Council Depot. Some rationalization of collection along these lines should be given urgent consideration by the Central Authority. There is no doubt that the Wellington City Council incur heavy losses through their present system of handling incoming milk from the Rahui balancing-station. It comes to the Rahui Station in cans, has to be weighed, chilled, and again poured into cans prior to putting it on the rail at Rahui. It is then transported by rail to Wellington, and the Wellington City Council arrange road transport from the Wellington Station, a distance of roughly a mile, to the City Council's Milk Depot. This handling of cans, with the consequent washing and sterilizing, is undoubtedly burdensome from an efficiency and economy point of view, and the sooner some direct transport can be arranged between Rahui and the City Council Depot the better.

This is by no means an isolated example, and the same considerations apply to transport in the other metropolitan areas. The Dunedin Supply Association at present do not own lorries and consequently have to arrange the cartage of milk through private contractors. It is their opinion that the cost of collection could be considerably reduced if the Supply Association owned and operated the vehicles. From an examination of the cost of cartage this would appear to be an entirely reasonable view. Naturally the war situation does not permit of full-scale alteration of existing methods, and consequently the Commission must be content with recommending that these proposals for rationalization be fully considered with a view to their immediate application when the necessary vehicles and materials become available.

Processing and Distribution

The Commission has had the opportunity of studying at least four different types of organization dealing with treatment and distribution. These are—

(1) Municipal Milk Council, as in Wellington:
(2) Co-operative companies, as in Dunedin:
(3) Proprietary companies, as in Dunedin, Christchurch, and Auckland:
(4) Private vendors dealing mainly with raw loose or bottled raw milk. This group also includes producer-vendors.

(1) *Municipal Milk Scheme.*—There is no doubt that the Wellington City Council have set an extremely high standard in the organization that has been created in its Municipal Milk Department. Furthermore, it is undoubtedly true that the centralization of treatment and distribution in the hands of one organization carries with it considerable benefits from the point of view of control over standards and quality. The actual costs of processing in the case of the Wellington Municipal scheme do not show any saving, however, as compared with the more efficient proprietary companies, but in distribution very considerable economic and control advantages are apparent. The Wellington Municipal Milk Department distributes milk at least a penny per gallon cheaper than any of the companies whose costs of distribution were investigated. As distribution costs form the major part of the vendors' margin it is obvious that municipal milk schemes, by efficiency of organization over distribution as a whole and by the control the municipality is able to exercise over all phases of processing and distribution of milk, carries with it important advantages from a public health point of view. At the same time it is also important to bear in mind the fact that Municipal Milk Departments, in order to be competitively efficient, must be controlled and guided by men with keen business ability, initiative, and foresight. They must have staff capable of putting into efficient application the work of the Department, and without this there would be little safeguard of the efficiency of an organization which is itself a monopoly and not subject to competitive enterprise.

It is possible that under present conditions Milk Councils could encourage co-operative organization of existing interests or organization under its direct control of the whole of the distributing side of the milk industry Under such circumstances there is little reason to doubt that considerable economies would accrue. Added to this there would be a much better general control over the conditions of distribution and such a scheme would go far to meet the benefits operating under a municipal milk scheme where the processing is in the hands of the City Council.

It is perhaps necessary for us to note at this point that, although the respective City Councils in Auckland, Christchurch, and Dunedin were given rights of representation at the Commission's hearing, nevertheless no case for municipalization in these centres was officially advanced. Such a question is of course a matter entirely for the local body concerned, and the Commission is of opinion that it is not called upon to make any recommendation in this respect. If, however, further action is desired by the local authority in any of these centres, then the matter is one for review by the Central Authority whose creation the Commission has recommended. The processing and distribution of milk is so important from the point of view of the health and nutrition of the community that consideration must inevitably be given to some form of public control. In the absence of a Municipal Milk scheme the Commission recommends that a Metropolitan Milk Council be set up to exercise control over the processing and distribution of milk and cream by existing institutions and private vendors. This means, in effect, that although the taking-over of existing services of processing and distribution by the municipality may be desirable, unless and until the municipalities concerned seek the power to operate these services, the present needs can best be met by a continuance of existing interests, but with a greater public control.

(2) *Co-operative Companies.*—In the four main areas there is only one co-operative company operating in both processing and distribution of milk. This is the Otago Co-operative Milk Supply Company, which operates in Dunedin, but the facilities at present used by this company, particularly for the processing of milk, are not satisfactory. This is discussed in Chapter 5 and needs no further emphasis here, except by stating that in this particular case it is difficult to see that the co-operative enterprise has resulted in any greater (or in any less) efficiency than ordinary private enterprise. Its advantages are, of course, that the suppliers would invariably receive better treatment because the company is their own, and they would receive, in addition to the producer quota price for milk, the profit margin in processing and distribution.

The only other claim to co-operative enterprise in processing and distribution comes from Auckland, but this company is registered under the Companies Act and its chief claim to being a co-operative company lies in the fact that all shareholders are or have been suppliers to the company. The company is liable for taxation, and dividends are distributed on shares as in the ordinary manner. As these shares are, however, held for the most part by supplier shareholders the company considers it is entitled to regard itself as a co-operative company. Again the evidence of efficiency within this company is not sufficient to enable the Commission to draw any favourable comparison of successful co-operative enterprise as against private companies.

These considerations do not by any means militate against the favourable consideration of the introduction of co-operative enterprise into the treating and distributing trade. The inherent principle to be observed is that the profit motive, as such, should be reduced as much as possible. The relative non-success of the present co-operative companies in achieving high standards is to a limited extent due to the severe competition they have had to face and their inability to build up large reserve funds in order to obtain the plant and equipment which would have secured them the means of providing milk of high standard to consumers. There is little doubt, however, that Dairy Farmers' Co-operative Milk Supply Associations properly organized, and with adequate funds, would result in a better relationship between the processing and vending institution and the producer then can exist under present circumstances between a proprietary concern and its suppliers.

(3) *Proprietary Companies.*—The Commission had the opportunity of examing the operations and equipment of at least six proprietary companies concerned in the processing and distributing trade. (The term "proprietary company" is used to distinguish from co-operative companies.) Only two of them have reached a stage of high efficiency in the processing of milk. These two have very modern plants and both are capable of turning out supplies of high-standard milk. In the case of at least one of these companies, however, the general organization of collection is such as seriously to counteract any efficiency in the processing of the milk. The Commission was also confronted with evidence in the case of one of these companies that the relationship between the company and the producers was not entirely satisfactory. The introduction of a Dairy Farmers' Co-operative Milk Supply Association would, however, overcome to a considerable extent the type of dissatisfaction existent, and under circumstances of reasonable public control there is little doubt that private enterprise can perform the functions of processing and distribution with a high degree of satisfaction.

(4) *Private Vendors and Producer-vendors.*—The distribution of milk by private vendors and producer-vendors remains a somewhat difficult problem. It is a noticeable feature in each centre that the average gallonage per round by private vendors is much less than would be delivered by roundsmen employed by treating-houses. Consequently, until the average round for such vendors is stepped up to that obtaining for the treating-houses, it is obvious that complete economy and efficiency of distribution is not likely to be achieved.

It is for this reason that the Commission has recommended elsewhere that one of the functions of the local Milk Council should be to consolidate existing rounds at a more economic size.

The private vendor also creates a problem in respect of the organization of distributing all bottled pasteurized milk, but the Commission is mindful of the fact that the private vendor has played an important part in the building-up of the distributing trade, and his claims for consideration cannot be lightly over-ridden. The Commission is of opinion that any change to be made should be gradual and should make full allowance for the welfare of efficient private vendors.

Zoning has created an additional problem in this respect, and it is one to which the Central Authority should give special attention. By allotting a particular vendor the monopoly of a given round circumstances are created under which the dissatisfaction of any individual customer can find little or no outlet, and he must be content with the quality of service given by the private vendor. The competitive phase under which he could turn from one distributor to another no longer exists and in its train there has undoubtedly come much dissatisfaction with those vendors who do not take all possible care in seeing that the consumer receives the type of milk which he requires and to which he is entitled.

It was the opinion of witnesses before the Commission and of most of the consumer representatives that the principle of zoning with its undoubted economies in distribution should be continued after the cessation of hostilities, but it is equally certain that consumers generally do not wish the round to be restricted to only one vendor. In the absence of the vending of milk of a uniform quality, such as bottled pasteurized milk, it would certainly appear that at least two vendors viz., one vending bottled certified raw milk and the other bottled pasteurized milk—would be necessary in each zone. In Wellington the nearby farmers compete within zones with the Wellington City Council, but distribute loose raw milk.

The Commission is not qualified by reason of the limited nature of its inquiry to select any type of organization as being the type which should operate in all centres and under all conditions. We have expressed our opinion on the merits and demerits of the types of organization as we have seen them, but the question of change from one type of organization to another is one which involves careful consideration and much greater attention to the implications of such change in the industry itself than the Commission has been able to give. The matter is essentially one for consideration by the Central Authority, and the Commission is of opinion that it is improbable that major changes can with adequate reason be imposed in any centre except where conditions are such as to necessitate and demand immediate large-scale reorganization. Under proper control by the local authority and guidance from the Central Authority it is probable that future changes in any area can be gradually and effectively directed towards the type of organization giving the greatest advantages in efficiency and standard of service.

CHAPTER 8.—PRICES AND MARGINS

A specific task of the Commission is to ensure an adequate supply of milk of high standard *at reasonable prices*. The determination of reasonable prices must of necessity be related to the service and quality of the commodity supplied. It must also take into adequate consideration all circumstances attending the costs of production, collection, treatment, and distribution. Yet the final result must ensure that the price to the consumer is strictly a reasonable price. The Commission's task was to investigate precautions and safeguards to be taken in production, collection, treatment, and distribution necessary to ensure that the consumer receives adequate supplies of milk of high standard, but it is

essential to guard against precautions and safeguards so elaborate as to increase the price of milk to the consumer beyond a point at which the quantity of milk consumed would be seriously reduced. The consumer must, however, be prepared to pay a price which is sufficient to cover all essential costs necessary in the production of high-quality milk and to cover the cost of the vigilance, care, and treatment needed to ensure that the high quality is maintained at least until it reaches the consumer. The Commission's considerations of a reasonable price must therefore be sufficient to ensure—

(*a*) Adequate supplies of milk of high standard from healthy cows:
(*b*) That the milk is produced under the best possible conditions of hygiene in the milking-shed:
(*c*) That the milk is rapidly cooled after milking and held prior to collection at a temperature sufficiently low to inhibit the growth of disease-producing organisms:
(*d*) That the milk is collected from the farm dairy and conveyed to the processing-plant or distributing centre as soon as possible after milking:
(*e*) That the milk is properly processed in order to ensure the destruction of disease-producing organisms:
(*f*) That after processing it is distributed as quickly as possible to the consumer under conditions of maximum safety and hygiene.

(*a*), (*b*), and (*c*) above are essentially functions of the producer and consequently can be considered under the general heading of prices to producers.

Prices to Producers

The first function of price to the producers must be to ensure that a sufficient number of suppliers will be induced to provide adequate quantities of high-quality milk. The ultimate test of the adequacy of price is whether or not sufficient quantities of high-standard milk are readily available. This means that the price to the producer must be competitive with other forms of primary production open to such producer. A price below the real costs of production will undoubtedly lead to further reduction in the quantity being supplied or a partial or complete diversion of the land to other primary production. The Commission has had considerable evidence placed before it from a number of sources indicating that at the present time, particularly in Christchurch and Dunedin, there is a strong trend away from city-milk production.

This trend is, in the opinion of the Commission, due largely to two important factors:—

(1) The economic attractiveness of other forms of primary production—*e.g.*, sheep, dairy-factory supply, and cropping:
(2) The considerable discomfort and hardship accompanying winter milking and the comparatively long hours associated with continuous milking for 365 days in the year. (There is no doubt whatever that the city-milk supplier who is attempting to achieve a level supply is working under conditions which are, to say the least, distinctly unenviable compared with those of any other primary industry.)

Much evidence was given on the question of alternative sources of revenue, particularly in the Christchurch area, where part of the farm can be diverted to cropping, thereby causing a reduction in the number of cows carried and consequently in the milk-supply. It is also true that to some extent the alternative to city-milk production can be, and has been, somewhat overstressed, but the evidence from producers, Stock Inspectors, and other reliable sources compels the Commission to give due weight to the importance of this factor at the present time and under present conditions.

There does undoubtedly exist a strong *prima facie* case as to the present relatively unattractive economic condition of city milk-production.

In a previous survey of the liquid-milk-supply position in the main centres (Fawcett, Munro, O'Shea, Cowell, 1942), the following comments are included:—

> "*Present Supply.*—It can be accepted that the supply position has been unsatisfactory in various centres for a number of years past, and that rapid deterioration has taken place under intensifying war conditions. As evidence of this it is necessary only to state:—
>
> "(1) The Price Tribunal has had numerous applications for revision of producer prices:
> "(2) The Price Tribunal has been unable to effect other than temporary relief in that its functions preclude that body from arranging sources of supply, and as milk is a stabilized commodity prices to consumers cannot be altered. Even though consumer prices may in certain instances be reasonably high, the Tribunal has difficulty in influencing distribution organizations even where it is considered savings could be made:
> "(3) Certain metropolitan areas have been forced to draw supplies from long distances and from unregistered dairies. This has been detrimental to quality and wasteful in transport:
> "(4) During the present winter children have been to a great extent deprived of liquid milk in schools in order that city and Army requirements might be met.
>
> "The position which has developed has been accentuated under war conditions, but is not wholly attributable to such causes."

In Dunedin particularly, but also in Christchurch, the evidence clearly indicates that the present price is too low to be sufficiently attractive to ensure adequate supplies. In Auckland the competitive nature of dairy-factory supply is strongly in evidence, and the position of the East Tamaki Pool of suppliers, where seasonal supply is much more marked than in other pools (see Chapter 2), is such that the pool pay-out is below that of other pools. At the same time the producers claim that their net profit position is as good as, if not better, than that of suppliers who attempt to achieve a better continuity of supply throughout the winter. This indicates that the present winter price is not sufficient to induce suppliers to attempt to cater for anything approaching a level supply.

Certain qualifications governing an adequate price to the producer could be summarized at this point:—

(*a*) The price must be competitive with other forms of primary production available to the particular supplier concerned:
(*b*) The principal interest competing with city-milk supply is the butter or cheese factory; consequently the price to the producer must be related to the price paid to the ordinary dairy-factory supplier, but must not be set so high as to result in a considerable swing over from dairy-factory production to city-milk production, with the consequent provision of too great a surplus of city milk;

(*c*) The price should not be so high as to result in action restricting the number of licenses issued for town supply, thus causing dissatisfaction amongst producers who wish to compete on the city milk market:

(*d*) The price must be stable in order to ensure continuity of supply from one season to the next. The prospect of a violently fluctuating price would inevitably be such as to upset the stability of supplies of milk to the metropolitan area.

Computation of a Reasonable Price

The producers who cater for the city milk trade are essentially dairy-farmers, and consequently must be considered as part of the dairy industry in New Zealand as a whole. In 1936 the New Zealand Government instituted a guaranteed price for all butter and cheese produced in the Dominion and decided that a single price should rule for all butterfat produced for manufacture throughout the Dominion. Consequently, similar basic consideration should inevitably determine the framework on which stability of city milk-prices rests. The primary alternative to the city milk market is the dairy factory, and the competing influence of the dairy factory lies in the guaranteed price for butter and cheese.

Furthermore, much of the surplus milk produced by the city-milk supplier is disposed of to the factory for manufacture into butter or cheese.

The Commission is of opinion, therefore, that the basic consideration in calculating a reasonable price to the producer must be that it shall return to the producer a price in keeping with the guaranteed price value of his product, plus adequate allowance for the important differences in conditions ruling between the average factory-supply herd and the average city-milk-supply herd. The main differences can be summarized under the following general headings (although there are many minor headings which are not covered):—

(1) *Carrying-capacity.*—The carrying-capacity on the city-milk-supply farm is lower than that of a factory supply farm under the same conditions. This is brought about by the fact that the supplier must devote a greater area of his farm to the production of feed for his cows in the winter than the factory supplier, who need only provide for the maintenance requirement of his cows in the winter. It is more costly to buy supplementary feed in the winter than it is to produce it in most cases, and as the city-supply herd must attempt to achieve as level a supply as possible it follows that a very considerable amount of supplementary feed must be either grown or purchased as compared with the factory-supply herd. Evidence of this reduction in carrying-capacity was supplied in all centres, and the Commission is satisfied with the final opinion of producers in all centres that a city-milk-supply herd carrying forty cows is a correct standard with which to compare a factory-supply herd carrying forty-eight cows. Professor Riddet, Director of the Dairy Research Institute, in evidence before the Commission, fully agreed with this basis of comparison.

(2) *Labour Units required.*—The guaranteed price is based on two full-time labour units being required to operate a farm carrying forty-eight cows. The average factory-supply herd in New Zealand, however, is essentially a herd concerned with seasonal milking—that is, bringing cows into profit in the months of July, August, and September and drying them off in the autumn months of April and May (North Island conditions). Consequently in the winter the average factory-supply herd is concerned with milking only those few cows that are not in calf or which have aborted or calved late in the season. These are normally few in number, and it can reasonably be said that the average factory-supply herd provides for a milking-season of approximately 300 days, whereas the city-milk-supply herd must cater for full-time milking for 365 days in the year. Wellington producers claimed that thirty-three cows was a sufficient number for two full-time labour units to cope with under city-milk-supply conditions, but producers in Christchurch, Dunedin, and Auckland were in agreement that forty cows was a reasonable number. Professor Riddet also expressed agreement with this figure, and indicated that in his opinion, in order to produce milk under satisfactorily hygienic conditions, forty cows was a reasonable and quite adequate number as the optimum for two full-time labour units. Department of Agriculture reports of surveys in Christchurch and Wellington indicate approximate agreement with this figure.

(3) *Capitalization.*—The guaranteed-price basis assumed a total capitalization of £75 per cow on a factory-supply farm with the standard of forty-eight cows. This amounts to a total capitalization of £3,600. The city-milk-supply farm invariably carries a higher land value owing to its proximity to the city and carries a higher value for farm equipment, including dairy and feeding sheds, milking-sheds, cooling-equipment, &c. Producers have claimed that a figure of approximately £150 per cow would be a fair approximation for a city herd, but in the opinion of the Commission, and on evidence supplied from sources such as the Department of Agriculture surveys and the figures of producers themselves, a capitalization of £100 to £120 per cow would be more in keeping with the real cost. The Department of Agriculture surveys indicate a range from £88 per cow in Dunedin, £105 in Auckland, £111 in Wellington, to £144 per cow for Christchurch. Consequently a standard farm under city-milk-supply conditions comparative with the guaranteed-price-standard farm would carry a capitalization of approximately £4,000 to £4,800.

(4) *Labour Reward.*—The labour reward for the farm owner or manager under the guaranteed price is at present approximately £4 14s. 6d. per week (excluding house allowance, perquisites, &c., valued at 30s.) and for farm workers approximately £2 17s. 6d. (excluding boarding-allowance of £1). Under city-milk-supply conditions both owner and worker are concerned with full-scale milk-production for 365 days in the year, as against the approximate 300 days by the owner of the factory-supply herd. The hours of work are, if anything, longer because of earlier rising, and the conditions of milking during the winter are undoubtedly irksome in the extreme. It is considered, therefore, that the labour reward to the owner of the city-milk-supply herd should be at least £1 to 30s. more than the reward to the owner of the factory-supply herd. This would give him a total labour reward of something between £5 14s. 6d. and £6 4s. 6d., or approximately £6 (plus house allowance, perquisites, &c., valued at approximately 30s.). This reward should be compared with the labour reward allowed to an individual vendor vending approximately 60 gallons of milk (see section, "Distributing Costs"). Approximately 60 gallons would be the production of the standard city milk-supply farm and it is considered that the responsibilities, the risk of loss, and the capitalization involved fully entitle the farm-owner to a similar reward to that of the vendor of approximately 60 gallons of milk. The hired labour on a city-milk-supply farm is also more costly, both because of the competing attraction of industrial employment

in the city and because of the increased hardship of working under the city-milk-supply conditions. Holidays have to be provided for to a greater extent than on the factory-supply farm because of all-the-year-round milking. The Commission is of opinion that a difference of 10s. to £1 per week would be necessary to recompense the owner of the city-milk-supply herd for the increased premium he must pay as compared with the owner of the factory herd in order to secure adequate labour. Inquiries by the Commission on farms which they visited, and also evidence submitted by producers, substantiate the point that the owner of a city-milk-supply farm pays at least 10s. to £1 per week more for labour than the owner of a factory-supply farm.

(5) *Production per Cow.* On all the evidence placed before the Commission it does appear that the production per cow of the average cow in the city-milk-supply herd is slightly lower than would be the average on a similar herd under factory-supply conditions. Considerable difference of opinion existed on this point, and claims were made by the producers that the production of a cow calving in the late summer and autumn would be at least 50 per cent. below what the same cow would produce if she calved in the spring that is, on a total lactation-yield basis. The Dunedin producers claimed that an average production of 400 gallons per cow was typical of Dunedin conditions; Christchurch claimed an average of 500 gallons as being typical; Wellington producers submitted evidence to the effect that a census taken over the past six years indicated an average yield of 426 gallons per cow; and Auckland producers stated that an average yield of 500 gallons per cow could reasonably be accepted.

The Commission is satisfied there is a lower yield in production per cow for the cow calving in the late summer and early autumn months, but that the amount of this reduction is undoubtedly linked with the feeding standards prevailing on the farm concerned. A number of farms visited by the Commission bore ample testimony to this fact. The owners of some of the high-producing herds indicated that, provided the cow was well fed throughout the autumn and winter, they could expect a total yield substantially the same as that for a cow calving in the spring. The Department of Agriculture's survey for the various districts indicated an average production of approximately 560 gallons at Dunedin, 620 gallons at Christchurch, and 507 gallons at Auckland. Evidence was given by the Herd Recording Supervisor, Mr. C. M. Hume, and also by Professor Riddet concerning the influence of month of calving on total production. Evidence was also available to the Commission on the production figures for herds tested in the various districts, and for the "effective" average production for factory-supply herds in the district. After weighing up the evidence from all these sources the Commission is satisfied that a production of 500 gallons per cow can reasonably be expected of city-milk producers under reasonably efficient conditions. The Commission is, however, fully aware of the very considerable differences existing between the different centres and between the different farms in each centre.

Again, in order to keep the comparison strictly in line with the guaranteed-price standard of 250 lb. fat per cow adopted for the factory-supply herd, the Commission is satisfied that a 10-per-cent. allowance for the whole herd to cover the loss due to out-of-season calving of a portion of the herd is quite adequate. This would result in an average per-cow production of approximately 225 lb. fat for city-milk-supply herds. To produce 225 lb. of butterfat at a 4·3-per-cent. test a cow must produce approximately 506 gallons of milk. It should be borne in mind, however, that this figure is for all cows carried on the farm and intended for milking.

The Commission therefore ecommends that 500 gallons of milk per cow at a 4·3-per-cent. test be accepted as the standard on which to assess a reasonable price.

(6) *Cost of Winter Feeding.* An allowance for this item is difficult to assess in view of the difference between herds within districts, and even between districts in the practice followed. Some farmers grow all their supplementary feed requirements, others purchase most of it. The labour allowance takes into consideration the importance of home-grown feed (and its economy as compared with the purchase of such feed), and the Commission has therefore made no special provision for this item. The Wellington thirty-mile area suppliers and the Dunedin suppliers have a claim to special consideration under this heading.

Assessment of Basic Price

Using only the above differentials it is now possible to assess what should be a reasonable reward to the producer under city-milk-supply conditions as compared with the producer under factory-supply conditions. A factory-supply herd with two labour units at the guaranteed-price standard of 250 lb. of butterfat per cow would produce 12,000 lb. of butterfat. The average cheese-factory pay-out for 1941–42 season was 18·025d. This excludes the allowance made to cheese-factory suppliers in the 1942-43 season of 0·61d. per pound butterfat. If this is added, it brings the approximate pay-out to 18·635d. (A city-milk supplier is compared with a cheese-factory supplier because both these suppliers send their whole milk to the factory. A butter-factory supplier separates the milk at the farm and sends only the cream to the factory, retaining the skim-milk for pig-rearing.) A small allowance would have to be made to the city-milk supplier for the possible value of whey which the cheese-factory supplier can obtain for pig-rearing, and a figure of 19d. per pound butterfat appears, in the opinion of the Commission, to be a reasonable figure for the butterfat basis of calculating city milk prices.

The total working and maintenance costs on the average town-milk-supply farm are reasonably comparable with those on a factory-supply farm and it is considered that no special adjustment necessary for this part of the total cost.

The gross return to the town milk-supplier under factory-supply conditions would therefore be:—

	£
12,000 lb. butterfat at 19d.	950
Add increased labour reward for owner, say, £1 5s. 6d. per week	66
Add increased labour-cost for farm worker, casual labour, and holidays, say, 15s. per week	39
Add interest at 4½ per cent. on increased capitalization (£4,400 — £3,600 = £800)	36
Total costs for standard city-milk-supply farm	£1,091

Production = 40 cows × 500 gallons = 20,000 gallons

$$\frac{£1,091}{20,000} = 13{\cdot}1\text{d. per gallon.}$$

This method of arriving at the approximate cost of production of town milk is in principle closely related to the manner in which the price of milk in the Wellington supply area has been assessed by at least two arbitrators (Sir Francis Fraser and J. S. Barton, Esq., C.M.G.). As the price mechanism in Wellington has been and still is subject to agreement by arbitration (under statute) and as that mechanism has functioned satisfactorily over a period of approximately twenty years, the Commission is of opinion that any alteration in the price structure should continue to be made in the manner already indicated in the agreement.

The above figure, then, of approximately 13d. per gallon is, in the opinion of the Commission, a figure to which the producer is reasonably entitled for the production of milk of high standard and produced as a reasonably level supply for 365 days in the year.

The Commission is satisfied that such a figure would constitute a " reasonable " price to the producer in terms of the requirements of an adequate supply of milk of high standard. There may be further refinements which should be introduced into the comparison between factory and city-milk-supply herds, and if the Commission's recommendations regarding the setting-up of a Central Authority are given effect to, then the proper collection of data will enable the final basis to be properly established.

In the fixing of seasonal prices to provide an annual return of approximately 13·0d. to the producer at the farm-gate the Commission emphasizes that proper disposal of surplus milk at a price commensurate with the price of liquid milk is essential. Cream should, for the same reasons that apply in the case of milk, be produced on farms properly licensed to supply city milk. It should therefore carry a price which will return to the producer a price equal to the milk necessary for its manufacture. If this principle is applied in fixing cream-prices (and properly adjusting the treating and distributing margin), there should be a minimum of loss to the producer in the disposal of surplus milk.

The seasonal producer with a heavy surplus in the summer must, of course, dispose of considerable quantities of surplus milk to the factory at manufacturing rates, but the Commission has calculated the cost of production not on the seasonal producer's costs, but on those of the producer whose supply is reasonably level and of " accredited " standard. It is this latter supplier whose price should be protected by the operation of high winter rates and cream-prices commensurate with the value of the milk used in its manufacture. Should the Commission's recommendations in this respect fail to return an adequate price per gallon to such an efficient producer, then the Commission recommends that the Central Authority take appropriate steps to assure such a return.

Furthermore, in order to fulfil the requirement that the price to the producer should remain reasonably stable, it is of considerable importance that any increase in the guaranteed price should automatically be translated into the price to the city-milk supplier. The principles governing the actual assessment of his price is dealt with elsewhere. Sufficient here to recapitulate that the basic price for the city-milk supplier must be related to the guaranteed price for butterfat, but must take into full consideration, without understating or overstating the margin of difference involved, all steps necessary to ensure sufficient licensed suppliers to keep the metropolitan area fully supplied with adequate quantities of milk of high standard.

Surplus Milk

Having assessed what is a reasonable price to the producer in order to ensure an adequate supply, it is necessary to deal with the problems created in the organizing of an adequate supply.

Under the following chapter on supply full consideration is given to the question of what constitutes an adequate supply and the provision of a proper surplus.

The question next arises as to how this surplus can best be organized and by whom the cost of it shall be borne. Naturally if the producers are being asked to provide adequate supplies, and this entails the provision of a surplus of milk, then it is only fair that the producer should be adequately recompensed for the provision of this surplus. On the other hand, the consumer should be protected against any undue burden of cost caused through failure to organize properly either the amount of the surplus or its disposal. There are several ways in which surplus milk in the winter-time can be disposed of. These fall under the following two main headings :—

(1) Separation into cream and sale as sweet cream to consumers :
(2) Either separation into cream and supply of cream to a butter-factory or straight-out sale of the milk to a cheese-factory or other concern interested in the manufacture of milk products—*e.g.*, condensed-milk factories, chocolate-factories, ice-cream manufacturers, and so on.

Estimates of the consumption of cream in a city indicate that a margin of 10 per cent. surplus milk in the winter would be less than the quantity required by the public in the form of cream. For instance, the Auckland public in the 1942 winter months consumed, in the form of cream, approximately 15 per cent. of all milk sold. By a proper adjustment of the price of cream it is possible that the utilization of surplus milk in the winter could be organized without any appreciable loss to the producer or any increase in cost of milk to the consumer. This question is, however, further discussed in the following chapter on supply, and will not be commented on further at this stage.

Surplus milk in the summer provides a different problem and would have to be disposed of to best advantage either to ice-cream manufacturers, cheese-factories, butter-factories, or some other manufacturing source. Again the course to be adopted will be dictated by the most attractive economic disposal of the milk. The cost of surplus milk should undoubtedly be spread over producers as a whole, and this can only be achieved by proper organization. At the present time small vendors and producer-vendors have to carry little or no surplus. In certain areas, particularly Christchurch, and to some extent Dunedin, the producer-vendors endeavour to secure a level supply throughout the year, but particularly in Auckland and Wellington, the producer-vendors depend to a considerable extent on the treating-houses to make up their shortages of milk in the winter. Naturally this adds considerably to the problem of surplus milk, and it is probable that some added price should be paid by such producer-vendors in the winter in order that they shall be carrying their fair share of the cost of surplus milk.

The question as to who should organize the supply of milk to the city and the detailed manner in which surplus can best—that is, most economically—be handled, is a matter which is discussed in the preceding chapter on organization. The authority accepting responsibility for the supply of milk to the metropolitan area must inevitably accept the responsibility for the economic disposal of surplus milk so as to ensure that an undue burden of cost is placed neither on the producer nor on the consumer.

Standard of Shed Hygiene

The reward to the producer must be such as to recompense him for the vigilance and care he is asked to exercise in the production of milk of the required standard. On the question of hygienic conditions in the milking-shed, healthy cows, and adequate cooling and dairy facilities, these will be controlled partly by the standards laid down by the Department of Agriculture in the terms of the license for a supplier of city milk, but will also be the special concern of the Central Authority and of the Dairy Farmers' Co-operative Milk Supply Association, both of which are concerned in encouraging a high standard from all suppliers. The Commission recommends that the full price shall be payable to a supplier of city milk only if the conditions of milk-production conform to the standards finally decided upon as those necessary for "accredited" herds.

Accredited Herds

"Accredited" standards should be finally determined by the Central Authority in consultation with the Department of Health, Department of Agriculture, and Dairy Research Institute, but should include:—

(1) High standard of milking shed and dairy building and equipment.
(2) (*a*) Facilities of a standard capable of cooling milk to and of holding it at a temperature of not more than 40° F.

Until such time as adequate supplies of refrigerating equipment are available the Commission recommends that the following conditions be accepted in lieu of the above:—

(*b*) Facilities of a standard capable of cooling milk to and of holding it at a temperature of not more than 60° F.

(3) Approved methods of herd-replacement, and, in the case of herds supplying vendors with raw milk, should include six-monthly testing for T.B. As soon as possible T.B. testing of all milk-supply herds of "accredited" standard should be carried out and replacement stock purchased from herds which have been similarly tested. This problem is, however, intimately linked with the steps to be taken nationally in T.B. elimination.
(4) High standard of milking-shed hygiene by farmer and employees.

Payment of the appropriate bonus, recommended as 0·5d. per gallon, for herds of "accredited" standard should be made as soon as standards can be finalized by the Central Authority and the herds so classified.

MILK-COLLECTION

The prompt collection of the milk twice daily from the farm dairy for as long a period as possible throughout the year, and certainly at least during all but the winter months, is essential if the consumer is to receive milk in as fresh a condition as possible. The Commission has had evidence in each centre that, although zoning has in most cases been efficiently carried out on the distributing side, little or no attempt has been made to cope with the zoning of the collection of milk, and it is quite certain that considerable economies can still be effected if collection of milk is properly rationalized. For this purpose it would again appear that a proper organization of producers could best organize the collection of milk by contract arrangements with carriers or by employment of their own trucks as in the case of the Wellington Dairy Farmers' Association.

A point which received a considerable amount of attention and which has been the subject of much comment by producers is the question of where the milk should be collected—at the farm-gate or at the farm dairy. The Commission is of the opinion that the price paid by distributors for milk should include the cost of cartage, and that the producers can best be left to effect the economical collection of milk and can decide amongst themselves whether milk shall be collected at the dairy or at the farm-gate. The position from the producers' side was summed up in the final submissions by the Auckland producers when they stated:—

> "There is one point which has been mentioned in connection with cartage which we would stress—that is, the collection of milk at the dairy and not the farm-gate. It is more economical for the milk-carrier to drive into the dairy than to have several hundred individual farmers starting up trucks, tractors with trailers, or catching and harnessing horses twice a day in order to cart the milk 50 or 200 yards to the farm-gate. In Auckland for a number of years it has been the practice of farmers to have cattle-stops or special entrances to enable a lorry to collect from the dairy. In the event of universal refrigeration it would be absolutely essential. It would be useless cooling milk to 40° F. or 45° F. and then leaving it standing on the side of the road in summer in Auckland for any length of time. If farmers are unable to provide satisfactory entrances to their dairies, suitable roadside covered stands must be provided."

The Commission is of opinion that this submission made by producers should be given adequate consideration. Many producers have indicated that they are fully prepared to pay for the service of having the milk picked up at the dairy. If the collection of milk is included in the price paid to the producer and the organization of such collection left in his hands, there seems little room to doubt that a satisfactory solution to this problem can be arrived at for all concerned. It certainly would, in the opinion of the Commission, be undesirable to continue the practice of collecting milk from wayside stands if refrigeration has been insisted upon on the farms. Lorry breakdowns or other circumstances which might upset the time-table of the collecting lorry would undoubtedly prejudice the value of the refrigeration of the milk prior to it having been placed on the stand with a view to its immediate collection. Consequently the suggestion of the Auckland producers is not only a time-saving suggestion so far as the farmers are concerned, but is also an important function of the control of the quality of the milk.

If the collection of milk is left in the hands of the producers, and assuming that the distribution of milk continues as under the present organization, there should be little difficulty in proper arrangements

being made for the supply of milk to the respective vendors at a cost which should not be in excess of the present cost. The position of producer-vendors would, however, be unchanged. Costs of collection in the four centres are shown in the following table:—

Inward Transport Costs

		Per Gallon. d.
Wellington	.. Weighted cost of transport from Wellington Dairy Farmers' Co-operative Association suppliers and Rahui suppliers	1·460
Auckland	.. Cartage cost for all suppliers for one representative treating-house ..	0·848
Christchurch	.. Cartage cost for all suppliers for one representative treating-house ..	0·750
Dunedin	.. Cartage cost for Dairy Farmers' Co-operative Milk Supply Co. ..	1·126

With rationalization of collection and the control of all collection by the Dairy Farmers' Milk Supply Co. it is highly probable that the average cost of collection per gallon on all milk could be reduced.

Payments for Milk supplied

Payments by Vendors

The following discussion assumes the existence of a Dairy Farmers' Co-operative Milk Supply Association in each area with the full responsibility for supply of all milk and cream to the metropolitan area. Should no such Association exist, then these principles must be accepted as applying to whatever organization—*e.g.*, Metropolitan Milk Council—exists for the organization of supply.

The price to be paid by vendors for milk supplied through the Dairy Farmers' Co-operative Milk Supply Association should be finally determined for each area by the Central Authority after due consideration of the Commission's recommendations. The vendor price should represent the price per gallon fixed by the Central Authority as the annual quota rate for prices payable to producers. For the purpose of illustration the principles of these recommendations are shown below, based on a presumed annual quota price to producers of 13d.:—

(*a*) The price per gallon to be paid by vendors and treating-houses would be based on a standard gallon of milk testing 4·3 per cent. butterfat and at the rate of 9·5d. per pound butterfat—*i.e.*, 4·2d. per gallon, plus 8·8d. per gallon for quantity, thus giving an overall price per gallon of 13d.:

(*b*) The average butterfat content of milk for a given area should be determined on the basis of the known butterfat content of the milk for all that portion of the supply which is being tested regularly for butterfat content. The Central Authority, after consultation with the local Milk Council and the Dairy Farmers' Co-operative Milk Supply Association, should determine whether the butterfat content should be fixed annually, quarterly, or monthly, according to the requirements and conditions in that area:

(*c*) The price payable by all vendors for butterfat content should then be increased by 0·1d. per gallon above 4·2d. for every 0·1 per cent. increase in the fat content above 4·3 per cent. and decreased by 0·1d. below 4·2d. per gallon for every 0·1 per cent. decrease in the fat content below 4·3 per cent. The price per gallon for quantity would remain at 8·8d. irrespective of the butterfat test of the milk:

(*d*) Treating-houses which with the approval and under the control of the Milk Council are carrying out butterfat tests for each supplier should pay the Dairy Farmers' Co-operative Milk Supply Association in accordance with the results of those tests—that is, at the rate of 9·5d. per pound for butterfat content plus 8·8d. per gallon for quantity:

(*e*) To the price payable per gallon as outlined above should be added an allowance computed by the Central Authority as the appropriate cost of cartage for all milk to be collected by the Dairy Farmers' Co-operative Milk Supply Association plus the levy to be collected on behalf of the Milk Council. (The Commission considers that the Milk Council levy can more easily be collected by the Dairy Farmers' Co-operative Milk Supply Association as an addition to the vendor price.)

The Commission is fully aware that there are many difficulties involved in introducing such a system of payment as that outlined above, particularly in areas where no regular testing for butterfat content has been carried out and where payment has been based wholly on gallonage. These difficulties should gradually disappear as more and more regular testing is undertaken, and it should be borne in mind that the objective of testing for quality will not be achieved until daily sampling of all milk becomes possible.

In the meantime the above recommendations suggest a means whereby payment can, to a reasonable extent, be based on the butterfat-quality of the milk in each area. The consuming public will then have the satisfaction of knowing that future increases in price will be strictly correlated with improvement in quality.

The standard price payable by vendors as quoted above would necessitate the building-up of an Equalization Fund by the Dairy Farmers' Co-operative Milk Supply Association so as to enable higher prices, in conformity with the rates fixed by the Central Authority, to be paid for the autumn and winter months. This would require the vendor price to be fixed as from the first day of the first summer month in each area.

All contracts between vendors and producers should in future be made through the Dairy Farmers' Co-operative Milk Supply Association, but, except for any special circumstances to which the Central Authority may give consideration, all payments should be made direct to the Supply Association.

Unearned Margins

Where a vendor is distributing loose raw milk, bottled raw milk, or loose pasteurized milk and is receiving the full retail price fixed for bottled pasteurized milk, then he is receiving payment for a margin of cost which has not been incurred. Such margins are at present being retained in full by vendors in all areas except Auckland. In the case of loose raw milk this unearned margin would be approximately 3½d., for bottled raw milk it would be approximately 1½d., and for loose pasteurized milk 2d. per gallon.

The Auckland Metropolitan Milk Council directs the vendor to pay such unearned margin back to the individual producer from whom the milk is purchased; but this affects loose raw milk only, because in Auckland there is a margin of 2d. per gallon between the retail prices of loose and bottled milk. The principle that these unearned margins should not be retained by the vendor is sound, but the Commission is not satisfied that the individual producer should receive them. The evidence presented is insufficient to establish that any extra effort is made by such individual producers to bring their herds up to a standard which would justify the full retention of such margins.

If the Commission's recommendation that all raw milk purchased by raw-milk vendors should be purchased from the Dairy Farmers' Co-operative Milk Supply Association were adopted, then unearned margins could be collected as an addition to the price charged.

Producer-vendors should also pay unearned margins to the Dairy Farmers' Co-operative Milk Supply Association, but as no purchase-money would pass through the hands of the Supply Association this could best be done by way of increased levy. Special consideration should, however, be given to producer-vendors in the assessment of the levy for unearned margins, because their costs, as compared with those of more distant suppliers, are high.

All unearned margins collected by a Dairy Farmers' Co-operative Milk Supply Association should be allocated to a Special Fund, such fund to be held on behalf of the Central Authority and be drawn upon as approved by the Central Authority for the following purposes:—

(*a*) Loans to producers for the purchase of equipment such as refrigerators, or other such dairy equipment necessary to bring their shed and dairy standards up to "accredited" standards:

(*b*) Financial assistance to the Dairy Farmers' Co-operative Milk Supply Association to set up and equip a testing laboratory:

(*c*) Organizing the purchase of young stock from approved tested herds and arranging for these to be grazed out and reared for later use as replacements in city-milk-supply herds:

(*d*) Any other purpose of an organization or educational nature designed to assist suppliers in problems of feeding, husbandry, and shed hygiene:

(*e*) Financial assistance to the Metropolitan Milk Council for approved purposes such as educational work on the vending and consuming side of milk hygiene:

(*f*) Any other purpose which the Central Authority may direct or approve.

The Commission recommends that items (*a*) and (*b*) be given priority consideration.

The Special Fund comprising unearned margins is likely to be a gradually reducing fund as the vending of loose raw milk is replaced by bottled milk. The use of these funds should therefore, as far as possible, be confined to initial expenditure of a non-recurring nature so as to avoid difficulties of finance when the revenue from this source falls away.

Payments to Producers

The Dairy Farmers' Co-operative Milk Supply Association should be responsible for all payments to suppliers (except producer-vendors) and should make all payments for milk supplied as follows. At the rate of, say, 9·5d. per pound butterfat for the butterfat content of the milk plus the quantity rate per gallon necessary to bring the price of a standard gallon of milk to the quota rates fixed by the Central Authority. The standard gallon of milk should be ascertained by reference to the average butterfat test for all milk tested during the period under review.

The system is essentially the same as that at present operating in Wellington, except that the butterfat rates are *half* the butterfat value of the milk; the remainder of the payment would be the same in principle as Wellington's "added value" system for gallonage except that it would constitute by far the greater portion of the price.

Payment for "Accredited" Standards

Payment to individual producers whose herds are not of "accredited" standard would be at the rate of ½d. per gallon less than the quota rate.

Payment by *vendors* to the Dairy Farmers' Co-operative Milk Supply Association would be conditioned by the proportion of producers in that supply area whose supply was of "accredited" standard. If half the producers were "accredited," then the rate would be only ¼d. less than the full quota rate, and the full quota rate would be payable as soon as all suppliers were of "accredited" standard.

In this way vendors would pay increasing prices only as the quality of the milk-supply improved, and producers would receive additional payments in keeping with their standard of production.

The Commission has described as much detail as is possible in order to indicate the general working of the price mechanism but is fully aware that many details remain to be clarified. These must remain the responsibility of the authority fixing and operating the price mechanism, and experience will be necessary before determining the details of the system finally adopted.

Maximum Payment for Butterfat Content

The problem of setting a ceiling on the payment for butterfat content has been created in Wellington, and to a lesser degree in Auckland, mainly by the practice of buying from accommodation sources of supply. Such milk is invariably high testing (being comprised to a considerable extent of milk from stripper cows and cows in late lactation), and the following information from the Wellington Milk Department indicates the savings that would have been made had milk-testing above 5 per cent. butterfat been paid for at the 5 per cent. butterfat rate. The table also indicates the high cost of winter milk due to this factor:—

Period 1942–43.	Pounds Milk testing over 5·0 per Cent.	Saving that would have accrued if Milk paid for at 5·0-per-cent. Rate.
		£ s. d.
16th April to 15th August	4,918,519	3,003 17 8
16th August to 31st January	309,696	40 1 9
1st February to 15th April	2,858,642	622 5 9
Total for year	8,086,857	3,666 4 2

The problem of deciding what ceiling, if any, should be fixed is difficult on the limited evidence available to the Commission, but we are of opinion that the necessity for fixing such a ceiling will largely disappear as dependence on "accommodation" supplies of milk ceases.

The following table illustrates this problem and indicates the high test and, under the Wellington system of payment, the high cost—of milk from sources other than the regular supply sources of Rahui and the Wellington Dairy Farmers' Association. The figures are for May, 1943:—

Source of Supply.	Quantity received.	Average Butterfat Test.	Average Cost per Gallon.
	Gallons.		d.
Levin	50,842	5·6	21·39
Shannon	24,624	5·6	21·23
Tokomaru	6,676	5·6	21·71
Wellington Dairy Farmers' Association	250,272	4·9	19·20
Rahui suppliers	79,210	5·1	19·86

The Commission recommends that the Central Authority take appropriate action to set a ceiling on butterfat payments if the application of recommendations on organization of supply fail to eliminate high-testing milk in any area. The Commission is of opinion that a ceiling between 5·25 per cent. and 5·5 per cent. would be reasonable.

Attention should be drawn to the fact that the tests quoted in the above table are average tests and that milk from individual suppliers tests as high as 7·0 per cent.

Producer Prices

The Central Authority should be the final authority on prices to be paid to producers and also upon the methods of payment, but each Dairy Farmers' Co-operative Milk Supply Association should have a certain amount of autonomy in this respect in order to meet local conditions and the expressed wishes of their members as a whole. Recommendations from Supply Associations carried by an adequate majority in annual meeting on any proposed alterations to the methods of payment or of working should receive full consideration by the Central Authority.

The Commission's recommendations are as follows:—

(*a*) All permanent suppliers should be required on 1st September or some such convenient annual date to declare a daily quota of milk for the following twelve months. (This system operates in Christchurch and has proved to be the most successful of the systems at present operating. A typical agreement is set out in the Appendix):

(*b*) The proportion of the total of all quotas that is represented by total sales of liquid milk should be computed each month, and each supplier shall be paid for that same proportion of his declared quota at the rate fixed by the Central Authority:

(*c*) Cream rates should be paid on so much of the remaining portion of each supplier's quota as represents his due proportion of the amount of cream sales. Any surplus from cream sales over and above that necessary to pay the full amount of the quota should be paid to each supplier according to the proportions of each quota:

(*d*) All remaining milk supplied should be paid for at realization value—*i.e.*, manufacturing value:

(*e*) The full quota price fixed by the Central Authority for milk of high standard should be based on milk supplied from "accredited" herds. A deduction of, say, 0·5d. per gallon from such quota price should be made for milk supplied from herds which are not of "accredited" standard:

(*f*) Adequate penalties should be imposed by the Dairy Farmers' Co-operative Milk Supply Association on all milk graded below the standard finally determined by the Central Authority.

Seasonal Prices to Producers

The Commission has outlined the need for fixing seasonal prices to producers in order to discourage heavy summer surpluses and to encourage winter production. The Arbitration decisions in the matter of price to Wellington producers have recognized the high cost of winter production and have set a standard for payment of winter milk at approximately 80 per cent. more than payment for summer milk. The Commission is satisfied that a differential of approximately this amount is desirable in the interests of an adequate supply and recommends therefore:—

(1) That there be three periods of price to suppliers—namely, summer, autumn, and winter:

(2) That summer milk be paid for at approximately 2d. to 2½d. above the average butterfat value of the milk calculated at 19d. per pound:

(3) That autumn milk be paid for at a premium over summer milk of approximately 2d. to 3d. per gallon:

(4) That winter milk be paid for at the summer rate plus approximately 80 per cent.

The seasonal prices paid should, however, be sufficient to return an overall price of approximately 13·0d. per gallon for all milk supplied from "*accredited*" *herds* with *reasonably level supply*, and for milk with an average annual butterfat content of approximately 4·3 per cent. The average overall return should increase or decrease by 0·1d. for every 0·1 per cent. above or below the 4·3 per cent. standard.

Application of these Payments to each Metropolitan Area

Dunedin.—The present quota price to Dunedin suppliers is—

8·5d. per gallon for the months October to February inclusive:
10·0d. per gallon for the months March and April:
12·0d. per gallon for the months May and September:
12·5d. per gallon for the months June, July, and August.

10·3d. per gallon—the average annual quota payment.

The Commission recommends the adoption of three seasonal periods comprising :—

Summer, five months ; autumn, three months ; and winter, four months,

and distributed according to the months agreed upon between the Central Authority and the Dairy Farmers' Co-operative Milk Supply Association as representing typical Dunedin supply area seasons.

The Commission recommends that an immediate increase be made in the seasonal quota rates so as to provide prices in the 1943-44 season, as follows :—

	Per Gallon. d.
Summer	9·0
Autumn	11·0
Winter	17·0
Annual quota	12·2

These increases are, in the opinion of the Commission, urgently necessary to prevent further deterioration of the present position and to secure adequate supplies in the winter of 1944. The full payment could then be gradually secured as the general standard of supply improves to the point approved by the Central Authority as the desired standard.

Christchurch.—The present quota price to Christchurch suppliers is :—

9·0d. per gallon for the months September to February inclusive :

11·0d. per gallon for the months March and April :

14·5d. per gallon for the months May to August inclusive.

11·17d. per gallon = the average annual quota payment.

The Commission recommends that one summer month be taken and added to the autumn months, and an immediate increase be made in the annual quota rate to 12·2d. based on quota prices per gallon of 9·0d. summer, 11·0d. autumn, and 17·0d. for winter. This gives a similar payment to that recommended for Dunedin for the 1943-44 season, and again the full increase in price should accrue to the Christchurch producers in conformity with improvement in standard of supply.

Auckland.—The present quota prices for Auckland are :—

10·25d. per gallon for the months September to February inclusive :

14·25d. per gallon for the months March to August.

12·25d. per gallon = the average annual quota payment.

The Commission recommends that three seasonal periods be created—

Summer, six months ; autumn, two months ; and winter, four months.

For autumn, the months of February and March are suggested, and for winter the months of April to July inclusive.

In order to improve the winter supply position for 1944 and to adjust the annual quota rate to 12·5d. per gallon in order to accord with quota rates for Christchurch and Dunedin (based on Auckland's average test of 4·3 per cent. compared with 4·0 per cent. for Christchurch and Dunedin) the Commission recommends that an increase of 0·75d. per gallon be paid on the four months winter price for 1944. This should increase the present winter price for the months April to July inclusive to 15·0d. from the present level of 14·25d.

The Commission is of opinion that the present summer price of 10·25d. per gallon is high and is unduly attractive to the seasonal producer. When quota rates are being finally determined by the Central Authority consideration should be given to lowering the summer quota rate and increasing the winter rate accordingly.

All payments as recommended above to producers in Dunedin, Christchurch, and Auckland should be increased by the payment of, say, 0·5d. per gallon for milk used for liquid consumption and supplied from herds of " accredited " standard.

The " accrediting " of herds should proceed as soon as matters of organization and standards have been finally decided.

Wellington.—The Commission is of opinion that the terms of the statutory agreement between the Wellington City Council and the Wellington Dairy Farmers' Co-operative Association, Ltd., relating to the fixation of price are satisfactory as a proper basis for negotiation and agreement. Wellington producers, particularly in the 30-mile area, produce under conditions not entirely favourable to city-milk production, and the higher quota price received by these producers is, in the opinion of the Commission, justified. It should be pointed out that quota prices do not reflect the average price received by the producer for all milk supplied, and the Wellington Dairy Farmers' Co-operative Association, Ltd., average pay-out for the past two seasons has been approximately 12·5d. This is due in part to the influence of seasonal production and does not reflect the pay-out which would be received by a " level " supplier. The price for quota milk in the Wellington area is based mainly on the butterfat content of the milk and is calculated from the composite price for butter and cheese and thus accords with the Commission's recommendations regarding the guaranteed price for butterfat as a basis of the price calculations.

General Notes on Producer Prices

The Commission would make it clear that the approximate reward to producers fulfilling the requirements of a 365-day production of a *level supply* of *high-quality* milk—that is, from herds of " accredited " standards—should be approximately 13·0d. per gallon for *all milk produced.* Quota payments can only ensure that the portion supplied for sale as liquid milk will average approximately 13·0d. per gallon, and the Dairy Farmers' Milk Supply Association will be dependent on the economic disposal of surplus milk in order to build up the remaining portion. For this reason the Commission has recommended the granting of reasonable priority powers to the Supply Association over the supply of milk for all milk or milk products used in the metropolitan area in order to enable it to secure the economic disposal of as much of the necessary surplus as possible. Though the Commission has stressed the responsibility of the Supply Association to provide an adequate surplus, and the necessity of ensuring the fair spread of the cost of providing such surplus, it should be borne in mind that the real cost of surplus is rightly a charge on the consumer either directly through the price of retail milk or indirectly through some other milk product. If through lack of powers the Dairy Farmers' Milk Supply Association is unable to dispose of surplus milk economically through other milk products, then consideration must be given to recovering the cost through the selling price of milk retail and wholesale.

In order to enable the Central Authority to introduce the suggested improvements in methods of treatment and distribution and properly to assess margins through the examination of accounts after such reorganization, and at the same time to permit such a payment to be made to producers as will ensure adequate supplies, the provision of supplementary funds may be necessary. In the opinion of the Commission it would be most undesirable to alter retail consumer prices beyond the amounts suggested by the Commission until reorganization has been effected and final margins have been properly assessed by the Central Authority. If, however, an increase in the price of milk to the consumer is otherwise unavoidable, the Commission recommends the Government to consider the provision of a subsidy through the Central Authority as a temporary measure.

Price of Cream

The Commission has indicated the necessity for the price of all milk products produced from city-milk supply bearing its fair and appropriate share of the cost of the milk needed in their manufacture. All the arguments which apply to the necessity for drawing liquid-milk supplies from registered sheds under good standards apply with equal force to the cream consumed by the public. (Cream being normally 40 per cent. butterfat and 60 per cent. milk.) It is therefore important that cream-supplies be drawn from fully-licensed suppliers, and to that extent should carry the proper cost of the milk used in its manufacture.

The Commission recommends, therefore, that the price of cream be assessed by the Central Authority on the basis of the value of the milk comprised in its manufacture, with the addition of a reasonable margin to the vendor for treatment and distribution. Due allowance should, however, be made in arriving at the final price to prevent any increase in the retail price of such a magnitude as to cause a substantial reduction in consumption.

In summer the approximate total demand for all cream sales expressed in terms of milk, and as a total of all milk sales, is between 20 per cent. and 25 per cent. In winter the demand falls to approximately 15 per cent., so that it will be seen that a 10-per-cent. winter surplus should easily be absorbed at an economic price in cream sales, provided the price of cream is properly adjusted and the realization on such sales is equitably spread among all producers. This, again, stresses the need for a single producer organization to ensure equitable treatment as between producers.

The question of disposal of milk for other milk products is discussed in Chapter 9 under the section on balancing-stations.

Processing and Distribution Costs and Appropriate Margins

The discussion on processing and distribution costs can conveniently be separated into two headings—viz., processing, and distribution. As practically all the processing, including pasteurization, is carried out by companies it is unnecessary to consider the position of the individual vendor or producer-vendor under this heading.

Processing

In the investigation of processing costs considerable difficulty was encountered in correctly apportioning the various costs of the company to the various forms of cost incurred in the processing of milk. The books and accounts of at least two companies were excellently kept, and it is due largely to the assistance of these companies and to the initiative and energy of the investigating accountant that a reasonable approach to the actual costs was obtained. These can be summarized under the following headings:—

(*a*) *Cost of Treating.*—The manner in which the costs of pasteurizing and of bottling were arrived at are dealt with fully in the Appendix, but the following table summarizes the relative costs of pasteurization for the companies investigated. The Commission agreed that the information supplied would be treated as strictly confidential, and consequently no attempt is made in this table to indicate which were the firms concerned in the various items of cost.

Treating-costs, in Pence per Gallon

	A.	B.	C.	D.	E.
Wages	0·80	0·92	0·56	0·82	0·76
Fuel and power	0·12	0·27	0·07	0·38	0·13
Dairy materials	0·02	0·10	0·05	0·15	0·07
Factory-maintenance	0·31	0·37	0·06	0·08	0·08
Rates and water	0·04	0·04	0·01	0·15	0·02
Can-repairs	..	0·17	..	0·03	..
Depreciation	0·11	0·14	0·12	0·13	0·06
Wastage allowance	0·14	0·15	0·12	0·13	0·13
	1·54	2·16	0·99	1·87	1·25

The difference in the costs is due mainly to the type of plant employed and the efficiency of the personnel engaged in operating that plant.

From the above table it will be seen that a reasonable margin for pasteurizing would be approximately 1½d. per gallon, and the Commission recommends the adoption of this margin until such time as evidence is available to the Central Authority from the accounts to be collected confirming or amending this figure. The margin fixed by the Auckland Metropolitan Milk Council of 2⅛d. per gallon as the cost of pasteurizing is, in the opinion of the Commission, much too high and cannot be related to the actual costs as shown by the Commission's investigations.

The Commission is of opinion that at least three plants in Auckland, one plant in Christchurch, and three plants in Dunedin should be modernized, and with up-to-date equipment it should be possible to reduce pasteurizing-costs to the margin suggested. The Central Authority should by the future systematic collection of accounts properly kept, be able to decide the justice of the margins recommended by the Commission.

(*b*) *Costs of Bottling.*—The following table sets out the costs of bottling for those companies which were able to supply the necessary information. The assessment of these costs was not an easy task, and the figures, whilst reasonably reliable, must nevertheless be regarded in some respects as an approximation:—

Bottling-costs, in Pence per Gallon

	A.	B.	C.	D.	E.
Wages	1·24	0·63	0·82	1·54	0·89
Fuel and power	0·23	0·14	0·11	0·29	0·17
Dairy materials and caps	0·45	0·33	0·47	0·57	0·65
Bottles	1·02	0·28	0·52	0·64	0·65
Factory-maintenance	0·06	0·40	0·08	0·04	0·09
Rates and water	0·06	0·04	0·03	0·10	0·05
Depreciation	0·06	0·14	0·16	0·08	0·13
Wastage allowance	0·07	0·11	0·06	0·06	0·07
	3·19	2·07	2·25	3·32	2·70

NOTE. The companies are shown in the same order as in the table on treating-costs.

It is very difficult to separate the costs of bottling cream from the costs of bottling milk, but an approximation to the respective costs has been made (see Appendix). Because of the impossibility of obtaining data on the breakages incurred on the rounds or non-return of bottles, all losses on milk-bottles have been charged as wastage in the factory.

The Commission is of opinion that the consumer should pay for the initial cost of the bottle, and for all replacements required by him. This should result in a saving of something approaching ½d. per gallon to all the companies outside Wellington. One particular company with a retail daily distribution of 1,026 gallons claimed in evidence that its estimated loss through breakages by the consumer and the non-return of bottles by the consumer was approximately £600 per annum. Consumer representatives at all hearings were in full agreement that it would be reasonable to ask the consumer to stand the initial cost of the bottle and of all subsequent breakages.

The Commission recommends the adoption of 2·0d. per gallon as the appropriate margin for the bottling of milk, but recognizes that such a margin will involve considerable savings on present costs.

These savings can be assisted in two ways: —

(*a*) By the consumer paying for the bottle:

(*b*) By a higher output of bottled milk.

Should these savings be insufficient to reduce the margin to 2·0d. per gallon, then the Commission recommends that consideration be given by the Government to a subsidy on milk-bottles, in the interests of economy of processing and distributing bottled milk.

The Commission's opinions on the necessity for distribution of milk in sealed containers are set out in Chapters 11 and 12.

COSTS OF DISTRIBUTION

Distribution-costs must be considered under two headings:—

(*a*) Distribution-costs of companies:

(*b*) Distribution-costs of individual vendors, with whom producer-vendors are closely associated.

(*a*) *Distribution-costs of Companies*

Here again considerable difficulty was encountered in correctly allocating and apportioning costs to the actual distribution of retail milk. On a number of rounds a certain amount of wholesale milk is delivered, and on all rounds a certain amount of cream is delivered, particularly at the week-ends. Exactly how much of the distribution-cost should be apportioned to these respective deliveries it is difficult to decide, but after discussion with the principal companies the Commission has decided that the cost of cream-distribution could be reckoned on the basis of the distribution-cost of a quarter-pint of cream being equal to the cost of distributing 1 pint of milk. On the question of the cost of delivering wholesale milk on a retail round an apportionment has been made in keeping with the volume of wholesale milk delivered, and the relative cost of delivering such quantity. The following table sets out the distribution-costs of the principal companies engaged in retail distribution. The Wellington City Council, because mention has been made elsewhere of its low cost of distribution, is indicated in the table: —

Distribution-costs, in Pence per Gallon

	Wellington Municipal Milk Dept.	W.	X.	Y.	Z.
Wages	3·65	6·05	5·60	3·40	5·90
Transport	1·54	2·46	1·67	2·57	1·79
Overhead	1·78	2·19	1·58	2·06	1·24
	6·97	10·70	8·85	8·03	8·93
Less credit for handling cream, &c.	0·54	0·28	0·63	0·38	0·14
	6·43	10·42	8·22	7·65	8·79

The chief item in distribution-costs is the cost of labour, and some comment should be made on this point concerning the different conditions obtaining in the different centres:—

(1) *Auckland.*—In Auckland an award rate of £5 10s. per week is payable for a forty-hour week of five days (the investigating accountant, in his report, included in the Appendix, has compiled a standard labour-cost per gallon of milk delivered retail under present Auckland conditions). The hours of delivery do not permit the roundsmen to work anything like forty hours, and these hours have been set (*a*) as to starting-time under the provisions of the Shops and Offices Act, and (*b*) as to finishing-time by the Metropolitan Milk Council, so that it is impossible for the milk roundsmen to work more than approximately four and a half hours on actual delivery. This is in contrast to the position in Wellington, where the delivery time is approximately seven hours per roundsman.

The Commission is of opinion that consideration should be given to the question of extending delivery-time in Auckland to permit of the roundsmen working their full forty hours, either by continuing delivery until a later hour or by commencing earlier and receiving night rates. This would then achieve the objective of a greater gallonage per man and so reduce the costs of distribution.

The delivery of a greater number of gallons per man is associated not only with a direct saving in labour-costs, but, because of fewer rounds, would result in savings on transport and all other costs associated with a round.

A further point affecting costs of distribution is the amount of milk delivered per call or, as it would be in most cases, per household. Accurate and detailed figures are difficult to obtain, but the Commission has been able to obtain general information indicating the following position for retail distribution:—

Wellington	2·13 pints per customer.
Hutt Valley	2·25 pints per customer.
Auckland	1·78 pints per customer.
Christchurch	1·95 pints per customer.
Dunedin	1·91 pints per customer.

The lower delivery figure for Auckland would be a contributing factor to the higher cost of retail distribution. The stepping-up of the *per capita* consumption to at least 1 pint per head would assist to a limited extent in lowering distribution-costs.

Another factor which has played a considerable part in increasing the cost of labour in Auckland is the fact that there has been considerable difficulty in obtaining roundsmen and, in many cases, high costs of overtime have been incurred. This is particularly so in the case of one firm whose accounts were investigated at the instigation of the Auckland Metropolitan Milk Council, and the distribution-costs were found to be approximately 11·5d. per gallon. This cost, however, was burdened to a very considerable extent by unduly high wage-costs due to overtime and the training of new men, so that the action of the Auckland Metropolitan Milk Council in moving the cost of delivery from 8d. to 10d. in the summer of 1941 cannot be accepted as typical of present distribution-costs or as indicating that distribution-costs as a whole had moved up to that level. One firm whose accounts were examined by the investigating accountant had incurred a total of over £500 during an eight months' period in avoidable overtime costs. Another firm incurred £322 in a six-month period.

The Commission is of opinion that if hours of distribution could be adjusted to permit of all roundsmen working full award hours on delivery, then with the savings that have been achieved through front-gate delivery and zoning, and that should accrue with the delivery of all bottled milk, a cost of 9d. to 9½d. per gallon would be an adequate margin to allow for the cost of retail distribution.

A further question of considerable importance is the method of payment for milk. At the present time the roundsman spends approximately three hours per week collecting accounts. If the Metropolitan Milk Council in each area were given authority to issue tokens as is done by the Wellington Municipal Milk Department, the cost of collecting accounts would be completely avoided and considerable savings would accrue to the company, both in the matter of bad debts and in the cost of keeping and collecting accounts.

It is the recommendation of the Commission, therefore, that the question of token payment for milk be thoroughly investigated, and, if practicable, powers be given to the Milk Councils to adopt this system. It is further of the opinion that the payment by the Wellington Milk Department of a commission of 2½ per cent. on the sale of tokens is too high, and as the sale is a service rendered to customers by retail shops this commission could, in the interests of economy of milk distribution, be reduced to, say, 1 per cent. or 1½ per cent.

(2) *Wellington.* Distribution-costs in Wellington are particularly low, mainly because of the system of distribution adopted and the high retail gallonage delivered per roundsman. This low cost strongly emphasizes the value of centralization either by a municipal enterprise or by general co-operative action of existing distributing interests. Centralization by co-operation between existing distributors is a matter which merits serious consideration by the Milk Councils in other areas with a view to cheapening the cost of delivery.

In Wellington a system is operated under which feeder trucks go out to the suburbs and keep each roundsman fully supplied with all the milk he requires. By this means the tremendous achievement of 120 gallons per roundsman has been obtained.

The Commission can see no reason why distribution in Wellington is any easier than in other areas. There are more hills, the suburbs are scattered, and the problems are the same as in the other areas. With proper organization, longer delivery-hours for the roundsmen, and consideration of the most efficient means of transport the Commission can see no reason why the costs of distribution should not be cheapened—that is, except in the case of Wellington.

(3) *Christchurch.*—Motor-vehicles are the main type of transport used, chiefly because of the difficulty with ice on the roads in winter. The average gallonage per round is approximately 85 and there is no doubt that further improvement along the lines mentioned in the case of Wellington could be affected with proper organization.

One particular firm which had been permitted to charge a higher rate for retail milk, because of circumstances connected with the quality of the milk, has stated a special case to the Commission. Difficulties were encountered by the firm when men were released for the Armed Forces and girls had to take over the retail distribution; but, whilst being fully sympathetic with this particular case, the Commission is of opinion that it has no power under its order of reference to direct any special attention to a differential price for any particular distributor. The Commission is also in principle opposed to differential prices for retail milk on the grounds that all milk should be of a uniformly high standard.

(4) *Dunedin.*—Dunedin distribution-costs are similar to those in Christchurch, but the system of distribution presents a new problem. It is the practice in Dunedin for distributors to engage the services of boys, one or more of whom attend a distributing vehicle in company with the driver and assist in the vending. The boys are paid a wage varying from 10s. to approximately 30s. per week, and, although the system appears to have worked satisfactorily, the Commission attaches weight to the objections stated by the consumer representative in Dunedin, and considers that there are good grounds for objection in principle to such a practice. Proper organization, as in the case of Wellington, would place the distributing trade on a sound basis and would eliminate the necessity for the employment of boys under conditions which, particularly in winter, must certainly be severe.

(5) *Hutt City.*—The problem of milk-distribution in the Hutt Valley and bays area necessitates special and separate attention. All milk distributed in the Hutt is distributed unpasteurized, and,

though at one time a small portion was distributed in bottles, at the present time it is all distributed loose. Complaints have been made by the Health Department concerning the quality of milk in the Hutt, and criticism has been encountered in this direction. At the same time it is difficult to decide just where the responsibility for this unsatisfactory milk lies. The Wellington Dairy Farmers' Co-operative Association, Ltd., which is the main source of supply to the Hutt City vendors, has set a high standard in the quality of milk delivered to the Wellington City Council, and it is difficult to see why the quality of the milk delivered to the Hutt vendors should differ in this respect. At the same time it does appear that the receiving depot for milk in the Hutt and the can-washing facilities are by no means good. The Wellington Dairy Farmers' Co-operative Association, Ltd., have indicated that they intend to carry out considerable improvements in this direction, but the Commission is of opinion that adequate consideration should be given to the question of whether a pasteurizing-plant should be established for the Hutt Valley and bays area. The vendors in this area, being individual vendors, come under the discussion which follows on vendors generally.

Summarizing, the Commission's recommendations as to margins for treating and distributing companies, on the assumption that all the savings outlined properly accrue to the treating-house or vendor, are as follows:—

	Auckland.	Christchurch.	Dunedin.	Wellington.
	d.	d.	d.	d.
Cost of pasteurizing	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2*
Cost of bottling	2	2	2	2
Cost of distributing	$9\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$6\frac{3}{4}$

* Including cost of Rahui.

The Commission is opposed to the practice of the retail distribution of pasteurized loose milk and is not prepared to recommend that a special margin be allowed to vendors to distribute this type of milk. In the appropriate section the Commission has stated the case for all pasteurized milk purchased by vendors being bottled.

(*b*) *Individual Vendors' Distribution Costs*

The problem with individual vendors in each area is, roughly, the same, and there is little need to discuss the application of the Commission's findings separately for each area. The margin for the vendor in each area, except Auckland, has been fixed by the cost of treating and distributing pasteurized bottled milk, so that the vendor of loose raw milk retains the full unearned margin of the cost of pasteurizing and bottling. The Commission can see no reason whatever, and the vendors in evidence have advanced no good reason, why this margin should be retained by the vendor. In Auckland the Metropolitan Milk Council has overcome the difficulty by requiring the vendor to pay the particular margin to the producer, but this is paid to an individual producer and it does not follow by any means that the producer himself has done anything to earn the margin in question. The Milk Council in Auckland submitted that because his milk is of higher standard than that of producers generally the individual producer had done something to earn the margin, but there was little or no evidence to support this submission. Consequently, the Commission is of opinion that the appropriate unearned margins should be paid by the individual vendors to the Dairy Farmers' Co-operative Supply Association for the general improvement of the milk standard for the district as a whole. If the vendor is purchasing milk through a treating and distributing house, he would be purchasing bottled pasteurized milk, and in such case there would be no unearned margin. If the vendor purchases his milk from the Supply Association he will automatically pay any unearned margin, plus the quota cost of the milk, to the Supply Association.

Typical costs for an individual vendor are shown in the Appendix. From these costs it will be seen that the present margins of 10d. in Auckland, and between 12d. and 13d. in Hutt, Christchurch, and Dunedin, is greatly in excess of the actual cost plus a reasonable allowance for interest on capital invested. Consequently the Commission recommends that the Central Authority examine this question with a view to reducing the margin to an appropriate level. The Central Authority should, in so doing, assess a reasonable return as interest on capital invested, but should endeavour to eliminate goodwill altogether or to reduce it to a minimum in any consideration of margins. If interest on goodwill were to be allowed in costs of distribution, then increasing margins would command increasing goodwills, and a spiralling cost would result.

If possible, small rounds should be consolidated, and consideration might well be given either to co-operative distribution by existing interests or, if serious difficulties were encountered in securing distribution at a margin of not more than $9\frac{1}{2}$d., then the Milk Council should consider organizing distribution in co-operation with existing interests.

It is worth while at this point making a comparison between the producer who produces 60 gallons and the vendor who vends 60 gallons: —

	Producer.	Vendor.
Capital required	£4,400	£725
Number of labour units required	2	1

There can be little doubt that the labour units on the supply farm each work considerably longer hours than the vendor of 60 gallons. The expenses of producing 60 gallons thus involve not only many times the capital costs of vending 60 gallons, but must also include considerably more than twice the number of labour-hours.

Consequently it is difficult to determine why the individual vendor should secure the same margin, and in many cases a greater margin, than goes to the producer and his assistant as the gross return for producing 60 gallons. Vendors have claimed that a gallonage of 50 gallons per round is a reasonable round to take as a standard, but the Commission is unable to accept this figure. Sixty gallons is itself a relatively small round considering the time involved in the actual vending and attention to the affairs of the round. If the Commission allows a greater margin to the vendor it becomes difficult to assess a reasonable reward to the producer, and, whilst a comparison on these lines must of necessity take into full consideration the different conditions of country and city costs, the Commission is satisfied that a better apportionment of returns would be a return of approximately 13d. per gallon gross reward to the producer for all milk sold, and approximately 9d. to the vendor for his labour and administration in delivering 60 gallons.

In Auckland the Metropolitan Milk Council has adequately safeguarded this position by allowing the vendor only the same vending margin as is allowed to any company.

On the question of goodwills the Commission has been able to obtain little accurate information, but from all evidence presented it is clear that very high values prevail for goodwills at the present time. In Auckland the evidence indicates that goodwill is valued at approximately £10 to £12 per gallon, and as the individual vendor's margin in Auckland is lower than in any other area it is safe to assume that this value is at least an approximation of what must be the position in the other areas. When one considers that £600 to £720 must be paid as goodwill before the cost of taking over the 60-gallon round is even considered, it will be seen that more than adequate profit margins exist. The Commission is of opinion that something should be done to control the value of goodwill on the sale of rounds, and, if possible, the Milk Councils, which, as in Auckland, should have power to purchase a round at a standard goodwill value of not more than £10 per gallon, should exercise their powers whenever it is in the interests of consolidation of existing rounds and with a view to the future organization of distribution. It may well be that the sale of future rounds should be co-incident with a reduction in the number of individual vendors and the increase of the distributing trade of the more efficient units at present in existence in that area.

The question of front-gate delivery has been raised in the various areas, and the Commission is of opinion that, although this was introduced in some areas as a specific war measure, it is a practice which should be continued after the cessation of hostilities. It is not a difficult matter for consumers to arrange proper receptacles at the front gate for the receipt of milk, and it certainly results in considerable economies in distribution. Special consideration should, however, rightly be given, as it is in Auckland, to requests by invalids and nursing mothers for a delivery of milk to the front door.

Savings on Distribution

Economies in distribution have been achieved in each centre through the effect of zoning and front-gate delivery, but as in each case the vendors have claimed that their costs have been forced up owing to circumstances associated with the general increase in costs due to the war, and these savings have not been passed on to the consumer. Under the Commission's recommendations considerable importance is attached to the setting-up of a Central Authority to organize the proper collection of costs and other statistical data. This work should be continuous and would then indicate where savings could be made, what were adequate margins, and whether the price could be reduced to the consumer. If this were done, the consumer would then be assured that any savings made by the distributing firms, through economies effected by the consumer himself, would be passed on to him. The Commission is strongly of opinion that if the consumer foregoes any rights he should be fully safeguarded in the cost of the commodity being distributed. However, the setting-up of a Central Authority will undoubtedly have much to do with the general success of any reorganization and should result in a proper safeguard of the position of the consumer, both as regards quality and price.

In the meantime the Commission is satisfied that a policy of fixing margins on a reasonably narrow basis is essential in order to enforce the maximum efficiency by companies engaged in treatment and/or distribution of milk. The Central Authority, with its continuous survey of accounts, can quite well function as an Adjusting Authority in case any great hardship has been caused by the adoption of the margins now recommended by the Commission.

The proper and continuous control of collection of costs and data from the production, collection, treatment, and distribution sections of the town-milk industry will do much to control the efficiency and smooth working of the various sections. The Commission is most emphatic in its opinion that inefficient methods and waste, distrust and suspicion between producer and vendor, bargaining for prices and unrestricted competition are evils in the milk industry, which, in view of its national importance to health, must not be allowed to continue.

Wholesale Prices

Wholesale prices for milk vary widely between the different centres, and, whilst fixed at a reasonable level in Wellington and Auckland, a policy of cut-price competition has forced them down to a low level in Christchurch and Dunedin.

The following table gives some indication of the range in prices and margins for summer and winter contracts in the four main areas:—

	Range of Wholesale Prices.	Price to Producers, in Pence per Gallon.
Auckland—	s. d. s. d.	d.
Summer	1 $3\frac{3}{4}$ to 1 11	10·25
Winter	1 $7\frac{3}{4}$ to 2 3	14·25
Wellington—		
Summer	1 6 to 1 9	10·54 (approx.).
Winter	1 8 to 1 11	12·92 and 19·31
Christchurch—		
Summer	1 2 to 1 8	9·00
Winter	1 2 to 1 8	11·00 and 14·5
Dunedin		
Summer	1 1 to 1 7	8·5 and 10·0
Winter	1 2 to 1 9	12·0 and 12·5

(Excluding milk sold for ice-cream.)

From a strict accountancy viewpoint it is extremely difficult to check what is the actual cost of distributing wholesale milk, but it is clear that under a system of keen competition, trade rivalry, and the attempt to secure wholesale contracts in order to build up the volume of milk being treated to an economic maximum, firms are tempted to quote prices which leave little or no margin of profit. The cost is then borne by the retail milk, and to that extent the consumer is likely to be subsidizing, in a mild form, the price of wholesale milk.

On the other hand, a system of price-fixation such as obtains in Auckland and Wellington whereby wholesale prices are fixed at a certain margin below retail prices and allowed to move up in accordance with upward movements in retail prices might possibly tempt distributors to build up retail costs as much as possible in order to extend the margin on wholesale.

A proper basis of costing for all treating and distributing companies is essential to ensure that costs are properly apportioned, and the Commission has recommended a conference of the executives concerned to determine this basis. The Central Authority will then be in a position to follow movements in costs and so to order in an equitable manner the margins necessary to ensure a fair return of profit. There should, if anything, be some slight loading on wholesale rates in order to keep retail margins at an absolute minimum. Certainly the reverse position is most undesirable.

School Milk

The rates for school milk should be properly assessed on the wholesale cost of milk and should not continue to operate on what has been to some extent an assumption that school milk is a means of getting rid of surplus milk. The cost should be based on a 365-day-a-year contract basis, with a proper allowance by the Supply Association for the realization value of the milk for week-ends and holidays.

Milk-bars

It has been the practice up to the present in certain areas to sell to milk-bars at a cut wholesale rate. The Commission can see no valid reason why milk-bars should not pay wholesale rates in strict accord with the standard scale, and recommends accordingly. The practice of concessions by way of discounts should also be avoided by proper use of standard payments.

Milk-shops

Margins of profit to milk-shops should be reconsidered in the light of distribution-costs, and, in view of the relatively small gallonages being vended by many such shops (several witnesses suggested that in many cases a milk license was chiefly a convenient means of securing week-end and after-hour trading), some reduction of margin ought to be considered.

The Commission is of the opinion that all milk-shops should be required to have refrigeration facilities and to buy bottled pasteurized milk, and that an appropriate margin would be 4d. per gallon.

Milk-bars, hotels, restaurants, and boardinghouses should receive quantitative discounts strictly in keeping with the amount purchased. The Commission can see no reason for delivering milk in quantities of 2 gallons or less to such institutions at prices below those charged to private householders. Those receiving more than 2 gallons should receive discounts in strict accordance with the quantitative scale determined by the Central Authority.

The Commission recommends, therefore, that an early duty of the Central Authority should be the examination of margins on wholesale distribution of milk and their proper standardization.

CONSUMER PRICES

The final objective of the Commission's task is to ensure that the price to the consumer shall be reasonable. This must of necessity be related to the strict costs of producing, collecting, treating, and distributing milk of a high standard, and a description has already been given of the Commission's opinion on this matter. The cost to the consumer must therefore be based on the cost of bottled pasteurized milk, and, in order to prevent the sales of this class of milk being prejudiced by the economic competition of loose raw milk, it is recommended that the price of all classes of retail milk be the same price to the consumer.

Auckland

The only area in which differential retail prices have been fixed for bottled and loose milk is in Auckland, where bottled milk is charged for at ½d. per quart more than loose milk. This has not always been the position, and it is interesting to note the statement contained in the submission of Ambury's Ltd., the biggest retail vending establishment: —

> "Holding firmly to the view that all milk should not only be pasteurized, but also bottled, the company in 1924 pioneered the bottling of milk on a large scale. A large factory was built and equipped for the purpose of bottling all milk. The business was reorganized to handle only bottled milk on the retail rounds, and the policy of selling no 'loose' milk was adopted. The public reacted favourably, and the trade of the company grew rapidly. After several years, however, it was found that the cost of bottling was so high that the price had to be increased by one halfpenny per quart above the price then ruling for 'loose' milk. The result was a fall in demand almost as rapid as the rise which occurred on the introduction of bottling, proof that the public was more interested in price than in quality."

It is to this firm's credit that of its present retail sales approximately 60 per cent. is bottled milk, but the statement is striking commentary on the power of economic competition in deciding public acceptance of grades of milk.

So as to restore the prices of bottled and loose milk to the same level and yet to make no overall increase in the price of retail milk the Commission recommends that prevailing summer prices per quart of 6d. for loose milk and 6½d. for bottled be standardized at 6½d. and that the winter prices of 7d. for loose and 7½d. for bottled be standardized at 7d. per quart for both.

The Commission further recommends that consideration be given to charging the proper cost for half-pint bottles or to restricting retail sales to pint and quart bottles, at least as a wartime measure. The use of half-pint bottles is mainly confined to offices and a few households, but the cost of 2d. per half-pint is not a true cost of the article delivered. It is considered that little or no hardship would be caused by requiring a minimum of 1 pint to be paid for as in the case of Wellington consumers, and the savings in expense of bottles and cost to the distributor would justify such action. Most vendors have put forward this case to the Commission, and, whilst viewing it favourably, the Commission recommends that further investigation be made and the appropriate action taken by the Central Authority.

Wellington

In Wellington consumer prices are 6½d. per quart for the summer period and 7d. per quart for the winter period. It has been the policy of the Council to extend the winter period beyond the six months if in its opinion the state of its revenue account warranted such action. The Commission is of opinion, however, that the very healthy financial position of the Milk Department does not warrant any such action at the present time, and recommends that power to vary retail prices by extension of the winter period be vested solely in the Central Authority as part of its price-fixing powers.

Christchurch

Retail prices in Christchurch are 6d. per quart for the whole year, and these prices are low compared with other areas. The adjustment of producer prices on the basis outlined may necessitate some adjustment of the retail price. On the other hand, wholesale prices are very low in Christchurch, and it may be that some adjustment of these to a standard figure may help to meet the situation. If the introduction of economies to the vending companies, such as payment for bottles by the consumer, adjustment of prices to milk-shops, hotels, and restaurants, savings due to improved distributing facilities, token system, and proper adjustment of all wholesale rates, fails to meet the changed situation consequent on higher producer prices and adjustment of cream margins, then the Commission recommends proper adjustment for the retail price to 6d. per quart for a summer period of, say, four months and 6½d. per quart for a winter period of, say, eight months (see also "Notes on Short-term Policy"). The Commission is of opinion that the adjustment of retail prices to 6½d. per quart for the whole year may ultimately be found necessary in order to provide reasonable margins for processing and distribution and an adequate price to producers for supplies of high standard.

Dunedin

This city has a graded scale of retail prices according to the amount purchased by the consumer. The scale is as follows:—

	Quantities.								
	½ Pint.	1 Pint.	2 Pints.	3 Pints.	4 Pints.	5 Pints.	6 Pints.	7 Pints.	8 Pints.
	d.	d.	d.	d.	s. d.	s. d.	s. d.	s. d.	s. d.
Summer ..	2	3	6	9	0 11	1 2	1 4	1 6	1 8
Winter ..	2	3½	7	10½	1 1	1 4	1 6	1 8	1 11

The Commission can see no adequate reason why small retail quantities should be graded in this manner, and therefore recommends that the full retail price apply to all quantities delivered retail. The price recommended is 6½d. per quart for the major part of the year and 6d. per quart for the remainder, depending upon the decision of the Central Authority as to the amount necessary to meet producer prices and margins for processing and distribution.

The price of milk to milk-shops, hotels, restaurants, &c., should be adjusted to standard rates and the operation of all economies closely watched by the Central Authority.

ADJUSTMENTS IN CONSUMER PRICES

The Commission recommends that the Central Authority give full consideration to the method at present in use whereby a halfpenny per quart difference between summer and winter price is used as a means of levelling up small increases of cost, either incurred in the producer's price or by an increase in vendor's costs. This system of adjustment may have to be used in all areas until stability in prices and margins is reached. Wellington City Council, for instance, has so used the halfpenny differential. By extending the months of higher or lower price small increases in cost or small economies in processing and distribution can be passed on to the consumer in an equitable manner. Provision for alteration of the higher-price period must, however, be the sole responsibility of the Central Authority after due examination of the submission of the local authority, otherwise the system is open to abuse.

The Central Authority would, however, need to pay careful attention in all centres to any proposed alteration of retail prices. The Commission has had to make its recommendations upon cost data and statistical information, which should be subject to further examination over an extended period and under the changed conditions envisaged by the Commission. Furthermore, the Commission has had evidence on profits made by treating and distributing companies which compels attention to the need for more efficient working by the less profitable concerns, and is satisfied that adequate profits can still be made by efficient concerns operating on the margins outlined in this report.

PROFIT MARGINS AND CAPITALIZATION

A matter of considerable importance in any investigation into the circumstances of the liquid-milk industry concerns the margin of profit being earned and the capital involved.

The work of the investigating accountant has disclosed a number of interesting facts concerning these matters. Information has been obtained on the profit margins on retail sales and capital involved in relation to the type of trade—that is, volume of wholesale and retail trade.

The following are the profit margins earned per gallon on retail sales of milk by five typical processing and distributing companies (for obvious reasons the identity of the companies is not disclosed): 1·21d., 1·17d., 0·45d., 1·13d., 0·04d. Because of the involved nature of the wholesale trade, including as it does sales of milk and cream not only for liquid consumption but also for manufacturing purposes, it is not possible to state the profit margin per gallon with any reasonable accuracy.

Some indication of the total profits earned by processing and distributing companies can, however, be given by stating such profits as a return on shareholder funds invested in the business, after provision for all taxation. Details are given below of the range of profits in a number of representative companies. In each case the figures refer to the latest balance-sheets of the companies. Four companies with a large volume of retail trade, including bottled pasteurized milk, show percentages of profit available for distribution to shareholders as follows:—

3·44 per cent. on shareholders' funds.
4·14 per cent. on shareholders' funds.
11·4 per cent. on shareholders' funds.
12·5 per cent. on shareholders' funds.

Two companies specializing in wholesale trade show similar profit percentages of—

100·0 per cent. on shareholders' funds.
26·6 per cent. on shareholders' funds.

Only one of all the companies operating in the four metropolitan areas shows a loss on the year's trading, and this was due to exceptional circumstances.

Wellington City Corporation show a profit for their Milk Department of £28,702 after setting aside £5,723 as addition to the Sinking Fund.

The profit margins mentioned above could be expected to continue provided the volume of wholesale and retail business is maintained and costs remain static.

The Commission recommends that processing and distributing margins be adjusted to permit of a profit of 0·5d. per gallon on all milk sold, and the table set out on the following page gives some indication of the adequacy of such a margin. For this purpose the 1942 43 season's sales have been used as a base.

The standard profits calculated at 0·5d. per gallon have been assessed on those sales of milk on which a profit margin of 0·5d. is likely to be maintained in practice. For instance, sales of treated milk to vendors for resale have not been included.

This table indicates that if these companies are able to earn the standard margin of 0·5d. per gallon on all milk sales, then the yield to the bigger companies will represent a return of approximately 4½ per cent. on the shareholder funds.

It is important to note from this table that the volume of retail trade bears a direct relationship with the amount of capital needed in the business. A relatively small capital is needed for companies dealing mainly in wholesale milk, and the comparisons between companies F and G and also between H and J afford striking examples of the capitals needed to carry on wholesale as distinct from retail business, and the rewards on capital in the respective trades.

All companies, A, B, C, and D, are capable of processing and bottling the whole of the milk delivered retail, and the size of the capital employed indicates that approximately £32,000 is in all probability an economic unit in the processing and distributing of milk.

Table showing (1) Approximate Shareholders' Funds (i.e., *Paid-up Capital plus Reserves in use*) *; (2) Sales in Gallons (both Wholesale and Retail), for Twelve Months ended 31st March, 1943 ; (3) Percentages of Wholesale and Retail Sales to Total Sales ; (4) Profits on Above Sales at Standard Margin of ½d. per Gallon ; (5) Taxation at Current Rates on these Profits ; (6) Amount available for Dividends ; (7) Return on Shareholders' Funds.*

Company	A.	B.	C.	D.	Wellington City Milk Department.	F.	G.	H.	J.
1. Shareholders' funds	£31,900	£33,250	£26,100	£38,000	..	£5,000	£800	£5,500	£1,200
Approximate capital in use	..	..	..	..	£165,000	..	..	..	..
2. Sales, in gallons—									
Wholesale and schools	535,444	1,060,251	965,418	824,673	1,606,279	5,200	244,899	197,301	267,937
Retail	344,515	292,316	765,787	697,625	2,277,369	155,638	16,250	155,307	56,250
Total sales ..	879,959	1,352,567	1,731,205	1,522,298	3,883,648	160,838	261,149	352,608	324,187
3. Percentages of sales to total—									
Wholesale	60·7	78·3	55·7	54·1	41·4	3·3	93·7	55·9	82·6
Retail	39·3	21·7	44·3	45·9	58·6	96·7	6·3	44·1	17·4
Total sales ..	100	100	100	100	100	100	100	100	100
4. Profits at ½d. per gallon ..	£1,833	£2,818	£3,606	£3,171	£8,090	£335	£544	£735	£675
5. Less taxation	£721	£1,263	£1,774	£1,483	..	£104	£175	£244	£222
6. Profits available for dividends	£1,112	£1,555	£1,832	£1,688	..	£231	£369	£491	£453
Profits available to meet interest and Sinking Fund	..	..	..	..	£8,090				
7. Return on shareholders' funds (per cent.)	3·49	4·67	7·02	4·45	..	4·62	46·12	8·92	37·75

	£
Interest paid twelve months to March, 1943	4,512
Amount required for Sinking Fund in March, 1943	5,723
	£10,235

Notes on Short-term Provisions

The following table sets out the position as it is likely to exist if the Commission's immediate recommendations as to prices and margins are adopted :—

	Prices, in Pence per Gallon.			
	Auckland.	Christchurch.	Dunedin.	Wellington.
Producer quota price	12·500	12·200	12·20	14·00 (app.)
Cartage	0·860	0·750	1·125	1·50
Levy (say)	0·125	0·125	0·125	Nil
Payment to supply organization ..	13·485	13·075	13·450	15·50
Standard costs—				
Treatment	1·50	1·50	1·50	2·00*
Bottling	2·00	2·00	2·00	2·00
Distribution	9·50	8·25	8·25	6·75
Profit margin allowance ..	0·50	0·50	0·50	0·50
Selling-price	26·985	25·325	25·70	26·75
1942 43 price of bottled pasteurized milk	28·00	24·00	25·00	27·796

* Includes cost of maintaining Rahui.

The above table shows a reduced levy to the Auckland Metropolitan Milk Council of 0·125d. per gallon in place of the previous levy of 0·25d. If a Dairy Farmers' Co-operative Milk Supply Association is set up in the Auckland area, then the expenses of the Milk Council will probably be adequately met by a levy of 0·125d. per gallon.

Producer Prices

The prices payable to producers indicated in the above table are the annual quota prices recommended by the Commission as the minimum increase for immediate application. In the opinion of the Commission these increases are urgently necessary in the case of both Christchurch and Dunedin if adequate supplies are to be assured for the winter of 1944 (see discussion in Chapter 8 on prices to producers).

In Dunedin this increase in price applies to a slight extent to the summer price, to a greater extent to the autumn price, and the major portion of the adjustment in the quota rate applies to the winter-period price. Unless producers can be immediately assured of an adequate price for the winter of 1944 the Commission is of opinion that a deterioration of the present position is likely to continue.

In Christchurch no adjustment is recommended to the summer and autumn quota prices, but an extension of the winter period from four to five months and a similar winter price as for Dunedin is recommended by the Commission as necessary as an immediate assurance to producers and in order to ensure adequate supplies for the winter of 1944.

In Auckland an adjustment of the quota price amounting to an increase of one farthing per gallon is recommended, so as to place Auckland quota rates on the same basis (after adjustment for the difference in average butterfat content) as for Dunedin and Christchurch. This increase should be added to the winter price for 1944 in order to encourage winter production and assure supplies. This adjustment would increase the present winter price for the months April to July inclusive to 15·0d. per gallon.

In Wellington no alteration is recommended by the Commission to the present system of price-fixation, except that any future adjustment of prices should be the function of the Central Authority.

Announcement of an increase in the producer price for the winter of 1944 for the Dunedin, Christchurch, and Auckland supply areas should, in the opinion of the Commission, be made at the earliest possible moment in order that the prospective winter-supply position for 1944 may be materially improved.

The Commission has indicated that producer prices will need to be further increased as soon as conditions of organization have been completed and payment on quality becomes possible. This further increase in payment should be adjusted partly by the bonus payment for "accredited" herds and partly as the necessary overall increase due to improvement in general standards of quality, including butterfat content.

Dairy-farm Costs Allowance, 1943

The Government has recently granted a dairy-farm costs allowance of 0·767d. per pound butterfat to dairy-factory suppliers for increases in farm-working and maintenance costs sustained since the 1938–39 season. The Commission's basic cost for city-milk production of 13·0d. per gallon has been calculated on the 1938–39 guaranteed price plus the 0·61d. per pound butterfat allowance granted in the 1942–43 season and does not take into consideration this recent allowance. Stability in prices between dairy-factory suppliers and city-milk suppliers must be maintained in order to retain stability in the supply of liquid milk, and as city-milk suppliers have incurred similar increases in farm-working and maintenance costs the Commission recommends that the effect of this increase should be taken into full consideration by the Government.

This increase in cost is a stabilization expense, and its adjustment would not affect vendor margins or consumer prices, but would be a direct allowance on farm-costs by the Government to the producer.

Consumer Prices

Auckland

The Commission's recommendations include a reduction in the overall retail price for bottled pasteurized milk in Auckland to 27·0d. per gallon, and if the prices and margins recommended by the Commission are adopted there need be no increase to the annual retail rate of 27·0d. per gallon. Present annual rates are 26·0d. per gallon for loose milk and 28·0d. per gallon for bottled milk.

Wellington

The consumer price in Wellington for 1942–43 was 27·796d. per gallon, due to the City Council's action in extending the period of winter price (of 7d. per quart) over the greater portion of the year instead of for the usual period of six months. The Commission is of opinion that the strong financial position of the Wellington City Council Milk Department does not warrant any extension of the winter-price period, and that the power to vary such period should be a function of the Central Authority.

Christchurch

Consumer prices in Christchurch will probably need adjustment to a winter-period price of 6½d. per quart and a summer period price of 6d. The length of these periods may need adjustment by the Central Authority according to ascertained movement in costs and the allotment of necessary margins to the processing and distributing interests.

Dunedin

Consumer prices in Dunedin should be immediately standardized at the same rate for all quantities delivered retail. The present rates of 6d. per quart for the summer period and 7d. for the winter period should, in the opinion of the Commission, be adjusted to 6d. summer and 6½d. winter, but on the basis of present costs the Central Authority may need to extend the winter period for the greater portion of the year. As in the case of Christchurch, this will depend on ascertained movement in costs and the allotment of appropriate margins to processing and distributing interests.

CHAPTER 9.—METHODS OF SUPPLY

The Commission's task under this heading is to consider what steps should be taken in order to ensure that the supply will be adequate in quantity, of a high standard, and produced in such a manner that whilst fulfilling these conditions milk will remain reasonable in price. It is in methods necessary to ensure adequate supplies of milk of high standard that the present organization has failed to a considerable extent. The Commission for that reason has thought it desirable to discuss in detail what constitutes an adequate supply and the steps necessary to ensure that the quantity available in future will be adequate.

In the opinion of the Commission the supply of milk is, and should remain, the full responsibility of the producer. Furthermore, it is axiomatic that milk, no matter how carefully transported or treated, can never be better in quality than when it leaves the farm. The producer, therefore, is the logical person to accept full responsibility for the initial safeguarding of the production of an adequate supply of milk of high standard, and the Dairy Farmers' Co-operative Milk Supply Association, as the representative body, should accept general responsibility for these matters.

Methods of Production

The Commission has stated elsewhere its opinion on the present conditions relating to production in town-milk-supply herds, and in order to achieve maximum efficiency in production a Dairy Farmers' Supply Association in each centre is recommended with full powers (including an appropriate degree of economic pressure) to bring production standards up to the highest point of efficiency.

The Commission recommends the Central Authority to give consideration to the appointment by the Central Authority, and under the control of the Central Authority, of at least two consultants or advisors for field-work among town-milk suppliers. It is possible that this might in some respect mean overlapping with the Fields Instructors, Dairy Instructors, or Stock Inspectors of the Department of Agriculture, but the technique of production of town milk is of such a nature that a considerable amount of specialized knowledge is essential. From what the Commission has seen of the work of the Department's field officers there is no doubt that the addition of any extra work would completely overburden them. In fact, at the present time they are fully occupied with carrying out normal routine duties, and in more than one area already have too many herds under their control to give effective assistance to all producers. Any work of a specialized nature must therefore involve the employment of more field officers.

The Commission regards the task of the Stock Inspector in Christchurch, where he has to supervise and control conditions on approximately five hundred licensed dairy-farms, as a task too great to permit full advantage accruing to the supplier from the advice of the Stock Inspector or to permit the Stock Inspector in turn to give the necessary detailed attention to the less progressive of such suppliers. It is, in the opinion of the Commission, a striking tribute to the Stock Inspector in this area that he has been able to achieve the results which are at present evident. It is worthy of note that in all centres the Stock Inspector is held in high regard by city-milk suppliers, and he is certainly regarded more as an instructor than as an inspector. This is a desirable state of affairs, but it would be a considerable improvement if the number of such field officers could be increased to permit of more detailed attention to all herds and sheds.

It is obvious that considerable room for improvement exists not only in the technique of actual milk-production on the farm, but also in matters of husbandry, such as replacement of stock, control of disease, and winter feeding, and these require urgent attention.

There are two major problems confronting the town-milk supplier on which it is imperative that assistance be given him in overcoming the problems involved. One is the technique of winter feeding in order to prevent the heavy fall in the production of autumn and winter calvers which, as most producers have claimed, actually occurs. It has been suggested elsewhere that the evidence before the Commission fully justifies the belief that this fall in production is largely a matter of feeding and could be avoided to a considerable extent by proper methods of feeding.

Secondly, there is the problem of herd-replacement policies and the necessity for avoiding methods of purchasing replacements from sources which are likely to prove unsatisfactory both in the health and producing qualities of the cattle purchased. This refers particularly to the present most unsatisfactory system of purchasing stock in the saleyards.

Whatever course is adopted by the Central Authority for the provision of specialized advice to town-milk producers it will be essential for the closest possible co-operation to exist between the officers carrying out the advisory work and the Dairy Farmers' Supply Association.

The reasons underlying the Commission's recommendations for the setting-up of such a supply association and the general conditions under which that supply association should operate have already been set out in the chapter on organization.

Farm Labour

In common with all primary industries, and particularly the dairy industry, the liquid-milk industry is facing severe difficulties owing to the shortage of man-power. This has had a direct effect on the quantity of milk-supply available and to the extent that the Government is able to ameliorate the labour shortage in primary industries generally the Commission asks that full consideration be given to the claims of the liquid-milk industry. Wage costs are undoubtedly very high at the present time on such farms, but the chief complaint of the producer is that he is unable to obtain adequate labour even at the high wage rates being offered.

Future Production Areas

In certain areas, particularly Dunedin and the 30-mile area in Wellington, costs of producing winter milk are high, and any attempt to achieve a level supply to a greater extent than is being achieved at present will undoubtedly involve the producer in additional costs. It is quite evident that costs of winter feeding are substantial, and the Commission recommends that the Central Authority give careful consideration to the question of whether in any area it would be better to incur mileage-costs

per gallon than extra production-costs per gallon for winter feeding. The point can be made clear by quoting a statement from the Department of Agriculture surveys in which the Investigating Officer, Mr. R. P. Connell, points out that in a survey of twenty-two farms in the Auckland district with a winter (April to September inclusive) output of approximately 40 per cent. of their total production that the cost per gallon was approximately 1·8d. dearer than the production-costs in fifty-two farms where the winter production averaged only 30 per cent. of the total production. While the Commission considers that the price it has recommended for payment to the producer takes into full consideration the costs of producing a supply of the type approximating to a production of 40 per cent. to 45 per cent. in the winter, it is aware that in certain areas the attempt to lift the winter production much above 40 per cent. of the total production may involve substantial increases in cost per gallon.

It should be the responsibility of the Central Authority, in collaboration with the local Dairy Farmers' Milk Supply Association, to consider expansion of production in any area from the point of view of the suitability of the present areas for meeting that expansion in demand. In Wellington it may be necessary to direct such expansion to areas north of Packakariki, such as Rahui, Levin, and Shannon districts, where winter-production costs may be appreciably less than in the Hutt Valley area. Similar remarks apply to Dunedin, and the primary factor determining the decision of the Central Authority will undoubtedly be the question of whether the mileage-costs involved will be considerably less than the extra production costs involved.

Conditions on Dairy-farms

(*a*) *Quality of Stock*

There are four main breeds of cattle in New Zealand namely, Jersey, Ayrshire, Friesian, and Shorthorn. Typical average butterfat tests under New Zealand conditions for each of these breeds is 5·3 per cent., 4·0 per cent., 3·5 per cent., and 4·0 per cent. respectively. A few Guernsey cattle are also beginning to appear in Christchurch herds.

Crossbred cattle predominate in all areas because of the method of replacement by purchasing from outside sources, but Friesians and Friesian crossbred cattle are much more in evidence in the Christchurch and Dunedin supply areas than in Wellington or Auckland. In Christchurch particularly this has led to considerable difficulty in meeting the legal standard for minimum butterfat namely, 3·25 per cent.—especially during the spring months. This occurs because the average test for any breed of cattle fluctuates under New Zealand conditions by approximately 0·6 per cent. between average summer and average winter months, and consequently a breed of cattle such as the Friesian, with an average test of 3·5 per cent., will be testing about 3·2 per cent. in the flush spring months. The course adopted by most suppliers is to maintain an appreciable number of crossbred or straight-bred cattle of other breeds in their herds so as to keep up their average butterfat content, but where payment is based on gallonage alone the temptation is to include as many as possible of the heavy-milk-producing but low-testing Friesian cattle.

As the Commission is of opinion that a high standard of milk might rightly be classed as one containing at least 4·0 per cent. of butterfat, it recommends that the standard payment per gallon be calculated on milk of a 4·3 per cent. average test and payment made on half the value of the butterfat content. By this means a summer average of approximately 4·0 per cent. and a winter average of 4·6 per cent. would be the desired objective and it can safely be left to producers to arrange the breed composition of their herds accordingly.

(*b*) *Health of Stock*

Producers in each area submitted that the cost of replacement in the average producer's herd was approximately 25 per cent., and in many cases a good deal higher. The average replacement rate in the dairy industry as a whole (*vide* New Zealand Dairy Board's annual reports) is not more than 20 per cent., and it was disturbing to the Commission, upon examination, to find that this unduly high replacement rate in town-milk-supply herds was in many cases a direct consequence of the general policy of buying replacement stock at the saleyards. The saleyards, to a considerable extent, cater for the selling of cows which are culls from some other herd, and reliance upon this source of replacement will inevitably mean that cattle of poor quality, or culled because of mastitis, abortion, &c., will be the incoming stock to the producer's herd. Naturally under these conditions a low replacement rate can never be achieved.

In certain areas, noticeably Christchurch, a better practice prevailed of purchasing two-year-old heifers from dairy-factory herds with quality stock. In a minority of cases suppliers visited by the Commission actually reared their own replacement stock, and it was a particularly noticeable feature that the herds with the highest gallonages per cow were invariably those which reared their own replacement stock.

The Commission states its opinion that urgent consideration must be given to this problem of replacing the average city-milk-supply herd. Only two methods of the three generally practised can be regarded as satisfactory, and the practice of buying replacement stock from the saleyards should be soundly condemned. In fact, the Commission regards it as one of the important standards for an "accredited" herd that such a herd should be breeding its own replacement stock or buying from a recognized and reputable source.

The producers in Auckland put forward a suggestion which merits serious consideration—it is a most progressive proposal. They have suggested that the Dairy Farmers' Milk Supply Association, if created, should organize the purchase of high-quality calves from dairy-factory herds and should arrange for these to be reared on suitable grazing-farms and then be made available to members of the Association as soon as they reach maturity. Such a step is highly desirable from all points of view.

(*c*) *T.B. Testing*

The question has been consistently raised by consumers' and by producers' representatives regarding the testing of dairy stock in town-milk-supply herds for T.B., and the elimination of all reacting cattle. The Commission can express its opinion by stating that it fully supports any move towards the general elimination of T.B. from the dairy industry as a most desirable step, and that where milk is being vended raw it is essential that the cattle should be T.B. tested at six-monthly intervals.

The difficulty of T.B. elimination in town-milk-supply herds rests in the fact that replacement stock are reared only in a minority of cases, and in order to ensure a continuity of freedom from T.B. it would be essential to organize either the testing of the herds from which the replacement stock was being purchased, or the testing of the purchased stock before it goes on to the owner's farm. The former proposal is the more practical, and if it were possible for the Dairy Farmers' Milk Supply Association to organize the purchase of young stock from T.B. tested herds, then the Commission's wishes in this respect would be met. However, until the dairying industry as a whole adopts measures for the elimination of T.B., any steps taken by the city milk industry can never be wholly effective. Consequently the Commission recommends that steps be taken to discuss these proposals with the representatives of the dairying industry and, failing a satisfactory national plan for T.B. elimination, that the Central Authority, whose creation is recommended by the Commission, take up the matter within the town-milk industry and at least organize the supply of raw milk from T.B. tested herds.

(*d*) *Shed Hygiene*

Milk-quality can never be better than when it leaves the farm, and consequently the standard of shed hygiene must be as high as possible. The city-milk producer should recognize his full responsibility to produce a high-standard article in return for a price compatible with that standard. The Commission visited a number of producers' milking-sheds, and the conditions in the different districts vary considerably. It is noticeable, for instance, in Dunedin, where low prices have prevailed for a considerable time and, indeed, where producers' prices are lower than in any other of the four main centres, that the general standard of shed conditions is not good. The producers' representative in Dunedin made out a strong case for the relationship between a low standard of shed conditions and a low price for the milk produced. The Commission is of opinion that this submission warrants serious consideration.

In the Christchurch area conditions as a whole were good, due, to a considerable extent, to the initiative and activities of the Stock Inspector in that district. As indicated in another section of the report, the number of new milking-sheds erected in this area is a direct reflection of the work of this particular Stock Inspector. Nevertheless, the Commission visited several sheds in the Christchurch area which were definitely below standard. In the Wellington area the Commission had little opportunity, owing to lack of time, of visiting many sheds, but it is of opinion that considerable room for improvements exists in this district also. In Auckland the sheds visited appeared to be a good cross-section of sheds generally. Certainly there was considerable room for improvement in a number of them, and some economic pressure should be brought to bear to ensure that the producer of city milk will not be given the full price for a milk of high standard until his shed conditions are such as to ensure that a high standard milk is likely to be produced.

(*e*) *Adequate Cooling*

The prevailing practices for cooling the milk immediately after milking are discussed in Part I, but the Commission is of opinion that a greater control of the cooling of the milk is essential, and that steps should be taken to assist dairy-farmers who at the present time do not have proper cooling facilities. For the production of really high-standard milk some artificial cooling facilities are essential, and the Commission recommends that the Dairy Farmers' Milk Supply Association, in conjunction with the Central Authority, give consideration to organizing the supply of refrigerators to producers so that proper and adequate cooling of milk can be secured.

It is equally necessary that after proper cooling has been secured the milk should be kept stored under refrigerated conditions until picked up by the collecting lorry. It is quoted elsewhere in this report that the collection, as far as possible, should be at the farm dairy and not at the farm-gate. This is a matter for the immediate consideration of the Dairy Farmers' Milk Supply Association, and as the cost of collection will be borne by such Association it is for this body to decide the best method of collection compatible with ensuring that the milk is retained at a sufficiently low temperature to restrict the growth of pathogenic organisms.

Adequate Supplies

One of the most disturbing features of the Commission's inquiry is the failure in each area to appreciate the importance of ensuring an adequate supply of milk. Under New Zealand conditions the average dairy-factory herd produces heavily in the spring and summer, falls away to only a very small supply in the late autumn, and in the winter ceases to supply except for what may be termed "accidental milk" from late-calving cows, cows which have failed to get in calf, and cows which have aborted. The seasonal nature of this supply is due to the general conditions of dairying in New Zealand where the cattle are grazed outdoors and where the main reliance for food-supply is placed essentially on grassland farming.

In order to swing over to city-milk production considerable and fundamental changes must occur. The farmer must alter the calving of his cows in such a way as to ensure a sufficient number being in milk in the winter to give him the desired quantity. He must organize the growth of foodstuffs other than grass or arrange to purchase these so as to have adequate quantities of feed for winter production. The producers in each area have submitted that the cow calving in the early autumn particularly, and to some extent in the late autumn, falls heavily in total yield as compared with the spring-calving cow. This, as has been pointed out elsewhere, is mainly a matter of feed coupled with climatic conditions, but it is quite certain that considerable difficulties are encountered and problems created when the normal seasonal milker decides to change over to all-the-year-round town-milk production. The tendency, therefore, in the average town-milk-supply herd in New Zealand is for a greater disparity between the quantity of milk produced in the summer and the quantity produced in the winter than would be encountered in other countries. A typical picture of monthly production for a representative sample of herds in each supply area is shown in the table quoted below.

It will be seen from this table that Christchurch comes closest to achieving a level supply and that in the Wellington and Auckland areas approximately twice as much is produced in the peak summer months as compared with the lowest winter month.

Dunedin is not included in the table because only an eight months' return was available. It is, however, worthy of note that the limited information for Dunedin does indicate a very low ratio of winter to summer production, a ration of the order of 1 to 4.

Season	1941–42.	1940–41.	1942–43.
Month.	Auckland.	Wellington.	Christchurch.
	Per Cent.	Per Cent.	Per Cent.
April	6·0	7·4	8·2
May	6·5	7·1	8·0
June	6·6	6·3	7·4
July	7·5	5·8	7·6
August	8·4	6·3	7·7
September	10·0	7·9	8·8
October	11·7	10·8	10·2
November	10·4	11·4	9·7
December	9·9	11·7	9·2
January	10·1	9·7	8·1
February	7·2	7·7	7·2
March	5·7	7·9	7·9
Total	100·0	100·0	100·0

The problem which needs immediate attention concerns the organization of supply in such a manner that production for the following winter will be at least equal to, and preferably at least 10 per cent. above, the estimated demand. Under the present circumstances prevailing in each area conditions are such as to militate against any attempt to organize a supply even equal to, let alone in excess of, the quantity normally required during the winter-time, with the result that accommodation supplies and temporary licensees have to be relied upon. This is a natural consequence of the position whereby no one organization accepts the full responsibility for ensuring an adequate supply.

As milk is a food which cannot be stored, in order to make certain that the full requirements of a city are adequately met it is necessary to ensure not only quantity of supply, but also full continuity of supply. Furthermore, city-milk production, like all primary production, is subject to considerable fluctuations due to climatic conditions, and the city milk demand, whilst reasonably static, is also subject to change from day to day, from month to month, and from one year to another. This is particularly so under war conditions, and whilst this situation is likely to be of a temporary nature it does tend to emphasize the importance of adequate planning of future supplies.

In New Zealand the practice in three centres, and to a limited extent in Christchurch, has been to place contracts only for a portion of the actual estimated demand, despite the fact that a producer must know at least twelve months in advance what milk he is expected to supply. He has to arrange the calving-dates of his cows at least nine months in advance, and the following winter's supply is completely dependent on the number of cows which calve in the late summer and autumn. The practice in all areas during the winter period has been to depend to a considerable extent on securing supplies of milk from suppliers with temporary licenses, and particularly from factory suppliers who have made no adequate forward provision for the supply of city milk and who depend for the small amount of milk available on the few stripper cows, late-calving cows, and prematurely-calving cows in their herds. This, in the opinion of the Commission, is not milk of high standard, and the practice should be soundly condemned.

The conclusion is therefore inescapable that future supplies must be planned on a basis which will ensure a surplus over and above the anticipated demand, such surplus being necessary to provide against exigencies of climatic and other conditions which would adversely affect the volume of supply and factors of population tending to create sudden increases in demand. On the question as to what amount of surplus should be provided for in the winter months the Commission has little factual data to guide it. The following comments from other investigating bodies are of particular value under these circumstances:—

The report of the Reorganization Commission for Great Britain, 1936 (page 212):—

> "*The Reserve for the Liquid-milk Market.*—The size of the reserve obviously depends partly upon the volume of supplies actually absorbed into the liquid-milk market, which can be ascertained from statistics of the milk marketing boards. But it is more uncertain what proportion the reserve should bear to normal requirements.
>
> "There are several ways in which the problem of estimating the proportion of the reserve required by the ordinary liquid-milk market might be approached. The English Board in the recent proceedings before the Committee of Investigation for England and Wales suggested that a minimum safety margin of 10 per cent. is needed in each month of the normal year, and that, owing to the present rate of seasonal variation, this entailed higher margins in the summer months, rising to a maximum of 16 per cent. in the peak month. On these estimates the average reserve would amount to some 23 per cent. of the actual milk sales.
>
> "The basic figure of 10 per cent. for the safety margin in the month of lowest production must be a matter of opinion based on experience. But if this is accepted it is still possible that the figure of 23 per cent. for the annual average may be on the high side."

The Joint Legislative Committee to investigate the Milk Industry in the State of New York, 1933, reports on the question of surplus milk as follows (page 15):

> "In the best practicable adjustment of supply to demand the industry must carry a surplus of about 20 per cent. This is due to the fact that milk is an essential food which must be available in the quantities demanded by the consumers every day in the year; to the fact that both demand and supply vary from day to day and according to season; and to the fact that milk is perishable and cannot be stored."

This Committee further goes on to state (page 16) :—

"A satisfactory stabilization of prices for fluid milk requires—

"(1) That the burden of surplus milk be shared equally by all distributors in the New York State. So long as the surplus milk is unequally distributed the pressure to market surplus milk in fluid form will be a serious disturbing factor.

"(2) That a united effort be made to reduce the amount of the surplus to the minimum by adjusting the supply of milk more closely to the demand."

On page 17 they complete their conclusions by stating :—

"Universal application of the classified price plan and control of surplus milk by the producers through effective co-operative organizations appears to offer the best prospect for permanent stabilization of the dairy industry in the New York State."

These quoted opinions indicate that it is widely recognized that adequate supplies of city milk of necessity involve long-term planning by the producer and that the cost of the surplus milk necessary in such planning should be spread over all producers in any given area. The question of just what the margin should be is a matter which requires a considerable amount of experience, and the Commission recommends to the Central Authority that the margin of 10 per cent. over the month of lowest supply be adopted until experience dictates the widsom of adopting a different percentage.

Because of the seasonal nature of milking under New Zealand conditions there is no difficulty in organizing supply for the spring and summer months. The difficulty lies in providing for an adequate supply during the months of lowest production from mid-autumn to the end of winter. The responsibility of production belongs to the producers. The organization of production must therefore be the responsibility of producers as a whole.

If they are to accept that responsibility, they must be given the right to organize efficiently in order to meet that responsibility. In Wellington, and also in Dunedin, a Producers' Supply Association is already in existence, but in neither area has the association complete control over the whole supply to the metropolitan area, and consequently in neither case is in a position to organize adequate supplies for the whole of their respective metropolitan areas. In Christchurch and in Auckland attempts have been made to form completely representative single groups of producers, but in Christchurch conflict of local interests has unfortunately prevented the achievement of a single Supply Association. In Auckland the existence of producer pools tied to the main treating and distributing houses has militated against any attempt to form a single Supply Association. The Auckland Producers' representative, however, placed a very strong case before the Commission for the creation of a single pool with control over the supply of milk vested in the hands of the Producers' Association and to unite the interests of town suppliers as a whole.

Consequently it is an essential feature of the Commission's recommendations that an organization should be created (if such does not already exist) in each area which can accept full responsibility for organizing adequate supplies of milk, particularly during the low-production winter period.

Balancing-stations

The problem of disposing of surplus milk is one which necessitates the existence of a balancing-station in the supply area so that milk which is surplus to the daily demand of the metropolitan area can be diverted to that balancing-station and converted into cream or milk products.

With the organization of supply centred in the one organization it is quite possible to arrange that the area around the balancing-station shall serve as a reservoir for any fluctuations in the daily needs of the metropolitan area. Milk from suppliers in all other areas would then be forwarded into the city for consumption as liquid milk, and the suppliers near the balancing-station, if their supplies were not needed, would forward them for conversion into cream or milk products. Such an arrangement in the hands of one controlling organization would ensure that the burden of surplus milk was adequately spread over the whole of the producers, and that supplies could be properly zoned to the city in the manner best calculated to give greatest efficiency in costs of collection and transport.

The principles of a balancing-station can be said to be—

(*a*) To cope adequately with the fluctuating nature of the demands of the metropolitan area both for liquid milk and cream :

(*b*) To control the disposal of surplus milk to the best possible advantage.

Ownership

The question of ownership of the balancing-station is of considerable importance, and the following points must be noted :—

(1) There must be adequate control against the possibility of milk being purchased as surplus and diverted to the liquid-milk market for sale at full liquid-milk rates :

(2) Producers must be protected against any possibility that the balancing-station is not being operated to their best economic advantage :

(3) The dairy industry in New Zealand is more efficiently organized on a democratic and completely co-operative basis than is the case in any other part of the world. The industry would strongly resent any attempt by private enterprise to alter the present status of butter and cheese manufacture. Furthermore, zoning has been established with all the butter and cheese factories and steps taken to prevent suppliers transferring from one factory to another. The establishment of a balancing-station in proprietary hands would inevitably lead to disturbances with the suppliers to neighbouring factories, who might be attracted to city supply and then be retained as suppliers to the balancing-station.

For these reasons the Commission considers it essential that a balancing-station should be run on a co-operative basis, preferably by producers themselves, or by producers in conjunction with a municipality.

Functions

As already stated, a balancing-station exists for the purpose of coping with the fluctuating demands of a metropolitan area for both milk and cream. This is achieved by the balancing-station always maintaining a supply of liquid milk for manufacture into milk products such as butter, cheese, dried milk, casein, &c. The availability of such milk for immediate diversion to the city in the form of liquid milk or cream ensures that shortages due to sudden demands shall not be inflicted on the consuming public. Such a balancing-station can always meet these demands much more expeditiously

and economically than could be done by the private arrangements of vendors with individual producers. To the producer the presence of a balancing-station ensures that the whole of his milk-supply will be disposed of to the best possible economic advantage. That portion of his milk which is not sent into the metropolitan area for consumption is manufactured into a product which will still return him the greatest possible return per gallon of milk.

Location

The location of a balancing-station is of very considerable importance and must be carefully considered both in order to ensure centralized collection of milk and its transportation to the metropolitan area in a manner compatible with the greatest efficiency in collection. In Wellington a balancing-station on co-operative lines, and owned by the Wellington City Council, is already established at Rahui. It is a matter for future experience, however, as to whether Rahui is situated to the best possible geographical advantage and whether its present basis of organization is the most desirable.

In Christchurch suggestions have been put forward that the Cam Dairy Factory be reopened as a fully operative balancing-station. Such a balancing-station would, no doubt, be advantageous for operations north of Christchurch.

In Dunedin the Momona and other cheese-factories at present operate as balancing-stations and may be reasonably satisfactory for this purpose.

In Auckland completely satisfactory facilities exist in the two cheese-factories (East Tamaki and Drury) owned and operated by the New Zealand Co-operative Dairy Co. and located close to the metropolitan area. The Commission is of opinion that, provided satisfactory arrangements can be made by the Dairy Farmers' Supply Association, whose creation is recommended, with the New Zealand Co-operative Dairy Co. to dispose of all surplus milk (the Supply Association taking up the requisite number of shares), then the existing facilities are quite adequate and satisfactory.

The Commission recommends that the Central Authority give early consideration to the provision of adequate and co-operatively-owned balancing-stations, and in the case of Auckland and Wellington recommends that existing facilities be examined with a view to their fullest use compatible with maximum efficiency. Rahui balancing-station could, for instance, be used to a much greater extent than at present, and, indeed, could be examined with a view to its development to maximum capacity in the interests of greatest economy.

NOTE.—There are two alternatives in the location and use of a balancing-station which will need consideration. These are—

(1) The balancing-station can be located in the midst of a thickly-populated area of licensed suppliers and can then act as both a bulking-station and a station to deal with the surplus milk :

(2) The balancing-station could be located in the municipal area or on the outskirts and could be served by bulking-stations from the country districts. The essential feature of a balancing-station is that it shall dispose of the surplus in the most profitable manner possible, and be situated so as to obtain the maximum advantage through bulking and collection. Facilities in bulking of supplies and organization of transport, can, if necessary, be considered separately, although in some areas it is possible that a combination of bulking and balancing station will be most economical and efficient.

Utilization of Surplus

If considerable quantities of milk are being separated at the balancing-station, then obviously the need will arise for disposing of the skim-milk to some economic advantage. In Dunedin, and possibly elsewhere, the attempt has been made to run pig-farms attached to the balancing-station in order to dispose of the skim-milk.

A suggestion has been made in several areas, however, that consideration should be given to the manufacture of fancy cheese and cottage cheese, &c., for which, at the present time, the American Armed Forces indicate that there is a strong demand. Whether this would be a purely temporary demand, passing with the withdrawal of Allied Forces, it is not easy to say, but the health authorities in evidence have indicated that they would welcome any attempt to extend the use of milk products and that such items of diet as cottage cheese would undoubtedly be a very valuable supplement.

The Commission has given careful consideration to the problem of raising the price of cream to ice-cream manufacturers so that they, too, shall bear their proper share of the cost of producing such cream. It is pointed out, however, and has been stressed in several quarters, that the supply of cream to ice-cream manufacturers depends to a considerable extent on the price to be charged for that cream. If it is too high, then other products such as butter and dried milk will be used. It would be unwise to follow a policy calculated to reduce the quantity of cream being consumed, and the Commission therefore recommends the Central Authority to go fully into the question of adjusting the price of cream to ice-cream manufacturers so that it will not be raised to a point likely to defeat the objective of the economic disposal of surplus milk as cream. Efforts should be made, however, to encourage ice-cream manufacturers to purchase as much as possible of their cream requirements in the summer when the price of cream is low. In the winter all cream should be sold at a price compatible with the value of the milk, because the amount of cream required by the consuming public will probably absorb most of the surplus milk.

One of the chocolate-manufacturing concerns in the Dominion indicated to the Commission that it could so organize its manufacturing processes that it would be able to take most of its milk requirements in the summer and would need to depend on the city-milk supply for only a very small quantity in the winter. This type of co-operative demand is in the best interests of the producers as a whole, and all possible steps should be taken to encourage such arrangements. However, with the Dairy Farmers' Supply Association taking full responsibility for the organization of supply and for the efficient disposal of all surplus milk it can be safely assumed that all possible steps will be taken to reduce the loss on surplus milk to a minimum. The Central Authority should give favourable consideration to any reasonable request from the producers in their attempt to safeguard the economic disposal of surplus milk. This would include such powers, for instance, as the prevention of heavy purchases of milk or milk products from sources outside the metropolitan supply area by firms or companies (other than dairy-factory companies) manufacturing within the metropolitan supply area. The Commission has already recommended that the Dairy Farmers' Supply Association should be given sole power to sell milk and cream to the metropolitan area. This would obviate what, in the opinion of the Commission,

is an undesirable practice in the Christchurch area, where large quantities of cream are purchased from the West Coast of the South Island and brought by rail to Christchurch to be vended as sweet cream. This trade should be in the hands of the Dairy Farmers' Supply Association in order to enable them to dispose of surplus milk to the best possible advantage.

Considering the importance of the disposal of surplus milk as a whole, the Commission recommends the Central Authority to determine what priority can rightly be given to the Dairy Farmers' Co-operative Milk Supply Association to supply all milk and cream for milk products in the metropolitan area (other than butter and cheese) in order to dispose of surplus milk at the best price.

Licensing of Suppliers

The Commission has heard much evidence in connection with the licensing of suppliers, and it has been put forward on more than one occasion that the Health Department should be given the right to control the quality of the milk from the farm to the consumer. At present this right can only be exercised by the Health Department from the farm-gate, and the jurisdiction of the Health Department does not extend to the milking-shed. The Commission is of opinion that the present arrangement is reasonably satisfactory, although there is undoubtedly scope for greater collaboration between the Health Department and the Department of Agriculture in following up complaints regarding milk. If the Dairy Farmers' Co-operative Milk Supply Association was made responsible not only for the supply of milk, but also for its quality, it is probable that the control of farm conditions could best be carried out by the Department of Agriculture, either through the Live-stock or Dairy Division in collaboration with the Supply Association. Consideration should further be given to any suggestion for expediting the follow-up of unsatisfactory milks by the Health Department.

With this qualification the Commission is of opinion that the present system of licensing suppliers is satisfactory and that, having been licensed by the Department of Agriculture, no further license should be required by the producer in order to supply city milk. He should, however, apply to the Dairy Farmers' Co-operative Milk Supply Association for membership (in accordance with recommendations stated in Chapter 7), and, having been accepted, he would then become a fully operative city-milk supplier.

The question of admitting to membership suppliers who are still on a seasonal basis of production—that is, producing far more milk in the summer than in the winter—is a matter of considerable importance and is again discussed at this stage because of its bearing on problems of supply. The supplier with a heavy summer production is the supplier who creates the major part of the surplus milk problem, and in Auckland it was on this point that the Auckland Metropolitan Milk Council had allowed considerations of economy existing within pools to override considerations of adequacy of supply. There appears to be at least one possible practicable method of exercising reasonable control over this question of the seasonal producer, and that is by the Dairy Farmers' Co-operative Milk Supply Association being given the right to set up two distinct types of membership:—

(*a*) Membership in a permanent group of suppliers: and

(*b*) Membership in a temporary, or "winter," group of suppliers.

The permanent supply group should be comprised of present full-time city-milk suppliers, plus any new suppliers whose winter production for the coming winter is estimated at, at least, say, 40 per cent. of their total season's production.

The temporary or "winter" group should be comprised of present suppliers who indicate that they do not wish to cater for all-the-year-round city-milk production and any new suppliers whose percentage of winter production to total production is estimated at appreciably less than, say, 40 per cent. The temporary group of suppliers would send the whole of their production in the summer months to the butter or cheese factories and would supply the city only in the autumn and/or winter according to their expressed wish.

No producer should be refused membership of a Dairy Farmers' Co-operative Milk Supply Association unless—

(*a*) He has been refused a license by the Department of Agriculture:

(*b*) The Dairy Farmers' Co-operative Milk Supply Association can show that their quota milk for the coming winter is at least 10 per cent. in excess of the stated estimated demand.

The Central Authority should confirm the refusal of any applications for membership. This safeguard is suggested as a means of policing any attempt by the Supply Association to restrict their membership before all supply commitments have been adequately safeguarded.

(Note.—The Central Authority, because it is aware of the number of licenses being refused, will be in a position to determine whether the price for city milk is proving unduly attractive compared with the price for dairy-factory supply. The Central Authority can then in its wisdom take appropriate action.)

Producer-vendors

Producer-vendors should be members of the Supply Association, but should be allowed to continue to vend the production from their own farms plus a controlled amount in the winter which may be purchased from the Supply Association at rates to be determined by the Central Authority. It is the recommendation of the Commission that the Central Authority consider whether producer-vendors should be limited to vending only the milk produced from their own farms or an amount not exceeding, say, 40 gallons daily, whichever is the higher.

In deciding the amount of milk which producer-vendors should be allowed to purchase in the winter the Central Authority must give full weight to the influence of seasonal conditions, &c. The purpose of this recommendation is to ensure that producer-vendors do not become an unduly heavy burden on the Supply Association, but the Commission is of opinion that they should be members of the Supply Association in order that they will bear their fair share of the cost of surplus milk.

To the extent that producer-vendors achieve a level supply and do not have to rely upon the Supply Association for milk in the winter, then to that extent should they be permitted to retain the full amount of the retail price, less a reasonable levy to the association. To the extent that they rely upon considerable quantities of winter milk from the association, then to that extent should they bear their full share of the cost of surplus milk. Just how this could be apportioned must remain to be determined by the Central Authority.

It is, further, a recommendation of the Commission that producer-vendors should have their herds T.B. tested, and as soon as possible should arrange the vending of their milk in sealed containers.

In concluding this chapter on supply reference ought to be made to the relationship, fully outlined in Chapter 8, between supply and price to producers. Nothing that can be done by way of organization or control will ensure the necessary supplies of milk unless the price is sufficient to induce farmers to undertake the task of producing city milk. Given reasonable contracts, assurance of price and continuity of market, proper organization and control through their own co-operative, then conditions should be conducive to adequate production of high-standard milk. An outlook that regards the achievement of a high standard of supply as a matter for assistance and economic encouragement, more than policing and penalties, is also required of the controlling organization.

CHAPTER 10.—ALTERATION AND REORGANIZATION OF METHODS OF COLLECTION

Need of Reorganization

The main objects to be achieved in any reorganization of methods of collection are—

(1) To ensure that milk is delivered to vendors in as fresh and clean a condition as is reasonably possible; and

(2) That the cost of collection should be as low as is possible consistent with the maintenance of freshness and cleanliness.

That such reorganization is desirable and, indeed, necessary is made abundantly clear by the survey of conditions obtaining in each of the areas, but particularly in Christchurch and Dunedin. When it is found that a night's and next morning's milk is collected in one lot, and at times not until about midday, and then is brought in for pasteurizing and for delivery the following morning, as is the case in Christchurch, a change of method becomes an imperative necessity. When, as in both Christchurch and Dunedin, the whole of one day's milk is collected from producers by a large number of vendors and kept by them on their own premises overnight for delivery next morning, then again, on the grounds both of freshness and cleanliness and of economy, reorganization becomes essential. It is not too much to say that in all areas appreciable and even substantial economies can be effected and the maintenance of a high standard in the milk, both raw and pasteurized, assured by a measure of reorganization that is in every way reasonable.

Control by Dairy Farmers' Co-operative Milk Supply Association

The first and most important reorganization is in the method of control of collection. The interests of the industry will best be served if that control is vested in the body whose particular interest it is to attain a high standard of efficiency and to carry out the work as economically as possible. That body is the Dairy Farmers' Co-operative Milk Supply Association. If, as we recommend, such a body is created in each area and if, as we further recommend, any fall in the standard of the milk when it reaches the treating-house immediately reacts upon the price to be paid, then the interests of each and every member of the association is closely bound up with the economic collection and delivery of the milk in the best condition attainable. Our first recommendation, then, is that the method of collection by the vendor be replaced by collection and delivery to the vendor by the Dairy Farmers' Co-operative Milk Supply Association.

The advantage of this change applies not only in the case of milk delivered to large treating-houses, but also in the case of milk handled by raw-milk vendors. Here again two marked defects are noticeable. The first is the time or times of collecting and the conditions under which in many cases the milk is kept. The second is the considerable waste that is involved in the distances travelled by the vendors individually in collecting their milk from a number of producers. A striking example of waste in this respect is supplied by the conditions in Christchurch. The summary of distances travelled and the gallonage delivered per mile shows the extent to which the evil has grown. It is from Christchurch, too, that the most authoritative complaint of the condition under which milk is often held overnight comes. But the same mischief is found in other areas, in Dunedin in a marked degree, in Auckland and the Hutt to a less degree. The remedy that the Commission recommends is to limit all purchases of milk within any area to purchases from the Dairy Farmers' Co-operative Milk Supply Association or from the treating companies, and to confer and to impose upon that association the right and the responsibility of collecting and delivering all milk purchased from it. This recommendation applies to all milk purchased by the treating-houses and to that purchased from the association by other than producer-vendors. It is not intended to apply to producer-vendors, concerning whose deliveries special recommendations are made. Nor is it intended to qualify the right of producer members of co-operative vending companies to protect their membership by electing to have their milk delivered to the company of which they are members. But even in this last case the collection should, in our opinion, be the responsibility of the Dairy Farmers' Co-operative Milk Supply Association.

Time, Place, and Manner of Collection

The most important object to be attained is delivery of the milk to the treating-house and to the vendor of raw milk in the best possible condition. In this connection four matters require attention. They are

(1) Collection while milk is fresh:

(2) Collection from cool room of the farmer's dairy, or from the farm-gate where conditions of entry are unsuitable for the collecting vehicle. Proper covered stands should be provided in the latter case:

(3) Prompt delivery to treating-houses and raw-milk vendors:

(4) Transport in suitable vehicles.

(1) Collection while milk is fresh involves the question of the milk being collected once or twice daily and also the further question of the time allowed to elapse between milking and collection. The practice in this respect varies. In Auckland the treating-houses collect the milk twice daily. The evening milk is collected in the evening, taken straight to the treating-house and pasteurized, and retailed on the rounds next morning. The morning's milk is collected in the morning, pasteurized forthwith, and delivered to wholesale purchasers later in the day. As already stated, in some of the other areas the milk of one night and the following morning is collected during the morning, pasteurized on delivery to the pasteurizing-house, and delivered the following day. In some cases raw-milk vendors deliver in the morning the milk of that morning and that of the night before.

While this last-mentioned practice ensures a shorter time-lag between the hour of milking and that of delivery to the consumer than is unfortunately allowed in some other cases to which reference is made, keeping milk overnight on a vendor's premises should be allowed only in cases in which satisfactory refrigeration storage is provided. The Commission approves the practice of the treating-houses in Auckland, and recommends the adoption of that practice with such necessary modification in any area as in the opinion of the Central Authority the circumstances of that area render necessary or desirable.

(2) The practice in regard to the place at which milk is picked up by the collecting agency varies. In many cases it is kept in the cool room of the farmer's dairy and picked up from there. But in other cases it is picked up from the farm-gate or other convenient roadside position. In a few cases farm-gate stands are provided with covers to protect the milk from the sun's rays or from rain and from some of the dust. But such covered stands are not common. Again, the dairy-farmer may know the time when the collector generally calls. But regularity and punctuality are subject to interruption, and exposure for undue periods is at times unavoidable.

The question of expense is sometimes raised in this connection. It is to the advantage of the vendor company or individual to pick up at the farm-gate, but certainly inconvenient and wasteful to the dairy-farmer to start up trucks or to harness up and cart cans of milk to the stands. A statement made in Auckland on behalf of producers may be appropriately quoted here:

> "There is one point which has been mentioned in connection with cartage which we would stress. And that is the collection of milk at the dairy, and not the farm-gate. It is more economical for the milk carrier to drive in to the dairy than to have several hundred individual farmers starting up trucks, tractors with trailers, or catching and harnessing horses twice a day in order to cart the milk 50 yards or 200 yards to the farm-gate. In Auckland for a number of years it has been the practice of farmers to have cattle-stops or special entrances to enable the lorry to collect from the dairy. In the event of universal refrigeration, it would be absolutely essential. It would be useless cooling milk to 40 or 45 degrees and then leaving it standing on the side of the road in summer in Auckland for any length of time. If farmers are unable to provide satisfactory entrances to the dairies, suitable roadside covered stands must be provided."

If the dairy-farmers' own supply association accepts at the expense of its members the responsibility for collection, there is no conflict of interest between the dairy-farmer and the collector. The dairy-farmers' interests in this respect are the only interests to be considered, and in the opinion of the Commission the question of place of pick-up may safely be left to the Supply Associations. It may be well, however, for the Central Authority to frame regulations that could be approved by the associations and that would protect the dairy-farmer in exceptional cases, and the Commission recommends accordingly.

(3) Prompt delivery to treating-house and raw-milk vendors should be a characteristic of all systems of collection. If a Co-operative Supply Association has a depot in which it weighs and samples each supplier's milk, some time will be occupied in this process. But such a depot should be conveniently placed, and time for weighing and sampling should be the only interruption to the direct delivery from the dairy-farm to the treating-house or the raw-milk vendor. Where the Dairy Farmers' Co-operative Milk Supply Association is controlling collection there should be no necessity for regulation, but as our first recommendation may not be adopted immediately and put into practice everywhere, a regulation that includes the necessity for uninterrupted transport may be necessary.

(4) In the opinion of the Commission the time has arrived for the adoption of regulations specifying the type of vehicle to be used. In Wellington a covered truck is in use. In other areas the trucks are open, and when, as often is the case, these trucks are on dusty roads in the heat of a summer's day the milk must suffer.

The Milk Department of the Wellington City Council is considering the possibility of using tanker transport after the war. It is obvious that a tanker cannot go from farm to farm picking up relatively small quantities of milk, bulking it in the tanker before it has been sampled, and subjecting it to the disturbance inevitable during the time that the tanker is only partially filled. But in cases in which milk is to be picked up from a depot or several depots at points along a main road, different considerations apply. If, for example, the Wellington Milk Department were to collect milk that had been brought into, say, Shannon, Levin, and Otaki, it could be conveniently transported in a tanker. This is a possibility for the future. In the meantime, some action to protect the milk during transport is desirable. The Commission's recommendation is that the Central Authority, when established, should prepare regulations prescribing the type of vehicle to be used.

One matter that deserves consideration is the desirability of the Dairy Farmers' Co-operative Milk Supply Association owning the vehicles that (if our recommendation that the work of collection become the responsibility of the association is adopted) will be used for the purpose. An alternative is for the association to arrange collection by contract. In our opinion the vehicles are more likely to be maintained at a standard required by those whose first interest is in maintaining quality if they are the property of the suppliers than if they are owned and operated under the sole influence of commercial interests. We recommend that as soon as is practicable the Dairy Farmers' Co-operative Milk Supply Association should purchase vehicles of the type best suited to serve their interests.

Cost of Collection

The Commission recommends that the Dairy Farmers' Co-operative Milk Supply Association be responsible for all costs of collecting and delivering milk to treating-houses and vendors' dairies. The cost should be assessed by the Central Authority after making proper allowance for any increased cost due to extending the period of twice-a-day collection, and should then be included in the price to be paid by the vendor to the Dairy Farmers' Co-operative Milk Supply Association for milk delivered. This matter is further discussed in Chapter 8 on prices and margins.

CHAPTER 11.—ALTERATION AND REORGANIZATION OF METHODS OF TREATMENT

The major purpose to be served in the processing of milk is to ensure the destruction of all pathogenic bacteria and to protect it from all danger of recontamination. This can be done only where the milk is properly and effectively pasteurized and immediately filled into sealed containers in such a manner that from the time the milk enters the pasteurizer until it reaches the container there is no danger of the introduction of pathogenic organisms. There is still a persistent belief in the

minds of the public, fostered to a considerable extent by the commercial interests of raw-milk vendors, that the process of pasteurization is harmful to the quality of the milk. The antagonism to pasteurized milk in the minds of the public is probably much more apparent than real. Evidence was available to the Commission in more than one centre that raw-milk vendors, especially in the low-production winter period, made up their shortages by purchasing pasteurized milk from the treating-houses. The customer was not informed that he was actually receiving pasteurized milk, and presumably firmly believed he was receiving raw milk. In another case evidence was obtained that a "raw-milk" vendor was purchasing pasteurized milk for his whole supply from one of the treating-houses, and his customers all apparently believed they were receiving raw milk.

It is true that inefficient methods of pasteurization as practised by some of the treating-houses have assisted the distributor of raw milk in his criticism of pasteurized milk. It is also true in some cases where very-efficient pasteurizing-plants have been in use that the age and condition of the milk when it reached the pasteurizer was such as to make it impossible for milk of high standard to be delivered to the consuming public. It has been repeatedly stressed in all discussions on pasteurization that the process of pasteurization does not make bad milk, or milk of poor quality, good. It is simply a means, and should be used as a means, of making milk of high standard perfectly safe for human consumption. The widespread misunderstanding of the purpose and function of pasteurization leads the Commission to its recommendation that steps be taken to educate the public on the value of pasteurized milk rather than immediately to enforce its universal sale. At the same time, it would be necessary for the authority advocating the increased use of pasteurized bottled milk to ensure that the processing of milk complied with all the requirements of efficient pasteurization and bottling.

Value and Danger of Milk

The medical evidence and the evidence of nutritionists has emphasized that milk is an indispensable article of diet and a most valuable food. The same expert evidence has stressed the fact that milk is, at the same time, one of the most effective means for spreading infectious diseases both of bovine and of human origin. An article prepared by Dr. Whitehead, Bacteriologist, Dairy Research Institute, at the request of the Commission is published in the Appendix, and there is no need at this stage to enlarge upon the type and incidence of the diseases communicable to human beings through milk. But in our opinion the value of milk as a food, its universal use, and the danger of infection at all stages from the cow to the consumer must be kept in mind throughout this discussion of the subject of treatment. The Commission has formed the conclusion that the use of pasteurization in some instances has been adopted for the purpose of improving the keeping-qualities of the milk rather than for the essential purpose of making it safe for human consumption.

Of the diseases normally described as milk-borne, many, if not the greater number, are of human origin, and the distribution of pasteurized milk by the can-and-dipper method must therefore be regarded as inconsistent with the protection of milk from all danger of recontamination. Recognizing this fact, it is impossible to escape the conclusion that the vending of pasteurized milk except in sealed containers is inconsistent with the purpose of providing the public with a safe milk. In Auckland and Dunedin large quantities of pasteurized milk are exposed to recontamination from the moment the milk leaves the pasteurizer until it is delivered to the consumer. Moreover, some of the methods of pasteurization employed are such that protection of the milk from recontamination is impossible even during the process of cooling immediately following pasteurization. Furthermore, conditions in some of the factories are such as to make it unlikely that the milk can be declared free from pathogenic organisms even when coming from the pasteurizer. All that has been said above, however, is no indictment of the case for pasteurization, and the Commission is satisfied that pasteurization of milk is a desirable policy as a means of protecting public health and of ensuring that milk is at least safe from disease-producing organisms. Inefficient pasteurization will undoubtedly draw criticism from the opponents of pasteurization. But it would be illogical to assume that, because certain of the processing-plants employed in pasteurizing had been used not for the purpose of making the milk safe for human consumption, but for the purpose of improving its keeping-qualities, the principle of pasteurization had been in any way discredited.

Need for Treatment

On the evidence submitted by medical authority it must be concluded that the only satisfactory method of processing milk intended for consumption in liquid form is to pasteurize it while fresh, and, as it comes from the pasteurizer, to fill it direct into some form of clean and sterile container.

The Commission recommends, therefore, that the Central Authority actively pursue the policy of encouraging adequate pasteurization of all milk sold, and that as early as possible it should be required that companies and private vendors distributing pasteurized milk should distribute such milk in sealed containers. The Commission has received information that there is no shortage of bottles, and there should be little difficulty in the way of giving effect to this recommendation. At the same time, we are of opinion that it would be unwise to attempt to enforce universal sale of pasteurized milk. Educational methods stressing the value of milk and the importance of ensuring its safety will achieve this purpose in a much more desirable manner, and there is much to be said for the submission that no attempt should be made to compel all consumers to purchase pasteurized milk. Some people will still demand raw milk, and their desires should be satisfied in the meantime; but they must be afforded a measure of protection, and the milk supplied to them should be as safe as possible. The Commission recommends, therefore, that all raw milk distributed to consumers must be from "accredited" herds, from herds that have been T.B. tested at six-monthly intervals, and must be bottled at the source of production as soon as possible after milking. In this way a measure of protection will be assured to the consumer, but the Commission would emphasize that it is not by any means 100 per cent. protection.

Scope of Subject

The term "treatment" in the minds of many people is applicable strictly to the process of pasteurization, but the Commission considers that it should be associated with daily sampling and testing of all milk prior to pasteurization in order to ensure that the quality of the milk is of the desired standard. It should be associated with bottling or filling into sealed containers immediately after pasteurization to protect against recontamination. These three matters of sampling, testing, and bottling of milk are therefore conveniently dealt with together.

In the opinion of the Commission, only good, clean, fresh milk should be pasteurized. This opinion is accepted by all authorities and needs no elaboration here, but in order to ensure that the milk is clean and fresh a proper system of sampling and testing ought to be adopted at every treating-house. The Commission is impressed by the system that prevails in Wellington, and recommends its adoption in all areas. The system has been described in Part I.

The essential features of a desirable system which need emphasis are—

(1) That a sample of every supplier's milk should be taken every day as the milk is received at the treating-house:

(2) That samples taken should be tested for butterfat content, cleanliness, and bacterial condition, and as frequently as possible for solids not fat and for evidence of added water:

(3) That the butterfat content of the milk shall be used to determine part of the basis on which the rate per gallon is assessed for payment to the producer, and that the condition of the milk in the other respects shall determine its grading and consequently rate of payment:

(4) That the rate of payment for second-grade milk should be sufficiently severe to be a proper economic inducement to the supplier to maintain a high standard of supply. Proper provision should be made for condemning milk from any supplier and for the cancellation of his license if the supply of unsatisfactory milk continues.

The Commission recommends that daily sampling, testing, and grading of milk, with adequate penalty or rejection in all cases of lower grading, be adopted in all areas as soon as facilities can be made available.

Pasteurization

Pasteurization, unless it is to defeat the purpose of the term, must be effective pasteurization. It cannot be wholly effective unless machines of an approved type are used and unless the methods employed throughout the processing are appropriate for the purpose. This is unfortunately not true generally of the plants and methods now in use. There are, of course, conspicuous exceptions, but they form a distinct minority of the plants in use.

The Commission made a point of inspecting all the treating-houses in the metropolitan areas, and reference has already been made to these visits in Part I of this report. The Commission is of opinion that a great deal of improvement needs to take place in the existing plants in order to bring them to a stage of efficiency such as will ensure that on each and every day of the year they are capable of providing a high-quality safe milk. There are thirteen plants operating in the four centres, and of these thirteen only three are completely modern in all respects. In six of the plants some portion of the unit, either the pasteurizer, the bottle-washer, the bottle-filler, or the layout of the building itself, is not up to date or completely efficient. The remaining four plants are completely out of date in all respects and should receive urgent attention. In this respect the Commission is of opinion that, in the interests of proper control over milk-processing and economy of operating, the number of plants in a given area should be reduced rather than extended. It may be desirable for the Central Authority to consider the de-licensing of present inefficient units rather than approving alterations and additions required in each individual case to bring the plants up to the required standard.

The number of plants that should operate in any area is one which must be decided after proper review of the circumstances prevailing in that area both in relation to the number of existing efficient plants and to the volume of the demand for milk in that area. Under the draft Pasteurizing Plant Regulations 1943 it is proposed that the Health Department should license treating-plants, but there is no proposal that the Department should have power to refuse a license if the plant and buildings fulfil all the requirements of the regulations. In the interests of rationalization of the processing of milk, power should be granted to the Central Authority to control the number of plants in operation. In order to ensure pasteurization being thoroughly effective from the technical and from the consumers' point of view, the Commission is of opinion that the following matters require immediate attention:—

(1) That the pasteurizing unit be thoroughly efficient mechanically for this purpose, be thermostatically controlled, and have recording thermometers installed at the appropriate points:

(2) That all bottle washing and filling machines be mechanically controlled, and attached to the pasteurization unit in such a manner as to ensure that the pasteurized milk is not open to contamination and that it is sealed in sterile containers:

(3) That can-washing machines, preferably mechanically controlled, be thoroughly efficient for their purpose of ensuring complete sterilization:

(4) That all pasteurizing units be housed in well-planned buildings, in the construction of which particular attention has been paid to ventilation and light, the building to be constructed or lined with material impervious to milk and water. The building should also be dustproof.

(5) That the plant be provided with adequate supplies of water, refrigeration, and steam:

(6) That the operating of all units be under the control of a fully-qualified working manager. The evidence of qualification should be a certificate from the Dairy Research Institute that the holder is fully qualified as a working manager of a liquid-milk-processing plant:

(7) That the whole of the operatives engaged in the processing of milk be subject to periodic medical examination in order to ensure that there is no danger of contamination of the milk with disease of human origin, particularly of the epidemic type:

(8) That the utmost cleanliness be observed in every operation connected with the processing of milk. In many of the treating-houses visited by the Commission there was evidence that those responsible for the processing of milk did not appreciate the extreme importance of cleanliness. The impression seemed to be that pasteurization was a process carried out in order to comply with a regulation rather than to provide milk of absolutely safe quality to the consuming public:

(9) That an analyst be attached to the treating-plant and that he be duly qualified for the work he is required to do. His appointment should be made in such a manner as to render him independent in respect of the matters dealt with by him in his capacity as an analyst. The qualifications for an analyst should be decided upon by the Central Authority after discussion with the Health Department and the Dairy Research Institute.

Finally, the Commission recommends that in order to give complete control to the processing of liquid milk the draft Pasteurizing Plant Regulations 1943, which include most of the above features, be introduced as soon as practicable.

BOTTLING

Pasteurization, unless it is accompanied by immediate filling of the milk into sterile sealed containers, does not ensure freedom from contamination. The danger of such contamination is constant from the time the milk leaves the pasteurizer until it reaches the consumer, and in view of the evidence that diseases of human origin form a considerable part of milk-borne diseases there can be no doubt that the value of pasteurization is negatived unless the milk is immediately filled into sterile containers and sealed. In the case of raw milk, similar considerations apply. While such milk may never be completely safe from pathogenic organisms of bovine origin, it can at least be protected from exposure to infection with diseases of human origin if the milk is filled into sterile containers at the source of production and immediately sealed. The Commission's recommendations covering both pasteurized and raw milk are therefore that such milk be filled into sterile containers either at the point of pasteurization or at the point of production and immediately sealed. All milk supplied to milk-shops for resale should be delivered in such sealed containers.

The importance of cleanliness is as great in the matter of bottling as it is in the matter of pasteurizing. Some of the treating-houses have expensive cleaning and sterilizing plants, and of some of these it may be said that they are modern and effective and of others that they are neither modern nor effective. In other cases bottles are hand-cleaned. Both among the cases of machine cleaning and sterilizing and among the cases of hand-cleaning there are examples of leaving the cleansed and sterilized bottles on one side for an interval between sterilizing and bottling. This practice affords opportunity for recontamination, and ought to be avoided. Though in some cases hand cleaning and sterilizing is carried out in a reasonably satisfactory manner, it is difficult to ensure efficiency in all cases. If mechanical means are employed, both means and methods are more capable of control. The Commission, therefore, is of the opinion that all bottles should be cleaned, sterilized, filled, and sealed mechanically, and it recommends that regulations be drafted with a view to ensuring control over the types of cleaning, sterilizing, and filling machines to be used and the methods employed in operating them.

Protection of Raw Milk

The question of the protection of raw milk has been mentioned under the heading of "Bottling," and is related to the bottling of pasteurized milk, because the ultimate object in both cases is the same. The presence of raw-milk vendors in the industry necessitates high standards of control if public health is to be properly protected. The Commission has already recommended that all retail milk should be delivered in sealed containers, and with a view to ensuring adequate control of the raw-milk section of the industry we recommend as follows:—

(1) That vendors of raw milk in each area shall purchase all milk required by them from the Dairy Farmers' Co-operative Milk Supply Association for that area, and that if they also vend pasteurized milk they shall purchase such milk in sealed containers from one of the treating-houses operating in the area. All supplies of raw milk should be drawn from "accredited" and T.B. tested herds:

(2) That in the event of the vendor requiring raw milk from the Dairy Farmers' Co-operative Milk Supply Association, steps must be taken to see that the raw milk is properly bottled at the source of production. Such an arrangement will probably be best arrived at between the individual producer and the vendor concerned, but the contract itself should be approved by the local Dairy Farmers' Co-operative Milk Supply Association:

(3) That producer-vendors be licensed to sell milk on condition that their herds are "accredited" and T.B. tested and that any additional milk required by them comes from such herds or direct from a treating-house. In the latter event it should be pasteurized milk in sealed containers:

(4) That all milk vended by a raw-milk vendor or by a producer-vendor should be distributed in sealed containers and properly labelled as pasteurized milk or raw milk.

The objective of the delivery of milk of high standard to the consumer and the efforts of the producer in producing milk of a high standard will be largely defeated unless processing-plants are operated on a basis of complete regard for the maintenance of the high quality of the milk and the destruction of all disease-producing organisms.

It should be the aim of the Central Authority in shaping and directing the policy of the liquid-milk industry to educate producers, vendors, and consumers alike to an understanding and appreciation of the need for universal pasteurization and bottling of milk.

CHAPTER 12.—ALTERATION AND REORGANIZATION IN METHODS OF DISTRIBUTION

OBJECTS OF ORGANIZATION

The final stage in the process of bringing milk from the cow to the consumer is the distribution of the milk. The three objects to be pursued in the organization of distribution of liquid milk are:—

(1) To maintain the standard of the milk distributed:

(2) To keep down costs by the employment of efficient methods and by eliminating waste:

(3) To deliver the milk at the time and in the manner appropriate to the needs of the consumer.

The best service can only be rendered if the milk delivered is of high standard and the price sufficiently within the reach of the lower-income groups to make it possible for adequate quantities to be purchased. In both these matters organization of distribution plays an important part.

Milk may suffer in its freshness by delay and be rendered dangerous by contamination. Its cost can be increased by inefficient or wasteful methods of delivery, and as the expense of distributing milk to the consumer is by far the largest item in the vendors' margin it follows that price to the consumer is vitally affected by the methods employed.

During its investigation the Commission has been forced to the conclusion that there are distributors who have little regard to the obligation they owe to the producer to maintain the quality of the milk, and to the consumer to deliver an article of high standard. They have not endeavoured over the years to make any appreciable improvement in the methods employed in handling and distributing the milk, and they continue to operate with minimum efficiency and a minimum of hygiene.

The measure of such efficiency and hygiene was, up to the time when zoning of distribution was introduced, a reflection of the conditions brought about by the depression years. Many vendors through economic circumstances were allowed to sell milk without any worthwhile control being imposed by the local authorities.

With the introduction of zoning and the elimination of competition, there remains no reason why the standards of distribution should not be thoroughly overhauled, brought under strict control, and rapidly improved. Under present conditions of zoning, the Commission is of opinion that the licensing authorities can demand maximum efficiency and a considerable advance in the present standard of service.

Agents of Distribution

There are several classes of agencies by which milk reaches the consumer. The chief of these is the milk-roundsman, but an appreciable part of the milk distributed reaches the consumer through the milk-shop and the milk-bar. Other avenues are hotels and restaurants. Hospital and other institutions, public and private, also purchase milk for consumption. Contractors deliver bottled milk to schools in cities and towns and throughout the countryside. Other supplies go to the camps and stations of the Armed Forces and to shipping, both naval and mercantile.

When the cleanliness, freshness, and wholesomeness of the milk consumed is under consideration, all these agents of distribution must be reviewed. In the final assessment of the consumer price, all these avenues of distribution form a composite part of the total costs.

The Commission has, in each metropolitan area, endeavoured to ascertain the quantities handled by the various agents. Incomplete records have made a really satisfactory statement on this matter impossible. What information is available is summarized for each area in the several chapters of Part I and in the Appendix to this report.

The maintenance of effective control may be rendered difficult and uncertain by the employment, in any section of the distributing trade, of an unnecessarily large number of persons. For instance, in the case of roundsmen it is obvious that if the Auckland standards of distribution, where approximately 60 gallons per roundsman is delivered, could be improved to the Wellington standard of 120 gallons per roundsman, then approximately only half the number of roundsmen would be required with a saving not only in total wages, but also in transport costs, &c. This comparison also applies to the large number of private vendors operating in each area. If each round could be built up to a standard of, say, 90 to 100 gallons, it would go very close to halving the present number of personnel engaged in the distributing trade and would considerably reduce vehicle and other costs.

These remarks apply to vendors and producer-vendors as well as to employed roundsmen. The fact must be borne in mind that the present wasteful method whereby individual vendors collect from the farm, sometimes situated at a considerable distance, means the unnecessary use of vehicles and equipment, consumption of petrol, depreciation of vehicles, and excessive man-hours. This total cost is directly related to the number of gallons which are then distributed. If the number of gallons distributed is 100, the cost per gallon will be at least half what it is when only 50 gallons are distributed. The following information on mileages travelled and gallonages delivered is striking evidence on this point. In Christchurch twenty-three producer-vendors travelled a total of 353 miles per day to deliver 776 gallons of milk, or an individual average of 15½ miles to deliver approximately 34 gallons of milk. These same twenty-three producer-vendors, in addition to the above mileage travelled on delivery, travelled a total of 226 miles, or an individual average of approximately 10 miles, to transport this milk to their round. In the same area information was available for seven vendors showing that they travelled a total of 129 miles to collect and deliver 253 gallons of milk, or an individual average of approximately 18 miles to collect and deliver 37 gallons of milk.

Examination of the tables available from other centres shows a similar position, and this must be considered undesirable both from the point of view of efficiency of collection and economy of distribution.

A further most unsatisfactory feature of this low gallonage of delivery per unit is that with the larger number of vendors engaged in the industry effective control over the standard of supply diminishes.

Considering that the health of both adults and children is vitally concerned, and that economy of distribution is directly determined by these factors, these matters are of considerable moment.

Milk-shops

Complete information was not available to the Commission concerning the numbers of all shop dairies in the several metropolitan areas. This is partly due to the fact that the control of the licensing authority (for instance, the Metropolitan Milk Council in Auckland) does not extend to the whole of the metropolitan area. The following table gives some indication of the position with the relationship of the number of milk-shops to the density of population :—

Area.	Population.	Number of Milk-shops.	Number per 1,000 of the Population.
Auckland	223,000	369	1·7
Wellington	124,000	91	0·7
Hutt	36,000	50	1·4
Christchurch	133,300	303	2·3
Dunedin	82,000	123	1·5

Milk-shops occupy an important place in the distribution of milk. In Auckland they distribute 13 per cent. of all milk sold (excluding Armed Forces). Their importance may increase or decrease in the future according to the development of the organization of distribution. It is highly desirable under all circumstances, however, that the number of such licensed dairies should not be excessive and that the conditions under which milk is stored pending its sale to the consumer should be under strict control.

In some other countries milk-shops sell at a lower retail price to the consumer than the delivered price of milk. This has not been the practice in New Zealand, and the Commission can see no good reason for altering the existing practice. The justification for extending the distribution of milk through milk-shops could only occur on the grounds of economy, and as no reduction in price to the consumer would result the Commission does not recommend any increase in the numbers of milk-shops.

Frequent inspection of the premises of milk-shops is necessary, and it is highly important that adequate refrigeration facilities should be available for storing the milk. The Commission recommends that, in common with producer-vendors and private vendors, milk-shops should be required to retail only milk in containers sealed at the source of production or at the source of treatment.

Conditions of Distribution

Apart from the question of the number of persons engaged in distribution, considerations arise of the conditions under which the milk is handled during distribution. Under the preceding chapter on treatment a paragraph is included dealing with the conditions under which milk is handled by vendors and producer-vendors. In this chapter the conditions obtaining in distribution and the means of transport as well as the personnel engaged on delivery rounds is discussed. The following result of tests made by the Health Department during the year ending 31st December, 1942, on samples taken from shops, restaurants, and on the rounds is repeated from the chapter in Part I, "Present Circumstances of the Supply of Milk to the Metropolitan District of Auckland":—

	Number of Samples.	Percentage not complying with Requirements of Food and Drugs Act.
Restaurants—		
Pasteurized	36	30·55
Raw	20	25·00
Shops and milk-bars—		
Pasteurized	463	8·64
Raw	311	11·25

The results may be compared with the results obtained during the same year by tests on official samples taken on the rounds from the same area:—

	Number of Samples.	Percentage not complying with Requirements of Food and Drugs Act.
Pasteurizing companies—		
Pasteurized	207	0·48
Raw	15	..
Vendors supplied by pasteurizing companies—		
Pasteurized	161	0·62
Raw	73	2·74
Vendors supplied by dairy-farmers—		
Pasteurized	Nil	..
Raw	124	4·03
Producer-vendors—		
Pasteurized	Nil	..
Raw	403	14·39

Any consideration of the above table must take into full account that the legal standards required by the Health Department are minimum standards. From the viewpoint of quality there must be numerous cases, constituting a considerable proportion of the total, in which the standard of the milk is low. In other words, the above table gives no indication of the proportion of samples which would not be classed as milk of good standard but which were just able to meet minimum legal requirements. The Commission is satisfied that the present legal standards, whilst continuing to operate as legal minima, should not be accepted as the minima for milk coming within the catagory of milk of high standard.

In order to exercise proper control and to give effect to the purpose of tightening up control the Commission recommends that the number of Inspectors at present engaged in sampling milk, inspecting facilities, and examining premises be increased. The local Milk Council should be responsible for determining the number of Inspectors necessary in order to give full effect to this recommendation.

In connection with methods of delivery on milk rounds, the Commission has already commented on the variety of vehicles employed in the different cities. Numerous types of vehicles are in use, including trucks, private cars, prams, cycles, dandies, and horse-drawn vehicles of the two- and four-wheeler type, many of which have undesirable features from the hygienic point of view. Comment has also been made on the condition of many of the vehicles used and the personal hygiene of the distributor. Comment has further been made on the employment of young boys to assist roundsmen, and in this connection the Commission recommends that the employment of boy labour be prohibited as soon as employment conditions return to normal. The Commission further recommends that a standard form of vehicle or vehicles for delivery be prescribed by regulation and a date fixed on which such regulations shall come into force. The Commission further recommends that the control organization immediately take up the question of periodic medical examination of all personnel employed in the distribution of milk, and, if such an examination be immediately practicable, that a regulation be prepared accordingly.

Maximum Delivery per Round

Wellington, through its municipal milk scheme, provides an example of an extraordinarily high degree of efficiency in the organization of distribution. The delivery per roundsman is the highest for any centre in New Zealand—viz., 120 gallons per roundsman. The reasons underlying differences in gallonages per roundsman have been touched upon to some extent in Chapter 8 on "Prices and Margins." One important advantage as compared with Auckland, for example, is that delivery-time in Wellington covers a period of seven and three-quarter hours, as compared with four and a half hours in Auckland. The latter is due to the effect of the Shops and Offices Act in prohibiting delivery before 3 a.m. and the regulation by the Milk Council prohibiting delivery after 7.30 a.m. The Commission recommends that further consideration be given to this question of the hours of delivery in order that roundsmen may be permitted to work full award hours on their task of delivering milk. It is probable that the number of gallons delivered *per hour* in Auckland compares favourably with the number delivered elsewhere, but due to the short period worked it is impossible for more than approximately 60 to 65 gallons per man to be delivered.

The problem of hours of delivery is not capable of easy solution. In view of the climatic conditions prevailing in Auckland, it does seem desirable to ensure that the morning's delivery shall be in time to provide the family with the milk required for breakfast. This would be impossible if the hour of delivery was extended beyond 7.30 a.m. In Wellington, where the climate is much less humid, delivery-time commences at 3 a.m. in the summer and 6 a.m. in the winter. Thus very few householders in Wellington City receive their milk in time for breakfast in the winter. In quite a large proportion of households milk is not received even in the summer-time in time for breakfast.

This has brought few complaints, for two reasons: First, because of the steps taken by the Wellington City Council to have the milk adequately cooled immediately on arrival at the balancing-station at Rahui or at its depot; secondly, because payment for milk to the producer carries heavy penalties for milk of inferior quality. This has had the effect of ensuring the delivery of high-quality milk which, even if received one day and used at breakfast-time the next day, still retains its quality.

In extending the hours of delivery in other centres in the attempt to increase the gallonage delivered per roundsman, strict attention must be paid to these points. The climatic conditions prevailing in that particular area must first be considered. Before any attempt is made to lengthen the delivery hours, reorganization of the whole supply of the milk from the producer to the treating-house should be such as to ensure a keeping-quality similar to that now firmly established in Wellington. Even in Wellington, the Commission feels that steps should be taken as soon as conditions are normal (recognizing that under war conditions it is not possible to enforce starting-times that would permit of an earlier delivery) to endeavour to have all milk delivered by 10 a.m. at the latest. An earlier finishing-time than this is desirable and should be possible in the summer—in the winter 10 a.m. appears late enough for completion of delivery. Mothers with small children must be given consideration in this matter, and for them 10 a.m. is the latest time by which milk should be received.

The question was raised during the Commission's hearings as to whether a daylight delivery of milk might not be desirable. There are important advantages and considerable disadvantages under a system of daylight delivery which the Commission does not feel fully qualified to discuss. It is a question, however, which should be given consideration in the light of future organization.

Another important factor affecting cost of distribution is that in Wellington only bottled milk is delivered by the roundsmen, while in Auckland roundsmen deliver both raw and bottled milk, and in a few cases deliver butter and occasionally eggs.

Payment for milk in Wellington is made by the token system, and roundsmen do not collect money or receipt accounts. In Auckland and other centres roundsmen are responsible for collecting money and receipting accounts. Approximately three hours per week (on one particular day) is spent by roundsmen in collecting payments which have not been collected during the round. Other factors affecting Wellington's high gallonage per roundsman is the quantity delivered per customer, which is approximately 2·13 pints, as compared with approximately 1·78 pints for Auckland, 1·95 pints for Christchurch, and 1·91 pints for Dunedin. The reason for this difference in delivery per call is not easy to determine. It is argued, too, that the extensive use of horse-drawn vehicles assists to raise the gallonage delivered per round. While the evidence available certainly favours the efficiency and economy of horse-drawn transport, there are many factors to be taken into consideration in any discussion of the efficiency of horse-drawn as against motor-drawn vehicles.

Auckland appears to have one advantage over Wellington and other areas which might well be considered in any prospective reorganization. A number of depots conveniently distributed throughout the suburbs have been set up in Auckland and from these roundsmen go out to relatively nearby rounds. This has advantages both from a transport point of view and in concentrating the roundsman's time to the maximum extent on actual distribution.

The Commission recommends that all these factors affecting the number of gallons delivered per roundsman be taken into full consideration in any attempt at reorganization. The main purpose of such reorganization must be to increase the number of gallons delivered per roundsman and thus, by reduction in total wages and in transport costs, effect appreciable reduction in delivery costs. Because of the fewer persons engaged on the rounds, better control can then be exercised over the conditions of delivery.

The Commission further recommends that advantages of the Wellington system, such as token payment for milk, delivery of all milk in sealed containers, and the working of full award hours on delivery, be examined and, if practical in each area, be brought into operation as early as possible. The subject-matter of these recommendations is matter suitable for the consideration of Milk Councils or other local authority having jurisdiction over the distribution of milk.

There is another matter that is closely related to the subject of prices and margins but which can be again mentioned at this point. The Milk Department of the Wellington City Council distributes all retail milk in bottles and requires the consumer to pay for the bottles. We recommend that this course be adopted in all areas. Further, the Wellington Milk Department distributes only pint and quart bottles of milk, and at the present time appear to be developing their trade almost completely in pint bottles. The Commission is of opinion that full consideration ought to be given to the advantages of distributing only two sizes of milk-bottle—namely, pints and quarts—and the delivery of milk in half-pint bottles only at the appropriate cost. This matter has also been discussed in the chapter on prices and margins.

On the question of the excessive number of vendors or producer-vendors engaged in the distribution of milk in any area, the Commission recommends that the Central Authority give this matter early attention with a view to devising and enforcing methods of rationalization that will reduce serious wastage of man-power and material involved and protect the consumer against avoidable cost.

PART III.—SUPPLY TO THE ARMED FORCES

CHAPTER 13

The third matter of reference is "The supply of milk for the Armed Forces, including Allied Forces in such areas"—that is, to the four metropolitan areas.

Particulars of all contracts made by the Food Controller for the supply of milk to the Armed Forces have been supplied to us. We have also had the advantage of conferences at Auckland and Wellington with representatives of the Armed Forces, including the Allied Forces, with a representative of the Food Controller, and in Auckland with the Auckland Metropolitan Milk Council. We have examined the returns supplied to us with a view to ascertaining the quantities of liquid milk required, the relation of these quantities to the total requirements of the areas from which the supply is drawn and the relation of the prices agreed upon to the costs involved and to the prices charged for supplies to the civilian population. We have given special attention to the inevitable fluctuations in demand. We have also consulted representatives of the Armed Forces on the question of quality, and have discussed this matter with the Milk Council at Auckland and with vending and producer companies who are responsible for supply.

Adequacy of Supply

The Commission was concerned to discover that severe cuts had been made in the supply to Armed Forces both at Auckland and at Wellington. These were due in part to circumstances adversely affecting production. In both areas the reduction in the amount of fertilizer available and, more seriously, the shortage of labour have had serious effects. In Auckland a severe and prolonged dry season has reduced production throughout the province. In both areas, in the opinion of the Commission, the policy pursued not only before but also since the outbreak of war has rendered the organization of adequate supplies to the Armed Forces difficult. In Auckland there appears to have been a failure to appreciate the importance of maintaining an adequate surplus and the failure also to encourage a nearer approach by dairy-farmers to an all-the-year-round-level supply. In Wellington the Milk Department has hesitated to commit itself to contracts adequate to meet the needs of the community. Failure on the part of all concerned to contemplate and to deal with the supply to the Armed Forces as a separate supply service having distinctive features and presenting unique problems has been, in our opinion, a contributing factor to the failure to maintain adequate supplies.

Standard of Milk-supply

The Commission was also concerned that there had been complaints concerning quality of the milk-supply and that a number of these had been justified. In Auckland, Allied Forces have refused for some time to draw milk from one of the large treating-houses, and in May of this year stopped all supply from another of the large treating-houses. This is not surprising in view of the conditions of the processing-plants and of the fact that a large part of the milk in Auckland was drawn from accommodation sources—that is, from dairy-farmers whose herds and sheds are not subject to the same control as are the herds and sheds of regular town suppliers. Reports from the Health Department show that in July of last year, of fourteen samples taken in Christchurch from the supplies drawn from one of the treating-houses, four showed a deficiency in butterfat, all four being below 2 per cent. and one as low as 1·03 per cent. On the other hand, a number showed high butterfat content, one as high as 6·12 per cent. A number were defective in solids other than fat, and eleven showed 6 per cent. or 7 per cent. of added water. In November, twelve samples collected from milk supplied to the Armed Forces by the same treating-house showed an improvement, but all twelve were deficient in butterfat, though in the worst case the butterfat content was 3·01 per cent.

Apparently the trouble in Christchurch has been removed. In Auckland the outside or accommodation supplies will cease for the year almost immediately, and it is hoped that steps will be taken to prevent a renewal of the practice of drawing such supplies.

Structural alterations with a view to ensuring better equipment and a higher standard of treatment are being carried out in the processing-plant at Auckland, supplies from which were stopped in May, and it is anticipated that there will be a marked improvement in this respect.

If the recommendations that we make are adopted, the supply to all Armed Forces should be assured and its quality prove satisfactory all the year round.

Milk to be drawn from Metropolitan Areas

In order to ensure supplies of high-standard milk it is necessary in the main to draw those supplies from sources catering for the metropolitan areas. It is only such sources that have a sufficient number of dairies licensed by the Department of Agriculture as suitable for town supply and prepared by long association with the town supply to produce milk of the standard required. It is only in such areas that the milk can be treated by pasteurizing-plants with capacities sufficient for the purpose. It is also desirable to protect the freshness of the milk by avoiding long journeys on collection and delivery.

Fluctuations in Demand

The demand for liquid milk by the Armed Forces is a demand that is subject to sudden and severe fluctuations. Not only may the demand fluctuate widely from day to day or from week to week, but the alternating periods with high demand and low demand are extremely irregular and often prolonged. This is inevitable and must be accepted as a feature of such supply To deal effectively with the problem presented, allowance must be made for this fact in fixing the conditions of contract. There are three respects in which the quantities of milk required at the periods of highest demand and the extreme fluctuations in demand affect supply and the costs of supply. First, the milk required at the height of demand in any one area forms an appreciable proportion of the total quantity required in that area. If the high demand occurs in the period of low production, a considerable increase is necessary in the number of suppliers who must be drawn upon for milk. Secondly, in practice this increase means extending the area from which milk is drawn, as all the milk being produced in the area and not already absorbed in the town supply is delivered to cheese-factories and butter-factories. Thirdly, the fluctuations in demand increase, and increase considerably, the surplus supply that must be sold at factory rates. If a substantial supply of this nature were drawn from an individual dairy-farmer, he would be obliged to fix his price at a level that would cover the loss on surplus milk. If he did not do this, he would be liable himself to suffer a very heavy loss when the demand dropped and remained at a low level for a lengthy period or ceased altogether. When the supplies are drawn from a treating-house and extra expense is incurred in securing the additional supply, that expense must fall on one or more parties in the industry or on the general consumer. When it results in a substantial increase in the surplus, the consequent loss probably falls on the general body of producers.

Proposed Basis of Contracts

In view of these facts, the Commission has considered and has discussed with representatives of the New Zealand and Allied Forces a proposal that each contract in respect of the Armed Forces should have regard to these fluctuations. The proposal involves the following terms:—

(1) That the quantity required to meet peak requirements each year should be estimated and stated by the purchasing authority as the basis of the contract:

(2) That the quantity so estimated and stated should be made available at all times throughout the year by the supply authority:

(3) That the milk delivered should be charged for at a reasonable price fixed in the terms of the contract:

(4) That the purchasing authority should indemnify the supply authority against any loss that may be unavoidably sustained:

(5) That if supplies additional to those covered by the year's contract are required for a limited period, such supplies ought to be paid for at agreed rates in correspondence with the actual costs of supplying this milk.

If this proposal were adopted, the supply authority would be required to make the best use of surplus quantities, and the indemnity would be available only when all reasonable steps were taken to avoid loss, and then only to the extent of the loss. In no case would the loss on any surplus exceed the difference between the contract price and factory price. In cases in which more profitable use—for example, use as sweet cream or for the manufacture of ice-cream or chocolate—could be made of the surplus, the loss would be reduced accordingly. If the surplus could be used for town milk-supply, then, of course, no loss would accrue. This proposal was favourably received by the representatives of the Armed Forces with whom it was discussed. It presents obvious advantages, and in the result the total cost to the purchasing authority ought not to be appreciably in excess of the present cost. Each of the parties would understand its own position and be able to regulate its action accordingly. This would give a stability that might well react favourably on the price charged. Another suggestion made was that when the supply authority knew the estimated requirement for twelve months it could and should contract for the production of that quantity with a group of producers not among those regularly supplying the area. Such producers would, of course, be selected men with dairies licensed by the Department of Agriculture as suitable for town supply. The supply so secured could be allocated to the needs of the particular group of Armed Forces affected, and in this way the supply of those needs would be assured. If such a special arrangement could be made, disturbance in the regular supply to civilian consumers would be avoided. It would have the advantage that, if added cost was caused by the necessity of going further afield for the supply, that added cost would be known to the supply authority and could be taken into consideration in fixing the price. The cost to the supply authority for the liquid milk required to meet the needs of the general body of civilian consumers would thus be unaffected by the supply to the Armed Forces.

In order to ensure that the milk supplied to the Armed Forces is of high standard, it is necessary that it be drawn from cows kept and milked under the best conditions. In one case brought to the notice of the Commission the milk is delivered raw but is drawn from T.B. tested herds. In other cases the milk is pasteurized, but in this connection it is necessary to emphasize that before pasteurization the milk should be of high quality and fresh and that pasteurization should be carried out effectively and under controlled conditions. The Commission is of opinion that the Armed Forces, including the Allied Forces, are justified in rejecting any milk that does not conform to the accepted standards and that any loss consequent upon that rejection should fall entirely on the supplier.

Recommendations

After consideration of all matters placed before it, the Commission makes the following recommendations:—

(1) That in respect of each contract for supply of milk to the Armed Forces the purchasing authority should in the month of August in each year estimate the quantity or quantities required for all periods during the year and that that estimate should contemplate peak requirements:

(2) That contracts for supply should be made with treating-houses or supply associations and should provide that the quantity or quantities specified are to be available throughout the year and that deliveries should be made as required:

(3) That the price to be paid should be a price per gallon for all milk delivered in accordance with orders received:

(4) That an indemnity against loss on so much of the amount made available under the contract as is not required be given by the purchasing authority. Proper safeguards should be introduced in the interests of the purchasing authority to ensure that the indemnity is invoked only in cases of actual unavoidable loss and be limited to the amount of loss actually proved:

(5) That if supplies additional to those covered by the year's contract are required for a limited period, such supplies ought to be paid for at agreed rates in correspondence with the actual costs of supplying this milk:

(6) That the standard to be attained be specified in the contract and that the purchasing authority be entitled to reject any milk that does not conform to such standard in all respects:

(7) As far as possible the supply authority should keep all contracts for supply of milk to the Armed Forces additional to, and independent of, the supply for civilian needs. Such contracts should be made with selected producers, preferably in selected areas.

PART IV.—SUMMARY OF RECOMMENDATIONS

CHAPTER 14

In Part I of this report the Commission has reviewed the present circumstances of the supply of milk to the four metropolitan areas and in Part II has discussed those alterations and forms of reorganization of the methods of supply, collection, treatment, and distribution that may be necessary to ensure at reasonable prices adequate supplies of milk of high standard to these areas. In Part III it has examined the position of the supply to the Armed Forces. In this chapter the Commission sets forth its recommendations in a concise and summary form. As the reasons for its conclusions are set out in the appropriate chapters, those reasons are not repeated.

On many matters relating to the present circumstances of the supply of milk to the metropolitan areas the information at present available is incomplete in some respects and unsatisfactory in others. If, as the Commission recommends, a Central Authority is constituted to control the liquid-milk industry in the metropolitan areas, that authority will be in a position to collect further data on all matters within its jurisdiction and to confirm, correct, and supplement the recommendations of the Commission.

The Commission recognizes the limitations imposed on it by time and the inadequacy of the information available in its consideration of the alteration and reorganization in the present methods of the industry. It is also aware that the form in which its recommendations are set out suggests an intention to prescribe in detail for all circumstances and eventualities. The form adopted, however,

is adopted for convenience of reference, and in some of their details the recommendations must be regarded as tentative or as illustrative only. A Central Authority will readily distinguish between the details that ought to be preserved and those that may need modification. The Commission hopes that the statement will represent the general development that it contemplates and will be found sufficiently explicit to give relief to all essential features.

Though any attempt to alter the existing circumstances of the industry must inevitably create difficulties and the adjustment of personal ideas and relationships, the Commission contemplates that powers vested in any controlling body, local or national, as the result of the Commission's recommendations will be used reasonably and with full regard to the interests of the industry and of public health, and that at all times such powers will be used with an awareness of the advantages of co-operative, rather than enforced, adjustment of present circumstances. The Commission can see no reason why the powers recommended need in any circumstance to be used unreasonably. The overriding consideration guiding all actions is that the milk must be produced in adequate quantity; it must be collected, properly treated, and conveyed to the consumer; and prices to the public must be as low as possible compatible with the service rendered and the quality of the article delivered.

Proper organization of the industry on a national basis necessitates national representation and the existence of an independent and impartial central authority. Proper organization of all local sections of the industry necessitates smooth and harmonious functioning between the various interests. Local control, particularly, should be adapted to this purpose.

In the matter of the supply of milk to the Armed Forces the Commission was faced with a distinct problem, but as this supply has to be drawn from the same sources and has to be treated by the same processing-plants as the supply to civilians in the metropolitan areas the same difficulties had to be faced. It was possible, however, to make the recommendations more precise, and these are repeated in this chapter in the same form as they appear in Part III.

The recommendations are arranged under the various headings adopted throughout the report and in the order in which they have been discussed.

Organization

In the opinion of the Commission, the first essential to the attainment of the threefold object of adequacy, high standard, and reasonable price is the reorganization of methods of control and direction of the industry. Such reorganization would involve three developments:—

(1) The creation of a central authority to guide and control the conduct and development of the industry:

(2) The appointment of Metropolitan Milk Councils for the Christchurch and Dunedin areas and the Hutt Valley and bays sub-area with functions and powers similar to those of the existing Auckland Metropolitan Milk Council:

(3) The establishment in the Metropolitan Areas of Auckland and Christchurch of a Dairy Farmers' Co-operative Milk Supply Association similar to the associations at present operating in Wellington and Dunedin, and the provision of statutory functions and extended powers for all such associations.

In the following statement the recommendations made by the Commission in respect of each of these developments and discussed in the appropriate chapters preceding are recapitulated.

Central Authority

The Commission recommends that a permanent body consisting of a small number of qualified persons be created as a central authority controlling the liquid-milk industry in the areas under review, and, in particular, to discharge the following functions:—

(*a*) To advise the Government on all matters relating to the industry and to interpret the national policy and to act as the principal administrative authority of that policy.

(*b*) (i) To confer with the New Zealand Dairy Board in all matters affecting the interests of the dairy industry:

(ii) To collaborate with the Departments of Health and Agriculture and the Dairy Research Institute in defining standards to be observed in production and in grading liquid milk and cream.

(*c*) From time to time to review the powers vested in Metropolitan Milk Councils and to advise in the matter of any additional powers required to enable such Councils to discharge their functions more effectively.

(*d*) To assist Metropolitan Milk Councils and the Wellington City Council in all matters pertaining to the industry and to give such directions and to take such other steps as may be necessary to ensure the execution of the national policy.

(*e*) To promote the formation of Dairy Farmers' Co-operative Milk Supply Associations in Auckland and in Christchurch similar to the associations operating in Wellington and Dunedin.

(*f*) To assist Dairy Farmers' Co-operative Milk Supply Associations, and, where necessary to the effective administration of national policy, to require amendment to their constitution and to give direction concerning administration.

(*g*) To act as an arbiter with final authority in any dispute arising between a Metropolitan Milk Council and a Dairy Farmers' Co-operative Milk Supply Association.

(*h*) To compute and determine all prices to be paid to producers and to the Dairy Farmers' Co-operative Supply Associations for all milk and milk products sold for town supply, all margins to be allowed for collection, treatment, and distribution, and all prices chargeable to consumers.

And the Commission further recommends that the Central Authority be empowered—

(*i*) To determine standards for "accredited" herds.

(*j*) To determine the conditions under which producer-vendors shall continue to operate.

(*k*) To appoint officers with special qualifications to assist farmers in developing efficient methods of production and hygienic methods of handling milk.

(*l*) To prescribe the qualifications required to be held by working managers of processing-plants and by analysts engaged in testing and grading milk.

(*m*) To arrange with the Dairy Research Institute and Massey Agricultural College for the training of working managers of processing-plants and of analysts.

(*n*) To collect from dairy-farmers through their Supply Associations, and from processing companies and distributors through the Metropolitan Milk Council, all data that it may deem necessary to an accurate knowledge of the condition, needs, and costs of each branch of the industry and to prescribe forms of records and methods of accounting.

(*o*) To maintain a programme directed to the education of all persons engaged in the industry in all matters related to the production, processing, and distribution of milk, and of consumers in all matters connected with the use of liquid milk and milk products.

(*p*) To administer all funds that are voted by Government grant or by the appropriation of "unearned margins."

And the Commission further recommends that—

(*q*) In order to ensure the independence of the Central Authority and its freedom from influence by any sectional interest, all moneys required to finance its administration be provided by grant from public funds.

Metropolitan Milk Councils

The Commission recommends—

(*a*) That the functions and powers of the Auckland Metropolitan Milk Council be modified so that if and when a Dairy Farmers' Co-operative Supply Association has been established in the Auckland Milk Supply area such association shall be entitled without license from the Council, to sell and deliver milk and milk products to vendors and producer-vendors within the district under the jurisdiction of the Council; and

(*b*) That Metropolitan Milk Councils, having powers similar to the powers of the Auckland Metropolitan Milk Council varied as aforesaid, be appointed to control the milk industry in the areas of Christchurch and Dunedin and the sub-area of the Hutt Valley and bays district of Wellington.

And the Commission further recommends that every Milk Council be empowered—

(*c*) To require every vendor of milk, other than producer-vendors, within the district under its jurisdiction to present to the Council not later than the 1st day of August in each year, or such other date as the Central Authority shall direct, a statement specifying the quantity of milk required month by month by such vendor during the ensuing twelve months.

(*d*) To require the Dairy Farmers' Co-operative Milk Supply Association to have available for the area at all times during the twelve months period a supply of milk 10 per cent. in excess of the total of the quantities specified as aforesaid.

(*e*) To require the vendors and the Dairy Farmers' Co-operative Milk Supply Association to enter into contracts for the supply of the specified quantities of milk.

(*f*) To require every producer-vendor, on the appropriate annual date prescribed by the Central Authority, to present to the Council a statement of the quantity of milk that he undertakes to supply and vend in the district during the ensuing twelve months.

And the Commission further recommends—

(*g*) That the area over which the Auckland Metropolitan Milk Council exercises jurisdiction shall be extended to include the districts of Otahuhu and the western suburbs and any other urban area adjoining the City of Auckland.

(*h*) That in all other cases the Metropolitan Milk Councils appointed shall have jurisdiction over the supply of milk to all urban areas adjoining their respective metropolitan areas.

Dairy Farmers' Co-operative Milk Supply Associations

The Commission recommends that a Dairy Farmers' Co-operative Milk Supply Association be established in the supply area for each of the four metropolitan areas. Subject to compliance with such conditions (if any) as the Central Authority shall impose, the Wellington Dairy Farmers' Co-operative Co., Ltd., and the Dairy Farmers' Milk Supply Co., Ltd., shall be recognized as the Supply Associations for Wellington Metropolitan Area (including the sub-areas of Wellington City and its immediate environs and Hutt Valley and bays district and its immediate environs), and the Dunedin Metropolitan area respectively.

And the Commission recommends:—

(*a*) That the constitution of every Supply Association shall provide, *inter alia*, as follows:—

(i) That every duly licensed dairy-farmer at present supplying milk to a metropolitan area shall be entitled to become a member of the Supply Association for that area:

(ii) That every dairy-farmer who receives a license issued by the Department of Agriculture entitling him to supply city milk may apply for membership of the local Supply Association:

(iii) That any dairy-farmer entitled to apply as aforesaid shall be admitted to membership unless the Central Authority consents to the refusal of such application. The Central Authority should not consent to such refusal unless it is satisfied that the quantity of milk available at all times is ample to satisfy all requirements:

(iv) That the association shall be entitled to admit to membership any dairy-farmer who undertakes to supply milk to the metropolitan area during the "autumn and winter months" only or during the "winter months" only.

And the Commission further recommends—

(*b*) That all milk and cream produced for supply to a metropolitan area, except only the milk produced by producer-vendors, shall be vested in the Supply Association for that area.

(*c*) That on communication from the Milk Council of the total declared milk requirements of vendors for the ensuing twelve-month period, the Supply Association shall—

(i) Make arrangements to have available at all times the total of such declared quantities increased by 10 per cent.:

(ii) Enter into contracts with the several vendors to supply the declared quantities.

(*d*) That all contracts made by vendors and producer-vendors for the purchase of milk and of all milk products in respect of which the Central Authority shall have declared the Supply Association to be entitled to priority shall be made with the Supply Association.

(*e*) That, as far as is practicable, the right of any supplier to membership in a co-operative vending company shall be protected by permitting such supplier to direct that the identity of all quota milk supplied by him shall be preserved and that such milk shall be delivered to the co-operative vending company of which he is a member.

(*f*) That all payments for milk and milk products shall be made to the Supply Association and be distributed by it to suppliers in accordance with its regulations.

(*g*) That the association shall collect and deliver all milk at such times and under such conditions as the association in its regulations shall provide or as the Central Authority shall prescribe.

And the Commission recommends that Supply Associations be empowered—

(*h*) To establish or to arrange for the provision of balancing-stations.

(*i*) To erect and maintain depots.

(*j*) To provide facilities for the sampling and testing of milk.

(*k*) To create and administer an Equalization Fund so as to provide for differential payments to suppliers for summer, autumn, and winter milk supplies.

(*l*) To advance moneys to their members for the purpose of procuring equipment necessary to improve conditions on supply farms.

(*m*) To co-operate with the Department of Agriculture in encouraging improvement to farm dairies and their equipment; with the Dairy Board and the Dairy Research Institute in the maintenance of extension services; with the Milk Council and the Central Authority in the collection of data relating to the industry; and with the Dairy Board in all matters affecting the interests of the dairy industry.

And the Commission further recommends—

(*n*) That all unearned margins collected by a Dairy Farmers' Co-operative Milk Supply Association be allocated to a Special Fund, such fund to be held on behalf of the Central Authority and to be drawn upon as approved by the Central Authority for the following purposes—

(i) Loans to producers for the purchase of equipment, such as refrigerators, or other such dairy equipment necessary to bring their shed and dairy standards up to "accredited" standards:

(ii) Financial assistance to the Dairy Farmers' Co-operative Milk Supply Association to set up and equip a testing laboratory:

(iii) Organizing the purchase of young stock from approved tested herds and arranging for these to be grazed out and reared for later use as replacements in city-milk-supply herds:

(iv) Any other purpose of an organization or educational nature designed to assist suppliers in problems of feeding, husbandry, and shed hygiene:

(v) Financial assistance to the Metropolitan Milk Council for approved purposes such as educational work:

(vi) Any other purpose which the Central Authority may direct or approve.

The Commission recommends that items (i) and (ii) be given priority consideration.

Prices and Margins

In the opinion of the Commission the second essential to the achievement of the threefold objective is that prices and margins shall be fairly and reasonably determined and be sufficient to attract the requisite supplies.

In this connection the Commission recommends:—

(*a*) That the price payable to producers be computed on a method applying uniformly to all areas.

(*b*) That the price be based on the guaranteed price with an allowance for extra costs involved in producing for city-milk supply.

(*c*) That a standard two-labour-unit farm of forty cows with an average production of 500 gallons of milk per cow per annum be adopted for determining costs, and that due allowance be made for increased capitalization and for extra labour reward for the employer and extra labour-cost for employee based on a 365-day milking-year. Reference to Chapter 8 on "Prices and Margins" will indicate that the price so computed is approximately 13·0d. for a gallon of milk testing 4·3 per cent. butterfat and from a herd of "accredited" standard.

(*d*) That the price of milk be computed so as to include payment for half the butterfat content of the milk at the rate of approximately 19·0d. per pound butterfat, and according to the following formula:—

For a standard gallon testing 4·3 per cent. butterfat at the rate of 4·2d. per gallon for butterfat—that is, at the rate of 9·5d. per pound butterfat—and a payment for gallonage comprising the difference between 4·2d. and the quota rate per gallon as fixed by the Central Authority.

(*e*) That the full annual quota price be divided into three quota periods computed as follows:—

(i) For the summer period, at 2d. to 2½d. per gallon more than the butterfat value of the milk:

(ii) For the autumn period, at 2d. to 3d. per gallon more than the summer quota rate:

(iii) For the winter period, at the summer quota rate, increased by approximately 80 per cent.

(*f*) That the full price so determined be paid to all suppliers whose herds and sheds are "accredited."

(*g*) That all suppliers whose herds and sheds are not accredited shall be paid 0·5d. per gallon less than the full quota price.

(*h*) That, subject to consideration by the Central Authority, the present method of fixing the price to be paid by the Wellington City Council to the Wellington Dairy Farmers' Association be continued.

(*i*) That the price payable by the vendors to the Supply Association shall be the producer price—that is, the full annual quota price—determined in accordance with the immediately foregoing recommendations, with the addition thereto of the cost of collection and the amount of the Milk Council levy.

(*j*) That the margins to be allowed for processing and distribution be fixed by the Central Authority after reviewing costs.

(*k*) That in each area the same price be charged for all liquid milk, whether distributed raw or pasteurized, loose, or bottled.

(*l*) That vendors distributing raw milk or loose milk pay to the Supply Association, in addition to the prescribed producers' price, an amount equal to the margins allowed for pasteurizing and/or bottling.

(*m*) That producer-vendors pay to the Supply Association as an "unearned margin" such amount as may be assessed by the Central Authority.

(*n*) That all moneys received by the Supply Association as "unearned margins" be paid into a Special Fund to be applied as directed by the Central Authority for the purposes set out in paragraph (*n*) of the immediately preceding section of this summary.

(*o*) That all wholesale prices be based on a properly costed and quantitatively standardized scale, and be varied, subject to the approval of the Central Authority, only in the case of contracts where special consideration is desirable.

(*p*) That the rates for school milk be assessed on a 365-day-year basis, with appropriate allowance for the realization value of the milk on week-ends and holidays.

(*q*) That cream be sold at a price based on the cost of the milk used in its production and a proper margin for processing and distribution; that prices for cream for ice-cream manufacture and for all other used be fixed by the Central Authority after taking into consideration the value of the demand in the utilization of supplies; that all surplus not otherwise disposed of be supplied to cheese or butter factories at factory rates.

And the Commission further recommends—

(*r*) That one price be charged for all milk retailed, whether raw or pasteurized, loose, or bottled; and that the present prices in Auckland be fixed at 6½d. per quart during the summer period and 7d. per quart during the winter period.

(*s*) That consumers pay for bottles used in the distribution of bottled milk.

(*t*) That the Milk Council in each area organize a system of payment by tokens.

Supply, Collection, Treatment, and Distribution

Many of the more important questions relating to alteration and reorganization in methods of supply, treatment, and distribution have been dealt with under the headings of "Organization" and "Prices and Margins." Other recommendations are more appropriately arranged under these separate headings.

Methods of Supply

In this connection the Commission recommends—

(*a*) That all permanent suppliers be required on 1st September, or some such convenient annual date, to declare a daily quota of milk for the following twelve months.

(*b*) That the proportion of the total of all quotas represented by total sales of liquid milk be computed each month, and each supplier be paid for that same proportion of his declared quota at the rate fixed by the Central Authority.

(*c*) That cream rates be paid on so much of the remaining portion of each supplier's quota as represents his due proportion of the amount of cream sales. Any surplus from cream sales over and above that necessary to pay the full amount of the quota should be paid to each supplier according to the proportions of each quota.

(*d*) That all remaining milk supplied be paid for at realization value—*i.e.*, manufacturing value.

(*e*) That the full quota price fixed by the Central Authority for milk of high standard be based on milk supplied from "accredited" herds; and a deduction of, say, 0·5d. per gallon from such quota price be made for milk supplied from herds which are not of "accredited" standard.

(*f*) That adequate penalties be imposed by the Dairy Farmers' Co-operative Milk Supply Association on all milk graded below the standard finally determined by the Central Authority.

And the Commission further recommends—

(*g*) That as at present all suppliers of milk to the metropolitan areas be required to hold a permanent license issued by the Department of Agriculture; that the conditions of such a license be strictly enforced; and that the issue of temporary and conditional licenses to dairy-farmers whose herds and sheds do not justify permanent licenses be severely restricted and, as soon as practicable, be discontinued.

(*h*) That as early as possible standards be adopted for, and recognition be given to, herds and sheds classed as "accredited"; that to gain such recognition the herds be T.B. tested, that a satisfactory practice of herd replacement be adopted, and that an approved standard of shed hygiene and equipment be maintained.

(*i*) That Supply Associations co-operate with members in securing the adoption of a replacement policy based either on the breeding of their own replacements or purchasing them from approved sources.

(*j*) That all organizations co-operate with the Department of Agriculture in raising the standard of farm dairies and equipment; and that special attention be given to the provision of adequate cooling facilities and of refrigerators.

(*k*) That producer-vendors whose farms are situated within, say, 5 miles of any boundary of a metropolitan area be permitted to vend all the milk they produce or an amount not exceeding 40 gallons, whichever is the higher; that the herds of producer-vendors be T.B. tested and of "accredited" standards; that all milk purchased for resale shall be purchased as raw milk from a Supply Association (in which case it should be from similar T.B. tested and accredited sources), or as pasteurized milk from a processing company; that all milk distributed by producer-vendors be distributed in sterilized and sealed containers.

(*l*) That all milk for town consumption be retained in cool storage until collected for transport and distribution, and, where collection from the farm dairy is impracticable, from covered stands and within the shortest practicable time after being taken from cool storage.

Methods of Collection

In this connection the Commission recommends—

(*a*) That all collection and delivery of milk to a vendor for town-supply be undertaken by the Supply Association.

(*b*) That, unless otherwise allowed by the Central Authority, all milk shall be collected twice daily; that as far as practicable the evening's milk delivered to a processing company in the evening be pasteurized immediately on arrival and distributed to retail consumers next morning; that the morning's milk be pasteurized and delivered as early as possible during the same day to wholesale purchasers; and that no vendor be permitted to store milk on his premises unless he has adequate cool-storage facilities.

(*c*) That milk be collected from the farm dairy or from a properly-covered stand as directed by regulations prepared by the Central Authority or in the absence of such regulations, as the Supply Association shall in each case decide; and that the highest practicable degree of regularity and punctuality be observed in the times of collection.

(*d*) That when collected all milk be delivered promptly to the processing companies and raw-milk vendors.

(*e*) That regulations be made by the Central Authority prescribing the type of vehicles to be used in collection; that as early as practicable Supply Associations procure and use their own vehicles for the collection and transport of milk; and that the question of tanker transport be considered by the Central Authority and Supply Associations.

Methods of Treatment

In this connection the Commission recommends that the Central Authority and all Metropolitan Milk Councils pursue an active policy of encouraging the extension of the demand for pasteurized and bottled milk and cream.

And it further recommends—

(*a*) That a sample of every supplier's milk delivered to a processing plant or depot be taken every day immediately on arrival.

(*b*) That all samples be tested daily for bacterial condition and cleanliness, by the ten-day composite system for butterfat content, and as frequently as laboratory facilities permit for added water and solids not fat.

(*c*) That all milk be graded according to its condition; that payment be made according to grade, with marked difference in the rates for first grade and second grade; and that provision be made for the cancellation of the license of any supplier whose supply continues to be unsatisfactory.

And the Commission further recommends—

(*d*) That the 1943 Draft Pasteurizing Plant Regulations governing the condition and operation of processing plants be introduced immediately.

(*e*) That similar regulations governing the condition and operation of bottling-plants also be introduced immediately.

(*f*) That all can-washing machines be required to be constructed and operated so as to ensure thorough cleansing and sterilization.

(*g*) That every processing unit be under the control of a duly qualified working manager; and that a duly qualified analyst be attached to every such plant.

(*h*) That all persons employed in the processing or bottling of milk be subject to periodic medical examination.

And the Commission further recommends—

(*i*) That vendors of raw milk shall be permitted to distribute only milk drawn from T.B. tested and accredited herds and purchased from the Supply Association; and that if they distribute pasteurized milk such milk shall be purchased from a processing company.

(*j*) That producer-vendors be licensed to sell milk on the condition that their herds are accredited and T.B. tested and that any additional milk required by them is drawn from other accredited and T.B. tested herds or from a processing company.

(*k*) That all raw milk and all pasteurized milk distributed by raw-milk vendors or producer-vendors be distributed in sealed containers filled at the source of production or by the processing company, as the case may be, and properly labelled as raw or pasteurized.

Methods of Distribution

In this connection the Commission recommends—

(*a*) That shop dairies be licensed and permitted to sell only milk in containers that have been sealed at the source of production or of treatment; and that no shop dairy be licensed to sell milk raw or pasteurized unless it has adequate and efficient cool-storage facilities.

(*b*) That the Central Authority and Metropolitan Milk Councils consider the adoption of regulations—(1) requiring the periodic medical examination of all roundsmen, and (2) prescribing a standard form or standard forms of vehicles used in the distribution of milk.

(*c*) That the employment of boys and girls under sixteen years of age on milk rounds be prohibited.

And the Commission further recommends—

(*d*) That attention be given by the Central Authority and by all Metropolitan Milk Councils to the rationalization of distribution, and in particular to extending the hours of delivery in areas in which less than a normal working-day is spent by roundsmen on their rounds, the establishment of depots at convenient positions in the areas; the limitation of containers to quarts and pints, the adoption of payment by tokens, and the continuance of front-gate delivery.

(*e*) That bottles be paid for by consumers.

(*f*) That the Central Authority and the Metropolitan Milk Councils give immediate attention to reducing the excessive numbers of vendors and producer-vendors engaged in the distribution of milk and to the rationalization of their systems of collection and delivery.

And the Commission further recommends—

(*g*) That the Central Authority and all Metropolitan Milk Councils endeavour to ensure that all retail milk shall be delivered in a fresh condition and not later than 10 a.m. on the day following production.

Short-term Provisions

The recommendations set out above are recommendations relating to a permanent policy for the conduct of the liquid-milk industry. In view of the urgency of the need for changes in Dunedin, Christchurch, and Auckland, the Commission recommends—

(*a*) That it is urgently necessary that the quota price to producers be raised in Dunedin, Christchurch, and Auckland. As indicated in Chapter 8, in the opinion of the Commission the annual-quota price in the cases of Dunedin and Christchurch needs to be 12·2d. per gallon, and in the case of Auckland 12·5d. per gallon (the difference represents an adjustment for butterfat content), and that the increases should be effected by raising the price for the winter period.

(*b*) That the "accrediting" of herds should proceed as soon as matters of organization and standards have been determined and that all payments recommended by the immediately preceding paragraph to producers in Dunedin, Christchurch, and Auckland should, in the case of accredited herds, be increased by, say, 0·5d. per gallon.

(*c*) That, as the Commission has in contemplation economies that may be effected and advantages that may be derived from adjustment of wholesale prices, it is not in a position to state whether the increases in price to producers in the three areas which are now recommended would necessitate either an increase in the retail price or a subsidy to producers. We therefore recommend that the vendors should continue to pay producers at present rates, and that, for the present, retail prices should remain unaltered. And we further recommend that the position should receive the special attention of the Central Authority with a view to advising the Government as to whether any, and if so what, subsidy to producers may be necessary in order to give them the return suggested.

(*d*) That, pending further investigation by the Central Authority, the following margins be recognized as appropriate to costs for processing and distributing houses—

Costs, stated in Pence per Gallon

——	Auckland.	Christchurch.	Dunedin.	Wellington.
	d.	d.	d.	d.
Pasteurizing	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2*
Bottling	2	2	2	2
Distributing	$9\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$6\frac{3}{4}$
Profit margin	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

* Including cost of Rahui.

Supply to the Armed Forces

The Commission recommends—

(*a*) That in respect of each contract for supply of milk to the Armed Forces the purchasing authority in the month of August in each year estimate the quantity or quantities required for all periods during the year and that that estimate contemplate peak requirements.

(*b*) That contracts for supply be made with treating-houses or Supply Associations and provide that the quantity or quantities specified be available throughout the year and that deliveries be made as required.

(*c*) That the price to be paid be a price per gallon for all milk delivered in accordance with orders received.

(*d*) That an indemnity against loss on so much of the amount made available under the contract as is not required be given by the purchasing authority. Proper safeguards should be introduced in the interests of the purchasing authority to ensure that the indemnity is invoked only in cases of actual unavoidable loss and be limited to the amount of loss actually proved.

(*e*) That if supplies additional to those covered by the year's contract are required for a limited period, such supplies be paid for at agreed rates in correspondence with the actual costs of supplying this milk.

(*f*) That the standard to be attained be specified in the contract and that the purchasing authority be entitled to reject any milk that does not conform to such standard in all respects.

(*g*) As far as possible the supply authority keep all contracts for supply of milk to the Armed Forces additional to, and independent of, the supply for civilian needs. Such contracts should be made with selected producers, preferably in selected areas.

In witness whereof we have hereunto set our hands and affixed our seals, this 16th day of August, 1943.

[L.S.]

WM. R. TUCK, Chairman.
A. H. WARD, Member.

PART V.—MINORITY REPORT

I find myself in agreement with all the statements and recommendations contained in the foregoing with the exception of those parts that relate to the question of municipal milk schemes and the granting of increased powers necessary to enable Milk Councils to treat and vend milk, and with that exception I adopt these statements and recommendations.

I disagree with the majority report of the Commission in regard to—

CHAPTER 7.—METHODS OF ORGANIZATION

PROCESSING AND DISTRIBUTION

(1) Municipal milk schemes, wherein it is stated—

> "Such a question is, of course, a matter entirely for the local body concerned, and the Commission is of opinion that it is not called upon to make any recommendation in this respect."

This disagreement brings me into conflict with the following recommendations contained in the Summary of Recommendations. I consider that under "Central Authority" (*p*) should be deleted, and under "Prices and Margins" (*m*) and (*n*) should be deleted. Under "Prices and Margins" (*l*) should read—

> "That vendors and producer-vendors distributing raw milk or loose milk pay to the Milk Council an amount equal to the margins allowed for pasteurizing and for bottling. Such 'unearned margins' to be assessed by the Central Authority; but that special consideration be given to producer-vendors who have to travel excessive distances to meet the demand for raw milk."

I am in accord with all other recommendations in the majority report.

I consider the Commission had power to recommend that Milk Councils should have the exclusive right to treat and vend all pasteurized milk.

The inquiries made by the Commission showed that the consumers in Wellington have the option of purchasing milk of much higher standard than the consumers in other centres.

I consider that milk of the same high standard should be made available to consumers in other centres without increase in price.

I give below my reasons for this opinion, and make recommendation accordingly in addition to those recommendations contained in the majority report.

Treatment and Distribution

The Commission has examined four different types of organization, treating and vending. These are—

Municipal Milk Department, Wellington:
Producers' Co-operative Co., Dunedin and Auckland:
Proprietary companies, Dunedin, Christchurch, and Auckland:
Vendors and producer-vendors dealing mainly with loose milk in the four centres.

They have examined two methods of control—

(1) By the Wellington City Council:
(2) By the Auckland Milk Council.

The Wellington City Municipal Milk Department has set an exceedingly high standard, both in organization and quality of milk. The producers have received a higher price than in other centres. The spread between the price of milk at the depot and retail price to consumers is less than in any other centre. Their profit last year was higher than in any of the other three centres. One of the prominent features of the inquiry was the importance attached to profits at the expense of quality.

Although it cannot be charged against the Wellington Milk Department that they have sacrificed quality for profits, and there appears to be justification for their claim that the profit of over £28,000 for the year ending 31st March, 1943, is partly due to unforeseen circumstances in regard to supplies to the Armed Forces, it must be considered that the average retail price to consumers was higher in this particular year than for a number of years. The profit for ten years, 1932–42, averaged £5,995 per annum. They claim that this profit has been used to extend the summer period, when the consumers receive milk at the lower price.

The Milk Department purchase on quality with penalties if the milk is below standard. This has resulted in the milk being of exceedingly high quality before being pasteurized. Every precaution is taken to ensure that the quality is maintained during treatment, and they claim that there has not been a sample taken off the roundsmen's carts during the past twenty years that did not comply with the Health Department's regulations.

The following is a table of the tests taken of raw milk, with results, before pasteurization for year ending 30th June, 1942 :—

Reductase	1·422 per cent.	did not comply.
Sediment	0·12	,,
Added water	0·002	,,
Other abnormal conditions	0·011	,,

The following is the total of tests determined :—

Reductase	27,444
Fat in milk	9,914
Fat in cream	1,398
Sediment	4,942
Total solids	97
Freezing-points	1,716
Micro.-examinations	66
Agar plate counts	6,038
B. Coli	1,507
Fermentations	2,105
pH values	448
Phosphatase	202

Average plate count before being pasteurized, 92,000; after being pasteurized, 5,800.

Every supplier's milk is tested every day for reductase and butterfat. The butterfat tests are all composite samples at ten-day intervals. Analysis is made by a qualified analyst approved by the Health Department and paid by the Milk Department.

The following are the number of samples handled by the Health Department in the four main health districts for the past five years :—

Comparison of Samples handled by the Health Department for Five Years from 31st December, 1938, to 31st December, 1942

(Worked out to the nearest decimal point)

Central Auckland Health District—
1938 : Number of samples handled, 3,456 ; number not complying, 81 = 2·3 per cent.
1939 : Number of samples handled, 3,651 ; number not complying, 183 = 5 per cent.
1940 : Number of samples handled, 3,654 ; number not complying, 95 = 2·6 per cent.
1941 : Number of samples handled, 3,751 ; number not complying, 204 = 5·7 per cent.
1942 : Number of samples handled, 4,309 ; number not complying, 560 = 13 per cent.

Central Wellington Health District—
1938 : Number of samples handled, 1,721 ; number not complying, 59 = 3·4 per cent.
1939 : Number of samples handled, 1,869 ; number not complying, 31 = 1·6 per cent.
1940 : Number of samples handled, 1,691 ; number not complying, 86 = 5 per cent.
1941 : Number of samples handled, 2,425 ; number not complying, 58 = 2·4 per cent.
1942 : Number of samples handled, 2,215 ; number not complying, 75 = 3·4 per cent.

Canterbury Health District—
1938 : Number of samples handled, 2,314 ; number not complying, 215 = 9·3 per cent.
1939 : Number of samples handled, 2,520 ; number not complying, 174 = 7 per cent.
1940 : Number of samples handled, 1,690 ; number not complying, 181 = 10·7 per cent.
1941 : Number of samples handled, 2,829 ; number not complying, 416 = 14·7 per cent.
1942 : Number of samples handled, 4,352 ; number not complying, 452 = 10·3 per cent.

Otago Health District—
1938 : Number of samples handled, 1,496 ; number not complying, 210 = 14 per cent.
1939 : Number of samples handled, 1,769 ; number not complying, 121 = 7 per cent.
1940 : Number of samples handled, 1,430 ; number not complying, 106 = 7 per cent.
1941 : Number of samples handled, 1,271 ; number not complying, 122 = 10 per cent.
1942 : Number of samples handled, 1,482 ; number not complying, 144 = 10 per cent.

For five years, 1938–42, the Health Department handled 6,547 samples of Christchurch City milk ; 10·5 per cent. failed to comply.

For the year ending 31st December, 1942, the Health Department handled 968 samples of Dunedin City milk ; 12 per cent. failed to comply.

The Canterbury Health District and Otago Health District cover a wide area, and evidently the samples taken in country districts have pulled down the percentage of samples failing to comply. Christchurch and Dunedin milk are worse than the average of the whole health district.

For the year ending 31st December, 1942, the Health Department handled 369 samples of Hutt Valley Milk ; 8·6 per cent. failed to comply. This average is much worse than the average for the whole health district.

It will be noted that the percentage not complying in the Central Wellington Health District was low. The samples of the Milk Department's milk would be included in the total samples taken, but they all complied. This would tend to lower the percentage not complying. If a comparison is made between tests of Wellington milk and milk in other centres it will be seen that other centres are far below the Wellington standard.

For the year ending 31st December, 1942, the Health Department handled for the whole of the Dominion 16,907 samples of milk from 8,588 vendors. Of these 16,907 samples, 1,514, or 8·9 per cent., did not comply. For the same year the Health Department handled 12,358 samples from the four main health districts ; 1,231, or nearly 10 per cent., did not comply. In the same year they handled 10,143 samples from the three central health districts other than Wellington ; 1,156, or 11·4 per cent., did not comply.

The conclusion to be drawn is that the standard for the whole of New Zealand is much lower than the Wellington City Milk Department milk, which did not fail to comply in any one instance, and the standard for the other three centres is much lower than the standard for the whole of New Zealand.

In Christchurch a small treating company has an obsolete plant and building, both of which should be scrapped. The producer-vendors' company has an out-of-date plant, but are turning out good-quality milk. This entails much attention, and they claim that it is not a payable proposition. The large proprietary company has the best combined plant examined by the Commission. The relationship between them and their suppliers is not good. They have been convicted for selling milk not up to standard.

In July, 1942, 14 samples of milk were taken at Harewood Aerodrome from supplies delivered by this company. All the samples contained added water. In November, 1942, 12 samples of milk supplied by this company to Harewood Aerodrome were taken. All were deficient in butterfat. This firm has been placed on probation by the Zoning Committee, the probationary period had not expired when the Commission sat in Christchurch. Much of the milk pasteurized by them is eighteen hours old before being pasteurized. The company insists on the cans being placed on the roadside, where they often stand for several hours with no protection from the sun and weather. The companies are working on a small margin. To make profits it would appear that they have to make a contract which sometimes acts harshly on the producers, and they are not putting out a satisfactory milk to the consumers.

It was difficult to get figures in Christchurch relating to the activities of the raw-milk vendors. Some of them travel long distances to pick up milk and to reach their rounds. The figures available for July, 1942, showed that 153 vendors and producer-vendors delivered on an average less than 29 gallons per day per business. Some of them employed labour, so the delivery per labour unit would be much less.

The Commission has decided on 60 gallons per day as an economic round under present conditions, but out of 153 vendors and producer-vendors in Christchurch only 17 delivered over 60 gallons per day, wholesale and retail.

The Dunedin treating-houses are out of date. The following is a report by Dr. Hercus, of the Medical School, of milk samples taken before and after pasteurization :—

" Routine investigations have been carried out on milk supplied to one of the city pasteurizing firms. Table III shows the results of raw milks supplied to this firm in 1942 :—

" *Table III.—Raw Milks, 1942*

Month.	Number of Samples.	Percentage Unsatisfactory, Coli.	Percentage Unsatisfactory, Plate Count.
January–February	28	71	71
March	19	95	42·1
April	25	12·0	32·0
May	16	62·5	37·5
June	28	11·8	14·3
July	30	23·3	36·6

" Table IV shows the results of tests done on pasteurized milk from the same firm :—

" *Table IV.—Pasteurized Milk, 1941 and 1942*

Month.	Number tested.	Percentage Unsatisfactory, Coli.	Percentage Unsatisfactory, Plate Count.
1-pint Samples			
August–December	60	60	13
January–February	23	95·5	60·8
March	13	100·0	50·0
April	12	50·0	33·0
May	15	40·0	20·0
June	21	14·3	14·3
July	22	18·0	9·0
½-pint Samples			
January–February	13	100·0	92·3
March	22	95·5	68·5
April	24	58·3	54·2
May	8	87·5	100·0

" The tests in May were done at the beginning of the month, a period of four warm days (two samples done daily). From Table IV it can be seen that there is a seasonal variation in the number of samples unsatisfactory, due to the presence of *Bacillus coli*—the number markedly increases in the warm summer months.

" It will be evident from these results that the standard of the raw milks supplied to the firm was generally of a poor hygienic quality, and that after pasteurization the milk was frequently recontaminated before it was received by the consumer. It is observed, from tests done in 1942, that on several occasions samples of pasteurized milk contained more *Bacillus coli* per cubic centimetres than the samples taken from the vat before pasteurization.

" This occurs mainly during the summer months, but has been recorded even as late as 21st April."

This gives a picture of Dunedin pasteurized milk, and comment is not necessary, except that Dr. Hercus tested samples between 1932 and 1936 which show that Dunedin milk has been unsatisfactory over a long period. The following is taken from Dr. Hercus's statement:—

"In 1934 the Corporation of the City of Dunedin passed By-law No. 25 with a view to improving the purity of the milk supplied to the city. The passing of this by-law was preceded by an investigation carried out in this laboratory on a large number of samples collected from some 70-odd suppliers during the years 1930–33. A summary of these findings is shown in Table I:—

"*Table I.—1932–33: An Investigation prior to the passing of By-law No. 25*

Month.	Number of Samples from Vendors.	Percentage Unsatisfactory regarding Plate or Coli.
May	48	37·5
June	57	42
July	37	30
August	55	22
September	54	32
October–November	54	24
November–December	66	44
January, 1933	54	50
February	60	50

"It will be seen from this table that in winter-time not quite one-third of the samples tested came up to the standard subsequently set in the above-mentioned by-law for accredited suppliers—viz., not more than 200,000 organisms per cubic centimetre and no *Bacillus coli* in $\frac{1}{100}$ c.c.—and that in summer, half of the total number of samples taken were of a very low grade. In 1934, 1935, and 1936 a further series of tests were done on samples from producer-distributors and distributors to the City of Dunedin, and also on samples from shops. These results are shown in Table II, from which it will be seen that the quality of the milk remains substantially as in the previous series of tests:—

"*Table II*

Year.	Number of Samples tested.	Percentage Unsatisfactory, Plate or Coli.
Producer-distributors		
1934–35	318	17·6
1935–36	227	16·7
Distributors		
1934–35	410	31·1
1935–36	589	26·5
Milk taken from Shops		
1934–35	48	54·2
1935–36	101	9·9

"It is noteworthy that since the passing of the by-law by the Dunedin City Corporation no suppliers have obtained accredited suppliers' certificates. As this standard is in no way extreme, but is an average one for a clean and safe milk, it will be seen that the position in Dunedin remains unsatisfactory.

"In 1934, 1935, and 1936, 36 samples were examined for the presence of the tubercle bacillus and the organisms producing undulant fever in man. None were positive for tubercle bacilli, and 30·8 per cent. were positive for *Brucella abortus*.

"During the period 1938–43, 466 samples from the city milk-supply have been collected by the city Inspectors and submitted to this laboratory for testing for tubercle bacilli and the organisms producing undulant fever in man. Of these samples, 106, or 22·7 per cent., were positive for *Brucella abortus*, and 5, or 1 per cent., were positive for tubercle bacilli."

It is apparent that the treating-house owners and the distributors have not made any attempt to improve the milk standard, and only pasteurize the milk to make it keep.

The treating-house owners have allowed their plant to degenerate, although the spread between price delivered at the depot and price to consumer is greater than either Wellington or Christchurch, although not so high as Auckland. The delivery by companies, vendors, and producer-vendors per labour unit is low. They employ boys extensively for delivery.

None of the companies in Auckland has a completely up-to-date plant. Three of them have plant which is partly up to date, and one has plant which could be made up to date by the addition of bottle-washing, crate-washing, and can-washing machines. All the premises need rebuilding. The United States Forces will only accept milk from one company, and prefer to go without if they cannot obtain it from this company. This particular company has not arranged for sufficient supplies of milk, and during the period from February, 1942, to April, 1943, their suppliers have not met requirements in

any one month. With other companies, they have pasteurized milk which was not up to standard. The following is a table of tests made on factory milk which was pasteurized and sold for some weeks until stopped by the Health Department:—

Aka Aka Milk, 1942

	Reductase.	Plate.
18th March, 1942—		
At A.M.C.—		
A.M. and mixed	1	720,000
At Ambury's—		
Mixed	1½	450,000
	1½	400,000
	1½	600,000
19th March, 1942—	1¾	470,000
At A.M.C.—		
Mixed	1¼	290,000
P.M. only	3¼	130,000
At Ambury's—		
A.M. and mixed	¼	740,000
At Stonex—		
A.M. and mixed	¼	780,000
	¼	960,000
	¼	1,200,000
	¼	800,000
20th March, 1942—	¼	900,000
At A.M.C.—		
Mixed	2	750,000
At Stonex—		
Mixed	¼	880,000
	¼	1,100,000
	¼	980,000
Week-end here		
23rd March, 1942—		
At A.M.C.—		
Mixed	¼	560,000
Same milk after pasteurization	+6	4,000
At Ambury's—		
Mixed	¼	610,000
	¼	650,000
	1	360,000
	¼	530,000
	1	440,000
24th March, 1942—		
At A.M.C.—		
Mixed	¾	Uncountable.
25th March, 1942—		
At A.M.C.—		
Mixed	½	780,000
At Ambury's	1¼	1,400,000
	¾	..
	1¼	630,000
	½	890,000
26th March, 1942—		
At Ambury's	1	530,000
	2½	230,000
	1	380,000
	1	410,000
	1	260,000
At Stonex Bros.—		
M.	¾	1,300,000
	1	550,000
	¾	990,000
	½	870,000
	½	680,000
27th March, 1942—		
At A.M.C.—		
P.M.	2½	210,000
P.M.	4½	130,000
A.M.	¼	1,600,000
31st March, 1942—		
At A.M.C.—		
P.M.	2	320,000
A.M.	½	530,000
1st April, 1942—		
At A.M.C.—		
P.M.	2½	290,000
Same milk after pasteurization	+6	5,000
	+6	6,000

		Reductase.	Plate.
2nd April, 1942—			
At A.M.C.—			
P.M.		1½	570,000
Same milk after pasteurization		+6	7,000
At A.M.C.—			
A.M.		¼	1,300,000
Same milk after pasteurization			5,000
7th April, 1942—	Easter here		
At Ambury's—			
A.M.		½	830,000
		½	750,000
		1	530,000
At A.M.C.—			
After pasteurization		+4	7,000
At Ambury's—			
A.M.		1½	660,000
		1¾	580,000
9th April, 1942—			
P.M.		4¼	140,000
		4¼	140,000

Of 54 samples handled, 15 stood up to reductase test for only quarter-hour, 20 stood up from quarter-hour to one hour, 12 stood up for one to two hours, 4 stood up for two to two and a half hours, 2 stood up for four hours and a quarter, 1 stood up for four hours and a half. Only 3 complied with Milk Council standard on reductase. Plate count ranged from 110,000 to 1,600,000. One was uncountable. Only four were below 210,000. None complied with Milk Council standard on plate count.

It will be noted that very low quality milk can be pasteurized and will then be up to standard. The Health Department minimum for milk standing up to reductase is four hours.

The Milk Council have made a regulation that milk which contains more than 100,000 bacteria to the cubic centimetre shall not be sold. It discloses a serious position when companies flagrantly infringe the Health Department and Milk Council regulation. The Health Department have stopped accommodation milk and cream from factories on three occasions during the autumn and winter of 1943.

A disturbing feature is added water. A report from the Milk Council's analyst shows that from January, 1942, to April, 1943, he made tests for added water on 201 samples; 147 of them contained added water.

The vendors deliver mostly loose pasteurized milk. They do not have to wash cans or bottles and do not require dairies. The average round is 50 gallons. They receive 10d. per gallon for delivery plus cream sales.

The Milk Council have made a regulation that milk labelled "baby milk" shall contain not less than 3·5 per cent. butterfat and not more than 4 per cent. butterfat. The following is a table of tests made on samples of baby milk by the Government Analyst between 26th January, 1943, and 7th May, 1943:—

Baby Milks, 1943

Inspector's No.	Date.	Fat.	Inspector's No.	Date.	Fat.
		Per Cent.			Per Cent.
J.S. 179	26/1/43	4·00	J.S. 784	26/3/43	4·30
184	26/1/43	4·60	788	26/3/43	4·70
374	9/2/43	4·30	1344	29/4/43	4·70
377	9/2/43	4·00	1347	29/4/43	4·85
418	16/2/43	4·30	1369	4/5/43	4·70
566	4/3/43	4·20	1374	4/5/43	3·90
569	4/3/43	4·65	1398	7/5/43	4·80
572	4/3/43	4·30	1401	7/5/43	4·15
644	15/3/43	4·30			

It will be seen that out of 17 samples, only 3 complied with the regulations. There is no record of any prosecutions having been taken or any other action having been taken against the companies concerned.

The Milk Council Analyst relies largely on the plate count. The following is a table put in by him:—

Analysis of Plate Count Results, Auckland Milk Council, 15th April, 1943, to 27th April, 1943, inclusive

100,001–200,000	33	1,000,000	1
200,001–300,000	10	1,200,000	1
300,001–400,000	1		
400,001–500,000	3		53
500,001–600,000	1		
600,001–700,000	1	Under 100,000	210
700,001–800,000			
800,001–900,000	1	Total	263
960,000	1	∴ 20 per cent. over 100,000.	

It will be seen that over 20 per cent. of the samples did not comply with the Milk Council's regulation. The Milk Council have power to cancel or suspend the license of any vendor or treating-house which infringes the regulations. They have not carried this regulation out.

The milk delivered to consumers in the Hutt Valley is not of the same standard as the milk delivered by the Wellington City Council or the raw milk purchased by the Wellington City Council before pasteurizing. Delivery methods are wasteful. Eighteen vendors travel 281 miles to deliver 1,830 gallons of milk. This is 6·5 gallons to the mile. Considerable saving must have been made from zoning, but this has not been passed on to the consumer. Before zoning was introduced some milk was bottled, but now it is all delivered loose. The Health Department have recommended that the Hutt Valley milk-supply be pasteurized.

The following is a table of costs put in by the Investigating Accountant who was employed by the Commission:

Treatment.	Company.	W.C.C.	Companies.		
	d.	d.	d.	d.	d.
Wages	0·56	0·92	0·76	0·80	0·82
Fuel and power	0·07	0·27	0·13	0·12	0·38
Dairy materials	0·05	0·10	0·07	0·02	0·15
Factory maintenance	0·06	0·37	0·08	0·31	0·08
Rates and water	0·01	0·04	0·02	0·04	0·15
Car repairs	..	0·17	..	..	0·03
Depreciation	0·12	0·14	0·06	0·11	0·13
Wastage allowance	0·12	0·15	0·13	0·14	0·13
	0·99	2·16	1·25	1·54	1·87
Bottling—					
Wages	0·82	0·63	0·89	1·21	1·54
Fuel and power	0·11	0·14	0·17	0·23	0·29
Dairy materials and caps	0·47	0·33	0·65	0·45	0·57
Bottles	0·52	0·28	0·65	1·02	0·64
Factory maintenance	0·08	0·40	0·09	0·06	0·04
Rates and water	0·03	0·04	0·05	0·06	0·10
Depreciation	0·16	0·14	0·13	0·06	0·08
Wastage allowance	0·06	0·11	0·07	0·07	0·06
	2·25	2·07	2·70	3·19	3·32
Distribution—					
Wages	3·40	3·65	6·05	5·90	5·60
Transport	2·57	1·54	2·46	1·79	1·67
Overhead	2·06	1·78	2·19	1·24	1·58
	8·03	6·97	10·70	8·93	8·85
Less credit for handling cream, &c.	0·38	0·54	0·28	0·14	0·63
	7·65	6·43	10·42	8·79	8·22
Retail milk—					
Quota price for milk	11·16	15·45	12·25	12·25	10·55
Inwards cartage	0·68		0·68	0·85	1·00
Treatment	0·99	2·16	1·25	1·54	1·87
Bottling	2·25	2·07	2·70	3·19	3·32
Distribution	7·65	6·43	10·42	8·79	8·22
Levy	0·06	..	0·25	0·25	..
Rahui	..	0·27	..	..	..
Profit	1·21	1·42	0·45	1·13	0·04
Selling-price	24·00	27·80	28·00	28·00	25·00

The following are tables of vendors' profits in Christchurch and Dunedin:—

Cost-sheet of Christchurch Vendor operating Two Rounds Distributing Raw Milk; Loose and Bottled

		Bottled.
Daily sales	136 gallons retail, including bottled retail	78
	7 gallons wholesale	7
	143 gallons.	85
Weekly cream sales	30 gallons—20 retail; 10 wholesale.	
Description of rounds	Flat.	
Transport	Two trucks.	

Number of operatives	Owner (part time), roundsman, roundsmen (part time), and girl.
Reward for own labour	£5 per week.
Mileage from depot to zone (on rounds and back to depot)	25 miles daily.
Mileage run for February, 1943	700 miles.
Miles per gallon petrol	12 miles.
Petrol used for month	59 gallons.
Basis of credit for delivering cream	1 gallon cream equivalent to 4 gallons of milk.

Capital invested

	£	£
Motor-vehicles—		
No. 1	342	
No. 2	225	
	—	567
Garage		150
Dairy	100	
Cans	30	
Boilers	35	
	—	165
Refrigerator		200
Bottling-plant—		
Bottler	25	
Sterilizer	20	
	—	45
Book debts		250
		£1,377

Costs for Month of February, 1943

	£ s. d.	£ s. d.	Retail, per Gallon. d.
Transport—			
Benzine (59 gallons at 2s. 9½d.)	8 4 9		
Repairs, oil, and greasing	3 12 0		
Tires	3 17 4		
Registration and insurance	0 12 6		
Depreciation—			
Trucks	9 10 0		
Garage	0 6 6		
		26 3 1	1·65
Dairy—			
Can replacements	0 4 6		
Dairy materials and water-heating	3 17 9		
Maintenance	1 19 0		
Depreciation	0 7 0		
		6 8 3	0·40
Cooling-plant—			
Power	1 10 0		
Depreciation	1 13 4		
		3 3 4	0·21
Administration—			
Telephone	0 14 6		
Printing and stationery	0 8 0		
Bad debts	0 8 0		
Book-keeping charge	2 0 0		
		3 10 6	0·22
Wastage Allowance, 3 per cent.—			
49 gallons		2 9 0	0·16
Hired Labour—			
Roundsman	38 8 0		
Relieving roundsman	6 0 0		
Annual holidays	1 14 0		
		46 2 0	2·90
Own Labour—			
At £5 per week		20 0 0	1·26
Total Distribution-costs (wholesale and retail)		107 16 2	
Less credit delivery wholesale milk and cream		3 19 0	0·26 *Cr.*
Distribution-costs (Retail): Milk and cream		103 17 2	6·54
Less credit for cream		8 1 10	0·51 *Cr.*
Retail Milk Distribution-costs (including own labour)		95 15 4	6·03

Costs for Month of February, 1943, of Bottling 85 Gallons of Milk Daily

	£ s. d.
Labour	4 10 0
Bottles	5 0 0
Caps and brushes	5 13 4
Depreciation	0 7 6
Crates	0 10 0
	16 0 10
Less savings on spillage allowance, 1½ per cent.: 36 at 1s.	1 16 0
	£14 4 10 = 1·44d. per gallon.

Profit and Loss Account for February, 1943

	£ s. d.	£ s. d.
By Gross profit margin on milk (wholesale and retail)		195 6 0
Gross profit margin on cream (less wastage)		23 10 0
		218 16 0
To Total distribution-costs	107 16 2	
Bottling-costs	14 4 10	
		122 1 0
Profit (exclusive of interest) for month		£96 15 0

Owner's Return—	£ s. d.
Own labour	20 0 0
Profit	96 15 0
Total reward—	
Per month	£116 15 0
Per week	£29 3 9

NOTE.—This man said in evidence before the Commission that he worked about three hours and a half per day on delivery, so that he makes £29 3s. 9d. per week of about twenty-three hours, plus 10s. per week allowed to his wife for keeping his books.

Sample Costing-sheet of Dunedin Vendor—Distributing Raw Milk: Loose

Daily milk sales	45 gallons retail. 9 gallons wholesale. 54		
Weekly cream sales	2 gallons.		
Description of round	Compact; varied over hill and flat.		
Transport	10 cwt. van.		
Number of operatives	Owner and three boys.		
Reward for own labour	£5 weekly (part time).		
Mileage from depot to zone (on round and back to depot)	2½ miles daily.		
Mileage run daily in obtaining milk	3 miles.		
Mileage run for February, 1943	154 miles.		
Miles per gallon of petrol	12 miles.		
Petrol used for month of February	13 gallons.		
Basis for credit for delivery of cream	1 gallon of cream equivalent to 4 gallons of milk.		
Capital invested	Motor-vehicle		£150
	Rents his dairy		..
	Cans		25
	Book debts	£100	
	Less creditors	50	
			50
			£225
Delivery times	1½ hours daily = 10½ hours weekly.		
Dairy times	¾ hour daily = 5¼ hours weekly.		
Accounts and general	.. = 5¼ hours weekly.		
	21 hours weekly.		

Costs for Month of February, 1943

	£ s. d.	£ s. d.	Retail, per Gallon. d.
Transport—			
Benzine (13 gallons at 2s. 9½d.)	1 16 3		
Repairs, oil, and greasing	4 3 0		
Tires	0 12 0		
Registration and insurance	0 11 0		
Depreciation	2 10 0		
Extras	1 0 0		
	10 12 3		
Less inwards cartage (84 miles at 4d.)	1 8 0		
		9 4 3	1·75
Daily—			
Rent of building	0 10 0		
Replacing cans	0 2 6		
Dairy materials	0 15 0		
Sundries	0 10 0		
		1 17 6	0·36
Administration			
Telephone	0 14 6		
Printing and stationery	0 5 0		
Bad debts	0 15 0		
Sundries	0 5 0		
		1 19 6	0·38
Wastage and Allowance—			
3 per cent. (16 gallons at 1s. 1d.)		2 19 10	0·48
Hired Labour—			
Three boys at 10s. week, plus milk and cream, 4s. 6d. each = £2 3s. 6d. weekly		8 14 0	1·65
Own Labour—			
Say, £5 per week		20 0 0	3·81
Total Distribution-costs (wholesale and retail)		44 5 1	
Less credit delivery 252 gallons wholesale		3 3 0	0·60 *Cr.*
Distribution-costs (Retail): Milk and cream		41 2 1	7·83
Less credit for cream		1 2 0	0·21 *Cr.*
Retail Milk Distribution-costs (including own labour)		40 0 1	7·62

Profit and Loss Account for February, 1943

	£ s. d.	£ s. d.	£ s. d.
By Gross profit margins on milk sold			67 8 8
To Inwards cartage		1 8 0	
Distribution-costs	44 5 1		
Less transferred to Cream Account	1 2 0		
		43 3 1	
			44 11 1
Profit over and above own labour reward, but excluding interest on investment			£22 17 7

Trading and Profit and Loss Account, Cream for February, 1943

	£ s. d.	£ s. d.
By Sales (8 gallons at 16s.)		6 8 0
To Purchases (8 gallons at 12s.)	4 16 0	
Delivery-costs	1 2 0	
		5 18 0
		0 10 0
By Wastage		0 10 0
		Nil.

	£ s. d.
Owner's Return for Month—	
Labour reward	20 0 0
Profit from above	22 17 7
Total reward	£42 17 7
Equivalent to	£10 14s. 5d. weekly.

NOTE.—Counsel for the milk-vendors at the hearing in Dunedin said: "This man I consider an average man to state our case for the milk-vendor at the present time, and represents the whole as a class."

This man finishes, in connection with his round, at 7 a.m. He works for the rest of the day at another occupation.

This man pays 1s. 0½d. for his milk all the year round. In February the retail price is 2s. per gallon, but for the three winter months the retail price is 2s. 4d. per gallon, so that his weekly profit taken over the whole year would be greater than shown in this table.

A perusal of these two tables will show that liberal allowances have been made for running-costs, repairs, maintenance, spillage, &c., and on top of that one vendor is making over £29 per week for twenty-three hours' work and another one is making £10 14s. 5d. per week for twenty-one hours' work.

No investigation was made of vendors' profits in Auckland, but the vendors there are in a better position than in the other centres. Most of them deliver pasteurized milk. The rounds have been compactly zoned. They pick up their milk at the nearest suburban depot and do not have to wash cans and bottles. They do not require dairy premises, and they are allowed 10d. per gallon for delivery, compared with the cost of 6·43d. per gallon for delivery in Wellington.

The following is a table of distances travelled by producer-vendors in Christchurch to deliver milk, based on the figures available and put in by the producer-vendors themselves :—

Producer-vendors, Christchurch

A	travels	21	miles per day to deliver	38	gallons of milk.
B	,,	12	,,	35	,,
C	,,	21	,,	70	,,
D	,,	19	,,	35	,,
E	,,	10	,,	32	,,
F	,,	$3\frac{3}{4}$	,,	14	,,
G	,,	16	,,	30	,,
H	,,	9	,,	$34\frac{1}{2}$	,,
I	,,	30	,,	40	,,
J	,,	$18\frac{1}{2}$	,,	43	,,
K	,,	$19\frac{1}{2}$	,,	37	,,
L	,,	27	,,	17	,,
M	,,	14	,,	29	,,
N	,,	$17\frac{1}{2}$	,,	30	,,
O	,,	16	,,	49	,,
P	,,	4	,,	27	,,
Q	,,	$8\frac{1}{2}$	,,	56	,,
R	,,	11	,,	$37\frac{1}{2}$	,,
S	,,	24	,,	30	,,
T	,,	6	,,	23	,,
U	,,	19	,,	30	,,
V	,,	$10\frac{1}{2}$	,,	8	,,
W	,,	$15\frac{1}{2}$	,,	31	,,
23		$352\frac{3}{4}$		776	

Twenty-three producer-vendors travel $352\frac{3}{4}$ miles per day to deliver 776 gallons of milk. This is 2·2 gallons of milk to the mile.

The following is a table of the distances travelled by producer-vendors to and from their rounds without taking into account the distance travelled on delivery :—

Producer-vendors, Christchurch

A	travels	17	miles per day to transport	38	gallons of milk.
B	,,	2	,,	35	,,
C	,,	15	,,	70	,,
D	,,	$9\frac{1}{2}$	,,	35	,,
E	,,	4	,,	32	,,
F	,,	$\frac{1}{4}$	,,	14	,,
G	,,	$12\frac{1}{2}$	,,	30	,,
H	,,	6	,,	$34\frac{1}{2}$	,,
I	,,	20	,,	40	,,
J	,,	$5\frac{1}{2}$	,,	43	,,
K	,,	$15\frac{1}{2}$	,,	37	,,
L	,,	26	,,	17	,,
M	,,	10	,,	29	,,
N	,,	9	,,	30	,,
O	,,	12	,,	49	,,
P	,,	$1\frac{1}{2}$	,,	27	,,
Q	,,	7	,,	56	,,
R	,,	3	,,	$37\frac{1}{2}$	,,
S	,,	15	,,	30	,,
T	,,	$4\frac{1}{2}$	,,	23	,,
U	,,	17	,,	30	,,
V	,,	6	,,	8	,,
W	,,	8	,,	31	,,
23		$226\frac{1}{2}$		776	

Twenty-three producer-vendors travel $226\frac{1}{2}$ miles to transport 776 gallons of milk to their rounds without taking into account the mileage travelled on the round during actual delivery. One lorry will transport 900 gallons of milk. Twenty-three vehicles are used to transport less than one lorry load of milk.

The following is a table of distances travelled by vendors in Christchurch to collect milk and to deliver milk based on the figures available and put in by the vendors themselves :—

Vendors, Christchurch

A	travels	26	miles per day to collect and vend	50	gallons of milk.
B	,,	14	,,	48	,,
C	,,	32	,,	20	,,
D	,,	14	,,	52	,,
E	,,	7	,,	25	,,
F	,,	24¼	,,	36½	,,
G	,,	11½	,,	22	,,
7		128¾		253½	

Only seven vendors sent in returns of the total mileage travelled per day to collect and deliver milk, but it is considered that they are fairly representative.

Seven vendors travel 128¾ miles per day to deliver 253½ gallons of milk. This is less than 2 gallons to the mile.

The average daily delivery of these seven vendors is 36½ gallons per day.

The average daily delivery by roundsmen in Wellington is 120 gallons per day. The average mileage in Wellington is five miles per round on actual delivery. The distance travelled to reach the round before commencing delivery varies from nothing to six miles.

The following is a table of distances travelled by vendors in Christchurch to collect milk without taking into account the distance travelled from their dairies to the round, on the round, and back to their dairies :—

Vendors, Christchurch

A	travels	25	miles per day to collect	171½	gallons of milk.
B	,,	20	,,	50	,,
C	,,	22	,,	127	,,
D	,,	10	,,	35	,,
F	,,	20	,,	80	,,
G	,,	8	,,	92	,,
H	,,	12	,,	48	,,
I	,,	5	,,	27	,,
J	,,	7	,,	52	,,
K	,,	19½	,,	20	,,
L	,,	15	,,	50	,,
M	,,	2	,,	13	,,
N	,,	4	,,	48	,,
O	,,	8	,,	33	,,
P	,,	6	,,	45	,,
Q	,,	20	,,	72	,,
R	,,	15	,,	60	,,
S	,,	20	,,	50	,,
T	,,	14	,,	39	,,
U	,,	17	,,	19	,,
V	,,	8	,,	129	,,
W	,,	4½	,,	23	,,
X	,,	19	,,	36½	,,
Y	,,	2	,,	47	,,
Z	,,	6	,,	25	,,
A1	,,	14	,,	23	,,
B1	,,	14	,,	60	,,
C1	,,	8	,,	52	,,
D1	,,	6	,,	40	,,
E1	,,	6	,,	22	,,
F1	,,	28	,,	40	,,
G1	,,	6	,,	15	,,
H1	,,	10	,,	22	,,
33		401		1,666	

Thirty-three vendors travel 401 miles per day to collect 1,666 gallons of milk. Thirty-three vehicles are used to collect less than two lorry loads.

Returns were received from 56 vendors and producer-vendors ; they delivered a total of 2,442 gallons per day.

Average delivery per day per business, less than 44 gallons. Some employ labour, so the average delivery per labour unit would be less.

The Zoning Committee in Christchurch have been negotiating with the vendors and producer-vendors for the last three years with a view to making savings on delivery on account of the shortage of rubber and petrol.

In July, 1942, a compulsory zoning scheme was put into operation despite vehement protests from the vendors and producer-vendors. Zoning resulted in a saving of 9,437 gallons of petrol per month, but the above tables show that much greater saving is possible and necessary. Such conditions should not be allowed to continue even in peace-time.

The vendors and producer-vendors appeared to be reluctant to supply information. They were asked to make returns, but only 56 out of 147 now operating complied with the request. The figures quoted in the above tables are from the returns put in by them in July, 1943, when there were 80 producer-vendors, 67 vendors, and 4 companies operating.

The 56 vendors and producer-vendors who sent in returns distribute 2,442 gallons per day wholesale and retail ; this is less than 44 gallons per business. Some of them employ labour, so that the delivery per labour unit would be still lower.

Some Comparisons between Wellington and other Centres

Average Quota Price to Producers—	d.
Wellington City Council	13·863
Christchurch companies	11·16 (some private vendors pay 2d.)
Dunedin companies	10·3 (some private vendors pay 12·25d.)
Auckland companies	12·25
Raw-milk vendors	14·375

It will be noted that the Auckland raw-milk vendors pay more than the Wellington City Council Milk Department. There are very few of them and they are compelled by regulation to pay to the producer the costs of pasteurizing. The Milk Council has doubts whether this regulation is carried out.

Cost of Milk at Depot, including Inward Transport

	d.
Wellington City Council	15·72
Christchurch companies	11·84
Dunedin companies	11·55
Auckland—	
Company A	12·93
Company B	31·1

Spread between Price to Consumer and Price paid at Depot

	d.
Wellington City Council	12·08
Christchurch companies	12·16
Dunedin companies	13·45
Auckland—	
Company A	15·07
Company B	14·9

It will be noted that the spread is lower in Wellington than in the other three centres. The producers in Christchurch received an increase of 1·16d. per gallon last year, and that increase has not operated during the whole of the time covered by the return. The company in Christchurch complains that they are making a loss of 0·75d. per gallon. Before the increase the spread in Christchurch was 13·32d. per gallon.

Spread between Price paid to Consumers and Price paid to Producers for Raw Milk

	Per Gallon. d.
Christchurch: Raw, loose, and bottled	12
Dunedin: Raw loose	12·25
Hutt Valley: Raw loose	12·25
Auckland: Raw loose	11·675

It will be noted that the raw-milk vendors received practically the same amount for delivering raw loose milk as pasteurizing firms receive for treating, bottling, and delivering milk.

Average Daily Delivery

Wellington	120 gallons retail per labour unit.
Christchurch companies	85 „
Christchurch vendors and producer-vendors	29 gallons per business, wholesale and retail.
Dunedin companies	50–90 gallons with one, two, or three boys, wholesale and retail.
Dunedin producer-vendors	42 gallons with boys, wholesale and retail.
Dunedin vendors	52 „
Auckland companies	60 gallons retail per labour unit.
Auckland producer-vendors	65 gallons wholesale and retail.
Auckland vendors	50 gallons retail per labour unit.
Hutt Valley producer-vendors	91 gallons per business.
Hutt Valley vendors	118 „

The Hutt Valley producer-vendors and vendors employ ninety-one labour units—some of whom are boys—for vending 3,371 gallons per day. This is 36 gallons per labour unit. Dunedin companies, vendors, and producer-vendors employ boys extensively for delivery. The above amounts are delivery per round. The delivery per labour unit would be less. Christchurch vendors and producer-vendors also employ labour, so that their delivery would average less than 29 gallons per labour unit on the only complete figures available. It will be noted that in none of the centres is the Wellington delivery per labour unit approached and in most cases delivery is less than half per labour unit in Wellington.

Wages paid to Roundsmen

Wellington	Horse-drawn Delivery: 46½-hour week of 6 days, £6 18s. 2d. per week, plus allowance for milk, uniform, and subsidy to insurance, and bonus of £20 per year from which breakages are deducted. Motor Delivery: £7 3s. 6d. per week, plus same allowances.
Christchurch	Roundsmen: 44-hour week of 6 days, £5 10s.
Dunedin	Roundsmen: 42-hour week of 6 days, £5 15s., plus commission. Boys are paid from 10s. to 30s. per week plus milk.
Auckland	Roundsmen: 40-hour week of 5 days, £5 10s.

Average Butterfat Test in the Four Centres for 1942

	Per Cent.
Wellington	4·481
Christchurch	4·21
Dunedin	3·89
Auckland	4·31

The Wellington test is from samples taken from every producer's milk, and can be considered accurate. The Christchurch, Dunedin, and Auckland are average tests of samples handled by the Government Analyst. Evidence given before the Commissioners would indicate that the Auckland and Dunedin tests would be comparatively correct, but the Christchurch test would be much lower.

Percentage of Samples not complying for Year ending 31st December, 1942

13 per cent. of Auckland milk samples handled by the Health Department failed to comply
8·9 per cent. of Hutt Valley milk samples handled by the Health Department failed to comply.
10·5 per cent. of Christchurch milk samples handled by the Health Department failed to comply.
12 per cent. of Dunedin milk samples handled by the Health Department failed to comply.
All samples of Wellington City Council milk complied.

For year ending 30th June, 1942, the Wellington Milk Department handled nearly twice as many samples to ensure the high quality of Wellington municipal milk as the Health Department handled for the whole of New Zealand for twelve months. Only 0·002 per cent. of samples taken at the Wellington Milk Depot contained added water. For sixteen months, 70 per cent. of samples tested by the Auckland Milk Council Analyst contained added water. The Wellington Municipal Milk Department is the only organization who supply high-quality milk at reasonable prices, despite the fact that they pay the producer more, that it costs more to transport the milk to the city because of the geographical position, and that they treat their employees better than any of the private concerns.

The Plunket Society stated that they had made inquiries from their charge nurses as to the quality of the milk in the different cities and towns, including the four main centres. They reported that the Wellington milk-supply was the only one that was consistently satisfactory.

I believe the Auckland Milk Council have made efforts to improve and maintain the quality of the Auckland milk, but without the power to treat and vend their efforts have not been successful.

The representative of the Food Value League in Auckland suggested that the Milk Council should be a body elected by the consumers in the metropolitan area. After considering the manner in which the Auckland Milk Council have failed to use their power in some directions and their lack of power in other directions, it would appear that the Food Value League were justified in their representations.

During the hearings of the Commission practically all producers' witnesses agreed that it would be advantageous if the producers were supplying one organization.

I agree that the best method of supply would be for a producers' organization to have the monopoly of the milk-supply to a city. This would be dangerous unless the producers' organization was dealing with one responsible body such as the local authority. I consider a strong producers' organization is necessary, but a vendors' organization would oppose it, as they have done with success in the past, while it would be to the advantage of the local authority to encourage a producers' organization.

An argument used against local authorities treating and vending is that they would have to pay a large sum for goodwills. Reference to the table on vendors' profits will show that some vendors collect the value of their goodwill biennially. It would be best to buy them out rather than that repeated payments for goodwill should be borne by the consumers.

The argument is sometimes used that municipal enterprise is not efficient. This is not a statement of fact. Municipal enterprises, including the Wellington Municipal Milk Department, have proved to be efficient from a business point of view, and, what is perhaps more important, they have given fair treatment to their employees and the consuming public.

I recommend that Milk Councils be elected by the voters in the Auckland, Christchurch, and Dunedin metropolitan areas, the Councils to have power to treat and vend all pasteurized milk, and that power to treat be put into operation as soon as practicable.

NOTE.—There has been some discussion on the amalgamation of local bodies; if and when that amalgamation is brought about, the resultant metropolitan body may be able to take over the functions of the Metropolitan Milk Council.

It is not advisable to divert labour to building or to import material which is not absolutely essential during the present war period.

As regards Auckland and Christchurch, with an elected Milk Council in control it should be possible to carry on for the duration of the war with some additions to existing plant, and until labour is available for building, and shipping available for imports, when the Metropolitan Milk Councils could erect and equip efficient treating-houses and purchase and treat all milk.

I consider that 8d. per gallon is a fair margin to allow vendors for delivery, and that the same price should be charged for raw milk as for pasteurized bottled milk, and that the vendors should pay a levy on raw milk. It must be remembered that 8d. per gallon is a fair price for delivery under present circumstances. If the recommendations of the Commission are put into operation *re* bottling, it will not be necessary for the vendor to have a dairy, and the distribution per day should increase. This position would have to be watched with a view to decreasing the margin and increasing the levy. As regards the present position, costs got out by the Accountant show that delivery is more expensive in some centres than in others. A period should be allowed for all centres to adjust their distributing-costs to 8d. per gallon. This levy on unearned margins should be paid to the Milk Council.

As regards Dunedin, if the present treating-houses are allowed to continue it is obvious that each one would have to erect new premises and install new plant immediately. With the present shortage of building-material and labour it is doubtful if permission would be given to erect three buildings for the one purpose. It would certainly be unwise to make such a suggestion. With the scarcity of shipping it would be unwise to recommend the importation of three sets of treating-plant when one plant suitable to treat all the milk required could be transported in about one-third of the space. More important, the present treating companies have not shown that they desire to improve the quality. If they had desired to do so they have had ample opportunity, and there is no guarantee that the conduct of their business would be any better in the future than in the past. It is obvious that, if they were allowed to continue, inspections would have to be continuous. This would be expensive, and would create unnecessary expense to be passed on to the consumer or met by subsidy. I recommend that a Milk Council be elected in Dunedin as soon as possible, that the Council be given power to treat and vend milk and to pasteurize and bottle all retail milk for the Dunedin metropolitan area and to can all wholesale pasteurized milk, that priority be given to the Council to erect suitable premises and to import and install the necessary plant. If the existing vendors desired to do so they could deliver the milk at the price it would cost the Council to deliver, provided the delivery-costs and other conditions met with the approval of the central authority. It would be necessary to take precautions that only suitable and efficient vendors were allowed to continue, and if they desired to sell their round they should be compelled to sell to the Milk Council.

Goodwills

Since the introduction of zoning it would appear that the value of goodwills has increased. The vendors have not done anything to bring about this increase. As a matter of fact, in most instances they strenuously opposed zoning. I consider that vendors who were in business before zoning are not entitled to any increase in the value of goodwill brought about by zoning. The vendor who has purchased a round since zoning is entitled to the price he paid. Other vendors may have paid a low price for their round and built it up before zoning until it had a much higher goodwill value than the purchase-price. I suggest that treating-houses be bought out at valuation, also that vendors' plant and equipment be bought at valuation. Goodwill of rounds owned by treating-houses to be paid for at the value before zoning or the purchase-price, whichever is the higher; the same procedure to be adopted with vendors who do not elect to continue vending milk supplied by the Milk Council, or with all vendors if the Milk Council decide to vend all milk.

Higher Standard without Payment of Subsidy

The Commission is satisfied that there is a definite movement amongst farmers in Christchurch and Dunedin away from city milk-supply. If this movement is not arrested as soon as possible, it means there will be a serious shortage of milk in those two cities, and prices should be announced which will make it economic for the farmers to remain on city supply. The Commission agree that the lowest price which should be paid to farmers in Christchurch and Dunedin pending arrangements for all milk to be purchased on quality is an average price of 12·2d. per gallon at the farm gate, to be adjusted to the different seasons.

Under the Stabilization Regulations it is not possible to increase prices to consumers. If the present system of treating and vending is continued, it will be necessary to subsidize farmers at least 0·85d. per gallon in Christchurch and 1·7d. per gallon in Dunedin. If the recommendations of the Commission for payment on quality are put into operation, this subsidy must increase as the quality of the milk improves. The treating-houses in Auckland will be allowed a margin of about 14d. per gallon, in Christchurch a margin of 12d. per gallon, and in Dunedin a margin of 13·5d. per gallon between the price paid at the depot and the price paid by consumers. It is most likely there will be a demand from the treating-houses in Christchurch and Dunedin that they be allowed a subsidy to bring them up to the same margin as allowed in Auckland.

I consider that if the local Milk Councils had power to treat and vend all milk there would be no necessity for a subsidy to be paid.

The following is a table of costs of treatment, bottling, and distribution:

	Company.	W.C.C.	Companies.		
	d.	d.	d.	d.	d.
Treatment	0·99	2·16	1·25	1·54	1·87
Bottling	2·25	2·07	2·70	3·19	3·32
Distribution	7·65	6·43	10·42	8·79	8·22
	10·89	10·66	14·37	13·52	13·41

It will be noted that though total costs were lower in Wellington, the cost of treatment was highest there. During the period under review the pasteurizing-plant was worn and required a lot of attention. A new pasteurizing unit has been installed, so cost of treatment in Wellington should be lower in future.

This year the Wellington Municipal Milk Department made a profit of £28,702 4s. 3d. after meeting all commitment and making payments to the Renewal Fund, which now stands at £70,719 10s. 2d., the Sinking Fund, which now stands at £21,121 3s. 8d., and the Selling Price Stabilization Fund, which now stands at £10,326 9s. 5d. The profit represented 1·42d. per gallon on all milk sold.

The spread between price paid at the depot and retail price paid by consumers was 12·08d. per gallon. If the spread had been reduced to 11d., the profit would have been 0·34d. per gallon, which I consider is ample.

Wellington is a difficult city to deliver milk in owing to the uneven surface and the number of steps that have to be ascended to reach the houses in certain localities. In the other three centres, if delivery were rationalized the same as in Wellington, it should not be so expensive. Milk Councils in Auckland, Christchurch, and Dunedin should have no difficulty in operating on a spread of 11d. per gallon, with a reduction in price to consumers in Auckland. The price to producers in Christchurch and Dunedin with a double daily pickup would work out as follows:

	d.
Christchurch—	
Cost of milk at farm-gate	12·2
Transport	0·8
Spread between depot and consumer	11·0
Total	24

This is the same as at present.

	d.
Dunedin—	
Cost of milk at farm-gate	12·2
Transport	1·3
Spread between depot and consumer	11·0
Total	24½

This is ½d. per gallon less than at present. With organization the cost of transport could be reduced.

The milk could be purchased on quality as soon as the Milk Council commenced operations, and there would no no need for the producer to pay a levy. As the quality of the milk improved, the price to the producers would improve until the Producers' Supply Association was in full operation and was delivering milk of an average 4·3 per cent. butterfat test at the depot for 14d. per gallon.

In the improbable event of the Milk Council not being able to meet costs on selling margins, they would have the levy of 4d. per gallon collected from the raw-milk vendors, and this could be used partly to meet excess costs, and the balance could be used to pay for purchase of goodwills. It is anticipated that the sale of raw milk would diminish, but it would not disappear for a considerable number of years. In Wellington there are about 2,900 gallons of raw milk sold per day. This represents over £4,400 per annum on a 4d. margin. If the sale of raw milk ceased and it were necessary to pay a subsidy on pasteurized milk, that would be making a payment on something worthwhile.

I consider that if the present institutions are allowed to continue treating and vending, increasing subsidies will be necessary, with no guarantee that the quality of the milk will improve or that the present waste will be eliminated. To improve the quality of the milk, if the present system of treating and vending is allowed to continue, would necessitate the employment of an unreasonable number of Inspectors. This would mean increased costs which could rightly be added to the cost of milk. In fact, another subsidy.

I consider that it is not advisable to pay subsidies, unless it is impossible to avoid doing so. To pay a subsidy to allow the present treating and vending interests—except Wellington City Council—to continue would simply be subsidizing the present wasteful and inefficient methods.

If the experience in Wellington is to be taken as an example, treating and vending by the local authority would ensure high-standard milk to the consumers at a reasonable price, savings in treatment, transport, and distribution, fair treatment to the producers, and fair treatment of employees.

A persual of the table of samples handled by the Health Department in 1942 will show that increased inspections, with the present interests treating and vending, has not improved the quality of the milk, and the present interests alone can be blamed for the low price to producers, poor plant, and the poor-quality milk in centres other than Wellington.

There has been ample evidence to show that the economic and competitive driving force of private industry in treating and vending city milk has resulted in unfair competition, adulteration, purchase and treatment of milk not fit for treatment and sale, treatment methods devised to make bad milk palatable, the sale of milk not fit for consumption, wasteful methods of collection and distribution, and exploitation of both producer and consumer.

Past experience has shown that by-laws, regulations, prosecutions, and inspections have not induced them to treat and vend milk of high standard, and there is no reason to believe they could be regulated into making improvements in the future. There would be no incentive for a local authority treating and vending milk to indulge in the methods adopted by private industry. In city milk-supply it is impossible to have adequate inspections of a number of small units treating and vending; cost of inspection would be the same for a large unit as for a small unit.

An elected Milk Council would have to appear before the court of public opinion at regular intervals, and this regular appearance would do more to maintain the standard of milk vended by the Milk Council than any number of inspections.

Summary of Recommendations

(1) That Milk Councils be elected for Auckland, Christchurch, and Dunedin metropolitan areas.

(2) That these Milk Councils have the power to treat and vend all milk sold pasteurized in the metropolitan areas.

(3) That these powers be put into operation as soon as possible in Dunedin, and as soon as practicable in Auckland and Christchurch.

(4) That the present vendors be allowed to continue to vend if they elect to do so at the price it would cost the Milk Council to vend.

(5) That plant and goodwill of treating-houses and the goodwill of vendors who do not elect to continue vending be bought out in the manner described under heading "Goodwill."

(6) That the Milk Council retain the levy on raw milk and use it to meet excess treating-costs and to purchase goodwills and present plants.

(7) All raw milk to be supplied by vendors licensed by the Council.

(8) Consumers to have the right of choice.

Conclusion

I agree that the consumption of pasteurized milk should be encouraged, and suggest that an intensive campaign should be conducted on the advantages of pasteurization. The following is a summary compiled from evidence given before the Commission from interviews with officers of the Health Department, and from Professor G. S. Wilson's book "The Pasteurization of Milk," which was frequently quoted to the Commission. This summary shows the danger present in raw milk and the advantage of pasteurization; it may be useful for educational purposes.

Pasteurization

The evidence placed before the Commission in favour of pasteurization has been extensive and convincing. One objection to general pasteurization was that some people could not drink pasteurized milk. This has not been borne out by the investigations of the Commission.

In Auckland producer-vendors meet the requirements of those people who desire raw milk. The producer-vendors purchase nearly 40 per cent. of their requirements during the year. This purchased milk is pasteurized. An official of the Producers' Association said in evidence that he did not think they told their customers who got the pasteurized milk that it was pasteurized.

In Wellington the nearby farmers serve the people who desire raw milk. They purchase an average of 200 gallons per day pasteurized milk from the City Milk Department. They meet the customers' requirements for raw milk in the summer and purchase most of the pasteurized milk in the winter. This is another instance of raw-milk vendors meeting the requirements of raw-milk consumers with pasteurized milk. It is doubtful if they inform their customers that the milk is pasteurized.

In Christchurch most of the cream sold by the members of the Fresh Milk Association is pasteurized. It is not pasteurized under hygienic conditions. The can containing the cream is placed in a tub of water and a steam-jet turned into the water. Some of the cream is pasteurized twice. No evidence was given before the Commission of people who cannot drink pasteurized milk having complained about being served with pasteurized cream.

Badly-pasteurized milk or pasteurized loose milk which is exposed to contamination is as dangerous, if not more so, as raw milk. The consumer thinks she is getting safe pasteurized milk, and treats it accordingly, while, with raw milk, she knows she must take the necessary precautions.

Necessity for Pasteurization

Germs of the following diseases multiply in milk and are capable of producing disease in man: Bovine tuberculosis, undulant fever, streptococcal mastitis, typhoid fever, scarlet fever, diphtheria, septic sore throat, gastro-enteritis.

The following are details of some milk-borne epidemics in New Zealand and tests showing disease germs in raw milk. These epidemics were definitely caused by drinking raw milk:—

In 1934 there were 92 recorded cases of undulant fever in New Zealand. Thirty-six were caused by drinking raw milk. The remainder were caused by contact on farms.

In 1921, 39 cases of scarlet fever with 2 deaths at Christchurch caused through raw milk. There were four persons employed in the dairy with septic sore throats.

In 1928, 23 cases of scarlet fever at Gore all caused through milk from one vendor.

In 1928, 10 cases of scarlet fever at Invercargill all caused by drinking raw milk. A girl worker in a dairy had a sore throat.

In 1942, 10 cases of scarlet fever at Timaru. All cases came from the one vendor, whose son was a carrier and handling the milk.

In 1918, 19 cases of diphtheria at Christchurch all from one milk round. The dairyman's two children were infected.

In 1926, 51 cases of diphtheria at Kaitangata all traced to the one milkman, who was a carrier.

In 1919, 34 cases of typhoid fever at Wellington (before the City Council pasteurized and bottled milk). All from unrecognized disease in a milker.

In 1926, 9 cases of typhoid fever at Masterton. The milkman's son was a carrier.

In 1942, 26 cases of typhoid fever with 4 deaths at Otahuhu. There were 2 cases in the vendor's home. In this instance the vendor was particularly clean and careful, but all his care did not prevent the deaths of four persons from drinking raw milk.

In 1924, 8 cases of food poisoning with 3 deaths in Christchurch definitely due to raw milk.

Another case in Christchurch was a producer-vendor who ran a model dairy. There was an outbreak of a bad form of septic sore throat among his customers. Investigations made by the Agriculture Department and the Health Department showed that there was no infection from the cows, the dairy, the plant, or utensils. It was finally discovered that the vendor was a carrier.

Tests taken in Dunedin showed that there was T.B. in 2 out of 12 samples of market milk and *Br. abortus* in 6 out of 20 samples.

The Cook Hospital, at Gisborne, had their own T.B. tested herd. The milk was produced under ideal conditions. If it were possible to make raw milk safe, the supply to the Cook Hospital would have been safe. A case of T.B. was discovered in the hospital and it was traced to their own milk.

These are some instances of epidemics and deaths in New Zealand caused by drinking raw milk. They should be sufficient to satisfy any reasonable person that raw milk cannot be made safe, and that the only safe milk is properly pasteurized milk. Pasteurization should not be used to make bad milk keep. Milk should be fresh and of high quality before pasteurization.

Most producers who gave evidence before the Commission claimed that the replacement rate of their herds was 25 per cent., much of it due to disease.

The following are some quotations from Professor G. S. Wilson's book "The Pasteurization of Milk," published in 1942: –

Page 71.—"In 1937, 50 per cent. of the milk consumed in Oslo was pasteurized, 50 per cent. of town supplies in Denmark are pre-heated, pasteurization compulsory in Sweden and France with the exception of milk sold directly by the producer to the consumer. London, 98 per cent. of the milk pasteurized."

Page 101.—"Details are given of an experiment conducted to ascertain whether it was possible to detect the difference between raw and pasteurized milk. Out of 144 samples of pasteurized milk tested, the opinion was expressed in 72 instances that it was raw. Each person taking part in the test received 30 samples of milk. The expected number of mistakes would be 15. The average was 14·2 mistakes per person. One person, a girl eleven years old, made only 8 mistakes out of 30. This was the only instance where a person was able to identify pasteurized milk from raw milk, and even she made 8 mistakes out of 30."

Page 156.—"We may now refer to the most striking piece of evidence that has so far been obtained to prove that adequate pasteurization of the whole milk-supply leads to a complete disappearance of all milk-borne tuberculous infection. Dr. Price, in Toronto, recorded the results of a painstaking investigation that she had carried out during the previous eight years. Working at the Hospital for Sick Children, she studied the type of infecting bacillus in a series of 300 cases of non-pulmonary tuberculosis in children under fourteen years of age. Of these, 15 per cent. were found to be infected with the bovine tubercle bacillus. Inquiry revealed that every one of these children came from parts of Ontario where the milk was drunk raw. In Toronto itself, where compulsory pasteurization had been in force since 1915, not a single case of infection with the bovine type was discovered."

Page 157.—"In both Great Britain and America epidemic milk-borne disease can almost invariably be traced to the consumption of raw milk or cream. In New York State, excluding New York City, during the years 1917 to 1940 no fewer than 160 out of 163 outbreaks were traced to raw milk. In New Jersey between 1910 and 1937, 57 out of 58 outbreaks were traced to raw milk; and in Massachusetts from 1927 to 1932, 16 out of 18 outbreaks were traced to raw milk. In practically all of the 113 outbreaks recorded in Great Britain between 1912 and 1937 raw milk or cream appears to have been involved."

Page 158.—"Milk-borne epidemics occur mainly in areas where raw milk is extensively drunk. It is significant that in the United States milk-borne disease has been practically banished from the large cities, where the great majority of the milk is pasteurized, and is now almost entirely confined to the rural districts and smaller towns, where most of the milk is consumed raw.

"Since Toronto introduced compulsory pasteurization in 1915, not a single case of infectious disease carried by milk has been recognized.

"Numerous instances are on record where the same supply of milk has been drunk both raw and pasteurized and where disease has been confined to consumers of the raw-milk portion. A typical example is afforded by the recent outbreak of gastro-enteritis at Wilton, where the raw portion of the infected milk gave rise to at least 132 cases of acute food poisoning, while the pasteurized portion was consumed with impunity."

Page 176.—"In a very small outbreak of typhoid fever in New York State in 1931, involving only four persons, the pasteurized milk was found to have been infected from a typhoid carrier employed in hand-capping the bottles." (This goes to prove the necessity of machine sterilizing and bottling.)

Page 180.—"Though the sale of liquid milk in Great Britain has increased of late years, the average *per caput* consumption is still considerably less than that in several other countries. One reason for this is believed to be the distrust, felt both by the medical profession and by the more educated members of the laity, for our raw-milk supply, which is more heavily infected with pathogenic micro-organisms and more likely to give rise to disease *than any other article of common use* in our dietary. Not until milk is regarded hygienically in the same light as water, and freed by suitable measures from the risk of causing disease, will doctors feel justified in recommending its unrestricted use as a food and a beverage without incurring, as they do at present, the moral responsibility for endangering the health of those under their care."

Page 181.—"Careful estimates made in two different ways show that the probable number of deaths in England and Wales in 1937 from infection with the bovine type of tubercle bacillus was between 1,500 and 2,000.

"With regard to epidemic milk-borne disease, excluding that caused by milk products, there are records available in Great Britain between the years 1912 and 1937 of at least 113 outbreaks of scarlet fever, septic sore throat, diphtheria, typhoid fever, paratyphoid fever, dysentery, and acute gastro-enteritis affecting about 14,000 persons. To these must be added an unknown number of outbreaks of acute nausea and vomiting due to milk rendered toxic before ingestion by staphylococci or other organisms. Part also of the 190,000 deaths in England and Wales during the years 1912 to 1937 caused by summer diarrhœa of infants and young children must be attributed to raw milk. In view of these figures it is impossible to deny the gravity of milk-borne disease."

Page 185.—"If some measure of compulsory pasteurization is introduced, it is important that the supply of milk and its heat treatment should be as satisfactory as possible. It is therefore suggested that—

"(*a*) A pre-pasteurization standard of bacterial cleanliness should be laid down so as to ensure a satisfactory article for processing:

"(*b*) The licensing of pasteurizing-plants should be transferred from local authorities to the County Councils:

"(*c*) The personnel of pasteurizing-plants should be subject to the same type of medical and bacteriological control as that recommended by the Ministry of Health for the employees of water undertakings:

"(*d*) All pasteurizing-plants should be subject to regular and frequent inspection:

"(*e*) Since most Sanitary Inspectors have neither the time nor the detailed knowledge and experience to perform this duty satisfactorily, specially trained whole-time Inspectors should be appointed, preferably on a regional basis, whose duty it would be to advise County Councils of the granting of licenses, to inspect plants in operation, and to take samples of the milk for examination both before and after processing:

"(*f*) Samples of the pasteurized milk should be examined as a routine by the phosphatase test, but this test should be checked at intervals by the method of guinea-pig inoculation."

Professor Wilson concludes by saying

Page 186.—"To refuse to act on this knowledge, and to allow the continuation of a wholly unnecessary amount of suffering, invalidity, and death, *may be justifiable on grave economic grounds*, but can no longer be excused on the plea of ignorance except by those who, through natural or acquired defect, are too blind to see or too dense to understand."

One cannot stress too strongly the observation by Professor Wilson that we should treat the milk-supply with the same care as we treat the water-supply.

I agree with all the recommendations of the Commission with the exception of those enumerated in this report regarding the powers of Milk Councils and the putting into operation of those powers.

The most important recommendations of the Commission are those in relation to a Producers' Supply Association providing all milk to a city, the purchase of milk on quality, adequate sampling and testing, and the supply of high-standard safe milk to the consumers at reasonable prices.

I consider these recommendations cannot operate successfully unless there is a local authority purchasing and treating all milk to be pasteurized.

This 16th day of August, 1943.

(Signed) G. W. DELL, Member.

PART VI.—APPENDICES

INVESTIGATING ACCOUNTANT'S REPORT, STATEMENTS, AND SPECIMEN AGREEMENTS

STATISTICAL APPENDIX

APPENDIX I. STATEMENT OF THE INVESTIGATING ACCOUNTANT ATTACHED TO THE MILK SUPPLY COMMISSION

The Chairman,
The Milk Supply Commission, Wellington.

SIR,

I now submit statements showing the result of my investigations into the costs of treating and bottling milk, and of distributing it retail.

While in this industry, due to wastage in treatment and distribution, more milk must necessarily be purchased than can be sold, I have followed the accepted trade custom of calculating my costs at so many pence per gallon of milk sold.

For my purposes, the industry resolves itself into two sections

(1) The business units which treat, bottle, and distribute milk (both loose and bottled); and

(2) The producer-vendors and vendors. The former distribute their own production, always raw and mainly loose, but in Christchurch a portion is bottled. Vendors buy all their milk—either raw or pasteurized—and distribute it mostly loose, but sometimes bottled.

PART 1.—BUSINESS UNITS WHICH TREAT, TREAT AND BOTTLE, AND DISTRIBUTE MILK

The books and records available to me, were those of:—

Amburys Ltd., Auckland.
The Auckland Milk Co., Ltd., Auckland.
Stonex Bros., Ltd., Auckland.
Wellington City Corporation (Milk Department), Wellington.
United and Albany Dairies, Ltd., Christchurch.
Devonvale Dairy Farm, Christchurch.
Christchurch Dairy Co., Ltd., Christchurch.
The Taieri and Peninsula Milk Supply Co., Ltd., Dunedin.
The Otago Co-operative Milk Supply Co., Ltd., Dunedin.
Dunedin Wholesale Milk Supply, Ltd., Dunedin.

While, wherever possible, costs have been calculated on figures for the twelve months ended 31st March, 1943, in some cases costs for shorter periods had to be accepted.

The books and records of these concerns were well kept, and apparently in each case gave the detail asked for by those directly interested. There was no common accounting plan, and in order to obtain comparable costs as between the various units for similar operations a considerable amount of redrafting of the information was necessary. Difficulties were experienced in apportioning certain items of expense and the costs submitted must be qualified accordingly.

I would like to record my thanks to the managers and accountants for their co-operation and patience.

Treatment

The term "treatment" is used to cover the cost of receiving, pasteurizing, and storing the milk until it is required for sale. Whether milk is ultimately sold wholesale or retail, the cost of treating it is the same.

Expenses allowed against treatment were —

Factory wages and the remuneration of the manager :
Fuel and power :
Dairy materials :
Rates and water :
Maintenance and depreciation of plant and buildings used by this section.
Wastage was allowed at 1 per cent.

Cream.—The costs submitted relate only to the costs of treating milk. In arriving at these costs adjustments have been made for the costs of handling, separating, and pasteurizing of cream.

Bottling

The costs under this heading are those additional costs necessary to this operation. Bottling commences when the pasteurized milk flows to the bottling department and ceases when the sealed bottles are taken from the conveyor system for transfer to the storage chambers.

Expenses allowed against bottling were —

Wages of those engaged in handling and cleaning the bottles, and of those operating the bottling-machines :
Fuel and power :
Dairy materials, including caps and crates :
Bottles :
Rates and water :
Maintenance and depreciation of plant and buildings used in this department :
Milk wastage has been allowed at one-half per cent. of the quantities bottled.

Under the item "bottles" are included all bottle losses and breakages, whether incurred in the factory or on the rounds. While some portion should be borne by distribution, in the absence of more reliable data as to just what bottle losses are attributable to the rounds, I am of the opinion that more comparable figures are arrived at by the method adopted.

No attempt has been made to apportion, as between treatment and bottling, the cost of additional storage space needed for storing crates of bottled milk as compared with that needed for cans.

Cream.—Here, again, the costs submitted refer only to milk, adjustments having been made for the cost, including estimated sums for bottle losses, of bottling cream.

Retail Distribution

Delivery is by either horse-drawn or motor-driven vehicles. Of the six larger concerns, two—viz., Amburys Ltd. and the Wellington City Corporation Milk Department—favour horse-drawn vehicles, the former operating twenty-three horse-drawn rounds and twelve motor rounds, and the latter forty-three horse-drawn and eleven motor rounds. The Wellington City Corporation, in addition, operates a motor-driven feeder service to replenish the supplies on the horse-drawn rounds.

Stonex Bros. Ltd., and the Taieri and Peninsula Milk Supply Co., Ltd., distribute by both methods, while the Auckland Milk Co., Ltd., and United Dairies, Ltd., distribute only by motor-driven vehicles. Those who operate both horse-drawn and motor-driven vehicles say that the distribution cost per gallon is cheaper on the horse-driven rounds. The question is pertinent, and, although there is evidence in support of their contention, there have been no properly conducted experiments over sufficient length of time to warrant drawing any definite conclusions as to what the savings are.

Where a company operates a fleet of both horse-drawn and motor-driven vehicles, the figure shown is a weighted average of the cost of delivering by the two different methods.

In Christchurch and Dunedin, especially, finding a true distribution cost presented difficulties. On almost all rounds a certain amount of wholesale milk was delivered and only by working from rounds which were predominantly retail, and by eliminating wholesale gallonage at a standard rate per gallon, was it possible to arrive at a fair cost for retail distribution.

The expenses of distribution are divided into three headings, viz. :—

(1) Labour :
(2) Transport :
(3) Overhead.

Labour.—This covers the wages paid to all roundsmen, and the rounds' supervisor.

Transport.—The expenses allowed here are those relating to the care of the horses, the horse-feed, stablemen's wages, maintenance and depreciation of horse-drawn vehicles ; petrol, oil, tires, registration, insurance, maintenance, and depreciation of motor-trucks.

Wastage.—On bottled milk, no further allowance has been made. On loose milk, wastage has been allowed at a further 2 per cent., which, in the condensed summary, has been grouped with overhead.

Overhead.—This covers the normal items of expense not elsewhere allocated. It includes the salaries of the office staff, audit fees, bad debts, directors' fees, donations, overdraft, interest, stationery, and general expenses. In each case, after discussion with the manager and accountant, I have apportioned the total overhead between wholesale and retail distribution.

Cream.—While it is impossible to dissect the costs of delivering cream from those of milk, it was agreed that cream should bear some portion of the costs. This has been done by debiting cream, and crediting milk, with an allowance for delivering cream calculated on 1 gallon of cream being equivalent to 4 gallons of milk.

Comparisons of Distribution-costs.—When one is comparing relative efficiencies in distribution it is important to compare the costs per call as well as the costs per gallon.

Distribution Wholesale.—Though it is a comparatively simple matter to ascertain an average cost of delivering milk wholesale, I do not know of any investigations into the savings arising from distributing larger as against smaller quantities per given call.

Depreciation

Depreciation has been allowed in accordance with the scale fixed by the Commissioner of Taxes.

Goodwill

In my opinion, interest on the value of goodwill is not a working-expense and has been disallowed.

Interest on Capital employed

Interest on shareholders' funds has not been allowed. In my opinion, such interest is not a chargeable cost, but is part of the profits arising from carrying on business and should be covered in any profit margin set.

Conclusion

Last year's costs are not necessarily this year's costs, for operating ratios are not static in any way and vary inversely with the quantities handled. If the industry is to become subject to some form of control, much time would be saved in future investigations, and more accuracy obtained if those in authority, in collaboration with those engaged in the industry, would lay down a uniform method of accounting based on approved terminology.

PART II.—DISTRIBUTION-COSTS OF VENDORS AND PRODUCER-VENDORS

Few statements of costs were submitted for examination, and fewer still were substantiated. Accordingly, I have had to adopt a standard cost for a standard round, based on an economic unit of one man working on his own account, with motor-driven vehicle, and delivering 60 gallons of loose milk retail per day.

Transport Costs.—These have been fixed only after consultations with executives prominent in the motor industry.

Dairy Expenses.—A sum of £26 per annum has been allowed for the use of the dairy. It covers rent (where paid), rates, insurance, maintenance and depreciation of the dairy, and general plant.

Other dairy expenses are in accordance with those claimed by the representative of one Vendor's Association.

Cooling-plant.—A sum of £14 has been allowed for the power used in operating this unit.

Administration.—Expenses allowed cover telephone, printing and stationery, bad debts, accountancy services, and sundries.

Wastage.—Milk wastage has been allowed at 3 per cent. of the quantities sold.

Own Labour.—Labour reward has been allowed at £364 per annum, plus £14 in lieu of holidays, bringing the total to £378.

Cream.—Cream has been debited, and milk credited, with the cost of delivering cream assessed as 1 gallon of cream being equivalent to 4 gallons of milk.

Depreciation.—Depreciation has been allowed at the scale fixed by the Commissioner of Taxes.

Goodwill and Interest on Capital employed.—No interest has been allowed as a chargeable cost.

Conclusion

The books and records kept by these dairymen generally are inadequate, and it would be of assistance in any future investigations if those engaged would adopt a uniform method of book-keeping.

L. C. NISBET, F.P.A.N.Z.

Wellington, N.Z., 28th July, 1943.

SHEET A

APPENDIX II.—STANDARD ROUND AT STANDARD COSTS: VENDOR OPERATING ON HIS OWN ACCOUNT AND SELLING LOOSE MILK (SHEETS A AND B)

Sales—Milk: 60 gallons retail per day = 21,900 gallons per year.
Cream: 5 gallons per week = 260 gallons per year.

Transport		Not exceeding 12 cwt. truck.	
Number of operatives		1.	
Reward for own labour		£7 per week and £14 in lieu of holidays = £378 per annum.	
Mileage from depot to zone (on round and back to depot)		10 miles daily.	
Miles run on delivery per year		3,650 miles.	
Miles per gallon of petrol		12 miles.	
Petrol used for year		305 gallons.	
Basis of credit for delivering cream		1 gallon of cream is equivalent to 4 gallons of milk.	
			£
Capital invested	Delivery truck		300
	Garage		100
		£	400
Dairy	Cooling-plant	200	
	Cans	25	
			225
		£	
Book debts		100	
Less owing creditors		60	
			40
			£665
Dairy and general plant	Allowance for use of, £26 per annum.		
Delivery time	4 hours daily = 28 hours weekly.		
Dairy work	1 hour daily = 7 hours weekly.		
Accounts and general	5 hours weekly.		
	40 hours weekly.		
Net cost (exclusive of interest on investment and profits)—as per Sheet B	7·38d. per gallon.		

SHEET B

OPERATING EXPENSES FOR TWELVE MONTHS OF A STANDARD ROUND AT STANDARD COSTS

	£ s. d.	£ s. d.	Pence per Gallon.
Transport—			
Benzine: 305 gallons at 2s. 9½d.	42 11 6		
Repairs, oil, and greasing	32 0 0		
Tires	13 8 0		
Registration and insurance	13 8 6		
Depreciation vehicle 20 per cent. D.V.	60 0 0		
Depreciation: Garage 1 per cent. C.P.	1 10 0		
Sundries	5 0 0		
		167 18 0	1·84
Dairy Expenses—			
Allowance for use of dairy	26 0 0		
Can-replacements	2 0 0		
Dairy materials	3 0 0		
Water-heating	10 0 0		
Sundries	5 0 0		
		46 0 0	0·50
Cooling-plant—			
Power	14 0 0		
Depreciation 7½ per cent. D.V.	15 0 0		
		29 0 0	0·32
Administration—			
Telephone	10 0 0		
Printing and stationery	6 0 0		
Bad debts	7 10 0		
Accountancy services	7 7 0		
General	15 0 0		
		45 17 0	0·50
Wastage, 3 per cent.—			
657 gallons at 1s. 2d.		38 6 6	0·42
Own Labour		378 0 0	4·15
		705 1 6	7·73
Less credit for handling cream		31 18 9	0·35
Net cost (exclusive of interest on investment, and profits)		£673 2 9	7·38

SHEET C

APPENDIX III.—COSTING-SHEET OF VENDOR DISTRIBUTING RAW MILK: LOOSE (SHEETS C–E)

Daily milk sales	45 gallons retail. 9 gallons wholesale. 54	
Weekly cream sales	2 gallons.	
Description of round	Compact, varied over hill and flat.	
Transport	10 cwt. van.	
Number of operatives	Owner and three boys.	
Reward for own labour	£5 weekly (part time).	
Mileage from depot to zone (on round, and back to depot)	2½ miles daily.	
Mileage run daily in obtaining milk	3 miles.	
Mileage run for February, 1943	154.	
Miles per gallon of petrol	12.	
Petrol used for month of February	13 gallons.	
Basis for credit for delivery of cream	1 gallon of cream equivalent to 4 gallons of milk.	
Capital invested	Motor-vehicle	£ 150
	Rents his dairy	
	Cans	£ 25
	Book debts 100	
	Less creditors 50	50
		£225
Delivery times	1½ hours daily=10½ hours weekly.	
Dairy times	¾ hour daily = 5¼ hours weekly.	
Accounts and general	5¼ hours weekly.	
	21 hours weekly.	

SUMMARY OF COSTS FOR FEBRUARY, 1943

Cost of distributing raw milk loose (as per Sheet D)			7·62d. per gallon.
Owner's reward—	£ s. d.		
Own labour	20 0 0		
Profit (excluding interest)	22 17 7		
	£42 17 7		
Equal to (as per Sheet E)	£10 14 5		weekly.

SHEET D

CONTINUATION OF COSTING-SHEET OF VENDOR DISTRIBUTING RAW MILK: LOOSE

COSTS FOR MONTH OF FEBRUARY, 1943

	£ s. d.	£ s. d.	Retail, Pence per Gallon.	
Transport—				
Benzine: 13 gallons at 2s. 9½d.	1 16 3			
Repairs, oil, and greasing	4 3 0			
Tires	0 12 0			
Registration and insurance	0 11 0			
Depreciation	2 10 0			
Extras	1 0 0			
	10 12 3			
Less inwards cartage: 84 miles at 4d.	1 8 0			
		9 4 3	1·75	
Dairy—				
Rent of building	0 10 0			
Replacing cans	0 2 6			
Dairy materials	0 15 0			
Sundries	0 10 0			
		1 17 6	0·36	
Administration—				
Telephone	0 14 6			
Printing and stationery	0 5 0			
Bad debts	0 15 0			
Sundries	0 5 0			
		1 19 6	0·38	
Wastage and Allowance—				
3 per cent: 46 gallons at 1s. 1d.		2 9 10	0·48	
Hired Labour—				
Three boys at 10s. week, plus milk and cream 4s. 6d. each= £2 3s. 6d. weekly		8 14 0	1·65	
Own Labour—				
Say, £5 per week		20 0 0	3·81	
Total Distribution-costs (wholesale and retail)		44 5 1		
Less credit delivery 252 gallons wholesale		3 3 0	0·60	*Cr.*
Distribution-costs, Retail: Milk and cream		41 2 1	7·83	
Less credit for cream		1 2 0	0·21	*Cr.*
Retail Milk Distribution Costs (including own labour)		£40 0 1	7·62	

SHEET E

CONTINUATION OF COSTING-SHEET OF VENDOR DISTRIBUTING RAW MILK: LOOSE

PROFIT AND LOSS ACCOUNT FOR FEBRUARY, 1943

			£ s. d.
By Gross profit margins on milk sold			67 8 8
To Inwards cartage	£ s. d. 1 8 0		
Distribution costs	£ s. d. 44 5 1		
Less transferred to Cream Account	1 2 0		
	43 3 1		
		44 11 1	
To Profit over and above own labour reward, but excluding interest on investment			£22 17 7

Trading and Profit and Loss Account: Cream for February, 1943

	£ s. d.	£ s. d.
By Sales: 8 gallons at 16s.		6 8 0
To Purchases: 8 gallons at 12s.	4 16 0	
Delivery costs	1 2 0	
		5 18 0
		0 10 0
By Wastage		0 10 0
		Nil.

Owner's Return for Month:—	£ s. d.	
Labour reward	20 0 0	
Profit from above	22 17 7	
Total reward	£42 17 7	
Equivalent to	£10 14 5	weekly.

SHEET F

APPENDIX IV.—COST-SHEET OF VENDOR OPERATING TWO ROUNDS—DISTRIBUTING RAW MILK: LOOSE AND BOTTLED (SHEETS F–H)

		Bottled.	£	£
Daily sales	136 gallons retail, including bottled retail	78		
	7 gallons wholesale	7		
	143 gallons	85		
Weekly cream sales	30 gallons—20 retail; 10 wholesale.			
Description of rounds	Flat.			
Transport	Two trucks.			
Number of operatives	Owner (part time), roundsman, roundsman (part time), and girl.			
Reward for own labour	£5 per week (part time).			
Mileage from depot to zone (on rounds and back to depot)	25 miles daily.			
Mileage run for February, 1943	700 miles.			
Miles per gallon petrol	12 miles.			
Petrol used for month	59 gallons.			
Basis of credit for delivering cream	1 gallon cream equivalent to 4 gallons of milk.			
Capital invested	Motor-vehicles—			
	No. 1		342	
	No. 2		225	
				567
	Garage			150
			£	
	Dairy		100	
	Cans		30	
	Boilers		35	
				165
	Refrigerator			200
	Bottling-plant—		£	
	Bottler		25	
	Sterilizer		20	
				45
	Book debts			250
				£1,377

Summary of Costs for February, 1943

Cost of distributing milk—loose	As per Sheet G	6·03d. per gallon.
Cost of distributing milk—bottled	As per Sheet G	7·47d. per gallon.
Owner's Return:—		£ s. d.
Own labour		20 0 0
Profit (excluding interest)		96 15 0
Total reward for month		£116 15 0
Equal to (as per Sheet H)		£29 3 9 weekly.

SHEET G

CONTINUATION OF COST-SHEET OF VENDOR OPERATING TWO ROUNDS

COSTS FOR MONTH OF FEBRUARY, 1943

	£ s. d.	£ s. d.	Retail, Pence per Gallon.
Transport—			
Benzine: 59 gallons at 2s. 9½d.	8 4 9		
Repairs, oil, and greasing	3 12 0		
Tires	3 17 4		
Registration and insurance	0 12 6		
Depreciation—			
Trucks	9 10 0		
Garage	0 6 6		
		26 3 1	1·65
Dairy—			
Can-replacements	0 4 6		
Dairy materials and water heating	3 17 9		
Maintenance	1 19 0		
Depreciation	0 7 0	6 8 3	0·40
Cooling-plant—			
Power	1 10 0		
Depreciation	1 13 4		
		3 3 4	0·21
Administration—			
Telephone	0 14 6		
Printing and stationery	0 8 0		
Bad debts	0 8 0		
Book-keeping charge	2 0 0		
		3 10 6	0·22
Wastage Allowance, 3 per cent.—			
49 gallons		2 9 0	0·16
Hired Labour—			
Roundsmen	38 8 0		
Relieving roundsman	6 0 0		
Annual holidays	1 14 0		
		46 2 0	2·90
Own Labour: At £5 per week		20 0 0	1·26
Total Distribution-costs (wholesale and retail)		107 16 2	
Less credit delivery wholesale milk and cream		3 19 0	0·26 *Cr.*
Distribution-costs (Retail): Milk and cream		103 17 2	6·54
Less credit for cream		8 1 10	0·51 *Cr.*
Retail Milk Distributing-costs (including own labour)		£95 15 4	6·03
Add cost of bottling			1·44
Cost of distributing bottled milk (raw)			7·47

SHEET H

CONTINUATION OF COST-SHEET OF VENDOR OPERATING TWO ROUNDS

COSTS FOR MONTH OF FEBRUARY, 1943, OF BOTTLING 85 GALLONS OF MILK DAILY

	£ s. d.		
Labour	4 10 0		
Bottles	5 0 0		
Caps and brushes	5 13 4		
Depreciation	0 7 6		
Crates	0 10 0		
	16 0 10		
Less savings on spillage allowance, 1½ per cent.: 36 at 1s.	1 16 0		
	£14 4 10		1·44d. per gallon.

Profit and Loss Account for February, 1943

	£	s.	d.	£	s.	d.
By Gross profit margin on milk (wholesale and retail)				195	6	0
Gross profit margin on cream (less wastage)				23	10	0
				218	16	0
To Total distribution-costs	107	16	2			
Bottling-costs	14	4	10			
				122	1	0
To profit (exclusive of interest) for month				£96	15	0
Owner's Return—				£	s.	d.
Own labour				20	0	0
Profit				96	15	0
Total reward per month				£116	15	0
Per week				£29	3	9

APPENDIX V.—AUCKLAND CITY: LABOUR-COSTS OF DISTRIBUTING MILK RETAIL

My answer to your question as to what is a fair standard labour-cost to-day of distributing retail milk in Auckland is 5·02d. per gallon.

While the labour position is still somewhat complicated by man-power shortages, it is not as acute as it was. Avoidable overtime is still being paid. "Avoidable overtime" is defined as that which would not have been incurred had there been sufficient men available to work under the regulations laid down in the industrial award relating to the industry.

The figures of one company show avoidable overtime paid between 1st June to 30th November, 1942, as £322 8s. 4d. and between 1st December, 1942, to 19th May, 1943, as £70 9s. 5d.

My standard cost-sheet for a full working-week is as follows:—

	£	s.	d.
Award wages (five days)	5	10	0
Relief driver (two days at £5 15s. per week)	2	6	0
Free milk (9 quarts at 1s. 6d. per gallon)	0	3	5
Provision for statutory holidays	0	4	0
Provision for annual holidays	0	6	0
Avoidable overtime	0	2	6
New roundsmen	0	4	3
Rounds foreman	0	8	4
	£9	4	6

Average quantity delivered daily 63 gallons = 441 gallons weekly.

Labour-cost per gallon, 5·02d.

NOTE.—One company whose roundsmen average a delivery retail of 66 gallons per day employs men to collect its accounts, and the wages of these men are estimated to cost 11s. per round per week.

L. C. NISBET, F.P.A.N.Z.

Wellington, N.Z., 28th July, 1943.

APPENDIX VI.—SCHEDULE SHOWING NUMBER OF HORSE-DRAWN AND MOTOR-DRIVEN ROUNDS OPERATED BY THE LARGER COMPANIES, JUNE, 1943

	Horse-drawn Rounds.	Motor-driven Rounds.
Amburys Ltd.	23	12
The Auckland Milk Co., Ltd.	..	18
Stonex Bros., Ltd.	9	20
Wellington City Corporation Milk Department	43	11
United and Albany Dairies, Ltd.	..	13
Devonvale Dairy Farm	5	..
Christchurch Dairy Co., Ltd.	..	2
The Taieri and Peninsula Milk Supply Co., Ltd.	8	5
The Otago Co-operative Milk Supply Co., Ltd.	7	2
Dunedin Wholesale Milk Supply Co., Ltd.	..	4

APPENDIX VII.—STATEMENT SUBMITTED TO THE MILK SUPPLY COMMISSION BY PROFESSOR W. RIDDET, DIRECTOR, DAIRY RESEARCH INSTITUTE, PALMERSTON NORTH.

I WISH to submit the following statement on education and research in relation to the production, processing, and distribution of town milk-supplies.

1. EDUCATION

In my opinion, there is urgent need for the employment of the following types of trained men.

(*a*) *Milk-production Advisers.*—The production of milk for city supply requires the employment of dairy-husbandry methods that are somewhat different from those pursued on farms from which milk or cream is supplied to dairy factories. In general terms a greater supply of reserve feed has to be provided for the months of scarcity of pasture supply, more especially winter, and the type of feed must be suited to milk-production rather than merely the maintenance of dry stock. Considerable knowledge is therefore required of the adaptation of crops to different soils and climates, of their yields, and dietetic value and especially of their value for milk production. In addition, there are many occasions when farm-grown crops need to be supplemented by purchased foods, particularly meals, and, since these not only fluctuate in price from season to season but also differ materially in food value, it is necessary, in the interests of economy, for the farmer either himself to understand the principles of the choice, use, and mixing of such foods or to be given specialist advice thereon. Furthermore the whole question of the provision and selection of stock for city-milk farms and the management of such farms calls for specialist knowledge. Accordingly, I recommend that there should be employed two specialist milk-production advisers in the North Island and one in the South Island to assist farmers with the solution of problems associated with the production of town-milk supplies. These advisers should be graduates in agricultural science and preferably honours graduates in dairy husbandry. They could very conveniently be attached to the agricultural colleges in the respective Islands as extension lecturers, and would thereby enjoy not only the advantages of discussing problems with specialist colleagues, but also of arranging to get tried out on the college farms suggested crops, meal-mixtures, and the like. Every encouragement should also be given to the sons of city-milk-producing farmers to take the courses given at the colleges in farming, in which instruction is given in methods of farming peculiar to this type.

(*b*) *City Milk-trade Advisers.*—There is great need for employment in the Dominion of specialist advisory officers in the treatment and distribution of city milk. Men qualified to undertake this work should have both a sound practical and technical training in dairy science. Graduates holding the B.Agr.Sc. (dairy science option) degree of the University of New Zealand are equipped with the necessary training. I strongly recommend that there should be at least two of these officers employed in the Dominion. They could give milk companies and producer retailers advice on the selection and operation of milk-plant, the testing and grading of milk and cream, methods of assembling, transporting, and distribution of milk, and methods of overcoming technical difficulties that arise from time to time. The work of these officers would not conflict with that of Department of Health Inspectors. Rather would it be complementary to the latter. These men could to the greatest advantage be attached to Massey Agricultural College as extension lecturers. In this capacity, they could get full advantage of the assistance of the college and Dairy Research Institute staff, get access to the college library, and be kept in the closest touch with the milk plant at the college.

(*c*) *City-milk-plant Operators.*—The efficient handling of city milk and operation of modern plant call for a sound knowledge of the principles and practice of treating milk. In the interests of public health it is not sufficient for employees in key posts merely to have a working knowledge of the operation of machines. They should understand the purpose of the devices employed and of the principles affecting their use. Those who are managers or who hope to become managers should have a sound training in the science of milk and its products. Preferably they should be graduates in agricultural science (dairy science option) of the University of New Zealand or its equivalent in the same way as those referred to under (*b*). Such men are qualified, after a period of apprenticeship, to manage plants or take technical control of them and to carry out necessary routine laboratory work. Under existing conditions, the peculiarities, limitations, methods of carrying out and interpretation of the tests used in grading and testing milk are not sufficiently realized by those in the trade, and sometimes persons are appointed to carry out the work who are not really qualified to do so. It should not be the duty of the State Inspectors either to teach these persons their job or to draw attention to their deficiencies. In my opinion, all grading and testing work should be carried out by properly qualified persons, who hold the New Zealand University degree of B.Agr.Sc. (dairy science option) or an equivalent qualification.

In addition, the key personnel employed in the treatment of milk should be trained for their work. The Massey Agricultural College offers a course in the manufacture of dairy products that can readily be modified to suit these needs. The course extends over approximately thirty-three weeks, divided into three winter terms (May–August), each of eleven weeks. In the interval between successive terms students are required to engage in practical work in their specialist study. The first-terms course embraces instruction in elementary chemistry, elementary bacteriology, milk-production on the farm, milk-testing and farm-dairy machinery, book-keeping and machine drawing. The second and third terms would embrace, in the case of city-milk-plant operators, instruction in elementary dairy chemistry, elementary dairy bacteriology, the conduct and interpretation of milk-tests, the assembly, transport, processing, and treatment of city milk, city milk-trade accounting, dairy engineering and workshop practice, elementary course in dairy economics, and milk-plant construction and management. The college awards a diploma to students who fulfil all the practical work required and pass the necessary examinations. It charges £10 per term for tuition. In addition, students pay their own board and lodging, at present approximately 35s. per week. I strongly recommend that every encouragement should be given to milk-plant employees to take this course. Accordingly bursaries should be made available to enable worthy students to attend the Massey Agricultural College and adequate compensation by status and emoluments, should be provided to those who complete it.

2. Research

In the course of receiving evidence you will no doubt have had impressed upon you the necessity for research work concerned with city milk to be carried out in New Zealand. It is accordingly unnecessary for me to deal extensively with the need for this. It would probably be sufficient to state that there are at present, and will always be, problems affecting both milk-production and milk-treatment that are peculiar to the city-milk trade and that cannot be satisfactorily overcome with definite knowledge at our command. A considerable amount of research work is therefore necessary in order that dairy-farmers and the city-milk trade may be properly guided. Some of this work can be done overseas, but much will still need to be studied under New Zealand conditions, because of different practices that obtain in this country, as compared with practices in overseas countries.

The Dairy Research Institute is well equipped to carry out the investigation of all types of technical problems affecting the production and the treatment of city milk. Under existing conditions, however, it is not justified in devoting considerable time to this because the cost of the Institute's work is borne in equal amounts by the Government and the Dairy Industry through the Dairy Board, and attention is thus focused on problems affecting the manufacture of export products. Some work, such as factors affecting the S.N.F. of milk, of interest to both aspects of the dairy industry, is being undertaken. If funds could be made available by those engaged in the city-milk trade for the study of its problems, an equal sum would probably be provided annually by the Government in accordance with the principle already established for the cost of industrial research work to be borne equally by the State and the industry, the Dairy Research Institute could by extension of its present activities readily undertake the necessary work. Already the Institute operates on behalf of the Department of Health a short-time-high-temperature milk-pasteurizing-plant for the treatment of milk supplied to schools in the Manawatu area and is equipped with laboratories and equipment. It, therefore, has facilities and experienced principal workers for carrying out research work. The milk-plant facilities could be easily expanded by co-operation with owners of milk-plants operating in different parts of the Dominion. I therefore recommend that the Commission should give careful consideration to the making of funds available for the prosecution of research work associated with the city-milk trade at the Dairy Research Institute. In this connection it should be noted that the Institute is a branch of the Department of Scientific and Industrial Research, and is located at the Massey Agricultural College, where the closest contact is maintained between the teaching work of the college and the research work of the Institute.

I trust that the above submissions will receive your favourable consideration.

APPENDIX VIII.—DISEASES TRANSMITTED TO HUMAN BEINGS IN MARKET MILK

Milk-borne diseases fall into three groups:—

(1) Those in which milk transmits to humans, a disease which normally affects the cow—*e.g.*, tuberculosis and undulant fever (due to infective abortion in the cow):

(2) Those in which the infection of a human disease enters the milk after it leaves the cow and before delivery to the consumer—*e.g.*, typhoid fever, food poisoning, dysentery, diphtheria, scarlet fever, tonsillitis:

(3) Those in which a human disease is transmitted to the cow, which thereafter gives a profuse discharge of the infecting agent in its milk—*e.g.*, scarlet fever and tonsillitis.

In New Zealand the first group is much the most important, although the other groups cannot be dismissed too lightly. Our human population is relatively sparser than our cow population and there is a slighter incidence of human disease like typhoid than in more closely settled countries. Hence there is a correspondingly smaller chance for the spread of disease through milk-supplies. Nevertheless, the danger exists and may be expected to become greater with an increase in density of population.

Of the two main cow diseases—tuberculosis and abortion—the latter is probably at least as prevalent in New Zealand as in other countries. The Dairy Commission in 1933 estimated that 9 per cent. of the cows were tubercular. This is a lower figure than obtained in most European countries, but it is large enough to imply a significant danger to human health. The danger of tuberculosis infection through milk, especially with young children, has been well publicized, and it is too big a subject in itself to be dealt with here. The danger to human health from the organism of bovine abortion (*Brucella abortus*) is less widely recognized, and, indeed, it is difficult to estimate exactly because of the varied severity of the disease in humans (undulant fever). McKenzie(1) states that 196 cases of undulant fever were reported in New Zealand between 1928 and 1938. Of these, 65 were farmers or farm workers, and 11 were wives or children of dairy-farmers. The series also included 4 slaughtermen, 1 veterinarian, and 1 bacteriologist working with *Brucella abortus*. Five of the cases were fatal. It is evident that contact with infected cows is a common source of infection, perhaps the most dangerous. McKenzie estimates that the number of cases caused through drinking infected milk is 11 per annum.

The question may be asked, Since abortion is fairly prevalent in cows, why is undulant fever not more widespread in New Zealand where little of the milk for liquid consumption is pasteurized? The answer lies in the rather low pathogenicity of the organism. For every person who develops a recognizable case of undulant fever there must be many who resist infection or who develop symptoms too slight for recognition and who acquire an immunity which lasts for a longer or shorter period. This is illustrated in an outbreak reported by Elkington *et al.*(2) in a school of four hundred boys. Two definite cases occurred and twenty-six boys suffered from a transient illness with fever, headache, malaise, and listlessness. Of these twenty-six, ten gave positive blood-tests for undulant fever. Blood-tests on seventeen boys who showed no signs of illness gave five positive results. The organism (*Brucella abortus*) was recovered from the raw-milk supply. It was concluded that the raw, infected milk produced clinical, sub-clinical, and latent undulant fever in some 30 per cent. of the boys. The very varied symptoms were noteworthy.

It is evident from records in the literature that we cannot know how much illness is caused in New Zealand by the organism of undulant fever. The cases officially recorded are only those which are diagnosed. There are probably many cases which escape diagnosis because the symptoms are slight or are typical. The loss of industrial efficiency in the aggregate may be significant.

The diseases listed in the second group above are in general more acute and more easily recognizable than undulant fever. Their spread through milk-supplies infected in the handling is a serious problem in thickly-populated countries. In general, typhoid fever holds the first place both in the number of

outbreaks and in the mortality rate; tonsillitis and scarlet fever are the next most prevalent and food poisoning comes third. The milk is usually infected during the course of production and distribution by some person who is either suffering from the disease or is a "carrier"—*i.e.*, the person harbours the organism although not apparently ill. Outbreaks of disease spread by milk like those spread by water are "explosive" in nature—*i.e.*, a large number of cases occur suddenly—and the cause is usually fairly easily identified because, in the case of milk, all the cases occur among people served by the same milk-supply. Quite often it has been possible to find the responsible person and to demonstrate that he or she is infecting the milk during its production or distribution. Even where milk is pasteurized it is obviously possible for it to become infected after the heat treatment. Hence the advantage of pasteurization, followed immediately by bottling, so that there is as little chance as possible for infection of any sort.

The third group of milk-borne disease mentioned above is only distinguished from the second group because of the different mode or path of infection. They comprise the cases where a person harbouring the germs of scarlet fever or tonsillitis infects the cow so that the animal secretes the germs in large numbers in her milk. Only in recent years has it been definitely established that such cases occur, and that the infection resulting is usually more intense and consequently more dangerous, than where infection is directly from human being to milk. Pasteurization of the milk eliminates this particular danger entirely of course.

Present knowledge on milk-borne disease is most excellently summarized in Reviews in the *Journal of Dairy Research*(3, 4).

REFERENCES

(1) McKENZIE (1938): Rep. Med. Offr. Minist. Health, London, p. 102.
(2) ELKINGTON, WILSON, TAYLOR, and FULTON (1940): *Brit. Med. J.*, *1*, 477.
(3) *J. Dairy Res.*, 1937, *8*, 265.
(4) *J. Dairy Res.*, 1941, *12*, 227.

PASTEURIZATION

Although pasteurization was originally introduced as a means of preventing spoilage and enhancing the keeping-quality of wine, the emphasis in the case of milk has shifted to the elimination of danger from disease. Milk becomes infected in the course of production with a variety of bacteria, the majority of which are harmless to human beings but objectionable because they lead to souring of the milk. The greater the care in production, the smaller the infection with bacteria and the greater the keeping-quality of the milk. But no amount of care will eliminate the bacteria of bovine tuberculosis and undulant fever from the milk if the cow is harbouring the organisms of those diseases. Actually the danger to human health is greater in milk-supplies to small communities than to larger ones because the more the milk is bulked the greater is the dilution of infected milk from the few cows suffering from tuberculosis and abortion. Nevertheless, the danger even if diminished by bulking, is always there in some degree, and for a milk-supply to be rendered safe the only alternatives are—

(*a*) Rigid inspection of the cows at frequent intervals:
(*b*) Pasteurization.

At one time there was a considerable body of opinion (led by Stenhouse Williams in England) which favoured the first alternative because of the belief that heat treatment of milk seriously reduced its food value. But since investigations over the course of the last twenty years have shown that the food-value of milk is little, if at all, affected by pasteurization, world opinion has been almost unanimous in favour of the second alternative. It appears that nothing is now likely to prevent the gradual universal adoption of pasteurization of milk.

Although pasteurization improves the keeping-quality of milk by destroying many of the souring bacteria which accidentally gain access on the farm even under the cleanest conditions of production, there is a growing realization that emphasis must still be laid on the production of milk as free from bacteria as possible. There are types of bacteria which withstand the heat treatment and other types which can actually grow at pasteurization temperature, and, although these bacteria are non-pathogenic, they may influence the keeping-quality and palatability of the milk. Hence the urge is to produce milk under conditions as clean as possible and to pasteurize it to make it as safe as possible. Opinion is practically unanimous on these points all over the world.

CONTROL OF PASTEURIZATION

Heat treatment of milk means more handling and more machinery, and during the treatment there are many opportunities for things to go wrong; hence a greater need for technical skill in the management of pasteurizing-plant than in the handling of raw milk. The accurate control of temperature and the cleaning and sterilization of everything with which the milk comes into contact all present problems which have made the business of milk-pasteurization almost a specialist occupation. There is a tendency in several countries towards insistence on the training and certification of operatives.

For the control of raw-milk quality the reductase or methylene-blue test is most useful, although when certain problems arise it has to be supplemented by direct microscopic examination and sometimes by plate counts and cultural work. For examination of the pasteurized milk the plate count or the test for *Bacillus coli* are the only really reliable methods available. Thus a milk-pasteurizing plant needs to employ or to have a call on the services of some one skilled in bacteriological technique. This has become very evident in our experience during the bottling of milk for schools at the Dairy Research Institute. For long periods the pasteurized milk shows no fault whatever, then suddenly there is evidence of some slight infection in the plant or some lowering in quality of the raw-milk supply which would pass unnoticed (and probably become worse) were it not for the daily bacteriological check.

For control of the heat treatment the phosphatase test appears almost infallible. It so happens that a heat treatment which kills the *Tubercle bacillus* (the most resistant of the disease bacteria likely to occur in milk) is just more than adequate to destroy the enzyme phosphatase which is invariably present in raw milk. Hence an absence of phosphatase in a heated milk proves that the milk has had a heat treatment adequate to destroy the *Tubercle bacillus*. The phosphatase test is easy to perform and it so sensitive that it will detect the presence of 0·25 per cent. of raw milk in pasteurized milk. The application of the test as a check on pasteurization gives, therefore, a reliable guarantee of the safety of milk.

If the milk is overheated the creaming-power is injured and the taste is possibly affected. It can be safely left to consumers to provide a check on any excessive treatment.

For many years the standard method of pasteurization was to heat the milk in batches to 145° F. for thirty minutes (British figures), but in recent years the high-temperature short-time system (161° F. for sixteen seconds) has been under trial and has found a certain amount of favour. Both systems have advantages, and both will probably continue to be used. The temperature and time used in the high-temperature short-time method can be varied using the phosphatase test as a guide to the lower limit of safety and the creaming tendency as a guide to the upper limit of advisability. So long as the treatment is such that the milk gives a negative phosphatase test it can be assumed that it is sufficient for the destruction of the *Tubercle bacillus*. Continued improvement is being effected by engineers in the design of pasteurizing equipment, and especially in the provision of automatic controls which prevent the passage of inadequately-heated milk.

A most important part of the plant apart from the apparatus for treating the milk itself is the bottle-washer (assuming that the pasteurized milk is to be bottled). Infection can come from bottles as well as from any other part of the plant, and it is obviously possible to have perfectly pasteurized milk spoiled by being filled into a dirty bottle. The performance of a bottle-washing machine thus needs constant checking. There are very many designs of machines, but their general principles are necessarily very similar. The bottles are rinsed to remove traces of milk as far as possible, then they are either soaked in or sprayed with an alkali solution which thoroughly cleans them by removing all adhering fat and dried-milk solids. The strength of this detergent solution needs to be carefully checked at frequent intervals. If it is kept up to strength and at the correct temperature, it sterilizes the bottles as well as cleaning them. The subsequent stages of the process consist in rinsing the bottles free from the alkali solution without reinfecting them. This is where there is some difficulty because the ideal from the plant operator's point of view is to finish with a cold bottle ready for the filling-machine. But a final rinse with cold water may reinfect the bottles unless the water is sterile. Milk regulations in England prohibit the use of chlorinated water (which can be sterile) because traces of chlorine would find their way into the milk. Thus in many English machines the bottles are rinsed with non-sterile water which, owing to cost considerations, is used over and over again during a run. Obviously this is not ideal, and it is surprising that so little trouble has apparently been experienced from this factor. The only alternative at present in England is to use a final treatment with hot water or steam and to allow time for the bottles to cool. It seems most likely that in time the English authorities will agree to the use of chlorinated water for the rinsing of bottles. The objection has been sustained so far not because of any danger to human health, but because of a fear that unscrupulous tradesmen would add chlorine compounds to inferior milk to enhance its keeping-quality. With proper supervision the chance of such a happening should be negligible, but in this connection again it is evident that there must be strict control of the bottle-washing-machine operations. In the whole process of bottle-washing the technician must check the following points regularly :—

(*a*) Temperatures of the various solutions :
(*b*) Strength of the alkali solution :
(*c*) Strength of the chlorine sterilizer (if used).

Finally, a frequent check on the sterility of the bottles is necessary to ensure that the desired result is being attained.

From the foregoing it will be sufficiently evident that if the pasteurized-milk supply is to be above suspicion there must be regular checks of every detail of the process and of the final product. Milk is more liable to dangerous contamination than any other food, and it needs correspondingly more precise and careful handling.

(Sgd.) H. R. Whitehead, Bacteriologist,
Dairy Research Institute (N.Z.).

APPENDIX IX.—SAMPLE FORM OF AGREEMENT BETWEEN SUPPLIER AND UNITED DAIRIES, LTD., CHRISTCHURCH

Agreement made the 1st day of September 1943 between Mr. Dairy Farmer of Tai Tapu (hereinafter called "the supplier") of the one part and United Dairies Limited a duly incorporated Company having its registered office at Christchurch (hereinafter called "the Company") of the other part whereby it is agreed as follows :—

1. In this Agreement "Summer months" means the months of September, October, November, December, January, February, March and April. "Winter months" means the months of May, June, July and August.

2. (*a*) The supplier agrees to supply and sell to the Company and the Company agrees to purchase from the supplier 60 gallons of milk per day (hereinafter called "the declared quantity") during the period from 1/9/43 to 31/8/44 at the price of :

9d. per gallon during the months of September, October, November, December, January and February.
11d. per gallon during the months of March and April.
1/2½d. per gallon during the winter months

or such other price as shall from time to time be fixed by order of the Price Tribunal (or other competent authority) for supplies of milk in respect of any period during the currency of this agreement.

(*b*) In respect of any milk in excess of the declared quantity supplied by the supplier and accepted by the Company during the winter months the price shall be 1/2½d. per gallon or such other price as may be fixed from time to time as mentioned in the last preceding subclause.

(*c*) If any milk in excess of the declared quantity shall be supplied by the supplier and accepted by the Company during the summer months such excess shall be treated as surplus milk and the price payable for the same shall be 6d. per gallon.

3. The supplier agrees with the Company that if his average daily supply during any winter month shall be less than the declared quantity the following provisions shall apply :—

(*a*) The average daily supply for each of the winter months shall be ascertained and shall be used as the basis for determining the average daily supply over all the winter months provided that in so doing no account shall be taken of any amount by which the average daily supply of any winter months exceeds 20 per cent. more than the declared quantity.

If the average daily supply over all the winter months calculated as aforesaid shall be less than the declared quantity, the difference multiplied by the number of days in the winter months shall be deemed the amount short supplied during the winter months and the supplier will pay to the Company by way of liquidated damages and not by way of penalty in respect of his failure to supply the declared quantity the sum of 3d. (or difference between summer quota price and summer surplus price (*c*) of clause 2.)

(*c*) The Company may deduct from any moneys payable to the supplier any amount payable to it by the supplier in terms of the last preceding sub-clause.

4. FROM and after the time when milk is delivered by the supplier to the Company or any agent or contractor on its behalf it shall be treated as supplied by the supplier only and it shall not be competent for him to direct the Company to treat the same as having been supplied by any other supplier to the Company unless in any particular instance the Company shall so permit.

5. (*a*) The supplier agrees that all milk supplied by him to the Company in terms of this Agreement shall be pure new milk, sweet clean and marketable with all its cream and without the addition of water or any preservative and the same shall be delivered by him in sterile cans adequately covered.

(*b*) If any milk so supplied shall fail to conform to the standard prescribed by regulations under the Sale of Food and Drugs Act 1908 or otherwise required by law from time to time whether in respect of content of butterfat or other solids, reductase test, added water or otherwise the Company may reject the same and either return it to the supplier or dispose of it as it shall see fit giving to the supplier reasonable notice of rejection and of the reason therefor.

6. THE supplier shall provide and keep in good order and repair all necessary cans for the conveyance of the said milk to the Company's premises each day and the Company shall take delivery of the milk in such cans from the supplier each day at such place as shall be agreed upon and shall return the supplier's empty cans to the same place on the day following the day on which the same are collected but the Company shall not be responsible to make any empty cans sterile when returned. While the Company agrees to take all proper care of the supplier's cans while the same are in its possession, the Company is not to be held responsible for loss of or damage to cans occurring through any act or neglect on the part of any cartage contractor engaged by it and not being an employee of the Company.

IN WITNESS whereof these presents have been executed the day and year first hereinbefore written—

SIGNED by the Supplier in the presence of: MR. DAIRY FARMER. JOHN CITIZEN.

SIGNED by UNITED DAIRIES LIMITED in the presence of: JOHN H. HARRIS. N. S. MCCANN.

APPENDIX X.—LICENSED RESELLERS CONTRACT

The Manager,
Dairy Farmers' Co-operative Milk Supply Co., Ltd.,
Dunedin.

I, ... of ..... being a licensed retailer of milk (License No. ....., issued by ..... Council), hereby make application for the supply to me of ..... gallons of milk per day from your Company. I agree to abide by the conditions set out hereunder and the same are to constitute a Contract between me and your Company. It has been explained to me that your Company wishes to regulate its business so that at all times there will be available an ample supply of wholesale milk for the requirements of Dunedin City and environs.

CONDITIONS

1. The purchaser undertakes to purchase from the Company the whole of his or her requirements of milk for commercial purposes for a period of ..... months from this date. If under special circumstances a purchaser with the knowledge and consent of the Company purchases a portion of his or her requirements elsewhere, such purchaser agrees that during the summer months he or she will restrict such outside purchases to the average amount of such purchases during the months of June, July, and August of the previous winter.

2. While it is understood that the Company will use every endeavour to maintain a prompt sufficient and regular supply, the Company is to be under no legal liability to any purchaser in the event of the supply failing in whole or in part from any cause whatsoever.

3. Delivery of milk will be given daily to purchasers at the Company's depot in Dunedin or at such other point mutually agreed upon between the parties in any particular case.

4. Payment at the rates set out hereunder is to be made at the Company's Dunedin Office twice monthly—that is, at the middle and the end of each calendar month and within four (4) days of the close of each bi-monthly period.

5. Milk will be measured or weighed at the rate of 10½ lb. to the gallon and the Company's weight or measure shall be deemed to be correct provided that any purchaser may decline to take delivery of any can which he considers short weight and may reject the same. Notice of rejection must be given immediately to the Company's manager or other nearest representative to the intent that the disputed weight shall be checked immediately and the shortage (if any) adjusted. No claims in respect of any alleged short weight will be recognized unless the right of rejection is first exercised as provided herein.

6. Should the milk be delivered direct to a purchaser and not pass through the Company's depot in Dunedin, the Company reserves the right to take daily samples of such milk.

7. All milk sold by the Company shall be delivered to purchasers in a pure unadulterated and fresh condition and in accordance with all legal provisions governing the quality of milk for human consumption. Every purchaser shall have the right to reject any milk, the condition of which he considers inferior. Such right of rejection must be exercised at the time of delivery and notice given immediately to the Company's manager or its nearest representative. Should any dispute arise between the Company and a purchaser as to the condition of any such milk the same shall be referred immediately to any Government grader of milk and his decision shall be binding on both parties.

8. One half of the cans necessary for the transport of milk from the farm where it is produced to the City of Dunedin shall be supplied by the purchaser and the supply of the other half shall be arranged by the Company. Purchasers shall promptly return all cans in a thoroughly cleansed condition to the Company's depot in Dunedin or (in cases where delivery is given direct) to the Company's carrier.

9. Should a purchaser make default in the payment of any moneys due to the Company for milk supplied hereunder, the Company reserves the right to discontinue all further supplies to such customer until the default has been remedied for the recovery of any moneys due to it.

10. The price per gallon to be paid for milk during the term of this contract shall be at the rates set out below and the purchaser shall be allowed a discount of one farthing per gallon for prompt payment within four (4) days from the close of each bi-monthly period of supply.

Month of Supply.	Where the Daily Gallonage exceeds—		
	(*a*) 5 Gallons but not 10 Gallons.	(*b*) 10 Gallons but not 50 Gallons.	(*c*) 50 Gallons but not 100 Gallons.
	d.	d.	d.
January	13	11¾	11½
February	13	11¾	11½
March	14½	13¼	13
April	14½	13¼	13
May	16½	15¼	15
June	17	15¾	15½
July	17	15¾	15½
August	17	15¾	15½
September	16½	15¼	15
October	13	11¾	11½
November	13	11¾	11½
December	13	11¾	11½
Average	14·83d.	13·58d.	13·33d.

Discount of ¼d. per gallon for prompt payment.

Dated this.....day of....., 194...

.....
Purchaser.

APPENDIX XI.—CONTRACT FOR LICENSED RESELLERS

(Special for larger Companies)

The Manager,
Dairy Farmers' Co-operative Milk Supply Co., Ltd.,
Dunedin.

THE TAIERI & PENINSULA MILK SUPPLY COMPANY LIMITED of King Street Dunedin being a licensed retailer of milk (License No. 488 issued by the Dunedin City Council) hereby makes application for the daily supply to it of milk from your Company. It agrees to abide by the conditions set out hereunder and the same are to constitute a Contract between it and your Company. It has been explained that your Company wishes to regulate its business so that at all times there will be available an ample supply of milk for the requirements of Dunedin City and environs.

CONDITIONS

1. The purchaser undertakes to purchase from the Company the whole of its requirements of milk for commercial purposes for a period of ten months and nine days from this date but if a purchaser with the knowledge and consent of the Company purchases a portion of its requirements elsewhere such purchaser agrees that during the months from September to May inclusive it will restrict such outside purchases to the average monthly amount of such purchases during the months of June, July and August of the previous winter. Under no circumstances shall that minimum requirements of the purchaser be less than the winter average as hereinafter defined. The vendor acknowledges that it has already consented hereunder to outside purchases based on the actual quantities bought elsewhere by the purchaser during the months of June, July, and August 1942.

2. While it is understood that the Company will use every endeavour to maintain a prompt sufficient and regular supply, the Company is to be under no legal liability to any purchaser in the event of the supply failing in whole or in part from any cause whatsoever.

3. Delivery of milk will be given daily to purchasers at the Company's depot in Dunedin or at such other point mutually agreed upon between the parties in any particular case.

4. Payment at the rates set out hereunder is to be made at the Company's Dunedin Office once in each calendar month and within ten days of the close of the immediately preceding monthly period. As from the first day of January 1943 the vendor reserves the right to revert to bi-monthly payments as hitherto in force.

5. Milk will be measured or weighed at the rate of 10½ lb. to the gallon and the Company's weight or measure shall be deemed to be correct provided that any purchaser may decline to take delivery of any can which it considers short weight and may reject the same. Notice of rejection must be given immediately to the Company's manager or other nearest representative to the intent that the disputed weight shall be checked immediately and the shortage (if any) adjusted. No claims in respect of any alleged short weight will be recognized unless the right of rejection is first exercised as provided herein. In the interim and pending the vendor establishing proper weighing machines on its own premises, the vendor entrusts the purchaser with the duty of accurately weighing, and the weights so recorded by the purchaser shall be accepted as correct by the vendor subject to the vendor's right to check weight any milk at any time on the receiving stages of the purchaser.

6. Should milk be delivered direct to a purchaser and not pass through the Company's depot in Dunedin, the Company reserves the right to take daily samples of such milk.

7. All milk sold by the Company shall be delivered to purchasers in a pure unadulaterated and fresh condition and in accordance with all legal provisions governing the quality of milk for human consumption. Every purchaser shall have the right to reject any milk the condition of which it considers inferior. Such right of rejection must be exercised at the time of delivery and notice given immediately to the Company's Manager or its nearest representative.

8. One half of the cans (or such lower proportion as may be agreed upon) necessary for the transport of milk from the farm where it is produced to the City of Dunedin shall be supplied by the purchaser and the supply of the other half shall be arranged by the Company. Purchasers shall promptly return all cans in a thoroughly cleansed condition to the Company's depot in Dunedin or (in cases where delivery is given direct) to the Company's carrier.

9. Should a purchaser make default in the payment of any moneys due to the Company for milk supplied hereunder, the Company reserves the right to discontinue all further supplies to such customer until the default has been remedied and until an acceptable provision against the recurrence of any such default. The Company retains all its other legal remedies for the recovery of any moneys due to it.

10. The price per gallon to be paid for milk during the period of this Contract shall be computed at the rates set out below and the purchaser shall be allowed a discount of One Farthing per gallon for prompt payment within Ten Days from the close of each monthly period of supply.

11. Whereas the Company draws its supply of milk from a district known as "the normal district" extending from and including the Borough of Waikouaiti in the north down to the northern boundary of Lake Waihola in the south and whereas in the depth of winter or in other periods of milk shortage it may become necessary for the Company to procure additional supplies from Producers resident outside the normal district then and in that case purchasers shall pay during such period a *pro rata* additional cost per gallon calculated on the amount per gallon by which the Company's transport charges have been increased beyond the normal transport cost of one penny. A similar *pro rata* additional cost shall also be paid by purchasers in respect of milk coming from within the normal district if the normal transport cost of same is increased beyond one penny by reason of the operation of any war regulation under which the transport of milk is diverted from road to rail either in whole or in part.

12. The vendor whilst retaining full legal freedom to deal with any purchaser will favourably consider restricting its sales other than sales to Commercial users of milk to members of the Dunedin Milk Vendors Association (Incorporated) provided that the said Association represents and continues to represent at least 75 per cent. of the persons or firms engaging in the retail vending of milk in Dunedin City and environs and provided further that membership in the Association be not denied to new applicants except for lawful reasons.

13. For each purchaser there shall be a term known as "the winter average" which shall be the average monthly amount of milk purchased by him or it from the vendor or the vendor's suppliers during the months of June, July and August of the immediately preceding winter. If during the period from the 16th day of September to the 31st day of March (inclusive) in any dairying year hereunder the vendor sells to the purchaser a quantity of milk in excess of its winter average which excess quantity is referred to herein as "surplus" milk, the price to be paid for such surplus milk shall be on a butterfat basis at the cheese factory rate of One shilling elevenpence three farthings (1/11¾d.) per lb. butterfat net with the delivery at the purchaser's premises Dunedin.

14. Should the purchaser desire to reduce the amount of its daily purchase it shall in all cases give three days previous written notice accordingly to the vendor provided that in no case shall there be any reduction below its winter average.

15. The prices set out hereunder shall be increased or reduced in accordance with any increase or any reduction hereafter made by the Price Tribunal in its decision of May 26th, 1942.

PRICE-LIST

Month of Supply.	Rate per Gallon of 10½ lb.
	s. d.
January	0 10
February	0 10
March	0 11½
April	0 11½
May	1 1½
June	1 2
July	1 2
August	1 2
September	1 1½
October	0 10
November	0 10
December	0 10

Dated this 22nd day of September, 1942.

THE TAIERI & PENINSULA MILK SUPPLY CO., LTD.:

(Sgd) A. H. TEMPLETON,
General Manager.

TABLE 1.—MILK AND CREAM PRICES: AUCKLAND, WELLINGTON, CHRISTCHURCH, AND DUNEDIN

	Auckland.		Wellington.		Christchurch.		Dunedin.	
	Summer.	Winter.	Summer.	Winter.	Summer.	Winter.	Summer.	Winter.
Milk	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Retail—								
Bottled, per quart	0 6½	0 7½	0 6½	0 7	0 6	0 6	0 6	0 7
Loose, per quart	0 6	0 7	0 6½	0 7	0 6	0 6	0 6	0 7
Wholesale: Price per gallon—								
100 and over	1 5	1 9	Wholesale at 1s. 9d. per gallon, less rebate of 1½d. per gallon where purchases amount to over 250 gallons per month.	Wholesale at 1s. 11d. per gallon, less rebate of 1½d. per gallon where purchases amount to over 250 gallons per month.	Wholesale prices range from 1s. 4d. to 1s. 8d. per gallon.		Wholesale prices range from 1s. 1d. per gallon in case of major contracts to—	Wholesale prices range from 1s. 2d. per gallon in case of major contracts to—
Under 100 and not less than 75	1 6	1 10					1 5	1 7
Under 75 and not less than 40	1 7	1 11					1 6	1 8
Under 40 and not less than 10	1 8	2 0					1 7	1 9
Under 10 and not less than 3	1 9	2 1					1 2	1 5
Under 3 and not less than 1	1 11	2 3						
Hospitals	1 3¾	1 7¾	1 6	1 8	1 2	..	9d. to 1s.	1s. 2d. to 1s. 6d.
Ice-cream manufacturers	0 11½	1 4¾	..	..	9¾d. to 11½d.	1s. 1d. to 1s. 2d.		
Cream								
Retail—								
¼ pint	0 7	0 7	0 6	0 7	0 6	0 6	0 6	0 7
½ pint	1 0	1 0	0 11	1 1	1 0	1 0	1 0	1 2
1 pint	2 0	2 0	1 10	2 2	2 0	2 0	2 0	2 4
Prices per gallon: Under 5 gallons and not less than 1 quart	15 0	15 0	..	..	..	..	..	..
For not less than 5 gallons	14 0	14 0	..	..	..	..	..	..
4 pints and over	..	..	12 4	15 0	..	..	..	..
1 gallon and over	..	..	..	..	12 0	12 0	..	..
Ice-cream manufacturers	..	..	..	..	7s. 6d. to 8s. 3d.	8s. 6d. to 10s.	7s. 6d. to 8s. 6d.	11 0

TABLE 2.—AUCKLAND: TABLE SHOWING GALLONS OF MILK PRODUCED MONTHLY BY PRODUCER AND PRODUCER-VENDORS LICENSED BY THE AUCKLAND METROPOLITAN MILK COUNCIL FOR THREE YEARS ENDING JULY, 1942.

(Figures shown in thousand gallons)

Month.	1939–40.			1940–41.			1941–42.		
	Producer.	Producer-Vendor.	Total.	Producer.	Producer-Vendor.	Total.	Producer.	Producer-Vendor.	Total.
August	541	72	613	735	82	817	753	68	821
September	636	84	720	906	95	1,001	903	73	976
October	835	102	937	1,051	108	1,159	1,057	90	1,147
November	864	105	969	1,018	108	1,126	934	89	1,023
December	889	105	994	999	107	1,106	883	92	975
January	819	101	920	870	98	968	907	87	994
February	762	97	859	793	87	880	632	70	702
March	742	95	837	711	76	787	499	61	560
April	621	87	708	708	81	789	530	62	592
May	605	81	686	695	77	772	571	63	635
June	572	74	646	628	69	697	589	63	652
July	618	77	695	665	68	733	669	62	731

TABLE 3.—AUCKLAND: AVERAGE DAILY SALES OF MILK, CREAM AND MILK FOR SCHOOLS FOR YEARS ENDING 31ST MARCH, 1938 TO 1943 (INCLUSIVE)

Month.	Milk in Gallons			Cream in Pints.											
	1938–39.			1939–40.			1940–41.			1941–42.			1942–43.		
	Milk.*	Cream.	Milk (Schools).	Milk.	Cream.	Milk (Schools).	Milk.	Cream.	Milk (Schools).	Milk.	Cream.	Milk (Schools).	Milk.	Cream.	Milk (Schools).
	Gallons.	Pints.	Gallons.	Gallons.	Pints.	Gallons.	Gallons.	Pints.	Gallons.	Gallons.	Pints.	Gallons.	Gallons.	Pints.	Gallons.
April	16,559	2,240	950	16,680	2,055	974	17,449	1,931	1,291	17,496	2,022	1,106	17,813	2,219	753
May	16,072	1,722	637	16,733	1,808	739	16,818	1,757	697	17,501	2,230	666	17,706	2,260	484
June	16,663	1,449	1,187	17,511	1,712	1,277	17,481	1,727	1,173	18,094	2,047	1,152	18,803	2,061	1,103
July	16,437	1,552	985	17,191	1,686	1,194	17,342	1,722	1,268	18,494	2,069	1,215	18,977	2,197	1,109
August	16,262	1,605	689	16,872	1,726	762	16,936	1,899	652	17,840	2,136	854	18,583	2,452	746
September	16,790	1,848	1,024	17,380	1,934	1,095	17,849	1,992	1,174	17,985	2,398	944	18,650	2,457	852
October	16,772	1,948	1,078	17,511	2,060	1,242	17,769	2,050	1,277	18,205	2,494	1,264	20,392	2,685	1,098
November	17,288	2,197	1,278	17,829	2,161	1,350	17,795	2,376	1,196	18,381	2,754	1,222	21,187	2,918	1,166
December	16,114	2,870	635	16,450	2,887	595	16,924	3,096	723	17,677	3,506	729	20,081	3,948	662
January	14,744	2,325	..	15,313	2,360	..	15,908	2,470	..	16,444	2,962	..	19,729	3,555	..
February	16,969	2,284	1,227	17,424	2,236	1,114	18,011	2,370	1,278	17,308	2,904	1,299	21,098	3,987	1,171
March	17,329	2,277	1,232	17,173	2,188	997	18,026	2,256	1,302	16,835	3,275	1,076	21,867	3,923	1,091

* Excluding milk and cream for ice-cream and shipping.

TABLE 4.—AUCKLAND: MILK AND CREAM SALES, IN GALLONS, YEAR ENDING 31ST MARCH, 1943

Sales.	Companies.		Vendors.		Producer-Vendors.		Totals.	
	Milk.	Cream.	Milk.	Cream.	Milk.	Cream.	Milk.	Cream.
Retail	1,806,909	11,850	1,729,314	7,885	871,595	4,694	4,407,818	24,429
Milk-shops ..	545,907	27,901	309,405	17,888	162,801	9,693	1,018,113	55,482
Restaurants ..	984,095	29,795	37,937	1,002	97,788	1,585	1,119,820	32,382
Ice-cream manufacturers	31,065	10,931	..	..	..	..	31,065	10,931
Shipping	31,774	610	57,514	1,370	255	10	89,543	1,990
Hospitals	148,348	1,630	..	..	..	..	148,348	1,630
Defence	112,384	..	..	..	2,017	..	114,401	..
Schools	310,068	..	..	..	..	..	310,068	..
Ice-cream mix ..	351,206	..	..	..	..	..	351,206	..
Totals ..	4,321,756	82,717	2,134,170	28,145	1,134,456	15,982	7,590,382	126,844

TABLE 5.—WELLINGTON CITY COUNCIL MILK DEPARTMENT: PURCHASES OF MILK FROM FOLLOWING AREAS, YEARS ENDING 31ST MARCH, 1941, 1942, AND 1943

District.	1941.	1942.	1943.
	lb.	lb.	lb.
Makara	2,324,911	2,161,894	2,207,381
Flats	7,985,940	7,964,676	7,592,468
Hutt	8,861,392	8,723,507	6,108,074
Wainui	2,985,172	3,204,009	3,160,608
Paraparaumu	1,687,137	2,222,391	3,009,102
Te Horo	2,690,674	3,546,551	5,287,749
Manakau	1,174,492	924,499	2,236,955
Ohau	839,292	758,826	1,886,591
Otaki	4,785,801	5,310,021	10,864,842
Levin	349,273	..	553,802
Shannon	..	..	143,397
Totals	33,684,084	34,816,374	43,050,969
Gallons	3,270,300	3,380,230	4,179,705

TABLE 6.—WELLINGTON CITY CORPORATION MILK DEPARTMENT: STATEMENT SHOWING SALES OF MILK AND CREAM TO NEARBY FARMERS, YEAR ENDED 31ST MARCH, 1943

	Milk (Gallons)			Cream (Pints).
	Pasteurized.	Raw.	Total.	
1942				
April	9,690	657	10,347	9,491
May	11,146	633	11,779	10,687
June	13,037	1,195	14,232	10,613*
July	7,885	561	8,446	8,807
August	2,574	119	2,693	8,505
September	839	7	846	5,695
October	533	8	541	4,702
November	455	35	490	5,110
December	1,656	395	2,051	8,806
1943				
January	3,285	706	3,991	6,000
February	8,930	952	9,882	6,815
March	7,673	1,219	8,892	6,750
Totals	67,703	6,487	74,190	91,981

Number of nearby farmers supplied .. .. — 48
Number of nearby farmers who purchased raw milk .. .. .. — 3

*Supply discontinued for six days.

TABLE 7.—DETAILS SUPPLIED BY VENDORS OF DISTRIBUTION CONDITIONS, HUTT VALLEY AND BAYS, JUNE, 1943

No.	Motor, Horse, Cycle, and Hand-cart.	Round Times.		Labour employed.		Number of Customers.	Daily Milk Sales.	Miles on Delivery.
		Start.	Finish.	Proprietor.	Employees.			
		a.m.	a.m.				Gallons.	
1	M.	2.0	6.45	1	3	660	170	20
2	M.	3.0	8.0	3	1	550	150	43
3	H.C.	5.0	7.0	1	2	123	30	3
4	H.	3.30	7.0	1	8	1,485	390	..
5	M.	3.0	8.30	..	5	875	250	40
6	H.	7.0	10.30	1	..	70	21	7½
7	M.	2.0	8.0	1	1	330	95	35
8	M.	4.30	8.0	1	1	204	66	17
9	M.	3.45	8.30	1	..	130	30½	9
10	M. and H.C.	1.30	7.0	1	..	210	75	9
11	M.	3.0	7.30	1	2	400	135	14
12	M.	3.0	6.30	2	..	175	46	7½
13	M.	3.0	8.0	1	..	132	36½	15
14	M. and H.	2.30	9.30	1	1	210	54	5½
15	M.	3.0	9.30	1	4	750	200	25
16	M.	4.45	8.45	1	5	520	185	35
17	M.	3.0	8.0	1	1	425	100	15
18	H.	3.0	7.0	2	..	360	100	4
19	M.	3.0	7.30	1	1	258	80	8½
20	M. and H.C.	4.0	6.30	1	..	210	60	3
Totals				23	35	8,077	2,274	
Averages				1·15	1·75	403	113	

TABLE 8.—DETAILS SUPPLIED BY PRODUCER-VENDORS OF DISTRIBUTION CONDITIONS, HUTT VALLEY AND BAYS, JUNE, 1943

No.	Motor, Horse, Cycle, and Hand-cart.	Round Times.		Labour employed.		No. of Customers.	Daily Milk Sales.	Miles on Delivery.	Own Daily Production.	
		Start.	Finish.	Proprietor.	Employees.				Summer.	Winter.
		a.m.	a.m.				Gallons.			
1	M.	3.30	8.0	1	..	175	55	14½	55	35
2	H.	3.0	8.0	2	10	1,470	400	..	160	105
3	M.	5.0	9.0	1	..	150	40	15	20	15
4	H.C.	4.0	7.0	1	1	184	46	4	46	23
5	C.	4.30	11.45	1	..	138	40½	3	20	12
			p.m.							
6	M. and H.	6.30	1.30	..	3	406	115	32	100	75
7	M.	6.0	2.0	1	1	216	54	20	30	15
			a.m.							
8	M.	5.40	7.30	1	1	109	28	9	23	28
9	M.	4.0	8.0	1	1	294	88	20	75	50
10	M.	3.30	7.30	1	1	305	100	15	100	100
11	M.	4.0	7.30	1	2	208	69¼	30	110	80
12	M.	4.0	7.30	1	1	250	62	40	150	100
Totals				12	21	3,905	1,097¾	..	889	638
Averages per round ..				..	..	325½	98	..	74	53

TABLE 9.—CHRISTCHURCH: ESTIMATED MILK AND CREAM SALES, IN GALLONS, YEAR ENDING 31ST MARCH, 1943

Sales.	Companies.		Vendors.		Producer-Vendors.		Totals.	
	Milk.	Cream.	Milk.	Cream.	Milk.	Cream.	Milk.	Cream.
Retail	463,053	7,379	1,289,304	19,182	1,525,143	52,232	463,053	7,379
							2,814,447	71,414
Wholesale ..	416,682	48,119					416,682	48,119
Shops	229,242	342	..	..	..	..	229,242	342
Milk-bars ..	23,036	..	..	..	..	..	23,036	..
Defence Services	418,297	..	..	..	..	..	418,297	..
Schools ..	149,123	..	..	..	..	..	149,123	..
Ice-cream ..	56,405	26,466	..	..	24,432	12,106	80,837	38,572
Shipping ..	..	..	..	..	7,757	..	7,757	..
Hospital ..	6,288	..	..	..	..	..	6,288	..
Totals ..	1,762,126	82,306	1,289,304	19,182	1,557,332	64,338	4,608,762	165,826

TABLE 10.—DETAILS SUPPLIED BY VENDORS OF DISTRIBUTION CONDITIONS, CHRISTCHURCH, JULY, 1943

No.	Motor, Horse, or Bicycle.	Hours on Delivery.	Capital invested.	Number of Retail Customers	Daily Milk Sales (Gallons).		Miles to collect Milk.
					Retail.	Wholesale	
			£				
1	M. and H.	3	155	120	30	5	10
2	M.	5½	540	207	52	..	8
3	M.	5	355	170	45	..	6
4	B.	2½	30	71	19	..	7
5	M.	5	603	215	50	..	15
6	M.	7½	1,444	200	45	47	8
7	M.	5½	800	240	54	6	14
8	M. and H.	6	1,145	383	84	3	22
9	M.	3	75	182	54	6	15
10	M.	4	190	170	47	..	2
11	M. and B.	9	423	202	50	..	16
12	M.	4½	..	178	52	..	7
13	M.	3	216	135	35	4	14
14	M.	6	1,029	545	140	31½	25
15	M.	4½	1,200	219	53	27	20
16	M.	2½	260	62	15	..	6
17	M.	5	1,670	200	46	5	10
18	M.	5	260	159	34	2½	19
19	M.	2½	195	70	17	11	Nil
20	M.	3	450	126	30	10	6
21	M.	1¾	413	79	20	2	6
22	M.	2	313	94	23	..	14
23	M.	6	381	205	48	..	12
24	M.	4	718	219	54	18	20
25	M.	7½	860	480	135	..	8
26	M.	2½	340	100	22½	..	4½
27	M.	4	399	208	48	..	4
28	M.	5	285	162	35	5	28
29	M.	6	1,554	712	161	31½	31
30	M.	2	412	45	11	16	5
31	M.	6	490	200	35	15	20
32	M.	2½	55	96	25	..	6
Totals	.. ..	141½	17,260	6,454	1,569½	245½	388½
Average per round ..	..	4·4	540	202	49	7·7	12·1

TABLE 11.—DETAILS SUPPLIED BY PRODUCER-VENDORS OF DISTRIBUTION CONDITIONS, CHRISTCHURCH, JULY, 1943

No.	Motor, Horse, or Bicycle.	Hours on Delivery.	Capital invested.	Number of Retail Customers	Daily Milk Sales (Gallons)		Daily Mileage to and from Zone.	Daily Mileage on Round.	Gallons purchased for Year.	
					Retail.	Wholesale			Milk.	Cream.
			£							
1 ..	M.	2½	340	120	27	2	10	4	400	52
2 ..	B.	1	53	41	6	..	..	..	562	59
3 ..	M.	3	151	132	36	..	15	4	4,628	288
4 ..	M.	3	855	110	30	4½	6	3	1,000	406
5 ..	M.	4	470	145	40	..	10	10	10,800	304
6 ..	H.	3	595	140	24	..	15	9	Nil	Nil
7 ..	M.	2	165	150	37½	..	3	5	352	124
8 ..	H.	2½	113	67	19	12	8	7½	7	74
9 ..	M.	2	212	121	30	..	17	2	3,650	156
10 ..	M.	2¾	395	50	23	7	12½	3½	1,013	164
11 ..	H.	2¼	831	116	27	..	1½	3½	496	159
12 ..	M.	2½	760	51	15	34	12	4	654	28
13 ..	M.	¾	200	29	8	..	6	4½	Nil	Nil
14 ..	M.	2	1,030	80	17	..	26	1	Nil	Nil
15 ..	M.	2	251	47	14	..	¼	3½	Nil	Nil
16 ..	M.	3½	505	172	38	5	3	13	2,771	306
17 ..	M.	2¼	507	84	20	15	9½	9½	1,400	104
18 ..	M. and H.	3½	520	180	35	..	4½	10	4,475	260
19 ..	M.	5	495	180	45	25	15	6	Nil	620
20 ..	M. and H.	2½	497	200	50	6	7	1½	7,300	234
21 ..	M.	2¼	344	93	22	1	8½	1½	150	104
22 ..	M.	4	751	127	32	..	4	6	1,038	96
23 ..	M.	2½	371	126	30	..	9	8½	1,180	156
24 ..	M.	3	430	120	28	5	7	3	1,835	208
25 ..	M.	2½	350	91	22	..	¼	1½	5,640	106
26 ..	M.	4	328	150	32	6	12	5	3,365	144
27 ..	H.	5	565	270	60	10	1	10	1,000	520
Totals		75¼	12,084	3,192	767½	138½	223	140	53,716	4,672
Average per round		2·8	447·5	118·2	28·4	5·1	8·26	5·2	1,990	173

TABLE 12.—DUNEDIN: MILK AND CREAM SALES, YEAR ENDING 31ST MARCH, 1943

Sales.	Companies.		Vendors.		Producer-Vendors.		Totals.	
	Milk.	Cream.	Milk.	Cream.	Milk.	Cream.	Milk.	Cream.
Retail	508,090	5,174	460,630	7,410	630,720	7,020	1,599,440	19,604
Wholesale ..	515,318	28,704	69,350	..	66,977	..	651,645	28,704
Schools	78,196	..	..	..	..	..	78,196	..
Defence Services ..	98,687	552	..	..	..	..	98,687	552
Ice-cream	28,770	8,117	..	..	..	..	28,770	8,117
Total ..	1,229,061	42,547	529,980	7,410	697,697	7,020	2,456,738	56,977

TABLE 13.—DETAILS SUPPLIED BY VENDORS OF DISTRIBUTION CONDITIONS, DUNEDIN, MAY, 1943

No.	Description of Round.	Motor or Horse.	Hours employed Daily.			Capital invested.	Daily Milk Sales (Gallons).		Weekly Cream Sales (in Gallons).
			Male.	Female	Boys.		Retail.	Wholesale.	
						£			
1	Moderately flat	M.	2¾	..	6¾	175	45	9	2
2	Hilly ..	M.	6½	..	8	205	82	..	4
3	Flat ..	M.	5¾	..	..	330	37	..	1
4	Hill	M.	6	..	1	380	42½	20½	3½
5	Hill	M.	5½	..	6	480	58	..	3
6	Flat ..	M.	5½	..	..	405	53	..	3½
7	Flat and hill ..	M.	4	2½	..	355	56	..	3
8	Flat ..	M.	6	..	..	185	60	..	3½
9	Flat ..	M.	5¼	..	2	265	48	..	3½
10	Flat ..	M.	..	4½	2	355	50	4	2
11	Flat ..	M.	7	..	4	145	60	4	2½
12	Flat ..	M.	7½	..	1	245	44	3	3½
13	Flat ..	M.	8	..	16	435	40	4	6
14	Flat ..	M.	4	..	4	205	40	..	2
15	Flat ..	M.	5¼	..	2	362	44	6	1½
16	Moderate hill ..	H.	4½	..	3	65	45	..	2½
17	Flat and small hill	M.	..	3½	4	245	40	..	2½
18	Flat ..	M.	10½	..	2	1,365	38	74	62
19	Flat ..	M.	7½	..	..	420	56	9½	2
20	Flat and some hill ..	M.	5	..	..	255	34	15	1
21	Hill	M.	5½	..	4	225	43	..	6
Totals			112	10½	65¾	7,102	1,015½	149	120½
Average per round			..	..	..	338	48·3	7	5·7

TABLE 14.—DETAILS SUPPLIED BY PRODUCER-VENDORS OF DISTRIBUTION CONDITIONS, DUNEDIN, MAY, 1943

No.	Description of Round.	Motor or Horse.	Hours employed Daily.			Capital invested.	Daily Milk Sales (Gallons).		Weekly Cream Sales (in Gallons).
			Male.	Female	Boys.		Retail.	Wholesale.	
						£			
1	Mainly hill ..	M.	5	..	10	290	72	4	7
2	Flat ..	M.	2¾	..	1¼	255	24	..	1¼
3	Hill	M.	4½	..	5	425	36	..	3
4	Fairly hilly ..	M.	9	..	..	315	60	..	8
5	Moderate hill ..	M.	5	..	4	285	40	..	3½
6	Hill ..	M.	5	3½	2	295	38	..	2½
7	Hill	H.	2½	..	6	65	26	..	2
8	Moderate hill ..	H.	4	..	..	75	35	..	4
9	Flat ..	M.	8½	..	..	370	47	5	3
10	Flat ..	M.	3	..	1	195	35	..	3
11	Hill	M.	5½	..	..	355	45	..	1½
12	Hill	M.	4½	..	2	415	40	..	2½
13	Mainly flat ..	M. and H.	5½	1½	..	190	40	26	3½
14	Flat ..	M.	7½	..	..	305	50	..	3
15	Hill and flat ..	M.	3½	..	4	240	40	..	2
16	Flat ..	M.	2½	..	2	305	25	30	..
17	Moderate hill ..	M.	3½	..	4	100	39	..	3
18	Hill	M.	6	..	..	255	38	1½	3½
19	Hill	M.	5	..	4	305	48	..	3½
Totals			92¾	5	45¼	5,040	778	66½	59¾
Average per round			..	..	..	265	41	3·5	3·14

Approximate Cost of Paper.—Preparation, not given; printing (2,030 copies), £275.

By Authority: E. V. Paul, Government Printer, Wellington.—1944

Price 2s. 6d.