1893.

NEW ZEALAND.

DEPARTMENT OF AGRICULTURE.

(REPORT OF SECRETARY FOR AGRICULTURE AND CHIEF INSPECTOR OF STOCK.)

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

The Secretary for Agriculture and Chief Inspector of Stock to the Hon. the Minister of Lands.

Sir,— Department of Agriculture, 1st July, 1893.

I have the honour to submit my report for the year ended 31st March, 1893.

Since my last report the Agricultural and Dairy branches have been amalgamated with the Live-stock, and this report therefore covers a wider field. During the year a large amount of correspondence has passed between settlers and this office, and much valuable information issued. Several leaflets, with drawings of the bot fly, Bathhurst burr, Hessian fly, and pamphlets on fruit-spraying, dairying, &c., have been published and distributed. These publications contain a large amount of information, and have been well received by those for whom they are intended. Other leaflets and pamphlets are in course of preparation.

Crops.

The grain crops were reported to be below the average. In many districts before harvesting they promised well, but in threshing the yield was deficient. The prices ruling are much below anything experienced before, and save in exceptional cases grain cannot be grown at a profit. This may to a certain extent be an advantage to the colony, as being the means of turning farmers' attention to other sources of profit not so exhausting to the soil. The extension of the dairying and pig-raising industries offers a sure means of utilizing the products of the farm.

Hessian Fly.—This fly was reported from several districts, from Marton and Wairarapa districts in the North to the Clutha district in the South, the wet season being considered favourable for its propagation. The greatest loss experienced was in the Wairarapa. In the Marton district it has been known to exist for many years, but between 1888 and 1892 no great damage was sustained, owing no doubt to the dry seasons during these years, and the presence in large numbers of a parasitic fly which kept it in check; an endeavour will be made to secure specimens of the parasite for liberation in other affected districts. The Agent-General has also been written to on the subject. A small grub was reported to have attacked some of the oat-crops in the South, but not to any great extent. Rust also made its appearance in several places. Careful experiments are now being conducted in South Australia with wheats supposed to be rust-proof, and if these experiments turnout successfully an endeavour will be made to secure a quantity for seed.

Seeds.—Many farmers are now turning their attention to the growing of clovers for seed, which the introduction of the humble-bee has enabled them to do. A fair crop may be put down at, say, 200lb. to 300lb. of seed per acre, selling at about 6d. per lb. when cleaned.

A large quantity of cocksfoot seed is annually saved, Banks Peninsula still supplying the greater proportion. Rye-grass and meadow-fescue are also grown largely.

Lately the growing of garden-seeds has been receiving attention, several Home seedsmen entering into arrangements with farmers to grow certain varieties.

Potatoes.—These were reported only a fair crop, with a considerable second growth in several districts in the South—supposed to have been caused by the excessive amount of rain in the autumn. The market for potatoes is exceedingly limited this season, and the price correspondingly low. A trial-shipment of several of the newer sorts, viz., Magnum Bonum, Bruce, Imperator, Main Crop, Sutton's Early Regent, and Abundance were imported from Home, packed before being quite ripe in barrels. They were distributed as widely as possible, and although arriving rather late in the

season give promise of an abundant crop.* The produce will be placed at the disposal of settlers for seed. They were shipped before being quite ripe in barrels with only a few perforations to allow of a free circulation of air, and came out as ordinary cargo, arriving in splendid condition. A return shipment of our early potatoes, packed in the same way, might be tried, to test the London market.

Turnips.—This crop is also reported to be considerably under expectations, and consequently the supply of prime mutton for shipment will be scarce during the spring months.

Fruit.—An expert was employed up to last January giving instruction in fruit culture, and for this purpose visited many districts, where he lectured, and explained the best modes of growing trees and dealing with blights. Inquiries are now being made in America, and if possible an expert will be engaged having a thorough knowledge of the culture, canning, and drying of fruits, and the best way of dealing with orchard-pests. In the meantime any questions on this subject are being attended to by the Acting-Biologist, Mr. Kirk.

Last session a Bill was introduced dealing with the codlin-moth and other pests, but time did not permit of its being considered by Parliament. During the recess the Bill has been widely distributed amongst those interested in fruit-culture, and has received but scant treatment at their hands. This, I consider, is much to be deplored, and the sooner the subject is faced the better.

Each year fruit-culture is receiving more attention, especially to the north of Auckland, where the growing of citrus fruits has now become almost the mainstay of the settlers.

Wairenga Nursery.

The wattle-plantation continues to make decided progress, and a considerable quantity of bark, estimated at 16 tons, has been stripped this season. An analysis is now being made to ascertain its value for tanning purposes. The balance of the land is being gradually brought into cultivation.

Whangarei Experimental Farm.

This farm, which is under the control of the Whangarei County Council, but subsidised by the Government to the extent of £150 per annum, also continues to do good service. Mr. Hislop, the manager, is able to distribute large numbers of trees, principally for shelter, besides carrying on experiments with many sorts of fruit and other trees and plants. The agreement with the Council, as well as with the Whangarei High School Board, who have been receiving £200 per annum towards the wattle-plantation at Kioreroa, terminates on the 31st August next, and arrangements for the future conduct of the farm are now under consideration.

Arbor Day.

This day, which it is hoped will now be observed annually, was initiated by the Government proclaiming the 4th August last as Arbor Day, and a public holiday in all the Government offices. Although rather late before the arrangements were completed, yet by a wide distribution of circulars the hearty co-operation of School Committees and local bodies was secured, resulting in considerable enthusiasm being shown when the day arrived. I am unable to give any idea of the number of trees planted, but am informed that in most districts some were planted and in others a large number. In Wellington His Excellency the Governor and the Countess of Glasgow interested themselves in the movement by each planting a tree on the Esplanade.

The importance of tree-planting, I am sure, is recognised by almost every one who has the welfare of the colony at heart. Not only does the necessity for the judicious planting of trees for climatic purposes, and shelter for stock, force itself on our attention, but, at the present rate of destruction of the native timber, timber for all purposes will before many years be difficult to procure. Districts lately covered with bush are yearly becoming denuded and will shortly be almost treeless. In districts where there is no bush the value of the thinnings of plantations for firing alone will amply repay the small outlay required to plant belts of timber. It is therefore to be hoped that this matter will be taken up with enthusiasm by young and old, and trees both useful and ornamental planted in all available spaces.

Sand-binding Grass (*Ammophila*).

This grass having been found well adapted for binding or stopping sand-drifts, several small lots have been sent to places where the sand is encroaching on to cultivated lands.

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* The returns to hand, 31st July, show that very satisfactory crops have been obtained. The following table gives the number of growers, gross weight of seed, and gross weight of crop:—

Name.	No.	No. of Growers.	Weight of Seed.	Weight of Crop.	Remarks.
			Lb.	Lb.	
Magnum Bonum	1	34	535	10,708	A good crop all over the colony. The largest tests were made in the Waimate, Palmerston South, Lincoln, and Whangarei districts. Of the returns to hand, the first shows the best results.
Bruce	2	29	538	11,722	
Main Crop	3	33	538	8,886	
Imperator	4	34	524	9,480	
Sutton's Early Regent	5	8	132	2,311	
Sutton's Abundance	6	8	116	1,130	

Fodder Plant (*Lathyrus Silvestris*).

Some time ago a quantity of this seed was received from London, and distributed. Lately circulars were sent out to those who had the seed, with a request that they would advise the department of the result of their experiment. The bulk of replies received state it to be a comparative failure; but, as in Europe it has a great reputation as a fodder-plant, a further quantity of seed has been secured, and is now being distributed. I am, however, afraid that, although satisfactorily grown, the cost of the seed required per acre (12lb. of seed, at 10s. 6d. per lb.) and the time elapsing (three years) before it arrives at maturity will militate against its being used here to any great extent.

Dairying.

This industry may now be said to have taken a firm footing, as is shown both by the large increase in the number of factories erected and produce exported. The number of factories and creameries in operation this season was 104, being an increase of 32. A considerable number are now in course of erection, and new companies, on a co-operative basis, are being formed. This system has been found to work most satisfactorily.

During the season three experts were engaged lecturing and giving practical demonstration in the manufacture of butter and cheese, and in putting New Zealand manufacturers in possession of the latest information. The Agent-General has been instructed to try and secure a first-class man as Dairy Instructor, having a thorough scientific and practical knowledge of the business. He may be expected in time for next season.

The Dairy Industry Act passed last session came into operation rather late to allow of shippers getting their trade-marks registered, and therefore its provisions were not strictly enforced. Inspectors, however, will be appointed before next shipping season, to see the branding clauses given effect to. Several complaints have been received of the quality of some of the butter shipped, and on inquiry this was found to apply principally to "farmers'" and odd lots. The shipping of inferior and mixed lots is not only a loss to the individual shipper but does an incalculable injury to the trade, and the only way of preventing such is the manufacture of all produce for shipment on the factory system.

The Agent-General has devoted much attention to the question of securing a uniform temperature in the chambers on board ships carrying produce, and by the aid of Messrs. Negretti and Zambra a tell-tale thermometer or thermograph has been perfected, and supplied to several of the steamers trading here. Shippers should insist that all steamers carrying dairy and other produce should be fitted with such an instrument. By its means any variation in the temperature would be detected.

Mr. W. B. Walters, who was sent home by the Middle Island Dairy Association to arrange for a more perfect system of ventilation on board vessels carrying produce, has after considerable trouble arranged for several steamers being fitted on his principle; the result of which cannot yet be determined.

The question of grading all produce previous to export, and the providing of cool stores at ports of shipment, are subjects requiring early consideration. It is now recognised by many in the trade well qualified to express an opinion that if New Zealand is to derive the utmost benefit from dairying only the very best butter and cheese should be shipped the way to insure this is by a system of grading.

Plans and specifications: Complete sets of these for the different sizes of cheese- and butter-factories and creameries have been prepared, and are available for distribution to settlers and others.

Land-drainage.

A Bill to provide for the carrying-out of this important matter by the election of special local bodies was presented to Parliament last session, but was not considered. In some parts of the colony a measure of this sort is urgently required, and, as it will be again before Parliament, with some slight amendments suggested principally by those interested, it is to be hoped time will permit of its receiving the attention it deserves.

Noxious Weeds.

A Bill has been prepared dealing with this question. The spread of many weeds of a noxious character is becoming alarming, and the necessity for legislation at the earliest possible moment cannot be overestimated.

Stock.

The return of sheep on 30th April, 1892, presented last session to Parliament, showed 18,570,752, or an increase of 1,817,000 over the previous year. This large addition may be attributed partly to more correct returns being furnished by sheep-owners. The classification is put down in the returns at—

	Males.	Females.	Total.
Merinoes	2,600,334	3,501,290	6,101,624
Other breeds	4,266,777	8,202,351	12,469,128
	6,867,111	11,703,641	18,570,752

The increases shown in the different provinces are—

Auckland	189,375
Napier	300,052
Wellington-West Coast	554,675
Marlborough-Nelson	48,880
Canterbury-Kaikoura	393,011
Otago	331,007
Total increase	1,817,000

From reports, the lambing was below the average in the North Island and northern portion of the South, while in Otago, and Southland especially, it was considerably over. The weather being very favourable during lambing in the higher portions of these provinces, an abundant crop of lambs was the result. The general percentage is reckoned to be slightly over last year's estimate, and therefore may be put down at 62 per cent. for merinoes and 83 per cent. for other breeds.

Lambs.—The demand for cross-bred lambs for freezing has induced many occupiers of high country, formerly considered only fit for merinoes, to put their cast or cull ewes to long-wool rams. The result, so far as reported, has been successful, and this has led to the experiment receiving a wider trial this season. With a fairly open winter and an early spring, there is no reason to doubt the result; but, on the other hand, should the spring be backward, and the ewes weak, there is every probability of a heavy death rate. Last winter several lots of Leicester cross-bred hoggets were wintered on one of the highest runs in Marlborough, and were reported to have come in well at shearing. Leicester and Romney rams are now being freely used for crossing, as the Lincoln rams have been found too soft. Especially was this the case in the North Island, and where Leicester and Romney rams have been tried the progeny has proved much hardier. To properly test the question, some experiments are now being tried by running the hoggets of the two crosses together, and exactly under the same conditions. Down rams are being largely used for crossing the coarser ewes, to produce early lambs for freezing.

Store Sheep.—The demand for the first four months after shearing was much beyond the supply, consequently prices went up considerably. A new element in the trade was the shipping of a considerable number of stores from the Wairarapa and other districts in the North Island to Canterbury.

Frozen Mutton and Lamb.—As will be seen from the accompanying tables, the number of carcases exported is short of the number shipped during the period ending 31st March, 1892, by 141,679. I am of opinion that this shrinkage may be accounted for by the large area of bush land annually being cleared, together with an increased demand by farmers, who have, owing to low prices ruling, abandoned grain growing. The market rate for our frozen meat, although much below its proper value, still maintains a fairly even figure; the article is also becoming better known. Lately the Imperial army and navy officials reported favourably on our meat, and it is to be hoped that arrangements will be made to supply these departments. The facilities for shipping may now be said to be amply sufficient for present requirements, and in nearly every case the meat is being landed in good order.

Wool.—The reports regarding the clip are much the same as the lambing. In the North Island and northern portion of the South Island, merinos light and long-wools fair—a good deal matted; while in the South it is reported above the average. The prices ruling are far from satisfactory, and until America removes the duty there does not seem to be much prospect of better prices.

Disease.—I regret to say that there has been considerable mortality amongst the hoggets in some districts. The excessive rainfall has, no doubt, much to do with this, causing, as it has, an overabundance of grass, combined with the presence of internal parasites. A great many remedies have been tried for these parasites, but without much if any effect, and a thorough and exhaustive investigation is urgently needed. I am of opinion that the system of farming must be changed, and instead of so many sheep being crowded on to the rich pastures, a certain proportion must be grazed with cattle and sheep alternately. A small quantity of chaff would be a great help to the young sheep during the autumn, winter, and spring months, and could be supplied at a cost of, say, 1s. to 1s. 6d. for each hogget for ten weeks. It is also of the utmost importance that an abundant supply of pure water should be provided. It is a well-known fact that many parasites are found in stagnant water, and an endeavour should therefore be made to have either a running stream, or water supplied in troughs, from wells, or by draining springs or swamps. This latter method, where practicable, is strongly recommended, as, besides reclaiming the land, a pure supply is always available at little cost.

Worms.

The Kind of Worms affecting the Sheep,

"In the treatment of sheep for worms, the first thing to be done is to ascertain the kind of worms with which the sheep are infested, as the treatment for stomach and intestinal worms is different from that for lung-worms. No drench should be administered until it is settled which kind of worms are infesting the sheep.

"With that view, one or two of the sheep exhibiting the most decided symptoms of being infested should be killed, their intestines opened and examined carefully throughout, and a thorough examination made of the lungs by ripping up and examining the bronchial tubes, or air-passages, right to the edges of the lobes of the lungs.

"The worms which are most injurious to the sheep are the 'stomach' worm (*Strongylus contortus*), the 'tape' worm (*Tænia expansa*), and the 'lung' worm (*Filaria bronchalis*).

"The *Stomach-worms* are to be found in the fourth stomach. They are like fine hairs, red or brown, and white, 'and marked like a barber's pole.' They are about one inch in length, and are

often attached to the coating of the stomach; but their presence is generally most quickly detected by their movements in the liquid in the stomach.

"The *Tape-worms* are found in the small intestines. They look like pieces of narrow white tape, and are often a good many feet in length; but if carefully looked for they will at all times be found in short segments towards the rectum.

"The *Lung-worms* are about two inches in length, and will be found like coils of white thread in the bronchial tubes, generally at their very extremities; their presence is frequently indicated by fleshy-looking spots on the outer surface of the lungs."—(*Bruce.*)

The following drench is recommended: One part spirits of turpentine to two parts of raw linseed oil or new milk, and of this mixture give fasting, one to three tablespoonfuls for a lamb, according to size; two to four tablespoonfuls for a weaner, according to size; three to six tablespoonsfuls for a sheep, according to size. To be given three times at an interval of seven days. An ordinary tablespoon holds from one-half to three-quarters of a fluid ounce.

Although the department does not recommend arsenic for drenching, it has been used with some success. It is prepared as follows:—

"Take arsenic, 1lb. 6½oz. avoirdupois; washing soda, 3lb.; water, 10 gallons; and boil slowly for half an hour at least, until the arsenic is thoroughly dissolved. Then add water to the mixture to make it up to 32 gallons for grown sheep, 44 gallons for weaners, and 56 gallons for lambs.

"*Dose.*—One fluid ounce of mixture to sheep, weaners, and lambs respectively, as prepared above.

"The following tabulated statement, which will assist in the correct preparation of this drench, shows the arsenic given in each case, and the strength of the dose:—

"*For Grown Sheep.*

Number of Sheep.	Ingredients.			Quantity of Mixture, in Fluid Ounces.
	Arsenic.	Soda.	Water.	
	(Avoirdupois).			
Sheep.	lb. oz.	lb. oz.	Gallons.	
5,120	1 6½	3 0	32	5,120
1,000	0 4 5/13	0 9 19/51	6¼	1,000
500	0 2 5/26	0 4 35/51	3⅛	500
50	0 0 2/9	0 0 5/11	0 5/16	50

For sheep each dose (1 fluid ounce) should contain from, say, 2 to 2⅜ grains arsenic, according to strength of sheep.

"*For Weaners from, say, Five to Twelve Months old.*

Weaners.				
7,040	1 6½	3 0	44	7,040
1,000	0 3½	0 6 9/11	6¼	1,000
500	0 1⅝	0 3 9/22	3⅛	500
50	0 0 4/25	0 0⅛	0 5/16	50

For weaners each dose (1 fluid ounce) should contain from, say, 1⅜ to 1⅝ grains arsenic, according to age.

"*For Lambs from, say, Two to Five Months old.*

Lambs.				
8,960	1 6½	3 0	56	8,960
1,000	0 2½	0 5 5/14	6¼	1,000
500	0 1¼	0 2⅔	3⅛	500
50	0 0⅛	0 0 4/15	0 5/16	50

For lambs each dose (1 fluid ounce) should contain from, say, 1 to 1⅛ grains according to age.

Recapitulation,—2 grains for a sheep, 1⅜ grains for a weaner, and 1 to 1⅛ grains for a lamb.

The greatest care and exactness should be exercised in preparing and administering this and every other drench. It would be well in purchasing arsenic to order it to be put up in the quantities in which it will be used in preparing the mixture, to save the trouble and risk of reweighing it. The quantity of arsenic in the mixture should be checked with the number of sheep to be dosed, to see that the mixture is of the proper strength. Where it is desirable to increase the quantity of arsenic to the sheep, it is preferable to increase the quantity of the mixture in the dose rather than to add to the quantity of the arsenic. As the whole of the arsenic is not always dissolved, although boiled as directed, there is a danger of the undissolved portion of the arsenic being allowed to settle in the bottom of the vessel containing the mixture, and perhaps injure the sheep which get the last of the mixture in the vessel. This may be avoided by allowing the mixture, after being properly boiled, to settle, and by drawing or pouring it quietly off without disturbing the sediment, which should, of course, be put where it can do no harm. It would be well, too, to shake up the mixture occasionally while it is being administered, as an additional precaution against the risk here noticed."—(*Bruce.*)

Licks.

During spring and autumn there should be kept in the paddock, in troughs protected from the weather, a supply of common coarse salt and sulphate of iron, in proportion of 20lb. of salt to 1lb. of sulphate. These quantities are sufficient for a hundred sheep for ten days. This precaution alone is one of the most useful preventatives against the attacks of parasites. The combination of sulphate of iron and salt in this lick, by enriching the blood, renders the system to a great extent

proof against parasitical life. Turpentine in proportion of one pint to 25lbs. to 50lbs. of salt is also found of much benefit.

Footrot has been troublesome in several districts. Many owners are somewhat careless in dealing with this disease. The steps to be taken being simple, and unless in exceptional cases, effectual. I append several dressings recommended. The first thing is to carefully pare and clean the hoofs, care being taken not to cut too close. Toe-parers can be purchased for this purpose, and are much superior to the knife. After the mixture is prepared place sufficient in a trough to cover the hoofs, which for small flocks should be, say, 16ft. long, 8in. wide, and 12in. deep, with hurdles alongside; or for large flocks the ordinary branding-race, with concrete floor and sides, suits admirably. Gratings must be placed both at inlet and outlet so as to keep the feet clean. The time required for the sheep to stand in the mixture is about three minutes. Dressings: Arsenic, 1½oz. to 2½oz.; washing soda, 2oz.; water, 1 gallon. The arsenic requires to be thoroughly boiled, and the soda added in small quantities, otherwise it will boil over.

Bluestone is sometimes used with arsenic—say 1½oz. of each to 1 gallon of water and a small quantity of soda. Freshly-slaked lime has also been found of service. If the sheep are badly affected the full strength of the mixture is required, but it should not be so strong on putting them through the second time—in, say, ten days.

If the flock be a small one the feet may conveniently be dressed by hand, at the time of paring, with one of the following dressings: (1.) Bluestone (in powder), 1 part; Stockholm tar, 8 parts. (2.) Oil of tar, 10 parts; carbolic acid, 1 part; olive oil, 1 part. (3.) Butyr of antimony, 1 part; tincture of myrrh, 1 part.

Lice have been prevalent to some extent, but where sheep have been properly dipped there is no trouble. Unfortunately many owners, either through carelessness or want of knowledge, give their sheep too short a swim or make the mixture too weak, resulting in complaints being made by Inspectors of the number of lousy flocks coming under their notice.

Cattle.

The health of the cattle is generally good. A considerable rise in the price has taken place within the last twelve months, the demand being principally for dairy-cows and fat stock. The former have gone up quite 50 per cent. in price. Several valuable additions to our herds were imported both from Scotland and Victoria. From the former some magnificent polled Angus arrived, and also one bull and three cows of the Highland breed—noble specimens, and the first of the kind in the colony. Several shorthorns were imported from Victoria. The whole of these cattle underwent the usual period of quarantine, and were released in good order.

The infusion of so much valuable blood into our herds will go a long way towards raising the general character of the cattle-stock of the colony. Now that dairying has become firmly established, and the demand for dairy-cows likely to increase, an endeavour should be made to establish a breed with good milking properties.

Disease.—Several cases of cancer, tuberculosis, and actinomycosis, have been met with, principally in sale-yards, and in each instance the animals were destroyed.

Horses.

The general health is good, and no serious losses were reported. The bot-fly has unfortunately become firmly established all over the colony, and although extremely troublesome has not been proved to cause any serious injury. Some time ago it was generally supposed that many deaths were due to bots, but the best authorities have been unable to trace a single death to their presence. The general quality has not improved, and much more care in the selection of both sire and dam is much needed. A considerable number of horses have arrived in the colony from Melbourne, and from all accounts this can hardly be a remunerative speculation.

Pigs.

This generally-despised species of our farm animal has lately come into prominence owing to the presence of a representative of a large firm dealing in mess pork. The firm alluded to are making preparations to erect several factories, and are willing to take all pigs offered at a price which should induce settlers to turn their attention to pig-raising as a part of their general operations. This opens up a way of utilising the skim milk and whey from our dairy factories,

The prohibition on the importation of swine having been removed, breeders have now an opportunity of introducing some fresh blood under quarantine regulations. As it is many years since any swine were imported, it is hoped some of our enterprising breeders will, at an early date, avail themselves of the alteration in the regulations.

Quarantine.

An unusual number of the different breeds of horses, cattle, sheep, and dogs arrived for quarantine, and to accommodate them considerable additions to buildings, and the erection of fencing for paddocks, had to be undertaken. The grounds both at Quail Island, Lyttelton, and Somes's Island, Wellington, are well provided with paddocks and sheds, the accommodation being now ample for many years to come. The spaces between the fences were planted with trees, and these have done remarkably well. The planting will be finished this incoming season. In accordance with the decision of the Stock Conference, new regulations are being prepared, and will shortly be issued.

Several important alterations have been made, all in favour of importers of stock.

Stock Bill.

The present Sheep, Cattle, Diseased Cattle, and Brands and Branding Acts having been found to require amendment, a new Bill was drafted last session and presented to Parliament, consoli-

dating and repealing these Acts, but unfortunately time did not permit of its being considered. During the recess the opportunity was taken of sending copies to all agricultural and pastoral societies, with a request that they would, after consideration, forward any alterations deemed advisable. A number of replies have been received, and a Bill is now being prepared embodying such of these suggestions as are considered of sufficient importance. This Bill will be found to contain, in a simple and concise form, all that is necessary to ensure the proper working of our stock, and I hope to see it become law at an early date.

Stock Conference.

Last July a circular letter was addressed to the several Australasian Governments inviting them to send representatives to discuss matters relating to stock, and allied subjects, and to which several responded by accepting the invitation. In the appendix will be found the names of the gentlemen present and the final report of the Conference. In connection with the Conference several papers of much value were read—namely, on cross-breeding of sheep, by Mr. John Roberts, C.M.G.; frozen-mutton industry, by Mr. T. Brydone; successful rabbit suppression, by Mr. Coleman Phillips; and period of quarantine, by Mr. T. A. Tabart; all of which elicited considerable discussion.

Perhaps the most important subject considered was the removal of the restrictions on the importation of our sheep into the Australian Colonies. Steps had been taken previous to the Conference to have a thorough inspection made of the flocks in the last infected districts, and that being satisfactory, no hesitation was felt in asking the delegates to recommend the removal of the restrictions. This was agreed to, provided that the flocks, on inspection at shearing were found healthy. I am glad to say this was proved to be the case; and in response to the request made to have the terms of the resolution carried out, the following complied—namely, Queensland, New South Wales, and South Australia. Victoria and Tasmania still hesitate, owing to a mistaken idea that the gad-fly (*Œstrus ovis*) is prevalent amongst our flocks; they seem, from newspaper reports, to have confounded the horse-bot (*Gastrophilus equi*) with the gad-fly; the former, unfortunately, is prevalent here, but has never been known to attack sheep. A few cases of gad-fly have been reported, and, although known to have existed in the colony for many years, it has not spread—in fact, in many parts is quite unknown.

The quarantine regulations were carefully considered, and several important decisions arrived at, amongst these being the reduction of the period of quarantine on sheep from ninety to sixty days; the removal of the prohibition on the importation of swine, which are now allowed to land under quarantine; the reduction from six months to three months of the period required to elapse before a vessel can come under the definition "clean," and some others of lesser importance.

After the Conference I had the pleasure of accompanying the delegates from New South Wales and Queensland over a large portion of the South Island. We visited a number of the freezing-works, dairy-factories, and private properties, from Christchurch to as far south as Invercargill. They were fortunate in being able to be present at the Christchurch Annual Show, where they gained much information about the different longwool breeds of sheep. They had also an opportunity of visiting Lincoln College, where they were shown every kindness by the Acting Director, Mr. Gray. Messrs. Bruce and Gordon visited a considerable portion of the North Island before the Conference, and also when on their way to catch the steamer at Auckland. The delegates, before leaving, one and all expressed themselves as highly pleased with what they saw here. Since Mr. Bruce's return he has presented a report, containing much valuable information, and highly favourable to this colony. His report deals exhaustively with the merits of long wool rams for crossing purposes, and this, together with the removal of the restrictions, has already borne fruit, several shipments of sheep having been sent over; and other transactions are pending. For a time, at least, there is sure to be a strong demand, especially for rams; and for the credit of the colony it is to be hoped that nothing but first-class animals will be shipped.

Veterinary Surgeons.—The department has for some months been without a veterinary surgeon, and, to fill this want, the Agent-General was requested to secure the services of two gentlemen well qualified for the work required. Advices to hand report the engagement of Mr. John Andrew Gilruth and Mr. J. R. Charlton, gentlemen holding very high credentials, and of considerable experience in their profession; they may be expected here during the next three months.

Rabbits.

From the local Inspectors' reports it will be seen that in certain districts the pest still holds its own. The reasons given for this being the want of unanimity of action amongst landowners, general apathy shown in dealing with the pest, and the favourable season for breeding, the latter being especially so in parts of Southland. On the other hand, in many districts there is considerable improvement, and with more united measures and improved methods I have great hopes that this incoming season will show a large diminution in their numbers.

Auckland.—There has been a considerable increase in the amount paid for rabbit-skins from the King-country, and some other method must be adopted to deal effectually with the nuisance there. There are great difficulties to contend with. The Natives show no desire to eradicate the pest; poisoned grain cannot be used for fear of killing their pigs; and unless the land is speedily purchased the evil is sure to grow worse.

Hawke's Bay.—The Rabbit Board still continues to do good work, and their jurisdiction has lately been extended so as to take in a piece of fresh country found to be slightly infested with the pest.

Wairarapa.—I also inspected part of the North Wairarapa County, and regret to say that I found the pest numerous on several properties, but on one only was it especially bad. Proceedings

have been taken against the owner on two or three different occasions, but without securing the desired end, technical objections being raised at every point. From latest reports greater activity is now being shown in dealing with the nuisance.

Wellington–West Coast.—The Manawatu Extermination Society continues to do good work, and the pest may now be said to be completely checked.

Marlborough–Nelson.—I had an opportunity of inspecting a large portion of the Marlborough and Nelson Provinces, and although the rabbits are very numerous on some properties, on others there is a very decided reduction. I made a special inspection of the country under the control of the Awatere Rabbit Board, the result of which has been a recommendation to abolish that Board. This is now being carried out.

South Canterbury.—During the early part of the year I inspected the line of the South Canterbury rabbit fence, from the Waitaki to the Tasman River, near Mount Cook. This I found in good repair. I was, however, much surprised to find a great many traces of rabbits along the whole line, on both sides of the fence, and, from reports, after careful inspection since made, I learn they are showing more or less all over the country to the northward. There are also evidences of a steady increase in the numbers on the Hunter Hills and river beds on the plains. To deal with this unexpected increase an almost entirely new staff has been placed in charge of the South Canterbury District with instructions to see that energetic measures are at once taken to cope with the evil.

Otago.—Owing to the department's powers to compel poisoning having been questioned last season some difficulty was experienced in the neighbourhood of rabbit factories in securing simultaneous work, many persons preferring to trap for the factories instead. Through this cause many more than the usual number of rabbits were left for breeding, and in consequence a large natural increase resulted. I am, however, given to understand that several of the factories will not be in operation this season, and therefore more united action may be looked for. Although this had a very serious effect in certain districts, in others, where simultaneous action was taken in poisoning, followed by other methods of destruction, good work has been done, and this is especially so in several places where a few years ago the pest was exceptionally bad. Stoats, weasels, and ferrets have become firmly established in the Wanaka and Hawea districts, and are doing good work. In Otago the general concensus of opinion regarding the pest is that there is a considerable change for the better.

A special inspection was made of the country from the head of the Hawea Lake through to the coast, *viâ* the Haast River. In the Landsborough and Clarke Rivers several bad patches of rabbits were found, and these are now being dealt with. From the nature of the country there does not seem to be much chance of their spreading.

Wire-netting.—As mentioned in my last report, a deputation of runholders from the Amuri waited upon the Government, urging the necessity for the erection of some rabbit-proof netting-fences in that district. This has now been accomplished by the continuation of the fence from near the Gorge Creek to the Boyle River and also 3½ miles up the Waiau. Mr. Duncan Rutherford, the lessee of Glynn Wye, contributing towards the cost of about 14 miles of this fence. Although I consider these fences an effectual barrier to the spread of rabbits from the north, the Hurunui Rabbit Board has taken no steps to compel owners to destroy the rabbits south of these fences, and through this neglect some trouble may result. The Board has, however, now provided for the work being superintended by this department, and, with energetic measures, the evil may be remedied. From personal observations, I am strongly of opinion that the erection of netting-fences, on proper lines, is the main solution of the rabbit difficulty.

Natural Enemy.—Satisfactory accounts of the benefit derived from their presence is evidenced by the number of rabbits found dead—unmistakeably the work of the natural enemy. When on my rounds I heard of several nests of young stoats, weasels, and ferrets having been found, thus showing they are breeding freely. They are also to be seen in districts many miles from where they were liberated.

I beg to append reports of local Inspectors of Stock, Dairy Instructors, Australasian Stock Conference, and list of Departmental Publications, also Tables of general information.

I am, &c.,

JOHN D. RITCHIE,

Secretary for Agriculture and Chief Inspector of Stock.

APPENDICES.

APPENDIX I.

REPORTS OF INSPECTORS OF STOCK.

Auckland District.

Sheep.—No serious disease affects the sheep of the Auckland District, except at Tauranga, where this year the death-rate, caused by the "Tauranga sheep disease" is excessively high. Further investigation into the cause of this mortality among their sheep is anxiously expected by the armers of that district, and it must be recognised that this mortality has stopped all progress and settlement, for their land cannot be brought into useful occupation except through the sheep.

During the spring an examination of the flocks last infected with scab was made, and no traces of it remain. Lately a considerable number of Native-owned sheep in the King-country have been examined; most of these sheep have been dipped and are fairly free from external parasites; in some of the older flocks lung-worm is causing considerable loss; but the well-grown lambs from this part of the district show the effect of new country and of fresh grass. Two importations of valuable stud sheep have been made from England during the past year—eleven Shropshire Down ewes and three rams and twenty-five Lincoln rams.

Cattle.—The trade from this district to Taranaki has almost stripped Auckland of cattle, so much so that stores are being brought back to meet the expected demand for turnip feeding. A good stock road from Waikato to the West Coast would develop a large trade in both sheep and cattle, for stock is alternately wanted for the West Coast grass and for the Waikato turnips. Under the provisions of the Diseased Cattle Act ten head have been destroyed.

Rabbits.—The rabbit is present in small numbers throughout the greater part of the Auckland Provincial District, but except in the King-country it cannot be considered to exist as a nuisance; even there it increases slowly when compared with the more southern parts of the colony; perhaps the most marked difference here during the last three years is that they were then found in patches (in the King-country), and that they are now more evenly distributed. An inspection of this country was made during the last autumn, and it showed that the inducement held out to the Natives by the threepence-per-skin bonus has had the effect of keeping the pest in hand. On some of the larger estates in the Waikato, a little rabbit killing has been carried on, but the rabbit need not be seriously considered except in the King-country, and there it would be quickly disposed of by settlement.

Auckland. E. Clifton.

Napier District.

Sheep.—Owing to the excessive rainfall during the last season, and consequent continual growth of feed, the sheep are not so fat as usual, the softness of the grass precluding their getting into the high condition which Hawke's Bay sheep are noted for. From the same cause there has been heavy mortality amongst the hoggets, produced by want of substance in the feed. Lice, though present amongst the flocks, are kept within reasonable bounds, owners, with few exceptions, paying attention to dipping for this pest. The percentage of increase has been good, averaging, I should say, from 70 to 90 per cent.; in some instances the increase in paddock-flocks has reached 127 per cent. The clip of wool was light owing to the continual rainfall.

Before leaving this subject I think it not out of place to say, with regard to the mortality amongst hoggets or weaners, that owners would find great benefit from dry feeding with hay or oaten chaff. The distribution of this, in properly constructed feed-racks, made so as to protect the contents from wet, should be commenced early, and before the hoggets get into a weak state from

scouring. Drenching with turpentine and milk, turpentine and oil, or other suitable drenches in the more serious cases should also be adopted, while salt and sulphate of iron or rock salt should be available for the flock at all times. The system of feeding hoggets entirely on turnip or mangel should be avoided. A very little dry feed will suffice to check any ill effects, and the sheep will thrive much better. Attention to these matters cannot be too strongly impressed upon stockowners, and the results I am satisfied will speak for themselves.

As regards the suitability of any particular breed of sheep for wet country, my experience is that the cross between Leicester and Lincoln or Romney Marsh and Lincoln gives a sheep which will best stand a cold wet climate and soil. I am of opinion that the constitutions of young sheep are often a good deal undermined through the want of greater care in rearing. At mustering time they are frequently kept far too long in yards or bare paddocks without food or water. Many owners do not realise the absolute necessity for providing their flocks with an abundance of water, which should be within easy reach. Where a natural supply, available all the year round, does not exist, provision to secure the wants in this respect should be made by the construction of dams or the erection of windmills, or, if possible, by the draining of springs and swamps into troughs.

Weak lambs should be taken from their mothers at shearing time, or as early as possible thereafter. They should be turned out on rape or Cape barley, and if there is a flush of feed should get some oaten chaff or hay occasionally. Great care, however, should be taken to watch these weaners closely at first, as the change of food, especially if the season be wet, will result in heating of the blood, when frequently they will swell about the head and ears and shed their wool. When these symptoms appear they should be taken off for a few days. I recommend rape or Cape barley for weaning purposes in preference to strong growths of English grasses.

Owing to unusal rains last season foot-rot has been very prevalent, and in some cases has assumed somewhat serious proportions. There has also been a good deal of scouring owing to the same cause.

Cattle.—The cattle in the district are in excellent condition and health. Here and there, however, instances of cancer and tuberculosis are noticeable. Several instances of apparently healthy cattle dying suddenly have been brought to my notice; in one case seven head died in this sudden manner on one station within a very short space of time. The owner made a *post mortem* examination of one of them, but no definite conclusion was arrived at as to the cause of death.

Cattle do well amongst sheep where there is a great growth of grass; and to improve or break in rough country I strongly recommend owners to keep and breed cattle. Nearly all runs would be better with a few of this class of stock to eat down the rough feed.

Horses.—I find that, generally speaking, the horses are in good health and condition. In some parts, however, I observed a few affected with staggers, which is attributed to ergot—the feed being principally ryegrass, and very abundant. Whether this is the true cause I cannot say, but the disease does not appear to be attended with fatal results. I regret to find that the bot-fly is very active and somewhat plentiful in the district; owners, however, appear to take little notice of it, and, as far as I can discover, no preventive measures are adopted.

Rabbits.—Rabbits are to be found more or less over a considerable portion of the Hawke's Bay District, and the majority of settlers appear to me to be fully alive to the danger of allowing them to become anything more serious. The greater portion of the district is under the control of a Rabbit Board, who are doing good work. It is proposed to enlarge the present jurisdiction of the Board by extending the boundary of the district as far as the Mohaka River. I have reported favourably on this proposal, and am satisfied that if it is given effect to good results will follow.

I observe that in places blackberry, sweetbriar, and gorse are permitted to spread; with few exceptions little or nothing is done to eradicate, or even keep in check, these noxious plants. Unless some efforts are made to get rid of these pests, they will soon prove, not only a great nuisance through long-wool sheep getting tied up in them, but a strong and almost impenetrable harbour for rabbits.

The crops generally have been good, and I have not heard any complaints of insect or other pests amongst the cereals.

J. Drummond.

Napier.

Wellington-West Coast District.

Sheep.—The mortality among hoggetts and old ewes has been very heavy, more especially in the parts of the district lying north of Wanganui. The chief cause of the death-rate among the young sheep must be attributed to the great prevalence of internal parasites which are even more plentiful this year than they were last; drenching has been largely adopted, all the specifics known having been tried, but I cannot say that any of them have shown very satisfactory results. Salt and sulphate of iron have been more extensively used, and in some cases satisfactory results have been obtained. I have not heard of any reappearance of the disease in the Rangitikei District, which caused such a large mortality last year among the lambing ewes. Several settlers attribute the death-rate on the coast to the delicacy of the Lincoln, and have decided to change to Romney Marsh or Leicester.

Lice have been very prevalent during the past season. It is greatly to be regretted that owners will not give more attention to the proper dipping of their flocks. If dipping were made compulsory within a given time it would largely assist to abate this nuisance.

Lambing has not been generally good throughout the district, the average being about 75 per cent., although in many cases large percentages have been obtained.

The wool-clip has been light, and not up to the usual average.

The rank growth of grass, caused by the unusual wetness of the season, has militated against a satisfactory result for stock, especially the young ones.

Horses.—The bot-fly has now made its appearance in this district, but so far I have not heard of any inconvenience or trouble arising therefrom; otherwise the general health of horses has been very good. I have heard no complaints from any other cause.

Cattle.—The general health is good; the loss of young stock much less than last year. A considerable number of cattle have been destroyed, suffering from tuberculosis, actinomycosis, and cancer, the owners (except in a very few cases) offering no objection, as it is the general wish to have these diseases stamped out as speedily as possible. In this connection the auctioneers have given every assistance, and cases of this kind are now becoming more rare. Several instances have been reported from the Hawera district of cows dying immediately after calving, but from what cause it is difficult to say. "Wasters" are not so numerous as formerly, greater care being given to feeding the calves owing to their rise in value.

Crops.—The crops generally have been very good throughout the district, but considerable loss was sustained owing to the difficulty of harvesting, on account of the unusual wetness of the season. The Hessian fly in the Marton and surrounding neighbourhood has, as far as I can learn, caused a loss of about three to four bushels per acre, The Bathurst burr is a new pest in this district, which has made its appearance at Parewanui, near Bulls, there being a patch there some four or five acres in extent, and if not taken in hand soon will shortly become a serious trouble. The Californian thistle, I am also informed, is in the district, but I have not seen it myself. The settlers generally express their satisfaction at receiving the "Farmers' Leaflets," issued by the department.

Rabbits.—Rabbits in this district have very materially decreased; 10,781 skins have been paid for by the Manawatu Rabbit Extermination Society during the year, making a total number of rabbits destroyed since the re-formation of the society in December, 1891, of 12,500. It was found that the price formerly paid—viz., 4d. per skin, was not sufficient to produce good work, consequently the bonus was raised to 6d., with very satisfactory results. The society shortly intend further raising the bonus to 1s. per skin, and this, I have every hope, will result in practically stamping out the pest in that portion of the district under the guidance of the Extermination Society, and which contains over two-thirds of the rabbit-infested part of the country.

The settlers are now fairly alive to the danger of allowing the pest to get possession, and those who formerly believed that no danger existed are now satisfied that continued exertions are necessary to prevent the possibility of such calamity. Weasels and stoats have been seen as far north as Hawera, and in the Manawatu are becoming quite numerous. A rabbiter at Foxton reported that on his setting fire to a flax-bush no less than seven weasels ran out; and the same man says he saw a weasel hanging on to the neck of a rabbit, so that it is evident they must be doing some good work.

RICHARD HULL, Inspector.

Wanganui.

NORTH WAIRARAPA DISTRICT.

Sheep.—Owing to the continuous rainfall last winter, assisted by internal parasites, there has been a good deal of mortality. Owners are becoming alive to the fact that means must be adopted to prevent the loss of hoggets every year, and the various remedies are now more generally administered. The work, however, is not always done at an early enough stage of the disease. Settlers in bush districts also purchased old sheep, unfit for new country, and in many instances their loss was considerable.

Lambing.—Fairly good, but not equal to that of last year. Average, from 70 to 75 per cent.

Wool.—Generally speaking, the clip has been light, with a large percentage of unsound and cotted fleeces, attributable to the wet season, and in a great many cases to the evil of over-stocking.

Lice.—Lice exist more or less throughout the district, though I have not noticed any serious cases. Most of the flocks in the district have now been dipped.

Foot-rot, which was troublesome in one or two instances, is now much reduced.

Horses.—The only feature in connection with horses is the presence of the bot, one or two instances having come under my notice in the immediate vicinity of Masterton, otherwise horses throughout the district are in good order.

Cattle.—Cattle are healthy, no report of any disease having reached me. Owing to the small demand for this class of stock during the last few years, various owners have reduced their numbers; prices, however, are now very favourable, and probably more attention will be paid to rearing cattle.

Crops.—The Hessian fly was more or less through the wheat crop in the Masterton district this season, one or two small fields badly infected, the majority only slightly.

Rabbits.—I am of opinion that, generally speaking, the steps taken by landowners in the district to cope with the pest, together with the natural enemies introduced by the late North Wairarapa Rabbit Board, have resulted in a diminution of the number of rabbits. There are, however, several instances in which rabbits are numerous. Neglect to take efficient steps to destroy are apparent, and the department has, in consequence, been obliged to put the law in motion with the object of enforcing the provisions of the Act. Good work has been done in many cases, the result of which must be to encourage the continuance of remedial efforts. The usual methods have been adopted—viz., poisoning in the winter with phosphorized grain, followed up with shooting, trapping, hunting with dogs, ferreting, filling in burrows and watercourses, fumigating with bi-sulphate of carbon, &c.

Since the North Wairarapa Rabbit Board was abolished, the late Trustees decided to expend the balance of rates collected in introducing more natural enemies. Accordingly, about a thousand ferrets were obtained and distributed throughout the district. A few of the settlers have also commenced breeding ferrets again. My experience with natural enemies is that, to keep up their numbers, a fresh supply must be turned out yearly, and as early in the spring as possible, as they will not increase in this district otherwise, but, on the contrary, die out. As regards stoats and weasels, numbers of them have taken to the bush districts, and travelled through to Woodville and Palmerston, where they are frequently seen.

Wire-netting.—Several miles of boundary fences are netted, and the benefit of doing this is a very noticeable feature. I am of opinion that the use of netting is of great assistance in coping

with the rabbit pest, and believe that it should be made compulsory in infected districts. Rabbits have made their appearance in the Pahiatua County, odd ones having been seen over various portions of it, Makuri, Puketoi, showing the strongest indications, but settlers appear aware of the importance of dealing with the evil in its early stage.

Masterton. J. Wallace Smith.

South Wairarapa District.

Sheep.—Owing to the continuous wet weather experienced during last winter the loss of stock was considerably in excess of the two previous years. The lambing, from the same cause, was somewhat lower than usual, averaging about 70 per cent. As a natural consequence of the wet season, the clip of wool was not up to the usual standard in this district, being light, tender, and among the heavier type of Lincoln sheep a great deal cotted. Through the great mortality among the Lincoln sheep, farmers are now crossing with Romney and Border Leicester, with the object of strengthening the constitution of the Lincoln.

Lung-worm.—There is a marked improvement in the flocks as regards lung-worm, stock-owners having become more alive to the evil of this disease, and the benefit to be derived from the several specifics now obtainable, and which have been used generally with satisfactory results. In my opinion, however, owners do not pay enough attention to this disease, and the proper time for drenching. It is generally acknowledged that the lambs should be drenched twice—viz., at weaning-time and again about the month of April.

Lice exist throughout the district in a mild form. Yearly dipping during the autumn months is becoming more general, having the effect of keeping this parasite under. In concluding my remarks under the above head, I am of opinion that there is a tendency to over-stock. It is also questionable if the practice of disposing of a large number of lambs (especially ewe) for freezing is in the end conducive of good, although the immediate result may be enticing.

Horses.—With the exception of a few cases of influenza in a mild form, which I have noticed during the summer months, this class of stock are in a healthy condition throughout the district.

Cattle.—The health of the cattle in the district under my charge has been good. The price for some time past low, has recently risen some 50 per cent., which will no doubt give an impetus to the rearing of this class of stock.

Crops generally are up to the average. The Hessian fly made its appearance last winter, but the extent of damage so far is not appreciable.

Rabbits.—On the whole the pest has not increased, and in no instance interferes with the pastoral and agricultural interests to any serious extent. I anticipate good results will be obtained from this winter's poisoning, if united action is taken by settlers, and followed up by other means immediately afterwards. The following means of destruction have been applied—viz., poisoning, shooting, dogging, ferreting, digging out, destroying burrows, and bi-sulphide of carbon.

The Natural Enemy.—Landowners have liberated this season about a thousand ferrets, and several of them have established breeding-places. If settlers would combine to have a united and systematic poisoning, employing only capable men as gangers to supervise the work, very great benefit would result. This work should be followed up in the early spring by other measures, such as turning out large numbers of the natural enemy—viz., cats and ferrets—and shooting and ferreting. James Harvey, Jun.

Masterton.

Marlborough District.

Sheep.—The flocks throughout the district, both cross-bred and merino, have as a whole come in this season in a backward condition owing to the unprecedented rain fall producing a flush of soft grass; the wool, from the same reason, has been light, though, as a whole sound. Merino flocks have been, by careful and judicious breeding, worked up to a high standard, and the Wairau Valley is now depasturing sheep that will compare favourably with any merinoes in New Zealand. I will, however, draw your attention to one serious evil—viz., the immense quantity of wool about the heads of many of the merino flocks, necessitating shearing several times in the year about the eyes. This, of course, is an impossibility on the runs, and the consequence is that many hundreds of young sheep are lost annually by blindness, or are left on the run, it being impossible to drive them.

There is a great increase in the number of crossbred-sheep. All the low-lying and suitable country is now, or will shortly be, stocked with them. The Lincoln is the cross mostly used, and when the country is good enough, no finer animal can be obtained, producing as it does a suitable carcase for shipment, well clothed with a maximum of useful, lustrous wool. Farmers are, as a class, very careless in the matter of the selection of rams, and take in preference a cheap inferior male. This will, I think, rectify itself when, by comparison, the great advantage of paying attention to breed will be recognised.

Lice are found in some of the cross-bred flocks, but dipping annually is getting more into general use, and if this is persisted in generally parasites will be reduced to a minimum.

Foot-rot is not by any means prevalent, and where it exists is kept in check by the use of the arsenical foot-trough.

Specifics mostly in use are, on the stations, bi-sulphide of lime, and, among the small holders, Cooper's, Little's, and in some few cases McDougall's dip.

Lambing.—Throughout the district the percentage has been only medium, and would not average more than 65 per cent. Lambs generally are looking healthy, and with little predisposition to lung-worm, which has not been seriously felt throughout the past season; many farmers are taking precautionary measures, however, and are dosing with turpentine and milk.

I will draw your attention to the serious evil likely to result from sending frozen lamb. The ewe lambs are invariably the most forward in condition, and are often selected and picked down-

wards. The result must be obvious. I think this evil should be shown up, and people warned against acting so injuriously for the true interest of their flocks.

Cattle.—There are few cattle in the district, and these are backward in breed with very few exceptions. They are, so far as I can learn, free from disease, though two or three cases of cancer have been reported as having existed here. I have not yet met one case. I purpose shortly making an inspection of all cattle used for dairy purposes, and will report the result to you.

Horses are healthy. One case of death from intestinal worm reported to me, and the horse-bot (*Gastrophilus equi*) has made its appearance here, and I was to-day informed by Mr. Beatson that he had dressed a horse to destroy the eggs attached to the long hairs on the throat. He came to procure the leaflet on the bot, and recognised it undoubtedly. No serious results have so far appeared.

Rabbits.—As a whole I consider this district to have made decided progress during the past twelve months, though the pest is gradually extending its frontier. Last week it was reported to me that the silver-grey had been seen within two miles of Old Tophouse. The natural enemy is, however, established, and is doing excellent work on most of the well-watered country suitable for its *habitat*, and many settlers who have hitherto had a poor opinion of it as a destructive agent are beginning to change their views in that respect. Some hundreds of ferrets have been liberated through the past spring and early summer, and preparation is being made for the liberation of many more at the close of the coming winter. The country is being subdivided by rabbit-proof fences, which materially assist matters, and enables settlers to make effective work. Large numbers of both stoats and weasels have drifted into the Sounds country, the wooded country being the attraction; this is unfortunate, as the Sounds settlers not having rabbits have little sympathy for the natural enemy, and I fear destroy them whenever opportunity offers, as they occasionally kill poultry. I have in the Sounds thought it advisable in cases to suggest the use of the bas-trap, as they would be readily bought here. I am aware this is a dangerous precedent, but it is the only way to be adopted to save the animals from destruction.

Crops have been fair, and in spite of bad weather have been got in in fair condition—discoloured a little but the grain sound. I have not been able to hear of the Hessian fly having made its appearance in this district.

The Californian thistle, the stinkweed, sweet-briar, and blackberry are in all parts of this district, and will, I fear, prove very difficult to deal with. The briar especially has a strong hold, and is as a rule on land that will not pay to clear.

JOHN MOORE.

Blenheim.

NELSON DISTRICT.

Sheep.—As no scab has been known in the district since September, 1889, it may with safety be assumed that the sheep are now free from that disease. A few flocks were slightly infected with lice, but to no serious extent. Many of the sheepowners make it a rule to dip every year to destroy the ticks. I have not seen nor heard of any serious mortality amongst sheep through lungworm or other diseases, except a case at Able Head, Totaranui, where a farmer lost about fifty, which had the appearance of having been starved or stinted of water, although there was abundance of grass on his run. There are sheep badly infected with foot-rot, but as that is not a disease under the Act, an Inspector has no power to have the hoofs dressed before being driven off the run.

The clip and lambing throughout the district have been fairly good, and the returns of April, 1892, show an increase of 28,732 over the previous year. I do not anticipate so large an increase this year, owing to so many sheep having been sent south, both for freezing and store; about 15,000 in all.

The freezing-works at Spring Creek, Marlborough, is a boon to the sheepowners in this district, enabling them to dispose of their fat sheep during the summer and autumn months.

Horses.—Although the bot-fly has been known in the district for years past I have not heard of any mortality amongst horses. The leaflet issued has been distributed through the district.

Rabbits.—Rabbits are scattered about in nearly all parts of the district, and have been for many years past, but as the back country is mostly bush, and not suitable for them to breed in any number, and nearly all the front country is taken up in small holdings, I do not think they will ever become a serious nuisance. In many localities rabbits are not so numerous as they were years ago, and have decreased during the last few years. Trapping, shooting, and poisoning with phosphorized grain are carried on every year.

Cattle.—I have not seen or heard of any disease in cattle during the year.

The crops throughout the district were up to the average, and very little damage has been caused by the Hessian fly, which has been known as the weevil for many years past.

Nelson. T. G. RICHARDSON.

CANTERBURY-KAIKOURA DISTRICT.

Sheep.—The condition of the flocks continues generally good, and though feed has been hardly so plentiful as in last autumn and for a couple of months in the summer, there was an indication that grass might be scarce in the coming winter, yet rain came sufficiently early to remove apprehension on that score.

The turnip crop, however, is in many places a partial failure.

During last winter there was more foot-rot than for some years past, but so far this season there has been comparatively little.

Lung-worm, of which we had a certain amount last winter, was, however, not as bad as it has been in former years.

The lambing was again a good one, though in various parts of the district there was some mortality among breeding ewes prior to lambing, principally amongst those bearing twins. Some loss was also sustained from docking, and from shear cuts at shearing time.

Lice.—In this direction I can still report continued improvement.

Wool.—The clip has been generally good and sound; but the condition of the wool in many of the back-country flocks was hardly as good as usual. The export of wool from Lyttleton was, up to the 28th February, 1893, about 3,000 bales larger than up to the 28th February, 1892.

Frozen Meat.—The number of sheep and lambs frozen shows a very considerable increase. In the twelve months ended 31st March, 1892, the total number amounted to 531,873; whilst in the twelve months ended 31st March, 1893, 636,067 carcases of sheep and lambs were frozen. There was a falling-off in the number of carcases of cattle frozen. There were frozen at—

	Sheep.	Lambs.	Cattle.
Belfast	155,129	115,666	133
Islington	265,272	98,080	...
Lyttelton	1,920	...	...
Total	422,321	213,746	133

thus showing an increase in sheep and lambs of 104,194.

Horses.—The main trouble in connection with horses is the bot-fly, though I do not know that in any case death has been directly caused thereby; they are a source of great annoyance. A very large number of horses in different parts of the district have been seriously affected by influenza.

Cattle.—Cattle as a rule are in good condition and healthy; but there is a certain amount of disease amongst them, and the number condemned and destroyed (the carcases being buried) points to the necessity of a more stringent and general inspection of this stock. Forty-two head were destroyed in the district, and this number included milking-cows, springers, steers, and fat and store stock. The larger number of cases consisted of tuberculosis.

Rabbit Nuisance.—In this respect both Inspectors Rees and Cunningham report favourably.

Quarantine.—A larger number of stock than usual has been quarantined during the past year. The improvements in the quarantine-station which have been carried out have given a good deal of satisfaction.

General.—The harvest has not as a whole turned out as well as had been expected, the threshing returns being in many cases very disappointing. I have not heard of any cases of either Hessian fly or Bathurst burr in this district.

Christchurch. R. F. Holderness.

Amuri-Kaikoura Division.

Sheep.—The general health of the flocks in this district is good, and no unusual mortality has been reported. All the sheep appear to be in good condition for commencing the winter. The lambing was fairly good, ranging from 40 per cent. up to as high as 80 per cent., and had it not been for a fall of snow which came at the commencement of the dropping and destroyed a number of lambs, the marking would have been nearly 10 per cent. higher.

The clip in many places did not appear to be as good as usual. The wool was light, and not in good condition, there being a large percentage of dry yolk, owing to the wet and severe winter; there was also on some of the back runs a good deal of sandy wool.

Foot-rot.—There are still a good many sheep about the lowlying lands in Kaikoura District affected with foot-rot, but I only know of one flock in Amuri which is troubled with it; and in all cases owners take steps to eradicate the disease.

Lice.—I have not come across any lousy sheep in this district yet.

Cattle.—The health and condition of the cattle is good, and I have not heard of any special mortality. I found a cow affected with cancer at Waiau last winter, and had it destroyed.

Horses.—All apparently well. The bot-fly is numerous all over this district, and very bad at Hanmer Plains, but I have not heard of it at Kaikoura yet.

Crops.—The amount of cropping done in this district is comparatively small, in most places being only for home consumption. What was grown yielded about the usual average. The turnip crops I have seen do not appear to be as good as last year's. I have not heard of the Hessian fly or any other pest having made its appearance here.

I have no information as to the state of the Kaikoura crops.

Rabbits.—I have much pleasure in reporting a decrease in the number of rabbits during the past twelve months in Amuri District, more especially on the worst infested portions. On St. Helen's Run particularly good results are shown, and I do not think there are one-third of the rabbits there this season that there were last. The poisoning was well and carefully done, and has been fairly well followed up by shooting, dogging, ferreting, and trapping, with the above result. On Tarndale Run, where it was poisoned, good work was done, and has been fairly well followed up during the summer. But there are large blocks of Crown land surrounding Mr. Adams's leaseholds (over portions of which his stock run and are mustered off), which are more or less infested with rabbits, and which he undertook to deal with, but neglected to do so, and when pressed refused to have anything further to do with the country, the consequence being that rabbits are in places numerous on these blocks. This unoccupied country will require attention this poisoning season. I think if it was well poisoned as early as possible in the spring, it would require very little work doing during the summer, as on these high blocks rabbits do not increase as fast as on the lower lands. I hardly think it is practicable to poison it this winter, as after May the country is liable to heavy snow, and is not safe to get about on. The Rainbow end of the run was not poisoned well last winter, and part not at all, and although a great many rabbits have been taken off during the summer, there are still too many about there. The result is that the rabbits

are working their way down the Wairau Valley, between Rainbow and Tophouse, and I would suggest that a short line of netting fence should be erected at the Waterfall Creek, which would be a great check on any rabbits going down the valley, and then a man might be put on for a month or six weeks to destroy any that might be on the Tophouse side of the fence. If something of this sort is not done, I am afraid these rabbits will work through by Tophouse into the Nelson District. The length of netting required at the place mentioned would be about 100 yards.

St. James's and Stanley Vale Runs: I found on making a thorough inspection of these properties that there were far more rabbits than I had expected, for, although inside the Hurunui Board's fence, I found patches of rabbits as thick as they were outside. Both properties were well poisoned, and Mr. McArthur had seven men constantly on St. James's, and I had two on Stanley Vale for five months, and they all did excellent work. The runs will be thoroughly poisoned again this winter, and I hope next year to be able to give a satisfactory report.

Woodbank and Hopefield Runs: On these properties the rabbits were in much the same state as St. James's and Stanley Vale. The country was poisoned last winter, but was not followed up by careful and continued work.

On all the other properties in the district there are odd rabbits, but, with one or two exceptions, the owners seem fully alive to their danger and anxious to keep the rabbits back, and I hope, with close supervision, to ensure good work being done by all.

The netting-fence erected up the Waiau River to Steyning Creek was only up in just time, as five rabbits have been hunted across from Hopefield side, and caught against the fence. The fence up the Hope and Boyle Rivers is also completed, and has been well and substantially erected. Mr. Rutherford has put men on to attend to these fences and keep them in repair.

Kaikoura.—The rabbits in this district are still well in hand. The worst part is on the Clarence side of the Warden and Tytler Runs, where the rabbits are in some places numerous. This country is exceptionally favourable for the increase of rabbits, but the poisoning will have to be better followed up than has been the case heretofore. Other owners, almost without exception, work well, and appear to recognise the fact that it is to their own advantage to keep the rabbits down, and consequently, as a whole, the district is in a satisfactory state.

The natural enemy appear to be very numerous in my district, especially weasels, and are, I consider, to a great extent responsible for the satisfactory condition of the district.

Waiau. W. A. Scaife.

South Canterbury Division.

The lambing has been well up to the average, and the clip of wool has been, on the whole, good. In some of the higher districts the clip was considerably lighter than that of last season.

During the twelve months 66,076 sheep and 18,653 lambs have been frozen and exported from Timaru, making a total of 84,729 carcases, a considerably smaller number than during the previous season.

Prices of store sheep have ruled high, but of late there has been a considerable fall. A great many farmers seem to be turning their attention more to sheep, and abandoning to a great extent the production of cereals, induced thereto by the unusually low price obtainable for grain.

No live stock has been imported or exported from Timaru during the year.

No cases of death amongst horses from the bot-fly have come under my personal observation, and I incline to the belief that many of the deaths attributed to the bot have really been due to other causes. The district has been very free from lungworm and other diseases, and I have not seen any cases of parasitical affections.

The rains which fell after the harvest have had the effect of freshening the pastures, and feed is now plentiful.

Rabbits.—As I have only lately taken over the Timaru district, I am not in a position to speak from my own personal knowledge as to whether there has been an increase or otherwise in the number of rabbits within the district. Rabbits are to be found in all the river-beds, more especially in those where the dense growth of gorse and broom afford them a shelter and refuge from which it is a matter of very great difficulty to dislodge them. In only a few of these river-beds, so far as I have yet seen, do they exist in any numbers, and these are now receiving attention. There can be little doubt that a grave danger is to be apprehended of rabbits spreading from south of the Waihao, and already a good many are to be found on the southern and western slopes of the Hunter Hills. As yet they do not seem to have crossed the top of the range, but they are to be found very close to the crest. Active steps to destroy the pest are now being taken by the occupiers in that locality, but a careful watch will require to be kept that these measures are unremittingly continued. I feel convinced that there we have the real wild rabbit, or at least a rabbit with the infusion of the blood of the wild one, to contend with. To the eastward of the Hunter Hills there appears to be as yet only a comparatively small sprinkling of the pest, and these ought to be easily kept under with the exercise of due care.

The usual methods of destruction are shooting, dogging, and digging out the burrows. In cases where rabbits are more numerous, such as the country outside the "rabbit fence," poisoning in winter is universal, and is always advocated by me in any place where rabbits exist in numbers. Any other means has beyond all doubt a tendency to scatter the rabbits over a still larger area and thus render their destruction more difficult and the consequent increase more rapid, though less observable for a time. There can be no doubt that stoats and weasels are rapidly increasing at the head of the Ohau Lake, and on the country between Lake Ohau and the Tasman River. Instances of their being seen were constantly being reported to me, showing they must be in considerable numbers, as owing to their habits they are difficult to see. I myself have only observed one, a stoat, on Glentanner run, western side of Tasman River.

Timaru. H. S. Thomson.

Otago District.

Oamaru–Palmerston Division.

Sheep.—The health of sheep has been good. Lambing has been exceptionally good, and the clip has been very satisfactory. Lambing of cross-breds on farms has been over 100 per cent., and run sheep about 70 per cent.

Lung-worm not troublesome; only a few cases have come under my notice and a remedy resorted to.

Lice to be found occasionally. Dipping generally carried out in the case of large owners; but considerable laxity exists in the case of small owners, owing to the want of proper conveniences for dipping.

High prices for sheep have been ruling up to quite recently, but a sudden and very great drop has taken place.

The past season has been an exceptional one for grass.

Horses.—The bot-fly has been found in the Palmerston district, but the horses affected having been treated for it at once, no further spread in other localities in the district has been reported to me.

Cattle.—Cattle with cancerous tumours come under my notice occasionally, and I have succeeded in getting the worst cases destroyed.

Swine.—It is reported to me that a disease exists among swine in this district, but the veterinary surgeon is so far unable to definitely say what it is.

Agriculture.—The crops of wheat and oats in this district are said to be very good, and the threshing results are coming up to expectations.

The Hessian fly has not caused any damage in the Oamaru district yet; but when in the Macrae's district last my attention was drawn to a field of oats which was considerably injured by the ravages of the leather-jacket grub.

Turnip and potatoe crops so far look very well.

Rabbits.—The usual means have been adopted for the destruction of the pest—poisoned grain, trapping, shooting, ferreting, and dogging. During the past year the work of coping with the pest has been fairly successful, and a marked decrease noticed in some parts of the district. The desire to dispense with winter poisoning, so as not to interfere with the operations of the rabbit factory, does not exist to such a large extent amongst landowners as formerly, and I have hopes for more united action in the matter of poisoning during the forthcoming winter. Poisoned grain being the chief factor in coping with the rabbit pest on rough country, any departure from it must only lead to a serious increase of the pest.

The spread of gorse and broom on public roads, river banks, and private property makes it extremely difficult to cope with rabbits where such harbour is allowed to exist.

Ferrets and weasels appear to be increasing, as indications of them are seen throughout the district; but they are not yet in sufficient numbers to have any very great effect upon the pest.

I have recently had many inquiries for ferrets for hand-working and breeding, and there appears at present to be very great difficulty in getting them.

Oamaru. W. Miller.

Dunedin Division.

Stock.—Stock in good condition and health. No diseases or unusual mortality have been reported to me. Found a few cattle with cancer, and had them destroyed. Feed of all descriptions abundant throughout the year.

Lambing very good, the season being favourable.

Clip was on the light side, but the wool was sound and in good order.

Lung-worm.—Have noticed very little of this disease amongst lambs.

Lice.—Not prevalent; dipping general.

Crops.—The crops seemed generally to be good, especially oats; but I understand are not threshing out as well as expected. The Hessian fly was observable on some of the farms in the Taieri and Maungatua districts, and did a good deal of damage to the wheat crop; did not observe it in any other parts of my district.

Rabbits.—On the high country rabbits are not thick, but in some localities in the low warm country more numerous, and difficult to cope with this summer. This I attribute to a very open winter, plenty of feed, and not sufficient wet to destroy the early litters of young ones. The means taken for destruction are: Poisoning in winter with phosphorized oats, trapping, shooting, dogging, fumigating, ferreting, digging-out and filling-in burrows.

The natural enemy is evidently increasing and spreading, as I hear of weasel sespecially being seen in a good many localities, and occasionally getting into the traps.

Mosgiel. Blair Fullarton.

Maniototo Division.

Sheep.—General health good. Lambing considered extra good for this high country, there being between 70 and 80 per cent. from merino run sheep. Clip of run sheep better than has been known for years, this owing to an exceedingly mild winter and luxuriant spring. Lice, lung-worm, foot-rot, &c., not prevalent in this district.

Cattle.—No disease exists. Only one case of cancer has come under my notice, and the animal was destroyed.

Horses.—No disease exists, horses being particularly healthy in Maniototo County.

Grass in abundance during early part of summer, and a keen demand existed for sheep.

Crops.—Wheat and oats generally throughout the district only fair. Hessian fly and other pests not known. Potatoes not grown to any extent, owing to unsuitableness of climate. Turnip crops fairly good, and more ground being put under this crop yearly.

Rabbits.—Poisoning was carried out generally during last winter, and followed up by other means, such as trapping, shooting, dogging, and hand-working ferrets. Natural enemy neglected here. Considerable difficulty has been experienced in getting many landowners to effectually deal with the rabbit pest, and proceedings under the Rabbit Act had to be taken in such cases. There is certainly a decided decrease in some parts of the district, but in other parts, owing to the favourable nature of the country for harbouring rabbits and the want of energy on the part of the owners, no great headway has been made. Arrangements are now being effected for a thorough and systematic poisoning throughout the district, and I hope for the best results.

Naseby. J. C. Miller.

Lake Division.

Sheep.—Health good; no disease in the district; the lambing exceptionally good—65 per cent. in merinoes, and 85 in cross-breds.

Wool.—The clip of wool very good and in sound condition.

Cattle.—Health good; condition low, owing to the scarcity of grass, having had an exceptionally dry summer. Have had two cases of cancer brought under my notice, and both animals were destroyed.

Horses.—Health good; class very inferior.

Rabbits.—I am pleased to be able to report a considerable decrease in the number of rabbits, especially in Lake County and the high country in Vincent County. The low country, and more especially the Molyneux Valley, show little if any decrease, although there has been a larger number destroyed than in any previous year. The rabbits are very numerous in the Landsborough, Westland County, all along the river flats.

The natural enemy, ferrets, stoats and weasels, are increasing and spreading all over the district. Weasels are very plentiful in the Wanaka district, likewise up the Hunter. I have seen a number of rabbits freshly killed by them.

The means adopted for the destruction of the pest are phosphorized grain in winter; trapping, ferreting, shooting, fumigating and flooding-out the burrows in summer. The most of the landowners have done good work in coping with the pest through the summer. There have been a few exceptions, necessitating proceedings under the Rabbit Nuisance Act.

Crops.—The crops have been below the average, owing to the very dry summer. There are no pests in this district but the small birds. The Hessian fly has not been seen.

Clyde. A. Ironside.

Tapanui–Lawrence Division.

Sheep.—The sheep as a whole are looking extremely well, although the grass is not as plentiful as last season at this time of the year, and I am sorry to say the outlook for the winter is not nearly so bright on account of the turnip crops (except in a few cases) being poor—in fact, quite failures.

Wool.—The clip for the past season was a good one, the average weight per sheep being about 7lb. This, when the number of merinoes in the district is taken into consideration, is a good average.

Lambing.—The lambing was, as far as I can learn, 70 per cent.

Diseases in the flocks have been very little—a few cases of lungworm, for which the usual remedies were applied with good results.

Cattle are looking well, and though some time back there was a good demand for fats and stores, now they have dropped back to a rather low price.

One case of cancer was reported to me, but on inspection I found that the so-called cancer was simply a large knob of horn formed by the animal being branded too deeply. There was no discharge of any kind, so I did not destroy the animal.

Rabbits.—Taken as a whole, the district is not so much infested as last year. There are certain patches that are very bad; these, in most cases, are places where people were waiting to see what the rabbit factories were going to do this season, and allowed the rabbits to increase. The breeding season was also very favourable to the rabbits, no floods occurring to drown the litters. Owners are now working consistently at the pest, and, with a favourable poisoning season, I hope to see the rabbits get such a thinning that they will not recover next season.

Crops.—The crops in the district are, as a rule, light this season. Some very heavy crops, however, were harvested at Crookston, Waikaia, and Waikoikoi.

The only pests to crops that I know of are the Hessian fly and small birds. The Hessian fly has worked up as far as Lawrence, where I saw a field or two badly damaged. Am glad to report that it has not as yet shown in any other part of my district. I mean that the Crookston, Beaumont, Roxburgh, Waikaia, Wendon, Waikoikoi, and Tapanui districts are still free of the fly. The small birds have done a deal of damage, and are yearly getting worse; they are particularly bad in the Waikaia District.

Tapanui. R. H. Hassall.

Balclutha-Tokomairiro Division.

Sheep.—On the whole, I consider the sheep healthy. During the last season there has been a slight mortality amongst both newly-shorn sheep and lambs newly cut and tailed, particularly in the Lovells Flat and Waiwera districts. In company with Government Veterinary Inspector McClean, I went through the district, but we came to no definite decision as to the cause. We could not get any fresh cases, but I think dirty sheds and yards were principally the cause of it.

Lambing.—The lambing has been good, being about 95 per cent. for the cross-bred and 65 per cent. for merinoes.

Wool.—Strong, and a good clip.

I have as yet seen no lungworm this season, and very little foot-rot.

There have been several cases of sheep infected with lice in the sale-yards, also unbranded sheep. In every case informations have been laid and convictions obtained, with a good result.

Cattle.—General health good, some very heavy weights coming from the Catlins district. There have been three cases of actinomycosis and two of tuberculosis; all the animals have been destroyed.

Horses.—Health good, and no appearance of the bot-fly.

Rabbits.—The means adopted for destroying—phosphorized grain during the winter months and also on bad patches during the summer, besides trapping, ferreting, and digging-out; also a little poisoning with jam. Some landowners have dug out the under-runners following up the gullies, which has done a great deal of good. Owing to the spread of gorse on private properties, it is very difficult to cope with the pest in some districts, and unless owners are compelled by Act to destroy the same very little headway can be made. This has been a very favourable year for the increase of rabbits, but not having been in the district last season, I cannot say whether there is a decrease in numbers or not. A rabbit-factory was working at Clinton last season, but has not started yet, and I do not believe it intends doing so, which, in my opinion, is a good thing, as it only tends to farm the rabbits during the summer months.

The high country is very clear, but wherever there is any bush, and in places along the foreshore, such as False Island and the mouth of the Tokomairiro River, I find them very hard to keep down.

Weasels are increasing very much, particularly in the Catlins and Owake districts, and are doing good.

Crops.—The Hessian fly has, I believe, been in the district for some time, but was not recognised till this season, the damage having been attributed to other causes. This year it is found on most farms in the Bruce and Clutha Counties. In the Tokomairiro district it has caused considerable loss. The grub leather-jacket, specimens of which were forwarded to you in February last for identification, has attacked oats in the Warepa district, and occasioned some trouble. I have circulated the information *re* preventive measures sent from the head office. There are no other crop pests.

HERBERT HULL.

Balclutha.

Southland Division.

Sheep.—The general condition of the flocks has been exceptionally good, last winter being very open, and the growth in feed received very little check. A slight mortality amongst a few flocks in the Fortrose district happened during the winter, but nothing serious. During shearing season farmers lost a few sheep. On making minute inquiries I could not find a single case where a sheep had just died; but from what I heard, and the descriptions I got of the sheep, I am led to believe that the deaths resulted from shear cuts.

I would also draw your attention to the enormous growth of the frozen mutton trade in this part of the Island. The export of frozen mutton from the Bluff for the period ended the 31st March was 189,595 carcases, and, notwithstanding that large number being killed, the total increase in sheep this year will be very large.

Lambing.—Good, and in many instances large percentages were dropped. Average lambing in merino ewes was about 55 per cent., and cross-breds about 80 per cent.

Lung-worm and Foot-rot.—There was nothing to complain of.

Lice I have found very prevalent, but settlers are beginning to realise the fact that it pays to dip their sheep regularly, and keep them healthy; so I trust that before long that I will not hear so much cause of complaint.

The increase in sheep has been very great, notwithstanding the large number that has been frozen during the past season. I attribute this principally to so much country being opened up, and more settlers going in for sheep, on account of the high prices ruling.

Cattle.—With the exception of two cases of cancer, which came under my notice, and which in each instance the beast was destroyed, the general health has been good.

Horses.—There was a slight mortality amongst horses in the Winton district, which was reported to you; so far, no cause has been discovered, one settler has lost twenty-seven horses in four years.

Rabbits were being got well in hand up till last winter, and I was in hopes that they would be kept so; but on account of the exceptionally fine winter and spring, very little rain having fallen, few rabbits were drowned in the nests; and notwithstanding the extra steps that the landholders have taken, the rabbits have increased very much. But I trust by having a good poisoning season this coming winter, and by insisting on every one following up during the spring months, the rabbits will be got well in hand again.

I have formed several depôts for the sale of phosphorized grain in different parts of my district; there settlers can obtain properly mixed grain at cost price, and this the settlers admit has been a great assistance to them. I only wish that it was in my power to insist that the only grain laid by settlers was procured from the Government depôts, as I am quite convinced that the cause of a non-successful poisoning is mainly due to the careless way the grain is mixed.

In many parts of my district I have been very successful with summer poisoning. I have given strychnine and jam poisoning a slight trial, and have found the results most deadly; but I am afraid that I could not recommend its use for general poisoning, as it is very dangerous to lay about a place.

Crops.—The crops have been very fair, but owing to the prevalence of dry weather last summer have not come up to the expectations of the growers. No damage that I am aware of has been caused by the Hessian fly.

Invercargill.

H. T. TURNER.

APPENDIX II.

REPORTS OF DAIRY INSTRUCTORS.

Report by Mr. John Sawers, Chief Instructor.

I have the honour to present my annual report for the year ended 31st March, 1893.

During the past season my time has been principally occupied in the Southland, Otago, Canterbury, Wellington, Taranaki, and Hawke's Bay Districts, and I may say that I have visited nearly every factory in these parts.

The past year has shown an increased interest in dairying as well as other branches of agriculture.

The information disseminated by the department to settlers, by means of pamphlets, &c., personal visits and lectures by the experts, is much appreciated.

It is pleasing to report that the dairy industry continues to make good progress. The number of butter- and cheese-factories and creameries throughout the colony is 104, being an increase of 32 over the preceding period, and from present indications there is every prospect of as large an increase to start the ensuing season with.

At present frozen mutton, wool, grain, and gold rank the highest of our exports; but should the dairying industry continue to develop as it promises to do, the products of the dairy at an early date will equal in value, if not exceed, those referred to. This occupation, besides employing a large amount of labour, gives ready and profitable returns. The low prices ruling for grain, and the uncertainty of good crops, owing principally to the continued cropping, and consequent exhaustion of much of our lands, are causing farmers to turn their attention to other sources of profit. When considering, for instance, that wheat is worth about £6 per ton, it seems absurd to pay the cost of transportation fourteen thousand miles, in preference to exporting beef or mutton, worth about £25 to £30 per ton, or cheese about £42, or first-class factory-made butter at about £84 per ton.

In extending our export trade there would seem to be two points that should be kept steadily in view by our settlers—viz., an endeavour to minimise transport charges by the raising of products of the highest value in proportion to weight, and the retention of the fertility of our soil. If this is carried out, a considerable decline in the exportation of grain is sure to be followed by an increase in that of mutton, butter, cheese, condensed milk, bacon, pork, fruit, &c.

Where Nature has supplied every want in the way of climate, and quality of the soil, required for successfully carrying on the dairy industry, no effort on the part of the Government can be considered too great to further this interest and to stimulate the spirit of enterprise now being seen in all parts of the colony. All over the civilised world science is being brought to bear on every branch of business; it therefore behoves us in this colony, where we have so many natural advantages, to use every means to place the most improved methods of manufacture before our producers, so that they may be in a position to furnish only the very best articles.

For the purposes of this report, and to show the increasing extent of our export dairy trade for the last ten years, and for the first quarter of this year, ended the 31st March, 1893, I subjoin the following table:—

Dairy Produce Exported, 1883–1892.

Year.	Butter.	Value.	Cheese.	Value.
	Cwt.	£	Cwt.	£
1883	8,869	42,020	2,519	6,892
1884	15,766	66,593	10,342	25,074
1885	24,923	102,387	15,245	35,742
1886	23,175	105,537	16,429	45,657
1887	17,018	54,921	23,913	54,562
1888	29,995	118,252	36,682	78,918
1889	37,955	146,840	26,558	67,105
1890	34,816	122,701	40,451	84,986
1891	39,430	150,258	39,770	86,675
1892	53,931	227,162	41,495	91,042
Three months ending March 31, 1893	22,917	103,696	24,995	52,347

This statement shows satisfactory progress in the exportation of cheese and butter, and the good effect the dairy interest is likely to have on the future of the colony. The results indicated in the table are the more satisfactory when the difficulties with which the industry had to contend for a few years after the initiation of the factory system, now nearly twelve years ago, are known. Many of the dairy companies, through the imperfect knowledge of those connected with them, had to succumb to financial difficulties. Now I can safely say that every one of our co-operative factories is in a healthy state,

Summary of Operations for Season 1892–93.

Before giving an explanation concerning the information I have been called upon to furnish, I herewith submit a summary of my visits during the past season, viz. :—

Taranaki.

Bank's Farm Dairy Factory.	Eltham Co-operative Dairy Factory.	Messrs. Robbins and Pierard's Stratford Factory.
Cardiff Co-operative Dairy Factory.	Lepperton Co-operative Dairy Factory.	Mr. Chew Chong's Dairy Factory.
Crown Dairy Company's Manaia Dairy Factory.	Messrs. Robbins and Pierard's Ngaire Creamery.	

Hawke's Bay.

Woodville Dairy Factory.

Figures in reference to Visits.—Thirteen factories received four visits, nine factories received three visits, six factories received two visits, nine factories received one visit.

Canterbury.

Flaxton Dairy Factory.	Tai-Tapu Dairy Factory.	Temuka Dairy Factory.
Flemington "		

Otago.

Aparima Dairy Factory.	Maungatua Dairy Factory.	Stirling Dairy Factory.
Bruce "	New Zealand Dairy Supply Company's Factory.	Taieri and Peninsula Dairy Factory.
Cranley "	Omimi Dairy Factory.	Taieri Dairy Factory.
Crescent "	Otama Bridge "	Tapanui "
Edendale "	Otara "	Waiareka "
Fairfax "	Outram Creamery.	Waikouaiti "
Henley "	Owake Dairy Factory.	Wyndham "
Island "	Shag Valley "	
Mataura "		

The longest time spent in giving ocular demonstration at any factory was seven days, and the shortest one day; seven of the factories named received only a casual call—a total of a hundred visits. During these visits an address was given, on "The Production and care of Milk from Farm to Factory," at five factories, and the attendance at these meetings was satisfactory. I also attended thirty-three meetings of directors for the purpose of giving information concerning the working of factories, plant, and surroundings, and generally of forwarding the interests of the industry.

Lectures to Promote the Erection of Dairy Factories.

During the year I have taken an active part in promoting dairy-factory companies, believing, like many other zealous advocates, that on the extension of dairy-factories and reform in dairy practices depend the future success of the industry. The efforts put forth in this direction have met with considerable success.

I also delivered lectures on "Co-operative Dairying as an Economic Factor in the Prosperity of New Zealand Agriculture," and the "Dairy Industry in its relation to Agriculture," in the following places:—

Hastings	Halcombe	Herbert
Lepperton	Ashurst	Ngapara
Midhurst	Colyton	Awamoko
Stratford	Cheltenham	Duntroon
Bird Road	Feilding	Pukeuri
Eltham	Paraparaumu	Kakanui
Hurleyville	Takaka	Maheno
Alton	Collingwood	Peninsula, Otago
Patea	Waihao	Fortrose
Wanganui	Waitaki North	Mataura Island.

It was my intention to prepare a summary of these lectures for this report, but finding it will be more voluminous than at first anticipated, I will submit a short account later on.

Meeting of Cheese- and Butter-makers.

On the 17th August a meeting of cheese- and butter-makers was held in Dunedin, under the auspices of the New Zealand Middle Island Dairy Association, for the purpose of discussing the theory and practice of their work as manufacturers, and for the consideration of other matters affecting the interests of the industry. I attended the meeting, and had the pleasure of reading a somewhat lengthy but unfinished paper on "Practical Cheese-making." This paper has since been printed and widely distributed among those interested. I append a copy. The importance of such gatherings is very great, and one from which the industry and the colony will gain much good. I therefore trust no individual or local jealousy will be allowed to interfere with the holding of these meetings annually.

Dairy Bulletin, Plans, Specifications, &c.

In consequence of the continual demand for information regarding the construction, equipment, and working of cheese- and butter-factories and creameries, a bulletin was issued and

distributed, containing full and detailed information on the subject. The pamphlet contains itemized lists of apparatus and utensils for a cheese-factory and a butter-factory of four hundred cows capacity, and also a cheese-factory and creamery of two hundred and fifty and three hundred cows capacity respectively. Itemized and approximate estimates of cost of plant and buildings are also given; likewise full information concerning location, site, and drainage, hints on construction and equipment of factories, creameries, and their application to dairying, by-laws specifying conditions of milk-purchase, &c.; also care of skim-milk at factories and creameries. The issue of this pamphlet has been the means of enabling me to supply inquirers with information more fully than I would otherwise have been able to do, and in this direction has supplied a much-felt want.

Full and working plans of three cheese-factories, two butter-factories, and one creamery, together with forms of memorandum of agreement, general conditions of contract, specifications, and detailed lists of quantities and sizes of material required for each building, have also been printed.

The object in having these plans prepared was not only to meet the expressed need of dairying throughout the colony, but to assist in diffusing a better understanding of the requirements of factory buildings. Already two hundred of these plans have been forwarded to persons applying for them. It is intended, if time permits, to issue, during the ensuing year, bulletins on the following dairy subjects: "Practical Cheese-making," "Practical Butter-making," "Milk-testing, and the Payment of Milk according to its Productive Character," and the "Feeding and Care of Calves."

Correspondence.

This part of my work has increased very much, and the time taken in replying to requests for information is considerable. During the year under report 217 letters on various subjects connected with the dairying industry were written by me; and, as many of them were of a technical and lengthy description, this branch of the work is not attended to without some considerable time and trouble. The following are samples of the more significant letters:—

From Mr. John Sawers, Chief Dairy Instructor and Inspector, to Mr. John Kelly, Chairman, Lepperton Dairy Company (Limited), Lepperton, Taranaki.

"Dear Sir,— "Dunedin, 23rd January, 1893.

"Surely an unnecessary delay has taken place in erection of factory. It is somewhat unfortunate, as the best of the season, so far as an abundance of milk is concerned, will now be lost; but better for the settlers to be late than have no factory at all. I trust everything is satisfactory so far, and hope same may characterize its operations hereafter. I have much faith in its future, and believe the settlers have much profit to gain from the inauguration of a well-organized system of dairying.

"I am glad you have seen fit to consult me regarding the payment of milk according to its productive character, and so save the company much trouble and annoyance. It is to be regretted more do not follow your example in this respect. The question is of such great importance to the company, and dairy interests generally, that I deem it necessary to here treat the matter somewhat minutely. There can be no doubt that the effect of the present general method of paying for milk in factories according to the number of pounds of milk a man may bring, has been to create a feeling of suspicion in the minds of farmers regarding the honesty of their neighbours and the justice of the management of factories. While such a feeling is allowed to prevail, the superstructure of the business is always in danger of disaster, for the foundation is wrong. It is not fair to pay A for more than comes in his can, or B for less than comes in his. If we can devise some method by which it is possible to make a fair and equitable division of profits, we can then expect to eliminate suspicion from the minds of the milk-suppliers. Nay, more, we shall thus put the buying and selling of milk on a business basis, and this will in its turn act as a whip to arouse farmers in the performance of their duty—to breed and feed for a special purpose. The principle which underlies this whole question is simply the payment of money for value received. The principle is a sound one, and it is one that underlies, and should underlie, all business transactions. Once admit this principle, and you have gone a long way towards the payment for milk according to the true value, for you will be ready to adopt any reliable and practical method to carry it out. So long as we pay for rich and poor alike, depend upon it we shall 'have the poor with us always.'

"It is claimed by many to be useless to put scientific instruments into the hands of farmers and factory-men, who have had no scientific training in the chemistry and testing of milk. Doubtless, if it is a question of carrying out a systematic course of experiments where scientific exactness is demanded, this claim is right, but for the payment for milk at factories according to its productive character, 'scientific exactness' is not an absolute essential, for we have now milk-tests so simple and yet of sufficient exactness as to be of the utmost value for the object in view, and can be worked by any person having a fair knowledge of milk, coupled with care, intelligence, and willingness.

"You ask my opinion concerning the advisability and suitability of the lactoerite for the purpose. Well, I say, without hesitation, I cannot recommend the company to use it, and especially as there are better and simpler 'testers' in the market. The lactoerite is used in a few creameries and butter-factories where the milk is paid for according to productive value for butter-making, but it has not been used to any great extent. At the same time, I must say it is perfectly reliable, but is rather too complicated and elaborate for everyday use. It requires the use of two chemicals—acetic acid and sulphuric acid—and the milk, in combination with the chemicals, requires to be boiled. All this work increases the percentage of error in getting a reliable test. In short, it requires to be in the hands of a good experienced milk-tester. For these reasons I cannot recommend its use, but only in factories where a person properly trained for the work is employed.

"A simpler, if not a better, 'tester' for your purpose would be 'Professor Fjord's Centrifugal Milk-controller.' In Denmark this tester is used for the payment of milk at the butter-factories very

extensively, and has been found to be practically exact. But, then, in Denmark there exists no such great variety in the milk as here, the latter due to the great variety of breeds of cows, the feed, treatment, and management. This is only a compressed cream-test, and like all cream-tests (although not applying to Fjord's method to anything like such an extent), where a great variety exists in the milk, it is not a thoroughly exact criterion of butter-value. It consists of glass tubes holding the milk, which are then placed in a specially-constructed apparatus, holding from 70 to 196 samples. This apparatus is made so as to screw on the cone of the drum of the 'H. C. Petersen and Co.'s Danish Cream Separator.' Independent machines are also made in which to revolve the apparatus containing the glasses holding the milk. In these machines, the apparatus containing the glasses holding the milk to be tested is set revolving at a great speed, and thus the milk in the test-glasses is submitted to centrifugal force, the cream being thrown in a compact mass to the top of the test-glass, where it is measured by means of a graduated scale supplied for the purpose. The percentage of cream being ascertained, by applying the graduated scale, the percentage of churnable butter in the milk is got from a 'Ready Reckoner' supplied with the machine. This, I believe, was the first test practically applied in factories to pay for milk according to its butter-producing value, and I think I am safe in saying it is more extensively used than any other test for that purpose at the present day. This test will shortly be used at the Tai-Tapu Co-operative Factory, Canterbury. The directors are awaiting arrival of a 'Ready Reckoner' published in English, the one they have at present being in Danish, and consequently of no value to them in appropriating milk-payments.

"I expect one of these testers to come to hand at an early date, having ordered one nearly three months ago. I intend demonstrating the practical utility of the test at various factories throughout the colony. Dr. Storch, of Copenhagen, Denmark, one of the world's best dairy chemists, says of Fjord's test: 'It is hard to conceive a simpler or better test for practical use in factories.'

"With the exception of the 'Beimling' and the 'Babcock test,' 'Fjord's Controller' is the best practical test in the market. It possesses one obvious advantage over the 'Beimling' or 'Babcock' in the reading of the test being easier, but it is not so accurate as either of the former. Special breeds of cows, or the influence of individuality, feed, treatment, or management of herds has no effect on the results given by these tests. The 'Beimling' test, although indorsed by many leading dairy chemists as being thoroughly correct, nevertheless seems to cause trouble if the chemicals used are not perfectly pure. But for this, the test is perhaps the most accurate and efficient known, but I cannot recommend it on this score.

"I would strongly advise the company to procure a 24-bottle Babcock tester. This is now the leading milk-tester in the American and Canadian factories, used for apportioning the dividends according to the relative value of the milk. Having worked and experimented with this test for nearly a year, and under very varied circumstances, I have every confidence in recommending its use in factories for apportioning milk-payments. I am firmly of opinion it will be hard to get a better, for simplicity, cheapness, quickness, and efficiency. I have gone so far as to have duplicate samples submitted to chemical analysis, and I must say the results throughout the experiment have been uniformally close, and proving beyond a doubt the Babcock test for practical purposes to be correct. Not only so, but the reliability of the system has been proved by actual results elsewhere.

"A very simple method can be devised for paying on the fat basis, at both cheese- and butter-factories, by the use of the 'Babcock tester.'

"Should you deem necessary, I will furnish you with more detailed information concerning this important matter of milk-payments at any time.

"When purchasing a Babcock Tester, get one run with cog gearing. With cog gearing there is no possibility of loss of motion. See also that the machine is fitted with 'swing pockets,' and thus increase the centrifugal force. The Babcock process is not patented, and so different machines are constructed by different manufacturers. One machine is now being made in the colony. It has 'cog gearing' and 'swing pockets,' and is of stronger and more durable construction than any of the American machines I have yet seen. "Yours truly,

"Mr. J. Kelly, Chairman, Lepperton Dairy Company. "JOHN SAWERS."

Mr. JOHN SAWERS to Mr. NEWTON KING, New Plymouth.

"DEAR SIR,— "Department of Agriculture, Wellington, 3rd March, 1893.

"I have the honour to acknowledge the receipt of your letter, under date of 29th April, concerning the temperature of steamers' cool-chambers for the transit of butter.

"In reply, I may state that my opinion in a great measure exactly coincides with your own, and from what I can gather from correspondence received from many of our leading dairy-produce brokers in London and Glasgow, the same opinion seems to be rapidly gaining ground there—viz., that butter has been carried at too high a temperature in the cool-chambers. So strongly have I felt on this point, that I have deemed it advisable during the past exporting season to recommend consignors to ship their butter in freezing-chambers rather than run the risk of too high a temperature, and consequent deterioration. At the same time, I must say that provided the butter is of first-class quality (free from moisture and other superfluous foreign matter) such as much of our factory-butter is at the present time, actual freezing will do it no harm. The only objection to freezing in that case is that neither the brokers, retailers, or consumers like butter as hard as a stone when being examined, for cutting on the counter, or on the table. All that is wanted on the part of the shipping companies to insure safe transit, is to keep the butter-chamber as near freezing-point (freezing-point of butter) as possible, without being actually frozen. Or, in other words, as a means of making myself more explicit, from repeated experiments during 1891, and from strict observation and attention to the point since, I have arrived at the conclusion that the lower the temperature of the room in which butter is kept—if that be above the actual freezing-

point of butter—the better will it keep while there, and the better will it keep when brought into the warmer temperatures of the brokers' stores and warehouses. This, of course, applies to its treatment before shipment as well as during transit. Actual freezing is not an absolute essential for the safe transit of butter, but it is much safer than consigning it to cool-chambers at present carrying temperatures.

"In my opinion you should recommend a range of temperatures from 25° Fahr. as a minimum, to 35° Fahr., as the maximum. From the printed regulations for the guidance of the New Zealand Shipping Company's commanders and refrigerating engineers, as to temperatures of chambers of vessels in which frozen-meat, dairy-produce, and fruit, are stowed, I observe that the instructions regarding dairy-produce read thus: 'Cheese and butter must each be placed in separate chambers, and the greatest precaution taken in the stowage of cases to insure free circulation of cold air; the temperature of chambers must never exceed 52° nor go below 38°.' The Shaw-Savill and Albion Company (Limited), in their instructions to their commanders and engineers, say that the temperature of the butter-chamber is to be maintained at 35° to 45°. From what I have said, it is almost unnecessary for me to say that I consider these temperatures far too high to insure the safe transit of the bulk of our New Zealand butters, and I feel sure that much more satisfactory results would have been obtained during the past shipping season had shippers sent their butter in the freezing-chambers. It is impossible for the shipping companies to carry out the instructions of individual shippers; and I would consider it a great favour if you interview, or call a meeting, of persons interested in the trade in New Plymouth or surrounding district, with a view to obtaining a concensus of opinion as to the temperature to be maintained for each class of produce—butter and cheese. By some such means as this we would be in a position to get this one great impediment cleared from the way, and we would also be working in concert with the opinion expressed by your London consignees.

"Feeling that you are as much interested as I am in the landing of the produce in good condition, I am sure you will exercise a little trouble in this matter, as it is one of great moment to your district.

"I shall be glad to attend any meeting you may convene for the purpose referred to, or you may consider me at your service in supplying further information connected with the subject at issue.

"I have, &c.,

"John Sawers."

Opinion on Factories visited and Products of same.

Twenty-one of the factories visited were thoroughly clean and sweet, twelve fair, and four very dirty.

At the factories where the makers are careless, untidy, and indolent, I invariably find the milk-suppliers following suit, and consequently not as particular about the care of their milk and cleaning of milk-cans as they should be. Cleanliness on the part of the makers and milk-suppliers is one of the great requisites in the making of first-class cheese and butter. If there is one place more than another where absolute cleanliness ought to prevail, it is a cheese- or butter-factory. Dirt will accumulate very rapidly, and the manufactory become, in a very short time, an exceedingly filthy place. When it is known how susceptible milk is to changes, and to take taint, it must be obvious that very little neglect in the matter of thorough cleanliness will in a short time become a great evil. To avert the evils which are sure to arise from the want of washing, scouring, and scalding, there is only one good rule: "Keep clean." Most of the factories are, however, models of cleanliness, and those working them are worthy of the highest praise for the exactitude and perseverance they display in carrying out this virtue; and, were it prudent, I would willingly mention them, for they are furnishing a good example to the others. It is also very pleasing to again note an improvement in the quality and uniformity in our dairy factories' productions, as compared with 1891–92 season. I gather this from reports furnished me by different buyers and brokers, here and in England, and what I have had the opportunity of seeing myself. There is, however, still room for improvement, more especially in the quality of our butter for export; and let me say here that I am perfectly satisfied that to effect this improvement will require an almost complete change in the present methods of treating milk and cream—not only in vogue here, but in other lands. Our remoteness from market, and the consequent age of the product before it reaches the hands of the retailer, necessitate an alteration in our system of working from that practised in other countries nearer the centre of consumption. The change indicated will take the form of the pasteurization or sterilization of the milk (perhaps of the cream) before separation, the speedy and effective cooling of the cream to a low degree as it leaves the separator, by means of small mechanical refrigerators, and, in all probability, the churning of the cream sweet. I have no doubt that mention of this will call forth considerable comment and criticism; but the change will live and grow in favour. This matter will be treated more fully when issuing bulletin on "Practical Butter-making."

I cannot do better than give some of the notes from my diary, on the condition of the buildings and productions of some of the factories visited:—

No. 1. "Factory anything but clean; maker has a fair knowledge of the business, but altogether too careless; cheese mealy and dry, showing signs of too much acidity, and the appearance of the cheese anything but 'catching' to the eye.

No. 2. "Cheese fair in quality and uniformity. Everything clean and tidy; maker proved an apt scholar.

No. 3. "Cheese very irregular in shape, appearance, and quality, some of them being far too sweet and others quite sour. Factory buildings and plant not good, and not arranged with a view to economy in labour; factory and utensils kept fairly clean. Tested all the milk twice, and, save in two cases, found same good; highest per cent. butter-fat, 3·8; lowest, 3·1; maker very anxious to acquire information.

No. 4. "Factory and surroundings clean and well kept; cheese fancy, in every particular being uniform in quality, and symmetrical in style and appearance; this is the best cheese I have come across in any of the factories so far. The produce is firm in body, and possesses a mild flavour, and nutty and buttery quality; maker very thorough and anxious to keep ahead.

No. 5. "Everything neat and clean; quality of cheese good, and neat in appearance; maker very exacting and thorough in his work. Surroundings and drainage of factory might be materially improved.

No. 6. "Factory and utensils in good shape; cheese neatly finished, but showed too weak a body and a sweety flavour; maker glad to see me, and predicts much improvement.

No. 7. "Factory and utensils good, but not kept clean; quality and appearance of cheese very bad, and showing no uniformity: worst class of cheese have ever seen in any factory; maker has had no experience to justify him acting as a factory-manager.

No. 8. "Everything in first-class order; factory a model of cleanliness and thorough competent management; butter produced first-class, being uniform in flavour, quality, texture, colour, appearance, and style of boxing. This is a first-class butter-factory, both in its construction and management."

The butter-factories as a rule are worse constructed for the work intended to be carried out in them than the cheese-factories. In fact, the construction of a few of them is such that it is impossible to make anything like a first-class product during the summer months; and how it is possible for the proprietors to get satisfactory returns for their product is a mystery. I look forward to much improvement in this matter during ensuing close season. Some of the proprietors have intimated their intention to have the buildings well lined, and if necessary, insulated. The more recently-built factories are much better constructed.

Suppliers, and Care of Milk.

I find that the milk suppliers are, on the whole, taking a much livelier interest in the welfare of the factories with which they are specially connected, and are looking more upon the industry as a permanent business, not as an offshoot too insignificant to engage their time and attention. The milk is being delivered to the factories in much better condition, and in increasing quantities. There is still room for much improvement in the care and treatment of milk at the farm. The bulk of the milk is kept standing too long in a body in the milk-cans without being cooled, and develops foreign fermentations thereby, which have to be contended with at the factory. If ever a perfect article in cheese and butter is to be produced, the process must start with the breeders and milk-producers. No efforts on the part of the makers can thoroughly overcome carelessness in aërating and cooling the milk at the farm immediately after milking, or of keeping the milk in an impure atmosphere.

Mistakes in Cheese-making.

The more prominent mistakes of cheese-makers during the past season have been in setting the milk too soon, or before it was sufficiently ripe to add the rennet, resulting, in most cases, in leaving the cheese with a sweety flavour and an open porous body. This was the case more especially in early spring. Two of the makers at the factories visited were using very inferior rennet extract, and some too little, thereby causing great injury to the texture of the cheese, and a heavy loss in quantity through want of proper coagulation. Many of them were not draining the curd enough, after the expulsion of the whey, thus causing the cheese to cure rapidly through retention of moisture. The use of racks in the making-vats or curd-sink would obviate the latter difficulty.

Babcock Milk-tester.

During my itinerant work I took with me an eight-bottle Babcock milk-tester for the purpose of testing the milk of every or any milk-supplier as delivered at the factories, and to instruct and explain the principles of its working to the makers.

There were 336 samples of milk tested. The highest percentage of fat found in any sample was 4·7, and the lowest 2·8; the average percentage of the 336 samples being 3·6. I trust every factory will procure one of these instruments, so that every man's milk may be reliably tested, and so assist in stamping out the dishonest practices of some milk-suppliers in adulterating their milk just a little. For further information concerning the "Babcock Milk-tester" see letter embodied in this report.

"The Dairy Industry Act, 1892."

"The Dairy Industry Act, 1892," has now been in operation for nearly a year, and, if its provisions are strictly enforced, it will work marvels in the course of another year or so; in fact, it is doubtful if any other plain and simple law on our statute-books has brought the immediate and valuable assistance to one of our chief industries that I feel confident this Act will do. The provisions of the Act are legitimate in every respect, and such as no honest dairyman can object to. I well know some of our prominent dairymen strenuously object to the clauses relating to branding; but they are directly interested, and would like to see the branding clauses deleted altogether or modified, so as to be of no use whatever in designating the true and exact nature and description of the goods. But for the Act, the practices of slightly skimming the milk before making into cheese, and false branding, by our dairy-factory proprietors in their endeavour to overreach others would become very prevalent; and when it became evident that they had overreached themselves and the industry generally, they would then be prepared to devise some means for regaining the colony's lost reputation. Let us discourage in every possible way the manufacture and exportation of anything but "full-cream" factory cheese and factory or creamery butter. The Government has just as much right to try by fair means to stop the manufacture and exportation of inferior goods as proprietors of dairy factories have to enforce by-laws to protect themselves from the dishonest practices of milk suppliers. I am well aware that until the majority of the factories make "quarter skim-milk

cheese," or "half skims," there may be money in it for those who skim, just in the same way as there is money in it for one or two farmers watering or skimming their milk; but if all the milk patrons were watering or skimming their milk, wherein would lie the profit? Having been in attendance at the port of shipment (principally Port Chalmers and Wellington) on nine different occasions when dairy-produce was being put on board the Home steamers, and by utilising the powers conferred upon me as Dairy Inspector under section 4 of the Act in question, I was enabled to see some of the foul compounds, by the name of cheese and butter, which, but for "The Dairy Industry Act, 1892," would have gone to Great Britain without any designating mark to distinguish them from "full-cream" factory cheese or "factory" or "creamery" butter.

On the nine different occasions in question, I opened and inspected 213 cases cheese, and 57 packages of butter. Out of this quantity I examined some cheese of the skim type, and butter of the "grocers'" and "dairy" blended type, which was neither wholesome nor palatable, but thoroughly injurious to our dairy trade, and which could only have the effect of curtailing the consumption of the good and pure article, and disgusting the consumers with New Zealand dairy-produce. If no competent legislation existed to prevent such produce being exported without being stamped or branded, so as to distinguish its true character, what would be the result? I venture to say that the dairying industry, instead of advancing, would steadily decline. Let us condemn by every means the practice of making anything but "full-cream" factory cheese and "factory" or "creamery" butter. Otherwise, our dairy interests are in the greatest danger of being permanently damaged. At the risk of reiteration of valuable truths, I extract the following from my last year's annual report, as having a special bearing on the subject at issue:—

"The contest between the countries which are making a specialty of dairy-farming is every year becoming keener. In the fight for supremacy, three factors, all of which are wholly within our own jurisdiction in New Zealand, can be made to bring the best of the trade to ourselves. In the competition for cheaper foods to sustain the great masses of wage-earners in manufacturing centres, the tendency is towards lower prices for several of the principal articles of diet. Our opposite seasons give us a good hold, in that we are competitors only when prices tend to rule highest. The economy which can be carried out in the cost of production, compared with our producing and commercial rivals, and especially in the manufacture of concentrated foods, is an item of the greatest value. The third factor, which will enable us to win success and maintain our place in the foreign markets, is that of producing and exporting only the best quality of goods, and of guarding with zealous care a reputation that all our dairy-products are genuine and pure. The protecting of our dairy factories in their desire to gain a reputation for exporting honest, pure, and fine dairy-products is the only way to enable us to lay a sure foundation upon which to build up a trade of ever-increasing dimensions with a certainty of continued profits. In fact, it would seem to me to be the very essence of commercial folly to allow the colony's name to be held so cheap as it has been during the last few years through the exportation of indifferent dairy-products, by neglecting to take steps to prevent it. Especially is this so when we know that such a step would not be costly to ourselves, and certainly not injurious to the consumers.

"For the above reasons, and in view of the practices in vogue, I would suggest for your careful consideration the expediency of an enactment providing against frauds in the supplying of milk to dairy factories, and to prevent deception in the branding of dairy-products. In fact, any legislation having a tendency to stop the tampering with our dairy-products is of the utmost importance to both consumer and producer. It would have a beneficial effect in extending our export trade and in maintaining the confidence necessary to a large consumption of the products. It is acknowledged that large quantities of mixed farm-made butter have been exported under a brand representing it to be New Zealand "factory" or "creamery" butter. It is also alleged that a considerable quantity of factory cheese, made from milk from which a part of the cream is first extracted, has been shipped Home branded "New Zealand Full-cream Cheese," or without any designating mark to distinguish it other than "Full-cream Cheese." Surely such proceedings are exceedingly harmful to New Zealand dairy interests, and more especially as many of the dairy factories are only emerging from heavy pecuniary difficulties."

The Act requires amending in the direction of making it compulsory for all cheese and butter, and packages containing the same, for export or not, to be branded before leaving the factory, creamery, dairy, or blending-house, and to prohibit proprietors of factories (whether butter or cheese) from taking in butter from the surrounding settlers for the purpose of having it blended, and packed for export or sale in the colony. Until this is done the Act is too easily evaded. I trust the point will receive due and early consideration.

The Crescent Farm Dairy of Mr. David Doull, Wyndham, Southland, has been declared a factory suitable for the manufacture of cheese under section 6 of "The Dairy Industry Act, 1892," and a certificate issued accordingly. This is a well-built and well-equipped dairy, capable of manipulating the milk of one hundred and fifty cows; and the manufacture of the cheese is intrusted to a competent maker. There were four other applications for certificates to declare certain dairies "factories," but on inspection of buildings, equipments, &c., certificates were refused.

Dairy Association.

Associated dairying naturally leads to associated marketing. Again I cannot conclude this report without dwelling briefly on the importance of the formation of dairy associations, as the means of promoting our dairy interests. From what has already been done by the Middle Island Dairy Association, the good work such organizations are able to accomplish must be obvious to any careful observer. Indeed, I venture to say the binding of the factories together is one of the most important, if not the most important factor in the success of the industry. In this connection history repeats itself, for on a retrospect of the state of dairying in Denmark and Canada for fifteen or twenty years, it will at once be seen that the industry there was in much the same condition as with us a few years ago. Until dairy associations took the industry in hand, it languished—made

no progress, and brought little profit. Now we find the industry flourishing, and growing more rapidly than at any other period in its history.

The wisdom of Government in spending small sums in the form of subsidies, to encourage and foster dairy associations, cannot be over-estimated.

The formation of an association for the North Island, or the further extension of the Middle Island Dairy Association, is absolutely necessary. The association, by inaugurating an annual produce show, which could be held at the same time as the meeting of factory proprietors and cheese- and butter-makers, would induce a keener desire to excel.

Experimental Dairy School.

The want of an experimental dairy school is now becoming evident to all reasonably versed in practical dairying. The industry already is by no means the least of our manufacturing interests, as is clearly shown by the number of factories at work, and the value of the exports. I have all along been much impressed with the thought that if instruction is to be of the utmost utility to our dairymen we must make another onward move in the establishment of an experimental dairy school. The time has now arrived when the condition of the industry demands it; for the growing magnitude of our dairy trade, and the peculiarities of our situation, will continue to create problems and difficulties in the manufacture of butter and cheese which can only be solved by experiments and investigations reliably conducted. I feel certain that much can be done by experiment and investigation to improve our products. The establishment of a dairy school is one of the best methods by which the Government could stimulate and assist cheese and butter manufacture, both from a practical and scientific standpoint.

There is a great field open to us in the way of conducting dairy experiments, and the most authoritative and serviceable way to carry out these is by means of a dairy school. The enterprise and intelligence of the dairymen in the countries where such schools exist have increased steadily, until their products are now placed in the front rank, and it is everywhere evident that there will be a further and further advance as time goes on.

The necessity for carrying out my present proposal may be illustrated by what has been done in Canada and Denmark. Many of us can remember the kind of American cheese which came to England when first imported—rank and soapy at its best; while much of it was black, rotten, and uneatable—but by the employment of itinerant dairy-instructors, and the additional aid of experimental dairy stations, Canadian cheese now takes the lead for quality combined with uniformity (tons of it being sold in England, months in advance, to arrive). The same thing has occurred in butter manufacture in Denmark. Less than half a century ago their butter had no name, but now it commands the highest prices and best markets.

It seems to be the special functions of farmers to provide food and clothing for the rest of the race; therefore anything we can fairly do to supply them with reliable information, to enable them to produce the necessaries of life best and cheapest will add to their benefit and profit. I contend, so far as dairying is concerned, that it is incumbent on the State to supply reliable and valuable information to farmers, and to put that information forward in such a way, by repeated ocular demonstration, that even the most apathetic will be taught to put in force the truths brought to light.

I add the following, as a few matters requiring investigation that could be well undertaken at such an establishment:—

- Treatment and care of milk at the farm.
- The effect of setting the milk at different degrees of ripeness.
- The effect of the use of different quantities of rennet extract upon a given quantity of milk, and its effects upon the cheese when made.
- The effect of "high *versus* low" scalding of the curd, when in the whey.
- The effect of "stirring" and "non-matting" of the curd *versus* matting and grinding of the curd.
- The effect of the use of racks on which to drain and mat the curd, *versus* matting on bottom of making-vat.
- The effect of early *versus* late grinding of the curd.
- The effect of various depths of matting of the curd.
- The effect of using different rates of salt.
- The effect of hooping the curd at various lengths of time after salting.
- The effect of milk possessing different percentages of butter-fat, on the quantity and quality of cheese produced.
- To ascertain the best milk-tester for discovering the percentage of fat in milk, with a view to introduce the system of paying for all milk, whether for cheese or butter manufacture, according to its productive character.
- To ascertain the best mechanical cream-separator.
- The effect of different methods of obtaining cream from milk.
- The effect of carefully pasteurizing the full-milk before separation, on the quantity, flavour, and keeping-qualities of butter.
- The effect of carefully pasteurizing the cream after separation, on the quantity, flavour, and keeping-qualities of the butter.
- The effect of churning the cream sweet, *versus* sour, and the quantity, quality, flavour, and keeping character of the butter.

Experiments could also be conducted in the fattening of pigs. The teaching of these and many other experiments would have a far-reaching effect for good on the industry, in stimulating and guiding our dairy-farmers.

The proposition here set forth is a very practical one, and I think well worthy of attention. To carry out this plan I would recommend for your careful consideration the desirability of leasing one

of the dairy factories at present working for a term of, say, three years, and, if not already done, to fit it up with suitable plant for the manufacture of both butter and cheese. Any plant put in by the Government could become the property of the company or proprietor at the end of the lease, by mutual agreement as to price, or the Government could remove the same.

Pork Industry.

Settlers supporting factories neglect one of the most valuable adjuncts to their business when they do not avail themselves of the pig as a means of assisting them to make money from the bye-products of the factory—whey, skim-milk, and buttermilk. Speaking generally, the attitude of farmers in the colony is against pigs, and they seem to regard "the dead pig as the only good pig." I feel sanguine that this view is directly opposed to the best pecuniary interests of dairymen. Any farmer milking cows for factory purposes should be able to fatten two pigs for every milch cow he keeps. Whey, skim-milk, and buttermilk are, if properly treated at the factory, and fed to pigs in a judicious manner, very valuable feed. The refuse at the factories is not at the present time utilised to anything like the best advantage. I believe that the farmers will soon find that the addition of this little branch to their business will bring in more money than they expect. In fact, as yet the pig is an unrecognised and undervalued source of wealth to our farmers, or any one who seeks to give them a fair amount of attention.

Hitherto the market outlet for pork has been spasmodic, irregular, and of a limited nature, but the introduction of the mess-pork industry at an early date promises to open up an unlimited market, and prove a most valuable appendage to our dairy work. With a regular and unlimited market, coupled with a fair return, the pork industry will assume large proportions. The importance of the pig, with the opening of the mess-pork industry on such a large scale as predicted, can hardly be over-estimated.

Cool-Storage and Transit.

The erection of cool-storage at the principal ports of shipment is a matter of primary consideration, and one on which the success of our export trade very largely depends.

This question is one of the most important connected with the trade; and as it admits of no two opinions, I will not at this time argue the matter at great length. The erection is simply an absolute necessity, if we are to succeed in our butter-trade with Great Britain. The sooner butter is put in a cool-chamber, having a mean temperature of about 30° Fahr., after it it is made, the better. If butter is not put into a cool-chamber soon after it is made (the sooner the better) it will change from fresh to stale; and shippers can only rely on good luck or a strong market to in any way meet their expectations in price. Until we get cool-chambers at the principal ports, and these universally utilised, we shall never be able to land high-class butter in England—it is simply impossible. We must arrest the process of decay in butter by means of cold. I trust something may be done in this matter for the ensuing season, so that we may have a chance to protect and maintain the quality of our butter production.

To some extent the transit from the place where the butter and cheese is made, to the cool-stores at the ports, also requires attention. Once in the cool-stores, or in the chambers of the Direct steamers, there is little risk attending transport to Great Britain. From strict personal observation, I am in a position to say that the arrival of inferior butter in England is in a great measure owing to the treatment it is subjected to before it reaches the freezing-chambers of the Direct steamers. Any one attending at the port of shipment when dairy-produce is being put on board, must be convinced that much loss is occasioned through lack of cool-storage. It is true that butter suffers more than cheese; much benefit, however, would accrue to shippers of cheese if storage at a suitable temperature, say 55° Fahr., was available; so I venture to urge the need of providing for the storage of cheese as well as butter.

During the past season I have examined tons of cheese, when being received on board, out of warehouses and Harbour Board sheds, where the temperature had been so high that the cheese was unduly heated; so much so that the butter-fat was becoming liberated from the body of the cheese. Needless to say this is very bad for the product; once the butter-fat becomes liberated it tends to become rancid, and so affects the flavour of the goods. It would be well for me to remark that the temperatures which would be required to be maintained in these chambers would be 35° Fahr. for butter, and 50° Fahr. for cheese. A variation of 5° Fahr., one way or the other, would make no appreciable difference.

Another reason why cool-storage is required at the chief shipping-ports, and the needs of producers thus provided for, arises from the fact that often butter and cheese, through the exigences of shipping, arrive at the port before the steamer is ready. Until cool-storage is provided, the want of it will constitute one of the very weak spots in the conduct of the dairying industry.

To carry out this suggestion requires the erection of suitably-constructed cool-stores at Auckland, New Plymouth, Wellington, Port Chalmers, and possibly Invercargill. Lyttelton is already provided for. The erection of such stores would be best in the sphere of the Railway Department. It seems a pity that some of the local steamers are not fitted with special appliances and chambers for the coastal traffic of dairy-produce, as the products are in much danger of being heated.

If cool-chambers were erected at the ports above mentioned, I believe much more of the produce would go by rail rather than risk heating in coastal vessels. Little or no fault can be found with the improved railway facilities for the carriage of dairy-produce.

From a perusal of a letter to Mr. Newton King, New Plymouth, embodied in this report, you will gather my view concerning the temperature at which dairy-produce should be carried on board the Home steamers. The regulating of the temperature is important; and if self-registering thermometers could be placed in every ship, set and sealed by some competent official at the port of departure, and the record removed on arrival by some responsible person acting under the

Agent-General much good would result. Such a step would be useful as a check on the refrigerating engineer's log, and would satisfy many shippers, who are inclined to be too ready to attribute deterioration of dairy-produce to a want of attention and vigilance on the part of the shipping companies.

CONCLUSION.

In concluding this report, I am pleased to be able to state that our shipments of produce have arrived in England in much better condition during the past season, and complaints as to quantity, quality, and uniformity have been much less numerous. Although the bottom, to a great extent, dropped out of the butter-market, due to mild weather and heavy stocks, our best "factory" has met with a ready and remunerative sale, and the trade in this class of goods seems to be capable of an enormous extension. If New Zealand dairy-produce is ever to obtain a recognised position in the markets of Great Britain, it is obvious that the elimination of farmers' and grocers' blended butters from our export is a consummation greatly to be desired.

It is becoming more and more clear to settlers that factory butter and cheese realise very much higher prices than that made by small farmers, in consequence of better buildings, plant, and skill being employed in the manufacture. Experience is teaching all interested that the co-operative system is the only satisfactory one upon which to work, and I am pleased to note that many of its strongest opponents are now favouring it. This, then, is a desirable advance, for it is upon the establishment of the factory-system that the success of the industry depends, and by it that we can insure the right quality of produce being sent, so as to bring steady and paying prices. In proof of this, I may state that, having examined a large proportion of our factory butter and factory cheese, I find it of as fine quality as it is possible to wish for; and it is not to be thought for a moment that farmers' butter and cheese of various qualities, quantities, and marks can be compared with the fine, regular productions of factories, and, accordingly, they realise lower prices. I am doing my very best in supplying every possible information, by correspondence and personal visits, to further the adoption of the co-operative factory-system, which cannot but lead to great financial benefit to the settlers.

Mr. W. W. Crawford, Assistant Dairy-Instructor, has devoted his labours principally to Canterbury, where he has been doing useful work in connection with the establishment of the Central Dairy Factory, and attached creameries. He was also employed for some time on Banks Peninsula, and in the Timaru District, South Canterbury. A report of his work is attached.

Mr. Newman Andersen severed his connection with the department early in this year. I have written him to furnish a short report concerning his labours while Assistant Dairy-Instructor. This will be furnished you as soon as it comes to hand.

I have, &c.,
JOHN SAWERS.

PAPER READ BY MR. J. SAWERS AT THE MEETING OF CHEESE- AND BUTTER-MAKERS HELD AT DUNEDIN ON 17TH AUGUST, 1892.

PRACTICAL CHEESE-MAKING.

MR. J. SAWERS, the Government Dairy Expert, read a lengthy paper on "Practical Cheese-making," but, as it was not completed, it was resolved that he be asked to complete it for publication.

When the resolution had been carried, Mr. Sawers said he would be most happy to finish the paper, and it would be distributed amongst the dairy factories in due course. It was the intention of the Department of Agriculture this year to publish pamphlets on various subjects dealing with the dairy industry, and the first one would deal with practical cheese-making.

The paper was as follows: Mr. Chairman and Gentlemen,—Allow me at the outset, and before starting to read this paper, to congratulate yourself and the other members of the Committee of the Dairy Association on having taken such an important step as convening a meeting of those so directly interested, and on whom the success of the dairying industry so much depends—I refer to the makers. Allow me to express my delight at seeing so many factory-managers present, and to express a hope that each and every one present will do his share to make this gathering a fruitful one. We are gathered together in the interests of an important industry to consider in a friendly way all the details which enter into its successful operation, and if possible to point out the mistakes which often cut short our profits. Gentlemen, I realise the importance of gatherings of this kind, and I trust it is only the first of many profitable gatherings we shall have together. In all branches of business men co-operate and combine for their self-protection and self-interest, and that, too, although their interests are in very many cases competitive—yes, I might say, antagonistic. But although the Committee has asked and wish the makers and factory-managers to co-operate, they do not ask them to combine in the true sense of the word. There is a great difference between co-operation and the commercial combinations we see at work in many parts to-day. In the combination there is always a tendency towards commercial coercion, while co-operation means giving more to the world by taking more from it. When one learns to make a better article in the shape of dairy produce than another, by our meeting in this way others will be induced to follow; and thus we create demand, and increase the price through the production of a better article. Thus, I say, factory-men would serve their employers and the country well by more thorough co-operation. Our interests on this side are in no way antagonistic, neither are they individually competitive, although collectively they are, or ought to be.

Gentlemen, a gathering like this is of the utmost importance to our dairy interests. It is replete with interest to us all, and one from which we can gain much and lose nothing. I trust no individual or local jealousies will be allowed to interfere with the successful issue of this meeting, but that we will all render it our best assistance. It is with much pleasure, and yet with no little embarrassment, that I appear here. I am pleased because I can fully recognise the value of this

assemblage on the future of our dairy work; but I am perplexed because the subject assigned to me looms up in such forbidding proportions. But, while I cannot hope to master my subject, I hope to at least throw on a few shavings for the present, trusting to some here—and by the discussion which I hope will follow—to provide more light and heat by piling on the more solid wood. The subject of this paper is practical cheese-making.

It is important that all who venture in this business start right, and I hope before I have done to at any rate enable them to keep clear of many of the sunken rocks on which so many have been wrecked. I do not purpose to present myself vainly and egotistically to the public as one who has learned all there is to know about the manufacture of dairy-produce, but only as one who is willing to give his somewhat varied and practical experience conscientiously. I am one who believes that one head cannot contain it all, and that there is much yet to be learned upon the subject, and that this may be the more speedily done, I record my views, hoping that by a comparison of the experience of others our aims may be sooner attained. Perhaps, like many others, I am following some hard-beaten track of our ancestors, when some other route would bring me quicker and more directly to the end we are all seeking. I purpose treating the subject in as clear a manner and in as brief a form as possible, consistent with the many ramifications of the business, so that all who may be engaged in the work may understand.

Milk is the raw material upon which the cheese-maker is first called upon to exert his skill, and that being so it ought to receive our first consideration. For the purpose of this paper, however, it is not necessary, although many may think it highly desirable, to enter at greater length than I possibly can help into this part of the business; so in the meantime I leave minute details for some other hand or for a future occasion, only touching on such facts regarding the raw material as have a practical bearing, as we pursue the process of cheese-making. However, let me say that the first and the last requisite in the manufacture of first-class cheese is first-class milk. For instance, we cannot make a rich cheese from poor milk, nor the finest flavoured products from tainted milk. Now, this fact proves conclusively that milk is more controllable as to its richness and condition through the special breed, individuality, and treatment of the cow, than in the treatment of the milk after it is drawn from the cow. For this reason I am in hearty accord with every attempt aiming at the education of the milk-producer, and, through him, the education of the cow. Then, after the improvement of the cow by breeding, feeding, and education, it ought to be the aim and duty of the milk-producer to so treat his milk that its value may be improved and not depreciated. Now, how to improve the value of the milk after it is drawn from the cow, is the next question for our consideration. If the milk is already wholesome and rich—or whether or not—a farmer can improve its value only by improving its quality and condition, in flavour and digestibility. This he can only do by changing the substance of the raw material so that a more merchantable product can be made from it. Now, to greatly assist to do this, my experience goes in the direction of strongly advocating the thorough aëration of all milk for cheese-making, and that immediately after milking and straining. I am positive that if milk is allowed to stand and cool in a large body without first being thoroughly aërated, it will not coagulate by the action of the rennet nearly so perfectly. I believe that if thorough aëration of the milk for cheese-making purposes was generally practiced, that a pound of cheese would be made from one-eighth to one-quarter of a pound less milk, and that of better quality. Thorough aëration will also materially improve the keeping-qualities of the milk, and of the cheese made from it, and I believe would reduce to a mere bagatelle the amount of what is termed "gassy milk," too common at most factories. I believe that much of the so-called "gassy milk," delivered at factories, and which is such a serious bar to the manufacture of a fine product, is principally due to dirt, and to the new milk being kept in a large body without being first thoroughly exposed to the air, causing it to retain its heat for too long, and thus keeping the milk in the best condition for the growth and action of the germs of fermentation. This is forcibly illustrated from the fact that factory-men experience very little or no difficulty with "gassy milk" in cold weather, the trouble arising principally during the hot weather. If milk is kept in a large body, in, say, factory-cans, and left undisturbed just as drawn from the cow, it will, in my opinion, through the speedy growth of the germs of fermentation, invariably turn out "gassy," and be a source of trouble and annoyance at the factory. Therefore, I would ask the cheese-makers and factory proprietors to insist upon the suppliers aërating milk, as being a much better preparation for preservation than the common practice of dumping it into a large can and leaving it undisturbed, or by cooling it to a low temperature, lower than the surrounding atmosphere, by means of cold water. In allowing milk-suppliers to keep their milk overnight, teach them to set it in small quantities rather than in a large body in one vessel. This will clear away many of the difficulties which invariably beset the maker in the manufacture of uniformly-fine goods. It is well known that there exists a value in milk not wholly due to the percentage of solids it contains, but due to its peculiar flavour and conditions regarding quality, resulting from the feed and treatment of the cow, and the treatment of the milk after it is drawn from the cow. For this reason it is very difficult, although needful, to establish an equitable basis for the payment of milk at cheese-factories according to its real value for manufacturing purposes. It is, however, the greatest injustice to pay the same price for milk containing 3 per cent. of butter-fat as for milk containing 4 per cent. of butter-fat. For if 3-per-cent. milk yields a given amount of cheese, then milk containing 4 per cent. of butter-fat will yield more cheese, and the patron supplying it ought to be paid accordingly. But more of this anon. Let us now consider briefly the main points in the treatment of the milk and curd, necessary for the production of the finest goods. In the manufacture of cheese there are, in addition to milk, other natural agents used, which working together bring about that change which milk undergoes in its conversion into cheese, by being changed from a liquid into a solid form. These are heat, rennet, salt, and the atmosphere, which must all work together in the fabrication of a first-class cheese, and the successful maker is he who knows how to treat his raw material and curd so as to arrange a healthful balance between them from first to last.

Of these I cannot treat in detail within the limits of this paper, but only so far as they may have a powerful and obvious bearing throughout the process.

Milk is usually composed of solids dissolved in about ten times their bulk of water, holding in suspension from 3 to 6 per cent. of butter-fat. Now, the first aim of the cheese-maker is to separate the caseine, or curd and butter-fat in combination with water, from the other substances the milk contains. How are you to bring about that state? By the action of rennet, making certain substances of the milk insoluble. The butter-fat, being in a state of emulsion, needs no special treatment to cause it to separate; in fact, the object should rather be to keep it in a fine emulsion until the coagulation of the caseine has taken place, so that the fat may be more evenly encased or distributed throughout the whole body of the solidified caseine or curd.

The first step, therefore, is to coagulate the caseine of the milk with rennet, by which solidification the butter-fat will also be encased and held in suspension. Now, there is a point here worthy of note, and to which I wish to draw your attention. The condition of the caseine at the time the rennet is added has very much to do with the quantity of cheese you can make from a given quantity of milk. Then, the quality of it at this stage exerts a powerful influence over the condition and quality of the finished product. It is of the utmost importance that you should determine the exact condition of the caseine of the milk as regards maturity before the introduction of rennet. In fact, I cannot find words strong enough to press home this point of the process. Here lies one of the great secrets of successful cheese-making, for undoubtedly the state of the milk when consumed raw, and before curdling in the making of cheese, exercises a most important influence both on the value of milk as an article of food and upon its conversion into cheese. The great importance to the cheese-maker of being able to estimate with accuracy the condition of his milk as regards maturity cannot be over-estimated. That a certain amount of maturity is required before the addition of rennet, for the purpose of causing a complete coagulation of the caseine, can be easily ascertained by a little experiment. Take, for instance, a given quantity of milk containing a feeble trace of acidity; then take a given quantity of milk newly drawn from a healthy cow. Again take a given quantity of new milk into which has been put a few drops of an alkaline solution. Let us now add a given quantity of rennet extract to each sample of milk, and carefully note the time required for coagulation of each sample and note the condition of the curd when coagulation is complete. The sample having a feeble degree of acidity will be found to coagulate more quickly and more perfectly, and will differ materially from that of the other samples. In the other samples it will be found to take longer for the rennet to act on the caseine, and that solidification will never be so perfect. The curd from the sample of milk slightly alkalized will be found, on examination after complete coagulation, to want that firm flaky body and cohesiveness that will characterize the slightly matured article. Moreover, the curd from the slightly alkalized sample, if any attempt is made to separate it from the whey, the latter will become full of extraneous matter, caused by minute fragments of curd separating with the whey through the weakness of the curd structure, thus forming what is known to the cheese-maker as "white whey." I will here quote an extract from a paper on "The Work of Acidity in Cheese-making," by Francis T. Bond, M.P., and published in the Journal of the Royal Agricultural Society of England, third series, Vol. ii., part ii., page 275. He says that while the presence of acidity in milk is not *essential* to enable rennet to exercise the peculiar power which it possesses of coagulating it, a certain amount of acidity in the milk when the rennet is added to it gives to the curd a degree of tenacity which renders it firm and enables it to be handled without loss of any material portion of its structure in the whey. Our makers do not seem to appreciate the value of this point and fact as they ought to do, and will have to do, before they will ever attain their desired end. This ripeness of the milk at this stage is not merely to hasten the action of the rennet, but is something which conveys its influence further. It acts as a regulating balance throughout the whole process, and its effects enter into the quality and build of the finished product. One thing makers must all recognise through their every-day work is that a certain amount of acidity is required in all curd before the addition of salt, in order that the cheese may possess that mildness of flavour, nutty, buttery quality, firmness of body, and keeping qualities which so much characterize a first-class Cheddar cheese. Now, this being so, it will readily occur to you that if the milk is set too soon, or before the proper degree of ripeness is reached, we have just to wait for the deficiency of maturity in some other part of the process. Now, by allowing a feeble maturity to be brought about in the milk prior to the introduction of rennet, not only do we obtain a better yield and a better quality of goods, but we save time thereby; for it is well known that milk ripens much faster and much better when all its constituents are together and intact. Any person of ordinary intelligence can carry out a series of experiments to prove the reliability of the primary effects of acidity, and of its excess or deficiency, on the curd and curded cheese.

Some of the makers, with a view to hastening the process of maturing, resort to the introduction of sour whey—a process, to say the least of it, which seems rather anomalous. Such a practice is very dangerous, and is very likely to propagate faults from one day's milk to another, producing a host of unnecessary evils which have to be contended with in subsequent parts of the process.

The amount of acidity which milk should possess before the introduction of rennet varies according to the season of the year. In the early part of the season—say, during September and part of October—a higher stage of maturity and more rennet is required to produce a thorough coagulation of the caseine than is required later in the season. This is due to a want of cohesiveness in the caseine of the milk in the early part of the season, resulting from the cows being newly-calved and from the too moist feed of the early part of the spring. But as the season advances and the feed becomes more mature, the cohesiveness of the curdy substance of the milk will be much greater, and will not require so much maturity in the milk or the addition of so much rennet to produce complete coagulation. Now, from what has been said, it will be obvious that this knowledge of the right condition of the milk before the addition of rennet is one of the nice points in cheese-making,

and one upon which it is highly important the greatest amount of light should be thrown. This is my only apology for treating so fully on this point. The safest and best plan for ripening the milk before the addition of rennet, if the desired condition is not already reached, is to heat the milk a little higher than the setting temperature and leave it to stand—stirring occasionally to keep down the cream—until the desired stage of maturity is reached. The exact stage of maturity depends upon a combination of circumstances, some of which have been already indicated—notably, arising from the nature of the soil, feed, water, and period of lactation of the cow—so that the cheese-maker must use his own good sense and judgment. Again, if the milk exhibits any trace of taint, or what is known by most makers as "gassy milk," I advise the development of a higher stage of maturity, as the presence of "taint" or "gas" is always opposed to the formation of "lactic acid." I believe this is the best if not the only effectual means of treating what is known as "gassy milk."

The more progressive and careful makers have for some years used what is known as the "rennet test" for determining the state of maturity of the milk before renneting. This is the best and surest test for acidity, at least for our purpose, I know of. A good deal can be done in judging the condition of the milk by smell and appearance, by any good maker familiar with the milk of his district. In factories, if the night's milk is "off" a little, it can easily be detected by the maker through commencing to display an old smell—*i.e.*, when the sweet smell of new milk exhibits a desire to disappear. When such is the case it is a sure indication of over-maturity. If the milk is kept by the suppliers over-night it is a good plan on arrival of milk at the factory, and before taking the lid off the carrying can, to surge the lid up and down, and thus force the odours eliminating from the milk up to the nostrils. If the makers are gifted with a keen sense of smell, they will by such means be able to detect any milk that is sour or tainted, and by such gain a good indication of the state of the raw material upon which they are called to exercise their skill, so that they may regulate their day's work accordingly. I have seen some makers resorting to the use of litmus paper as a test for maturity. The application of litmus paper may be used as a guide, but is not by any means a reliable or satisfactory test, and is very liable to lead astray.

The rennet test will supply any maker of ordinary intellect with an unerring indication as to the exact condition of his milk. This test is based upon the well-known fact that ripe milk will coagulate with less rennet in a given time than sweet milk. All that requires to be done is to use a tea-cup or other small vessel, and take from your milk-vat a given quantity of milk, say 6oz. Now introduce to this 6oz. of milk a given quantity of rennet, of which you know the strength, say for handiness a teaspoonful, or a fluid drachm, and note the time employed in coagulation. If solidification begins in, say, 15sec. or 20sec., add your rennet immediately, as it is a sure sign of a forward maturity; if in, say, 25sec. or 30sec., then it is obvious that the process of maturing (ripening) is not sufficiently advanced, and ought to be carried forward yet for some time by allowing the milk to stand at a temperature of, say, 90° or 92°, and thus bring about the desired condition naturally, and without the baleful practice of using sour whey as a whip to arouse dilatory Nature.

In the autumn, or late in the fall, when the nights are cold, and the milk arriving very sweet, I advise the use of a little old milk as being much preferable to whey.

The temperature at which the rennet is added is of no great moment, so far as I am aware. But for the saving of time, and convenience, I advocate setting at a temperature of 84° to 88° Fahr. I made several experiments during the year to determine the best setting temperature, and so far the conclusions lead me to believe that there exists no influence in the setting temperatures between 80° and 90° that will materially change the value of the cured cheese. In fact, for milk showing indications of much acid, I prefer a setting temperature of from 90° to 92°, as it allows me to keep the acid more under control by hurrying on the process of coagulation and heating of the curd. Setting at the lower temperatures of 80° to 82° seems to me a waste of time, for its only tendency is to retard the action of the rennet and formation of acidity, which is not desirable or beneficial when the milk is in proper form. My experience leads me to believe that in setting at a low temperature it inclines to produce a too soft curd, which requires extra careful handling in order to obviate a great waste in the whey. In setting over 90° you incline to produce a whitish whey, so that I prefer a setting temperature of from 84° to 88°.

By setting at 88° we save time thereby, for experience has shown us that in the manufacture of Cheddar cheese a temperature of 98° must be reached in order to produce sufficient contractility in the curd to expel the whey without undue bruising and waste. If we set at 80° we have a range of scalding temperature of 18°. If we set at 88° then we have only 10° to raise the temperature. Now, in setting at the lower temperature the curd is softer, and requires to be heated more slowly and carefully than at the higher temperature of 88°. Then, again, it must necessarily take longer to raise the temperature through 18° than 8°; and I believe, if anything, by setting at the lower temperature more waste will result. So far as my experience goes, I have not been able to detect any appreciable difference in the quality of the cheese made from the same milk but set at different temperatures. Therefore, I advocate setting at 84° to 88°, as being likely to produce the largest quantity of the finest goods.

Having been successful in attaining the proper degree of acidity and temperature of the milk, the next step is to add the rennet—presuming the colouring, if any, has been already added—which should just be sufficient to produce a nice straw colour. It is superfluous to say, seeing that rennet fulfils a somewhat important mission in the fabrication of all cheese, it is of the greatest importance that nothing but the best rennet should be used. By the use of rennet the cheesemaker reduces the bulk of his milk by fixing the caseine and fat into a consolidated body, and getting rid of the water and some of the other ingredients which go into the whey tank.

Now, as already stated, all makers will find that coagulation will be more perfect if the milk has been well aërated immediately after milking and straining. The contents of the vat should by no means be disturbed after the addition and thorough distribution of the rennet, or coagulation

will be imperfect. Even the vibration of the floors of some of the factories I have worked in is detrimental to the best solidification of the milk. During the period of coagulation everything should be still.

The rennet extract should always be diluted with water to the extent of, say, one gallon to every 2oz., or largely enough to allow of the even distribution of the rennet globules through the whole mass of milk. In using a rennet extract of great strength, it is hard to get it properly mingled with the whole mass before it starts to act on the caseine of the milk. I claim that by diluting the extract it insures more reliable and exact work; and this in itself is no small matter, for much depends upon the condition of the curd at this stage. Now, as to the quantity of rennet to be used, much depends upon the condition of the milk, arising from a difference in soil, food, and water, and time after calving.

Newly-calved cow's milk is very difficult of perfect coagulation; so also milk from very succulent feed, such as in the early part of the spring. This is due to the want of tenacity in the solids of the milk at that time. For this reason the addition of more rennet is necessary in the early part of the season, say during September and part of October, than later. A higher degree of acidity is also necessary in the milk, to effect a proper structure in the curd during the early part of the season, but great care must be used in doing this, as milk sours very rapidly during the early period of lactation of the cow.

In the early part of the season, use enough rennet to induce coagulation in eight to ten minutes, and to have the curd fit for cutting in twenty to twenty-five minutes, with your milk at a temperature of 84° to 88°. This will produce a curd with a firmer body and better structure, and save a considerable loss in the whey, thereby producing more curd from a given quantity of milk.

Later in the season add enough rennet to produce coagulation in, say, from thirty to forty minutes, with the milk at a temperature of from 86° to 88°; and in the fall, say in April and May and later, add enough rennet to produce coagulation in from thirty-five to forty-five minutes, with the milk at a temperature of from 88° to 90°. These quantities and temperatures will produce the most curd of the best quality. Now before leaving this point, regarding the use of rennet, I wish to state that I do not think that rennet has much if any effect on the curing of cheese. I believe a large quantity may have a tendency to cause the curd to retain more moisture, and on that account to produce rapid curing. I believe some milks, as already indicated, require a larger quantity of rennet to make coagulation perfect than other milk, and that if too much is added it may tend to cause the curd to hold more moisture, and so lead to the faster decomposition of the cheese, unless means are taken to expel and counteract such surplus moisture.

Add only enough rennet, according to the season and other circumstances, to cause the perfect coagulation of the caseine. Any more is waste. I have heard it remarked that if rennet has no influence on the curing of the cheese, then the coagulation of the milk by any acid will fulfil the purpose. We well know that it will not. The milk must be coagulated with some natural substance, and so far nothing has proved effective but rennet. If care is taken in the treatment of the milk and curd no appreciable difference will be seen in the yield and quality of cheese made by the addition of an overdose of rennet. In fact, the use of a larger quantity of rennet in over-ripe milk is beneficial, as there will be a great difference in the time of coagulation, and this will allow of getting more ahead of the action of the lactic acid, and a better cheese invariably will result.

After coagulation is complete the cutting of the curd commences. The usual test for determining when the curd is ready to cut is when it will split clean over the finger, which is a very good indication, but cannot be strictly adhered to. Another way is to note the time taken to influence coagulation, and then, in time and half the time taken to induce coagulation the curd will be ready to cut. To illustrate: If coagulation commences in twenty minutes, then in twenty minutes and ten minutes more coagulation should be complete, and the curd fit for the knife. If in sixteen minutes coagulation commences, then in sixteen minutes and eight minutes more it should be ready to cut. When followed, with a little common sense this is a very good rule, but does not hold good in all cases.

In the early part of the season, and for over-ripe milk, the curd should be cut rather earlier, but very slowly and carefully, in order to prevent loss in the whey. By cutting early a quicker and more thorough separation of the whey from the cubes of curd is effected, which is highly desirable at the beginning of the season and in the case of over-ripe milk.

Always cut with a horizontal knife first, and by so doing you will prevent waste. If the perpendicular knife is used first, when the curd is so tender, more of the fat globules of the milk will rise to the surface, because they meet with less resistance in rising. By using the horizontal knife first the whey lies longer between the layers of the curd, and does not allow of the same freedom for the fat globules to ooze out of the pieces until on the surface of the curd a skin is formed which will prevent an undue waste of fat. I believe that by this simple act a saving of a few pounds of curd could be effected in a common vatful of milk. If the milk is rich, which it always is at the fall of the season, or if the curd or cured cheese inclines to be moist, or in the case of over-ripe milk, cut the curd a little finer. The force of this is evident, for the finer the cubes of curd the more quickly will the whey expel, and the more likely you will be to get rid of the surplus moisture.

After cutting with the horizontal knife, it is a good plan to allow the curd to settle until the whey rises over the whole surface. This will allow of the cubes of the curd having become sealed on the surface by the formation of a thin skin, and thus waste is prevented. Now cut with the perpendicular knife to desired size, and, immediately after cutting is finished, stir the mass carefully for a few minutes, and then gradually raise the heat until 98° Fahr. is reached. The heating process should occupy about forty to forty-five minutes. This will allow of the cubes of curd being gently healed over, and so allow for the free expulsion of the whey by contraction.

Now makers are all the time wondering at what exact state the whey should be drawn. It is more important to know how and when to have the whey out of the interior of the pieces of curd. Then, if that is effectual, the dipping of the curd is not of so much importance as the majority of us

think. If the curd is dry, and the moisture properly expelled, a higher development of acidity in the curd is acquired, and a finer cheese in flavour and texture will result. The first evident action of acid is to take more whey out of contact with the caseine, and the structure of the curd becomes more contracted. Always endeavour to have the curd strong enough in its own structure before the acid begins to contract it, so that it will not be ruptured. Then, when the curd is well "cooked," the texture is much stronger, and the curd will not harm with a much higher stage of acidity. If the curd is soft, however, draw the whey sweeter. Remember that a sour cheese is always a mealy dry cheese, because the action of the acid has so ruptured the curd that the particles do not stick together, rendering the caseine of the curd much less soluble. If the milk be "gassy," then it is necessary to develope more acidity before drawing the whey, because the formation of gas is always antagonistic to the formation of lactic acid, and *vice versâ*.

Draw most of the whey early, and so guard against being caught unprepared for the rapid development of acid. Do not dip the curd until the presence of acid is clearly discernible by the hot-iron test. When you are troubled with "gas," allow a development of acid, such as will be indicated by threads from the hot iron at least a quarter of an inch long before the removal of the whey.

REPORT ON SEASON'S WORK BY MR. W. W. CRAWFORD, ASSISTANT-INSTRUCTOR.

My work was begun in Dunedin, on the 6th October last, when I visited the New Zealand Dairy Supply Company's Factory, advising them on many matters, principally of an engineering character, and pointing out how impossible it was to work with the small steam-raising accommodation they possessed. It was evident that this company had only made arrangements for a small business, and were suddenly faced with an enormous milk-supply, with which the manager had not the necessary appliances to cope. I advised in the erection of a creamery for this company at Hampden, as also in the taking over of a factory at Owake, Catlin's River, which places I visited several times for the purpose. The creamery at Hampden has been a great success in every way, and has worked without a hitch during the season; and I must here say that I consider that the carting of huge quantities of milk into town is a mistake in many ways, and that in every instance the milk should be separated in the district where it is produced. Not only is this desirable from a cost-of-carriage point of view, but also because fermentations of a wrong character are liable to be set up in milk which remains unskimmed for a long period, and the butter be consequently of a non-keeping kind. I also advised this company to use per-manganate of potash as a deodoriser, and issued a circular to the factories in the Middle Island advising its use; indeed I was quite astonished to find that not one dairyman I met was aware of the valuable qualities of this excellent and harmless substance.

The factories on the Taieri were subsequently visited. The Cranley Factory, belonging to the Henley Estates Company, was in a very creditable condition, and turning out fine quality cheese. The Henley Co-operative Company had not been so fortunate in the previous season, the report upon their cheese being that it was "of very inferior quality, being short and sour, and did not keep well." I soon found out what was the matter, and by lowering the working temperatures (setting at 82°) the difficulty was got over. I remained the best part of a week instructing the manager in his manufacture, with the result that the buyers' report upon the cheese for this season reads as follows: "It is of excellent quality, all the fat appears to be left in the cheese, and the flavour and texture leave nothing to be desired." Maungatua Cheese-factory and the Edendale Factory were next visited.

On the 7th December I proceeded to Le Bon's Bay, Banks Peninsula, where I found a butter-factory almost completed, in which great mistakes had been made. I suggested such alterations as were possible; but a large amount of their money could have been saved to these settlers had they obtained advice earlier.

A campaign was arranged for Banks Peninsula, and schools of instruction were held in the several bays, and lectures delivered at public meetings at Pigeon Bay, Okain's, French Farm, Wainui, German Bay, and several public meetings at Akaroa; at the last of which a resolution was passed in favour of establishing a system of creameries round the Akaroa Harbour in the various bays. This has not yet been done, owing to small differences between the residents in the respective bays; but it is my opinion that next season these settlers will be compelled to drop out of the dairy business unless they adopt the factory system of manufacture, for, although scrupulous cleanliness is the rule with the farmers on the Peninsula, I saw instances requiring the presence of a sanitary inspector—in one instance cheese was being made in the midst of filth—indescribable filth.

In Canterbury I have had the pleasure of assisting in the organization of the Canterbury Central Co-operative Dairy Company, specifying and arranging the machinery for their central factory at Addington, and creameries at Oxford, Springston, Doyleston, Halswell, and Marshlands. The Little River settlers have joined this organization, and plans are being prepared by me for large creameries in connection with the Canterbury Central Dairy Company, at Little River, Ladbrook's, and Lakeside. I look upon this as the most important dairying organization in New Zealand, for the reason that it is purely co-operative. They are providing themselves with freezing machinery and every modern appliance.

I have also prepared plans for a large creamery for the Tai-Tapu Dairy Company, at Greenpark; and afforded a great variety of information of a technical character, by letter, to a large number of people who have applied to me.

In concluding this report, allow me to express my belief that until milk is passed through the separators at a high temperature, and the cream suddenly reduced to a low one by the aid of the freezing-machine, and the butter after being made kept at a temperature below the freezing-point of water, after being thoroughly dried in a centrifugal machine, New Zealand will not land the best class of butter in England.

W. W. CRAWFORD.

APPENDIX III.

AUSTRALASIAN STOCK CONFERENCE.—(CONFERENCE OF CHIEF INSPECTORS OF STOCK, VETERINARY SURGEONS, AND STOCK-BREEDERS OF THE AUSTRALASIAN COLONIES, HELD IN WELLINGTON IN OCTOBER, 1892.)

REPORT.

THE Conference commenced its sittings on the 25th October, and concluded its labours on the 31st October. It was called together by the Hon. the Premier of New Zealand for the purpose of considering the regulations relating to the introduction of stock, the prevention of disease in stock, and other subjects.

The following were the representatives of the several colonies :—

New South Wales	...	Mr. Alexander Bruce, Chief Inspector of Stock.
Queensland	...	Mr. P. R. Gordon, Chief Inspector of Stock.
Tasmania	...	Mr. T. A. Tabart, Chief Inspector of Stock.
"	...	Mr. Archibald Park, M.R.C.V.S., Veterinary Surgeon.
New Zealand	...	Hon. Sir John Hall, K.C.M.G., Stock-breeder.
"	...	Mr. John Roberts, C.M.G., Stock-breeder.
"	...	Mr. Thomas Brydone, Stock-breeder.
"	...	Mr. William Boag, Stock-breeder.
"	...	Mr. W. E. Bidwill, Stock-breeder.
"	...	Mr. Coleman Philips, Stock-breeder.
"	...	Mr. W. F. Lawry, M.H.R., Stock-breeder.
"	...	Mr. J. McNicol, Stock-breeder.
"	...	Mr. John D. Ritchie, Chief Inspector of Stock.
"	...	Mr. John F. McClean, M.R.C.V.S., Veterinary Surgeon.

Victoria, South Australia, and Western Australia were unrepresented.

The following is a copy of the circular-letter, dated the 11th July, 1892, addressed to the different Australasian Governments :—

"SIR,— "The Premier's Office, Wellington, 11th July, 1892.

"As the time is approaching for the triennial meeting of Chief Inspectors of Stock, Government Veterinary Surgeons, and stock-owners of the Australasian Colonies, I have much pleasure on behalf of my Government to convey a cordial invitation that the Conference be held in New Zealand.

"I shall be obliged by your advising me at the earliest opportunity if it will be convenient for your representatives to attend, so that the necessary arrangements can be completed.

"I would suggest that the Conference be held in Wellington on the 25th October next.

"I have, &c.,
"JOHN MCKENZIE,
"For the Premier."

All the delegates were present with the exception of the Hon. Sir John Hall, K.C.M.G., Mr. W. E. Bidwill, and Mr. McNicol, who, it was announced, would arrive later.

The delegates were introduced by Mr. Ritchie, Chief Inspector of Stock, who read the following letter from the Hon. J. McKenzie, Minister of Agriculture, apologizing for his being unable to attend through illness.

"GENTLEMEN,— "Minister of Lands Office, Wellington, 25th October, 1892.

"I have to express great regret that the state of my health prevents my being present at the opening of the Conference this morning to welcome the representatives of the Australian Colonies and the stock-owners of New Zealand. At the same time I have to express my gratification at the decision of the Governments of Queensland, New South Wales, and Tasmania, to accept the invitation of the New Zealand Government to hold the Conference here.

"I trust the outcome of this Conference will be of mutual benefit to all the colonies interested, as I have every confidence that the business brought before the Conference will receive such attention as the importance of the several subjects merits.

"I needly hardly add that it will give me the greatest pleasure to render you every assistance iu my power, although I shall unfortunately be absent from your sittings; and again thanking you for your presence,

I have, &c.,
"JOHN MCKENZIE,
"Minister of Agriculture."

"The Members of the Australian Stock Conference.

Mr. Ritchie thereupon called upon the meeting to elect a chairman, when it was unanimously agreed that the Hon. Sir John Hall, K.C.M.G., be asked to take the chair on his arrival, and that, in the meantime, Mr. John Roberts, C.M.G., be Acting Chairman.

The meeting then proceeded to consider the resolutions passed at the Australasian Stock Conference held in Melbourne in November, 1889.

The following resolutions were passed :—

Preliminary.

1. That each colony represented have three votes.
2. That where a colony is represented by the Chief Inspector of Stock and another delegate, the former shall have two votes.
3. That a notice of motion must be in the hands of the Chairman not later than the day preceding the proposed discussion thereof, unless the matter is considered urgent by the Conference.

4. That no member of the Conference be allowed to speak on any subject under discussion for more than ten minutes, but that such time may be extended five minutes, or a still further period by the indulgence of the Conference. The mover of any motion shall have the right to reply.

5. That the following be the subjects for discussion:—

(1.) Regulations regarding the introduction of foreign animals. Foreign diseases, *i.e.*, diseases not known in Australasia.

(2.) Regulations regarding the introduction of Australasian animals: (*a*) by sea; (*b*) by land.

(3.) Regulations regarding disease: (*a*) Scab; (*b*) catarrh; (*c*) fluke; (*d*) worms; (*e*) foot-rot; (*f*) anthrax; (*g*) pleuro-pneumonia; (*h*) tuberculosis; (*i*) stringhalt; (*k*) coccidium and actinomycosis; (*l*) prurigo (horse-mange).

(4.) Rabbit-pest.

(5.) Frozen-meat trade.

(6.) Stud-book for Australasia.

(7.) Any other subject which may be suggested and agreed to by members of the Conference.

6. That the term "Australasian colonies" comprises the colonies on the Continent of Australia, also Tasmania and New Zealand; and that the term "foreign" includes all other parts of the world.

Animals and Things prohibited.

7. That the following foreign animals and things be prohibited:—

(1.) Cattle, sheep, and pigs from all foreign countries and colonies other than Great Britain and Ireland, unless they have been fourteen days in Great Britain or Ireland.

(2.) Goats, deer, antelopes, llamas, buffalo, and any other ruminants from all foreign colonies and countries, unless for a zoological society.

(3.) All fodder and litter with which foreign animals have been in contact from any foreign colony or country, or from any foreign vessel.

Introduction of Foreign Animals.

8. That the following foreign animals be admitted, subject to regulations framed on the resolutions of the Conference:—

(1.) Horses from any colony or country.

(2.) Camels from any colony or country.

(3.) Cattle, sheep, and pigs from Great Britain or Ireland.

(4.) Goats, deer, llamas, antelopes, buffalo, and any other ruminants from any colony or country, if intended for a zoological society.

(5.) Dogs from any colony or country.

9. That the following be included among the regulations under which foreign animals and things not prohibited may be admitted into any Australasian colony:—

(1.) That twenty-four hours' notice be given by the owner of the animals of his intention to land them.

(2.) That the animals be accompanied by a declaration by the owner, and a certificate by the Inspector, or by a qualified veterinary surgeon, in the district from which they start.

(3.) That no animals, or any fodder, fittings, or effects, with which foreign stock have been in contact, be landed without the written permission of the Inspector.

(4.) That notice be given to the owner when any stock are ailing or are about to be destroyed.

(5.) That notices be given personally, or left at the residence or place of business of the person for whom the notice is intended, or sent by registered letter to the address of such person.

(6.) That at least fourteen days' notice be given to the Chief Inspector of Stock of an owner's intention to introduce foreign stock.

(7.) That all cattle and sheep and pigs exported to Australasia be shipped from the port of London or Glasgow.

(8.) That the Agents-General for the several colonies be asked to appoint one (*i.e.*, the same) qualified veterinary surgeon at each port of shipment, to examine all stock intended to be exported to any of the colonies; such veterinary surgeon to give a certificate of health to accompany the animals.

(9.) That animals intended to be introduced into any of the colonies, and all other animals on board the same vessel, be examined at the port of shipment by the veterinary surgeon appointed by the colonies, and be accompanied by a certificate from him that they are all free from infection, and that in their case the regulations have been complied with.

(10.) That the skins of all animals which may have died or been slaughtered on board any foreign vessel during the voyage, and not destroyed or thrown overboard, be salted and securely packed in cases or casks, and not landed except for transhipment under the supervision of an Inspector.

(11.) That a joint declaration be obtained from the captain of the vessel and attendant of the stock as to the health of foreign stock on board on arrival in port.

(12.) That all stock intended for ship's use and all dogs arriving by any foreign vessel shall, within forty-eight hours of their arrival in port, be either removed to quarantine or killed under the supervision of an Inspector.

The carcases of any cattle, sheep, or pigs so killed may by instructions of an Inspector, and under his supervision, be sold and delivered ashore.

(13.) That foreign animals intended to be landed in the colonies be examined on arrival by a veterinary surgeon, and an Inspector of Stock, who shall report to the Chief Inspector of Stock whether or not such or any other animals on board such vessels are infected.

(14.) That if foreign animals (except camels) are infected they be destroyed or disposed of as the Minister directs.

(15.) That camels found on arrival to be infected with scab be dressed as the Chief Inspector directs.

(16.) That if foreign animals are not prohibited, and are reported free from infection, and if the Chief Inspector be satisfied that they are not infected, they may, after being washed and disinfected when necessary as he shall direct, be landed for quarantine on sufficient bond and guarantee.

(17.) That all foreign animals be conveyed by water, at the owners' risk and expense, to quarantine, and remain for the terms respectively prescribed for the different kinds of animals, at their owners' risk and expense, and that they be washed, dipped, or disinfected as the Chief Inspector of Stock shall direct.

(18.) That the quarantine for the several animals shall date from the day of landing, and shall be as follows: (*a*) For horses, fourteen days; (*b*) for cattle, sheep, pigs, goats, deer, antelopes, llamas, and any other ruminants, sixty days; (*c*) for camels, ninety days; (*d*) for dogs, six months.

(19.) That all foreign sheep landed in the colonies forthwith receive two or more dressings with tobacco and sulphur, or with lime and sulphur.

(20.) That, on the expiry of the term of quarantine prescribed for foreign animals, they be examined by a qualified veterinary surgeon and an Inspector of Stock, and released on the order of the Chief Inspector.

10. That dogs be quarantined in the Government quarantine grounds only.

11. That no foreign stock nor skins be transhipped without the permission in writing of an Inspector, and that no foreign stock be put on board any Australasian vessel unless such stock has undergone quarantine, and the regulations referring to foreign stock have otherwise been complied with.

12. That foreign stock, and the stalls and pens used by them, and the attendants' clothes and effects on board a foreign vessel, in any Australasian port be disinfected as the Chief Inspector may direct.

13. That Australasian stock coming into direct or indirect contact with foreign stock, or with infected stock, be deemed foreign or infected stock.

14. That if the Inspector at the port of arrival is doubtful as to the freedom of any stock from infection he may temporarily detain them on board ship, or remove them to some other vessel for a period not exceeding forty-eight hours, at the owners' expense, where they may be dressed or disinfected as the Inspector may direct.

15. That all stock during the period of quarantine be under the surveillance of a qualified veterinary surgeon.

Interchange of Australasian Animals.

16. That no colony be deemed to be a clean colony in which scab exists or has existed within the next preceding two years, and no sheep or sheepskins shall be introduced except from a clean colony.

17. That no sheep shall be imported by vessels that have traded to any but a clean Australasian colony within the next preceding three months, nor by any vessel which shall within that period have had any sheep on board from any colony or country other than a clean Australasian colony; and the captain of the vessel shall, when required, make a declaration to that effect.

18. That no stock, other than sheep, shall be imported by vessels that have, within the next preceding three months, had on board any infected stock, or any stock from any colony or country other than a clean Australasian colony; and the captain of the vessel shall, when required, make a declaration to that effect: Provided that cattle may be imported into any colony for immediate slaughter in quarantine, and under proper quarantine regulations.

19. That all stock intended to be landed shall be accompanied by a declaration from the owner, and a certificate by the Inspector, or a qualified veterinary surgeon at the port from which such stock were shipped, that they are not infected, and had not during the next preceding twelve months been infected; also that, unless they are intended for immediate slaughter in quarantine, as provided by the last preceding resolution, they are from a clean colony.

20. That, if the Inspector at the port of arrival be doubtful as to the freedom of any stock from infection, he may temporarily detain them on board ship, or remove them to some other vessel for a period not exceeding forty-eight hours, at the owners' expense, and they may be dressed or disinfected as the Inspector may direct.

21. That, if on examination by the Inspector or a qualified veterinary surgeon, and the production of the necessary declaration and certificate, the Inspector considers the stock free from infection, he may allow them to land.

22. That if the stock be found to be infected they may be destroyed or otherwise disposed of, as the Minister directs, without compensation.

23. That where an outbreak of disease occurs in any Australasian colony, the neighbouring colonies may, pending the extent and risk of the outbreak being definitely ascertained, at once issue a prohibition against the introduction of stock from such colony; and that the duration of the prohibition depend upon the amount of risk arising from such outbreak.

24. That sheep imported into any colony, and certified by an Inspector of that colony as free from infection, may be introduced into any other colony if found to be free from infection by the Inspector of the latter colony into which the sheep are being imported

25. That Australasian horses and dogs, accompanied by a declaration by the owner and a certificate from the Inspector or veterinary surgeon at the port of shipment, be allowed to land on the permit of a Customs officer; but, in the event of any colony or colonies not carrying out the regulation requiring foreign dogs to be quarantined in Government quarantine grounds only, all dogs arriving either by sea or land from any such colony or colonies shall be deemed foreign stock.

26. That no Australasian stock be transhipped in any Australasian port without the permission of the Inspector.

Miscellaneous.

27. That this Conference considers that M. Pasteur's vaccine of anthrax is effective, and recommends that assistance be given him in establishing agencies in all the colonies, with a view to those owners who require the vaccine obtaining and using it.

28. That the travelling, selling, or offering for sale, or slaughtering for food, of any animals affected by the diseases known as tuberculosis and actinomycosis, or the using of cows affected by tuberculosis and actinomycosis for dairy purposes, be punishable by law; and that there be a more thorough inspection of dairy cattle in use in populous districts.

29. That the Conference expresses its belief in the efficacy of inoculation as preventive of pleuro-pneumonia.

30. That the Conference affirms the principle of compulsory inoculation for pleuro-pneumonia where the disease appears.

31. That on the Continent of Australia there be no restrictions against the free interchange of inoculated cattle, bearing the inoculation ear-mark, but that a declaration by the owner that the cattle have been duly inoculated accompany them.

32. That all sheep infected with catarrh be destroyed; that the owners be recompensed to the extent of two-thirds the value of sound sheep at the date of destruction; and that the run or place on which the sheep were pasturing be strictly quarantined for six months.

33. That, as the conditions are so various in the different colonies, each colony should legislate for itself, where practicable, on the subjects of fluke, worms, and foot-rot in sheep.

34. That the Government of Western Australia be urged by the Governments of the colonies represented at the Conference to take more energetic steps than those at present adopted for the speedy eradication of scab.

35. That steps be taken by the several Australasian Colonies to thoroughly eradicate ticks and lice in sheep.

36. That any animals found to be affected with glanders, farcy, foot-and-mouth disease, rinderpest, sheep-pox, swine-fever, rabies, trichinosis, or any other infectious or contagious disease not existing within the colonies be at once destroyed.

37. That it is desirable that an efficient and competent staff of Inspectors of Stock be maintained in each colony, to prevent the introduction and to arrest the spread of contagious or infectious diseases in each colony, and to give the other colonies confidence that the stock asked to be introduced are free from infection; and that where stock come from a colony in which such a staff is not maintained, the colony into which they are proposed to be introduced be entitled to put on such restrictions as it may deem necessary to impose by way of guarantee that such stock are not infected.

38. That it is desirable the Governments of Queensland, South Australia, and Western Australia should exercise the greatest possible vigilance with respect to their northern ports to prevent the introduction of diseases from Eastern, Indian, or Chinese ports.

39. That regulations in regard to the travelling, movement, or conveyance of animals be left to be dealt with by each colony within its own boundaries.

40. That all drafts of laws or regulations dealing with the diseases of animals be, as far as practicable, submitted by the Government framing them to the Governments of the other colonies for remark before they become law; and that proofs of any papers or reports relating to pastoral matters, which would be likely to be of benefit or interest to stockowners generally, be also forwarded, in order that the other Governments may, should they see fit, order a supply of copies for distribution.

41. That this Conference affirms the desirability of establishing an Australasian laboratory or institution for the purpose of investigating and experimenting upon any diseases to which stock are or may become liable, particularly, in the first instances, pleuro-pneumonia, anthrax, and tuberculosis.

42. That the Inspectors of the various slaughterhouses and dairies shall, as far as possible, be qualified veterinary surgeons.

43. That it is most desirable that a stud-book for horses, cattle, and sheep be kept in each colony as a register; and, as the best means to accomplish this end, the different representatives present be requested to communicate with their principal agricultural societies and associations of stock-breeders, and endeavour to prevail upon them to keep such register.

44. That the means hitherto in use in the different colonies that are infested with rabbits have not had the effect of materially reducing the number of those animals, and that, in consequence, the period of being relieved from the pest is still uncertain, thereby entailing continued loss to the pastoral and agricultural industries of the Australasian Colonies; and that joint action should be taken by the Governments of the different colonies to offer a bonus for a scheme that will lead to the more rapid extermination of the pest.

45. That the resolutions 1 to 8 hereunder, passed by the Royal Commission of New South Wales, and as altered by these resolutions, be the measures recommended by this Conference for dealing with the rabbit-pest:—

(1.) That the responsibility for the destruction of rabbits, whether on freehold or on leasehold land, must rest on the landholder. That with respect to unoccupied Crown lands the State must accept similar responsibility.

(2.) That the rabbit-pest has made the continuance of the system of annual leases of Crown lands impossible.
(3.) That no finality in rabbit-destruction will be obtained without making the erection of rabbit-proof fences compulsory.
(4.) That the department administering the Rabbit Destruction Acts should be empowered to permit the fencing of holdings in groups. That in dealing with land of very poor carrying-capacity the State should show special consideration to the lessees in respect of tenure.
(5.) That in all infested country simultaneous operations for the destruction of rabbits should be made compulsory.
(6.) That netting 42in. wide (3ft. above and 6in. in the ground), with a mesh of 1¼in., forms a practically efficient barrier against the incursions of rabbits.
(7.) That the system of trapping with professional trappers, and of State bonuses, is radically bad.
(8.) That legislative measures should be taken compelling landowners or lessses in districts infested by rabbits to join, subject to the above provisions, in payment of the cost of rabbit-proof-netting fences, or of the addition of such netting to existing fences.

46. That the Conference, taking into consideration the importance of the subjects that have come before them for discussion and decision, are of opinion that an Australasian Stock Conference should continue to be held triennially at the chief city of one of the colonies, and they respectfully offer this recommendation to the several Governments.

47. That the Conference desire to call the attention of the Agricultural and Pastoral Associations of the several colonies to the desirability of intercolonial conferences being held periodically in one of the chief cities of each colony, to discuss matters of general interest to agriculturists and stockowners as a class, each colony to send, say, three delegates, as may be agreed upon.

48. That, in view of the fact that no scab has been found to exist in sheep in New Zealand since the 30th June, 1890, and that during this period a regular and proper system of inspection has been carried on, this Conferenee recommends the different Australasian Governments to remove the restrictions at present in force against the importion of New Zealand sheep if after next shearing the flocks in the last-infected districts are on inspection found free from scab. The Conference also recommends that in such case the restrictions on intercolonial steamers be removed.

49. That, as no disease exists in cattle in New Zealand, the Tasmanian Government be requested to allow New Zealand cattle to enter their colony without imposing any period of quarantine.

50. That, in the opinion of this Conference, the proclamation of private premises as quarantine grounds for imported stock constitutes a grave public danger, by virtually abolishing all safeguards against the introduction of disease.

51. That this Conference respectfully recommends the various Australasian Governments to make inquiries through their Agents-General as to the most suitable months in the year in which to ship cattle from the United Kingdom to the colonies, so as to prevent the introduction of so serious a pest as the gad-fly (*Œstrus bovis*); and that warbles (*Œstrus bovis*, or gad-fly) should be included among the diseases to be dealt with by the several Australasian Governments.

52. That, in the opinion of this Conference, it is desirable that the various Governments of Australasia should take such steps as will foster and further develop the dairy industries which are or may be established in the several colonies under their charge.

53. That it is desirable a uniform code of regulations, embodying the resolutions passed by this Conference, be adopted by all the colonies. That such code do come into force on or after the 1st January, 1893.

54. That a copy of the proceedings of the Conference be forwarded to the Governments of Victoria, South Australia, and Western Australia, and that they be respectfully asked to adopt and act upon the resolutions agreed to.

31st October, 1892. JOHN HALL, Chairman of Conference.

APPENDIX IV.

LIST OF PUBLICATIONS OF THE DEPARTMENT ISSUED DURING THE YEAR.

1. List of Dairy Factories in Correspondence with the Department. 8vo, 8 pages.
2. Spraying Fruit Trees, &c. By L. Hanlon. 8vo, 16 pages.
3. First Report of the Pomologist. By L. Hanlon. 8vo, 14 pages.
4. The Dairy Industry: Report by J. Sawers, with Appendices. 8vo, 28 pages.
5. Cheese- and Butter-Factories and Creameries: their Construction, Equipment and Management. By J. Sawers. 8vo, 16 pages.
6. Plans and Specifications: Large and Small Cheese-Factories; Large and Small Butter-Factories; Cheese-Vat.
7. Illustrated Leaflets for Farmers. By T. W. Kirk: 1. Hessian Fly. 2. Bathurst Burr. 3. Horse Bot-fly.

Table I.

Comparative Statement of the Number of Carcases of Frozen Mutton exported from the Colony during the Years ended 31st March, 1884 to 1892.

—	Estimate for 1882.	Estimate for 1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Auckland ..	..	..	7,968	..	18,561	19,913	..	9,697	7,104	11,236	18,558
Napier	..	..	9,003	89,089	132,700	157,800	155,057	208,335	279,081	471,068	282,181
Wellington ..	..	..	46,803	130,439	137,964	140,302	209,785	229,466	238,583	407,318	320,615
Poverty Bay ..	..	..	..	..	..	..	..	..	..	..	50,061
New Plymouth ..	..	..	..	..	..	..	..	..	..	..	8,195
Wanganui ..	..	..	..	..	..	..	..	..	..	..	40,842
Picton	..	..	..	15,950	..	..	..	..	..	..	13,507
Lyttelton and Ch'ch	..	..	80,920	121,627	161,462	235,631	316,455	327,652	401,788	691,206	531,873
Timaru	..	..	..	..	..	..	..	..	..	..	153,734
Oamaru	..	..	..	..	32,250	..	..	63,103	94,415	88,599	118,701
Dunedin ..	..	..	86,781	133,964	91,255	153,321	250,229	134,091	146,837	126,849	109,963
Bluff and In'cargill	..	..	16,297					40,688	37,255	49,957	119,825
Totals ..	30,488	173988	247,772	491,069	574,192	706,967	931,526	1,013,032	1,205,063	1,846,233	1,768,055

The above return includes lambs.

Table II.

Return of Frozen Mutton exported during the Year ended 31st March, 1893, showing the Number of Carcases, Weight, and Value, not including Lambs.

Port.	Carcases.	Weight.	Value.
		Cwt.	£
Auckland	7,745	4,170	4,849
Napier	206,130	110,877	140,399
Wellington	277,824	154,496	177,262
Poverty Bay	40,768	21,884	25,803
New Plymouth	5,516	2,812	3,535
Wanganui	34,621	17,266	20,142
Wairau and Picton	12,167	5,540	5,171
Lyttelton	410,302	221,758	239,004
Timaru	66,076	35,427	41,303
Oamaru	30,870	16,645	17,064
Dunedin	37,733	20,305	18,946
Invercargill	170,965	88,984	103,823
Totals	1,300,717	700,164	797,301

Table III.

Number of Carcases of Frozen Lambs exported during the Year ended 31st March, 1893.

Port.	Carcases.	Weight.	Value.
		Cwt.	£
Auckland	5,577	1,611	2,261
Napier	23,298	6,502	11,374
Wellington	22,874	6,912	9,855
Poverty Bay	1,194	237	549
New Plymouth	1,973	596	894
Wanganui	3,165	965	1,574
Wairau and Picton	4,291	1,329	1,395
Lyttelton	202,614	70,629	102,355
Timaru	18,653	6,075	10,612
Oamaru	14,053	4,776	6,379
Dunedin	9,337	2,974	4,158
Invercargill	18,630	6,012	9,520
Totals	325,659	108,618	160,926

TABLE IV.

EXPORT of FROZEN BEEF for Years ended 31st March, 1892–93.

	Weight.		Value.	
	1892.	1893.	1892.	1893.
	Cwt.	Cwt.	£	£
Auckland	5,969	123	8,211	165
Napier	11,724	570	11,947	599
Wellington	65,480	11,057	69,594	11,433
Poverty Bay	4,311	790	4,024	737
New Plymouth	19,973	19,987	19,036	20,411
Wanganui	2,018	2,259	2,352	2,634
Lyttelton	1,708	436	1,933	509
Dunedin	13	1,852	12	2,282
	111,196	37,074	£117,109	£38,770

TABLE V.

COMPARATIVE STATEMENT of the NUMBER of SHEEP in the Colony, returned annually, 1880 to 1892.

1880	11,530,623	1887	15,155,626
1881	12,190,215	1888	15,042,198
1882	12,408,106	1889	15,423,328
1883	13,306,329	1890	16,116,113
1884	13,978,520	1891	16,753,752
1885	14,546,801	1892	18,570,752
1886	15,174,263		

NOTE.—The return of all sheepowners, and the number of sheep and lambs on 30th April, 1893, showing the county in which owners reside and their sheep are depastured, so far as the information is supplied in the Schedule "C" furnished by sheepowners under section 21 of "The Sheep Act, 1890," will be published in the *New Zealand Gazette* as soon as the returns are complete.

TABLE VI.

NUMBER of OWNERS, Year 1883 to 1892.

Owning—	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Under 500 sheep ...	5,039	5,422	5,622	6,024	6,247	6,579	7,054	7,662	8,272	8,822
500 and under 1,000	970	1,033	1,146	1,189	1,139	1,182	1,381	1,528	1,691	2,033
1,000 " 2,000	609	672	718	747	723	794	826	854	969	1,193
2,000 " 5,000	467	473	505	532	531	524	597	586	666	761
5,000 " 10,000	244	256	270	263	289	287	277	283	287	314
10,000 " 20,000	200	211	213	228	221	213	239	236	239	231
20,000 and upwards ...	149	154	157	166	166	166	151	160	169	176
Totals	7,678	8,221	8,631	9,149	9,316	9,745	10,525	11,309	12,293	13,530

TABLE VII.

EXPORTS and IMPORTS of STOCK during Year ended 31st March, 1893.

	Exported.				Imported.			
	Horses.	Cattle.	Sheep.	Dogs.	Horses.	Cattle.	Sheep.	Dogs.
Auckland	36	27	185	30	32	4	39	41
Napier	5	...	...	...	...	...	...	...
Wellington	115	...	...	13	4	6	51	71
Lyttelton	169	10	...	110	13	18	22	41
Oamaru	93	21	20	...	...	...	...	...
Dunedin	43	87	...	4	82	3	3	6
Bluff	34	50	...	...	...	...	66	...
Totals ...	495	195	205	157	131	31	181	159

Table VIII.

Comparative Statement of the Number and Value of Rabbit-skins exported from the Colony during the Years ended the 31st March, 1885, to 1893.

District.	Number.									Value.								
	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
										£	£	£	£	£	£	£	£	£
Auckland ..	..	229,000	..	1,468	3,336	5,309	..	..	..	..	2,182	..	12	33	46	..	..	..
Wellington	889,436	1,240,223	544,712	337,988	313,441	583,198	512,373	939,788	793,721	9,220	12,550	4,325	3,428	2,671	4,299	3,732	7,394	6,359
Wairau and Picton	68,736	..	..	87,716	460,479	700,471	730,780	794,249	583,728	848	..	..	972	5,228	7,474	7,467	8,520	5,650
Lyttelton ..	1,525,730	2,308,650	3,689,982	762,556	198,876	37,848	86,798	1,114,154	337,075	15,728	22,252	24,544	6,147	1,253	331	878	11,673	5,462
Oamaru ..	24,534	121,135	17,170	52,700	57,240	152,550	132,680	54,300	186,775	256	1,009	163	440	480	1,339	1,407	552	1,940
Dunedin ..	7,014,993	4,787,600	4,376,228	9,986,752	10,801,641	7,929,493	9,538,272	9,707,048	12,183,745	79,242	42,217	35,375	85,842	81,795	66,256	83,891	81,221	88,085
Bluff ..	345,636	205,764	272,600	896,691	750,448	876,820	2,308,130	1,913,482	1,976,030	3,346	1,637	1,839	11,388	6,141	7,416	21,090	18,529	16,001
Other ports	..	..	..	..	7,716	9,528	3,540	2,500	4,120	..	..	..	..	31	57	22	21	36
Totals ..	9,869,065	8,892,372	8,900,692	12,125,871	12,593,177	10,295,217	13,312,573	14,525,521	16,065,194	108,640	81,847	66,246	108,229	97,632	87,218	118,487	127,920	123,533

TABLE IX.

RETURN of BUTTER and CHEESE Exported during Ten Years ended 31st December, 1892.

	Butter.		Cheese.	
	Cwt.	£	Cwt.	£
1883	8,869	42,020	2,519	6,892
1884	15,766	66,593	10,342	25,074
1885	24,923	102,387	15,245	35,742
1886	23,175	105,537	16,429	45,657
1887	17,018	54,921	23,913	54,562
1888	29,995	118,252	36,682	78,918
1889	37,955	146,840	26,558	67,105
1890	34,816	122,701	40,451	84,986
1891	39,430	150,258	39,770	86,675
1892	53,930	227,162	41,493	91,042

TABLE X.

QUANTITY and VALUE of BUTTER and CHEESE Exported from each Port of New Zealand during the Year ended 31st December, 1892.

Port.	Butter.		Cheese.	
	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£
Auckland	5,291	24,213	1,570	3,500
Poverty Bay	...	...	431	917
New Plymouth	19,351	82,708	403	883
Wanganui	66	324	...	...
Patea	167	616	...	...
Wellington	16,869	68,703	5,095	9,981
Napier	32	105	...	...
Wairau and Picton	6	28	...	...
Nelson	359	1,584	...	...
Lyttelton	6,257	23,644	4,106	7,666
Timaru	24	95	41	91
Oamaru	4	16	181	396
Dunedin	5,187	23,780	24,883	56,176
Invercargill	318	1,820	4,785	11,432
Total	53,931	227,162	41,495	91,042

TABLE No. XI.

QUANTITY and VALUE of BUTTER and CHEESE Exported from each Port of New Zealand during Quarter ended 31st March, 1893.

Port.	Butter.		Cheese.	
	Quantity.	Value.	Quantity.	Value.
	Cwt.	£	Cwt.	£
Auckland	3,633	16,202	572	1,104
Poverty Bay	...	...	3	5
New Plymouth	7,554	35,986	680	1,360
Wanganui	116	438	...	...
Wellington	7,359	32,851	2,815	6,122
Wairau and Picton	15	61	...	...
Nelson	57	239	...	...
Lyttelton	1,873	8,391	1,778	3,290
Timaru	...	...	2	5
Oamaru	...	...	276	596
Dunedin	2,271	9,382	18,679	39,430
Invercargill	39	146	190	435
Total	22,917	103,696	24,995	52,347

[*Approximate Cost of Paper.*—Preparation, nil; printing (1,400 copies), £30 10s.]

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Price 1s.