1945
NEW ZEALAND

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT FOR 1944-45

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

SIR,—

I have the honour to forward for Your Excellency's information the report of the Department of Agriculture for the financial year ended 31st March, 1945.

This report provides a summary of the principal farming activities of the year and briefly outlines the comprehensive and numerous activities of the Department.

The accompanying statement by the Director-General of Agriculture reviews production during the war years and indicates the steps being taken for the post-war development of agriculture. The reports of the Directors of the Divisions cover all phases of the Department's work.

I have, &c.,
B. ROBERTS,
Minister of Agriculture.

His Excellency the Governor-General.

ANNUAL REPORT OF THE DIRECTOR-GENERAL

IN my annual report for the period ending 31st March, 1944, a brief outline was given of production objectives for the 1944–45 season. Results have been satisfactory in some branches of farming, whilst in others climatic conditions have been adverse. The season has favoured the output of milk products and meat, but has been detrimental from the viewpoint of grain, potatoes, and pulse crops.

MAN-POWER

As forecast in my last report, the man-power position on farms during 1944–45 showed a marked improvement and was responsible to some degree for a more settled state in primary industries. There has, however, been some apprehension during recent months that the recent call-up of A Grade men will be reflected in the number of cows milked during the forthcoming season.

FERTILIZERS

The provision last season of additional quantities of fertilizer to dairy-farmers proved advantageous, and the effect should continue to be apparent during 1945–46. Our requirement of 325,000 tons of rock phosphate for the 1945–46 rationing year has been recognized in London and Washington, but we have been requested to base our rationing procedure on an anticipated delivery of 300,000 tons only. This represents an increase of 50,000 tons of rock over the previous year, and has been allocated as an overall increase for top-dressing, an increase for wheat, an allowance to meet hardship appeals, and a reserve for returned servicemen. The National Council of Primary Production unanimously recommended to the Hon. the Minister of Agriculture the discontinuance of a per-cow allocation to dairy-farmers. Arrangements are now being completed for an increased production of serpentine-superphosphate to meet the growing perference shown by fertilizer users.

Live-stock Production

Season.	Production in Long Tons.		
	Butterfat: Year ended 31st July.	Meat: Year ended 30th September.	Wool: Year ended 30th July.
Average of five seasons, 1934–39 ..	189,900*	470,000† (Three seasons only)	134,000
Average of five seasons, 1939–44 ..	191,500*	526,000	148,000
1944–45 forecast	193,000	537,500	166,500

* Owing to change in allowance of butterfat represented in milk and cream consumed, the total butterfat-production figures as given above are higher than those quoted in previous years. † Years ended 30th June.

Cash Crops: Acres in Crop

Season.	Areas threshed.					Commercial Areas outside Boroughs.		Total.
	Wheat.	Oats.	Barley.	Maize.	Peas and Beans.	Potatoes.	Onions.	
Average of five seasons, 1934–39	214,200	63,400	22,400	6,900	19,100	21,900	800	348,700
Average of five seasons, 1939–44	255,900	57,700	30,000	8,100	33,200	20,700	900	406,500
1944–45 forecast ..	184,000	50,000	36,000	5,000	45,000	31,500	2,000	353,500

Objectives, 1945–46

During the past year arrangements of far-reaching importance to New Zealand primary industries have been completed. Long-term purchase agreements for butter, cheese, and meat have been finalized between the Governments of the United Kingdom and New Zealand, and it is expected that finality relative to disposal of accumulated and current wool clips will be announced at an early date. In terms of these arrangements the Dominion has a clear objective—the development of production to the maximum—as realization of such an objective must react to the advantage of producers and the nation as a whole when subsequent contracts or production objectives are under discussion. This is the narrow viewpoint—there is, in addition, however, our obligation to contribute to the maximum towards the satisfaction of international food requirements. Our production objectives for butterfat, meat, grains, pulse crops, potatoes, onions, and vegetables have been advanced accordingly.

The Department of Agriculture has played an important part in the adjustment of primary industries to war conditions, and will continue to do so. The time is approaching, however, when it is hoped controls necessitated by a state of emergency can be relaxed and the staff of the Department concentrated on its normal duties of more adequately servicing primary industries. As circumstances permit, research and advisory work is being resumed and intensified and experience gained during the war will contribute to future progress.

Post-war Development

During the past year the Agricultural Development Committee of the Organization for National Development has commenced work on many problems in which primary industries will require guidance in post-war years. The Committee, under the Chairmanship of the Minister of Agriculture, the Hon. B. Roberts, is composed of representatives of farming and labour interests and of State Departments concerned with production, marketing, and land utilization.

For purposes of investigation, the problems confronting New Zealand have been divided into three sections:—

(1) Internal consumption requirements:
(2) World trade:
(3) Provision of productive goods and services.

(1) *Internal Consumption Requirements.*—Problems under this heading are concerned mainly with the production of commodities needed for domestic consumption which in the past have been imported and with the general policy of improved distribution of all types of food requirements. These problems are being studied in association with representatives of producer and distributor organizations concerned, and attention is being given to the possibilities of absorbing ex-servicemen in these channels.

(2) *World Trade.*—The progressive development of our export trade in meat, wool, and dairy-produce will depend largely on international policies relative to finance and trade and to the realization of the policy of full employment. Data are being collected for the purpose of forecasting potential production of meat, dairy-produce, and other commodities to cater for established and potential markets. Particular attention is being devoted to possibilities of expansion in exports of grass, clover, and other seeds.

(3) *Provision of Production Goods and Services.*—Under this heading problems associated with labour, with the supply and distribution of lime and fertilizers, with improved mechanization of farming operations, and with the supply of goods and services generally are all being studied. The supply and proper employment of seasonal labour is of particular importance, and overseas experience in the operation of co-operative labour and machinery pools is being studied.

In addition to the foregoing, the Dominion is facing many difficulties associated with land utilization, soil conservation and erosion, and the reclamation of hill country which has gradually deteriorated under constant stock management. It is essential in the interests of economy and increased production that the regressive trends which are so obvious on hill country should be arrested, as such country is the main reservoir of breeding and fattening stock.

The structure of our primary industries is sound. Continuance of stability in prices, assured markets, and equitable costs of goods and services will facilitate an upward trend in production.

During the year the utmost co-operation has been given the Hon. the Minister and his Department by members of the National Council of Primary Production and District Councils and Committees. Advisory bodies representing commercial and producer organizations have also rendered valuable assistance. The co-operation of all those concerned has been greatly appreciated.

E. J. Fawcett, Director-General.

ACCOUNTS DIVISION

REPORT OF L. C. SCOTT, ACCOUNTANT

Net expenditure for 1944–45 was estimated to require £1,150,621, an increase of £160,533 on the 1943–44 estimated requirement. A major feature of departmental aim is aid to production. Where the aid is tangible in form—*i.e.*, direct monetary aid—definite control of each proposal involving expenditure applies where such administrative action is practical, but where either varying rates per acre or flat rates per ton are the measures of control, considerable fluctuations in expenditure are seldom avoidable. Where the aid is intangible—*i.e.*, advisory aid, research, &c.—the cost can be, and is, controlled administratively. There is a point, however, at which cost control must give way to demand. That demand may be for personal service by way of interviews, lectures, demonstrations, and so on, or for literature in bulletin form or by means of the Department's official publication, *the Journal of Agriculture*.

The year 1944–45 closed with a net expenditure of £1,130,315, being £20,306 below the total of £1,150,621 appropriated. The usual grants and subsidies were met; inspectional services to control quality in produce for sale, to restrict diseases and pests, and to ensure healthy conditions in crop and animal life were maintained; research activities were pursued to the fullest extent possible within available man-power and equipment resources; and the increasing keen and continuous demands for advisory aid were accorded support on the most liberal lines that financial resources, man-power, and equipment could yield.

Examination in respect to gross expenditure and revenue respectively indicates that administrative services were under the gross amount voted by £3,125. This, with a buoyancy in revenue of £21,281 above expectations, brought the actual net expenditure out £24,406 under the net amount voted. The main sales and fees sources that contributed to revenue buoyancy were wine, butterfat, seed certification, and seed production.

Payments under statutes exceeded the voted position mainly by way of an increased amount paid to Rabbit Boards (£6,678); the Boards are paid subsidy in accordance with rates collected. Under "Miscellaneous grants," &c., there were some fluctuations. A heavy output of lime and a comparatively satisfactory availability of fertilizer resulted in the voted figures being exceeded by £15,738 for lime railage and £11,153 for fertilizer railage contributions. Lack of man-power and sodium chlorate shortage led to a saving of £5,265 on the figures voted for noxious weeds.

A summary of the 1944–45 vote, with 1943–44 figures in parentheses for comparative purposes, is given below :—

	Expenditure.				Revenue.			
	Appropriated.		Paid out.		Appropriated.		Paid out.	
	£	£	£	£	£	£	£	£
Administrative services ..	660,616	(561,473)	657,491	(585,231)	148,270	(138,000)	169,551	(155,193)
Miscellaneous advances, &c. ..	558,130	(486,570)	564,788	(505,677)	26,855	(23,205)	35,029	(24,294)
Payments under statutes ..	109,000	(104,500)	115,427	(108,845)	2,000	(1,250)	2,811	(2,866)
Totals	1,327,746	(1,152,543)	1,337,706	(1,199,753)	177,125	(162,455)	207,391	(182,353)
Less credits-in-aid ..	177,125		207,391					
Net totals	1,150,621		1,130,315					

Financial transactions, mainly revenue, under Special Acts and Deposits Accounts brought in about £89,000, and after dealing with outgoings under deposits, approximately £74,000 remained as available revenue.

War Expenses Account has again been a substantial financial feature. Gross expenditure was greater than in the previous year by £651,000, and gross revenue greater by £451,000. In round figures, War Expenses Account expenditure amounted to £2,740,000, adjusting credits to £999,000, leaving net expenditure at £1,741,000.

LIVE-STOCK DIVISION

REPORT OF W. C. BARRY, DIRECTOR

The year 1944–45 was a mixed one in regard to live-stock production. Favourable conditions prevailed throughout the winter, and with plenty of feed stock wintered well. The late spring and early summer months were not so favourable for production through cold weather retarding production However, as has been noted in previous years with a late spring growth, there was not the heavy mortality of dairy stock which has been experienced under the opposite set of spring feed conditions. The rainfall through the summer was good, and the last quarter of the year was distinctly good for dairy production. Feed was plentiful, and many dairy factories will record an increased output.

A wet season, on the other hand, is not so favourable for the sheep-farmer, particularly the fat-lamb producer. In several districts there has been trouble with lambs scouring and not fattening as they would under drier conditions. This tends to result in light-weight lambs being killed, and a large number of lambs have to be fattened on crops or carried over into the winter. Older sheep fattened very well under the pasture conditions.

Health of Live-stock

Horses have remained healthy during the year. Apart from an outbreak of anthrax, no serious epidemic disease of sheep or cattle occurred during the year.

Scheduled Diseases of Cattle

Tuberculosis.—The number of cattle condemned under the Stock Act for tuberculosis during the year ended 31st March, 1945, amounted to 5,088 head, 4,532 being condemned on clinical symptoms and 556 being reactors to the tuberculin test. The tuberculin test was applied to 17,319 cattle, of which number 556 reacted, giving a percentage of 3·2. The lower percentage of reactors this year is due to the retesting of a number of herds previously tested. At the owners' request 15,838 cattle were tested.

Actinomycosis and Actinobacillosis.—The number of animals condemned for this disease was 757, a large number being successfully treated.

Malignant Growth.—The number of cattle condemned for malignant growth was 268. In all cases compensation was paid in accordance with the Stock Act.

Anthrax.—The vaccination of cattle on farms where this disease occurred a few years ago has been continued. In August, 1944, an outbreak of anthrax occurred at a new centre, causing the death of 13 cows and 4 pigs. The control measures of vaccination and regulation of the movement of stock on to the farm have been very satisfactory, in that no further loss of stock was experienced.

Blackleg.—The number of calves vaccinated against this disease in Taranaki was 16,572, and in Auckland 36,407, making a total of 52,979. In the Auckland district there were 302 outbreaks of the disease as compared with 283 last year.

Johne's Disease.—In the Taranaki district 81 animals affected with this disease were condemned under the Stock Act during the year. The majority of the animals dealt with were clinical cases of the disease.

Non-scheduled Diseases

The incidence of diseases associated with calving was low last spring. Contagious abortion and mammitis still continue as serious diseases for the dairy-farmer.

It is pleasing to record that results obtained from the use of the abortion vaccine (strain 19) are very favourable, and increasing numbers of calves are being vaccinated from year to year. This angle of control in regard to this disease is likely to call for larger numbers of animals to be vaccinated each year.

Sheep

The year has not been altogether favourable for the sheep-farmer. Although a good lambing season was experienced, the spring was cold, wet, and late, and retarded growth in the lambs. The wet summer and autumn in the greater part of the South Island and in several districts in the North tended to cause an excessive growth of watery feed, resulting in scouring and a heavy infestation of young stock with parasites. The good intention of the fat-lamb raiser to increase the average weight of his lambs was therefore made very difficult.

Shearing operations were often held up owing to broken weather, and in some districts the dipping results were not as satisfactory as in other years. Some losses of sheep after dipping are again recorded, and, as might be expected in a wet season, there was an increase of worm trouble in young sheep and a general increase in foot-rot disease.

Pigs

There was no serious outbreak of disease in pigs during the year. The Dominion has been fortunate so far in regard to the possible introduction of such diseases as swine fever. Reports generally indicate that pig-raisers using garbage are carrying out the requirements of the regulations and ensuring that all garbage is boiled before being fed to pigs.

Swine Husbandry

The report of Mr. H. M. Peirson, Superintendent of the Pig Industry, is submitted herewith :—

" The season just ended marks the completion of most of the projects recommended and supported by the National Pig Industry Council during the year, embodying increases in the price of pig-meats, a rise in the weight range of baconers, and the introduction of the crop subsidy scheme.

" Lectures and demonstrations have been given on all aspects of breeding, sanitation, and disease in both the North and the South Islands, which were reasonably well attended in view of restricted travelling conveniences. Baconer competitions on a big scale have been staged at main killing centres, and these also have been responsible for a considerable amount of interest.

" *Progress of the Industry.*—The present status and past development of the industry are set out in the following table :—

Year.	Number of Sows as at 31st January.	Total Pigs killed, Year ended 31st March.	As—		
			Bacon.	Pork.	Choppers.
1941	100,400	986,985	505,478	433,068	48,439
1942	91,300	1,002,211	414,017	553,818	34,376
1943	82,000	839,882	410,561	392 996	36,325
1944	77,300	726,282	421,947	281,153	23,182
1945	80,000*	678,834	481,195	177,859	19,780

* Estimated.

" During the year ended March, 1945, killings showed a decline of 47,440 carcasses. However, in spite of this, there has been an increase in the production of pig-meats by 449 tons. This was due to increased slaughterings of bacon pigs, which exceeded those for the same period last year by 59,248, and the general rise in the average weights of pigs slaughtered. In view of the shortage of imported grain feeds from Australia, production can be considered satisfactory.

" *Crop Subsidy Scheme.*—The crop subsidy scheme was introduced to encourage farmers to provide their own winter feed requirements for pigs. A subsidy of £5 per acre was made available to farmers growing the crops specified in the scheme. Due to the encouragement given through the crop subsidy scheme, the effect of which cannot be shown until 1946, an improvement may be expected by March of that year. Increased production depends not only on the amount of dairy by-products utilized in season, but also upon available winter feed supply.

" The position of imported grain feeds for 1945–46 is still in some doubt ; therefore, the continuance of the crop subsidy scheme is still the only solution to the increased production of pig-meats. Many producers were quick to grasp the advantages of a crop subsidy, as is shown by the fact that to date 5,250 farmers have made claims under the scheme, involving some 23,000 acres of mixed crops. One-third of this area comprised grain crops—barley, maize, and peas—representing 9,000 tons to 10,000 tons of high-quality feed, approximating half the total grain imported for pig production in the previous season.

" *National Instruction Service.*—Reports from the nine District Pig Councils indicate a continuance of interest in the pig industry. This is borne out by the greater production of bacon pigs, which entails better accommodation on account of the longer feeding period. A noticeable improvement in methods of pig production is evident in all districts as a result of the instruction and advice given by District Pig Council Supervisors."

MEAT INSPECTION AND SLAUGHTER OF STOCK

The standard of inspection of all meat and meat products has been effectively maintained throughout the year. The introduction and application of the meat grading regulations to meat intended for local consumption has been effected at abattoirs and other centres. It may be claimed that general satisfaction has been given in grading, when the extensive nature of the work and the general staffing difficulties are considered.

The numbers of stock slaughtered at meat-export slaughterhouses were :—

Sheep	3,105,782
Lambs	10,515,905
Cattle	374,225
Calves	923,192
Swine	584,980

and at abattoirs :—

Sheep	810,004
Lambs	176,563
Cattle	165,906
Calves	37,853
Swine	67,590

Importation and Exportation of Stock

The following stock were imported during the year: sheep, 47; horses, 25. In addition, 24 horses (thoroughbreds and trotters), 162 sheep, 4 pigs, 33 dogs, 2 cats, and number of pigeons were dealt with at ports on arrival from Australia.

During the year the following animals were exported to Australia: horses, 47; cattle, 44; sheep, 384; pigs, 20; dogs, 28. In addition, 85 sheep and 7 dogs were exported to the United States of America. A considerable number of poultry and other birds were exported to island territories in the Pacific, as well as 10 cattle, 6 pigs, 6 dogs, 1 cat, 147 poultry, 7 ducks, and a number of rabbits and guinea pigs to Fiji.

Dairy Inspection

The inspection of premises, plants, and herds used in the production of the milk-supply to the consuming public has been maintained. Some staffing difficulties have been experienced, but it is hoped to be able to provide additional staff in the near future.

The supply of adequate milk for the main centres during the winter months was again a difficult problem, the normal registered suppliers being unable to provide the required amount. This was supplemented by milk from other approved sources during the period of scarcity.

Poultry

Mr. F. C. Bobby, Superintendent of Poultry Husbandry, comments as follows :—

"Two factors of importance have affected the poultry industry during the past twelve months.

"The granting of a subsidy of 3d. per dozen on all eggs passing through authorized egg marketing channels, backed by a campaign throughout New Zealand for increased egg production, resulted in an appreciable stimulation to poultry production generally, more particularly in the North Island. This subsidy also enabled the Internal Marketing Division to obtain a greater number of eggs for military and civil priorities, while at the same time allowing the Division to make more consistent allocations to the public.

"Without question, the full benefits from this increased poultry production would have been felt during the coming year, but unfortunately the second factor affecting the industry—namely, the present shortage of poultry-feeds—is tending to offset the advantages which might have accrued from the subsidy.

"While there is no indication that flocks have been reduced owing to the feed shortage, there are some indications that the number of birds likely to be reared during the coming season will be less than during 1944–45.

"It may be said, however, that the poultry industry is still alive to the fact that increased egg production is seriously needed, and, unless the feed position becomes more acute, will still be in a position to go ahead immediately more feed becomes available."

Wool

From July until the end of the year the work carried out can be summarized as follows :—

Investigation of moth damage in wool stored ready for shipment to Great Britain.

Successful experiment, using fumigation, which eradicated moths and beetle infestation in wool held at the Fairfield Freezing-works.

Lectures to the Army Education Welfare Service and civilian classes at Petone.

Revisiting the wool-scouring works in New Zealand to ascertain what improvements, if any, have been made to buildings, plant, &c., since the original survey carried out by the Wool Supervisor in 1939.

Rabbit Pest Control

Despite labour and strychnine shortages, which have created difficulties in maintaining control of the rabbit pest during the war, the position is reasonably satisfactory. Nevertheless, there are still too many rabbits, and it is quite apparent that on the present position the slightest "let up" on control work would be fatal, and continuous work must be maintained.

There are now 97 Rabbit Boards—55 in the North Island and 42 in the South Island—and but for the work of Rabbit Boards the rabbit position over the war period would undoubtedly have been much more serious. It is recognized that an extension of the principle of Rabbit Board control would go a long way to solve the rabbit pest menace in this Dominion, and it is hoped that, with the termination of the war and a return to more normal conditions, legislative authority giving more extended powers than exist at present for the formation of Rabbit Board districts will be brought down.

Noxious Weeds

Weather conditions in general during the year have favoured the growth of all plant life, and noxious weeds such as ragwort and the various thistles in particular have responded to an abnormal extent. Limited quantities of sodium chlorate became available during the year, and this was made full use of by County Councils and others, but apart from work on ragwort in the North Island little work was done on the other major weeds such as blackberry, gorse, and sweetbrier.

Activity in connection with the control of nassella tussock in North Canterbury and Marlborough has been continued during the year and some progress made. Financial assistance has been granted to the Nasella Tussock Committee in North Canterbury and to the counties concerned in Marlborough, and these grants have been used to check the spread of this weed.

A special departmental committee has been set up to go into the whole question of nassella tussock control.

There is evidence of a more enlightened outlook by County Councils on the necessity for some concerted co-operative action by groups of counties in regard to noxious weed control, and with labour conditions improving some improvement should take place in the clearing of land that is of a productive value, whether it be for grazing, cropping, or afforestation purposes.

ANIMAL RESEARCH DIVISION

REPORT OF J. F. FILMER, DIRECTOR

With the return of some research workers who have been on active service overseas and the prospect of relatively early termination of hostilities, it is now possible to embark on the planning of long-term research. This is absolutely necessary for the solution of some of the major problems of animal industry in New Zealand. During the year the Chemical Section was transferred to Ruakura. The section is at present accommodated some two miles from Ruakura in some disused factory buildings which have been converted into make-shift laboratories. It is hoped that it may be possible to construct an up-to-date laboratory at Ruakura to house all the research workers in the not-too-distant future. Both Wallaceville and Ruakura now have their own chemical staff, and this should result in greatly increased efficiency.

Diagnostic Section, Wallaceville

During the year 7,576 specimens were received for diagnosis. This included nearly 3,000 specimens from poultry. Ninety-five thousand doses of black leg vaccine and 23,750 doses of scabby mouth vaccine were prepared and issued.

Research Work

Facial Eczema.—Most of the North Island experienced a very wet summer, but in Poverty Bay a dry summer was followed by a dry autumn. It was therefore not surprising that very few clinical cases of facial eczema occurred during the autumn of 1945. The Department has purchased an area of 68 acres at Manutuke, nine miles south of Gisborne, for its facial eczema field experiments. The developmental work required there and the climatic conditions hampered the investigations. However, some toxic grass was collected and dried. Grazing experiments indicated that Japanese millet, rape, and turnips provide safe grazing through a period when pasture causes liver damage. Collodion casts of bile ducts and bile vessels of affected livers have been prepared. Preliminary investigations have been made with a view to devising a satisfactory method for chemical fractionation of dried toxic pasture.

Inheritance of Photosensitivity in Southdowns.—Breeding results for the year further tend to support the theory that this disease is due to an inherited liver defect which behaves as a simple Mendelian recessive. A further season's breeding work should be sufficient to finalize this aspect of the work. Affected animals will then be bred in sufficient numbers to provide material for studying the physiology of the condition.

St. John's Wort Photosensitivity.—Typical symptoms of hypericism have been produced in white sheep fed dried St. John's wort. Convulsions occurred when such sheep were dipped. Black sheep dosed with St. John's wort showed no response to sunlight and behaved normally in the dip. Sheep made photosensitive by other agents such as eosin and rose bengale, and sheep with facial eczema, showed some reaction in the dip. The response was not so violent as in sheep fed St. John's wort.

Sheep Unthriftiness, Canterbury.—Excessive summer rains resulted in a considerable number of deaths in young sheep in the late summer and autumn of 1945. These were apparently due to two conditions, one resembling entero toxæmia and one in which wasting, scouring, and heavy gastro-intestinal parasitism were prominent conditions. Though lambs did not fatten well, unfortunately the diseases causing mortality elsewhere did not occur on the experimental farm. Some investigations were conducted on other properties. Further studies were made of sheep feeding under Canterbury conditions.

Bone Disease in Sheep.—Further work at Kirwee confirmed the value of a single massive dose of calciferol in the prevention of rickets in sheep. Sheep received one million units in 2 c.c. olive oil subcutaneously or in 30 c.c. by mouth.

Sheep-breeding.—In the Romney breed, rams are being progeny-tested for fleece weight, count of wool, carcass quality, and rate of growth of lambs. The influence of ewe conformation on fat-lamb quality is being measured by mating long- and short-legged Romney ewes with the same Southdown rams. The inheritance of wool count in Romneys is being examined by mating a fine- and a strong-wooled ram with groups of ewes, half of which are fine-wooled and the other half strong-wooled in each case. A small inbred flock of Romneys has been established to provide uniform sheep for experimental purposes.

Effects of Castration on Lamb Quality.—The carcass quality of ram, wether, and ewe lambs reared under the same conditions has been compared. Ram lambs yeilded the heaviest carcass and, though quality was slightly inferior, they gave the greatest cash return per lamb.

Tailing Experiments.—Tests at Mamaku and Kirwee with a patent tailer indicated that it possessed no advantage over the knife in regard to subsequent rate of growth or mortality.

Mastitis.—The field investigations in collaboration with the Dairy Board to study the effect of environment on the incidence of mastitis have been continued. Trials have been made to determine the efficiency of antiseptic solutions in sterilizing teats. Measurement of quarter yields has suggested that there may be an inverse correlation between yield and leucocyte count even when clinical mastitis does not occur. In some cases pathogenic organisms could not be incriminated.

Studies of Milking Methods.—Preliminary investigations of the precise mechanics of the letting-down process in milking are in progress, and it is hoped that they will throw some light on the many problems associated with the milking process, including non-stripping. A special machine for recording the rate of flow of milk from machine-milked cows has been used for the purpose. In general, preliminary work indicated that a large proportion of cows will release their milk to the machine without the aid of even machine-stripping techniques, though some animals required machine-stripping, while others will not respond without the use of hand-stripping. As the season advances, the tendency to respond to stripping appears to increase.

Artificial Insemination.—In collaboration with the New Zealand Dairy Board, an attempt was made to extend the field use of artificial insemination by inseminating 3,000 cows in Cambridge, Whatawhata, and Manawatu areas with semen collected from 13 bulls stationed at Ruakura. Unfortunately, results were disappointing, the average rate of conception being only approximately 30 per cent. for the first round. The experiment was therefore discontinued after six weeks to enable farmers to get their cows in calf by natural mating. The reasons for the poor results have not been definitely determined. Only 5 of the 13 bulls were really satisfactory for artificial insemination, but it is certain that some weakness in technique also existed. The limited breeding period in New Zealand obviously presents real difficulties, which were intensified in the task of providing semen for over 100 cows daily. It is perhaps worth recording that, in spite of unsatisfactory results, 800 cows conceived to the 5 best bulls during the short period the service was operating. Further experimental work is being conducted to eliminate errors in technique. Sixty-four pedigree Friesian cows situated in Auckland, Waikato, King-country, Bay of Plenty, and Dunedin were inseminated from a bull situated at Ruakura, and 25 proved in calf. Three cows out of 5 conceived when inseminated at Ruakura with semen brought from Australia by air.

Sterility in Dairy Cattle.—The free semen-testing service was again available to farmers. Of the 192 bulls examined, 25 proved sterile and a further 55 were of low fertility. A survey is being made of cows of known breeding history culled for sterility. Lesions noted at autopsy are being recorded, and the possibility of any relationship between ovarian and pituitary dysfunction is being examined. This work is also being extended to ewes and sows.

Hormone Studies.—Studies have been initiated into the hormone status of pregnant dairy cows with a view, *inter alia*, of evolving a biological or chemical test for pregnancy.

Contagious Abortion.—Results are now available for 10,000 calves in 791 herds vaccinated in 1943. In these herds 22 per cent. of unvaccinated two-year-old heifers aborted in 1943, while the abortion rate in vaccinated heifers in 1944 was 3 per cent. In 17 herds results of two years' vaccination are available. In 1942 there were 38 per cent. abortions in 277 unvaccinated two-year-old heifers, in 1943 there were 6·3 per cent. abortions in 298 vaccinated two-year-old heifers, while in 1944 there were 1·4 per cent. abortions in 293 two-year-old vaccinated heifers and 1·9 per cent. abortions in 269 three-year-old heifers vaccinated as calves in 1942. Some 85,000 calves have been vaccinated this year.

Dairy Cow Nutrition.—During the past three seasons it has been demonstrated that calves which are rotated quickly through fresh paddocks enter the winter 70 lb. to 140 lb. heavier than those set stocked in a calf paddock. Continuation of set stocking during the winter of 1944 resulted in the death of nearly 50 per cent. of the calves. Under rotational grazing, drenching for internal parasites does not appear necessary, while under set stocking it has not proved effective. A ten-year project has now been initiated to examine the effect of plane of nutrition at different ages on lifetime production. Examination of the nutritive value of pampas grass has been continued. No difference in strain has been observed. Quality is affected by soil fertility, rate of growth, and maturity. It is unlikely that pampas grass will prove more than a maintenance ration, but where it suits a farmer's convenience to grow pampas instead of shutting up pasture for hay it may be valuable as a substitute for hay. A study of nutritive value of paspalum has been commenced. Considerable time has been devoted to devising suitable technique for dairy cow metabolism work, especially under grazing conditions.

Copper Deficiency.—Further work has confirmed the occurrence of copper deficiency on most peat soils in New Zealand. The effectiveness of top-dressing with copper sulphate has been demonstrated on dairy farms. After top-dressing, young and adult stock are healthy and remain free from peat scours and butterfat production is very materially increased.

Identical Twins.—An attempt has been made to obtain identical twin calves for precise experiments designed to measure environmental effects on production and reproductive behaviour. Twenty-five pairs were obtained, but the method of collection made rearing difficult, and only 17 pairs survived.

Production of Twins in Cattle.—The possibility of increasing the occurrence of twins in cattle by hormone treatment has been the subject of a preliminary investigation. Obviously, increasing the fertility of beef herds in this way could be of economic importance. Thirteen cull cows were treated with pregnant mare serum. Post-mortem examination of 12 pregnant cows showed 5 to carry singles, 5 to carry twins, and 1 triplets. The remaining cow had 6 atrophied young. The work will be extended next season with cows intended for beef purposes, when the animals will be allowed to carry their calves full term.

Induction and Stimulation of Milk Secretion with Hormones.—The use of stilboestrol and thyroprotein for inducing and increasing milk secretion has been further studied. Though definite effects can be demonstrated experimentally, these treatments could not be used economically in the present state of our knowledge.

Pig Nutrition.—Final results of experiments on vitamin A have shown that pigs bred under conditions where they have access to green pasture do not need vitamin A supplements even when they are subsequently fattened from stores to baconers under indoor conditions on factory buttermilk. Further experiments have substantiated the previous conclusion that the feeding of reasonable meal supplements to grass-fed pregnant sows is profitable.

Parasitology.—Field tests of phenothiazine have been made to determine the minimal effective doses for different sheep and calf parasites. A number of cases of keratitis have been reported following the use of phenothiazine in calves, and an investigation of the condition is in progress. It has been shown that lambs born in a paddock from which dogs have been excluded for over two years become infested with cestode larvæ. Results obtained from dosing dogs with arecoline have given disappointing results when measured by the occurrence of cestode larvæ in the livers of sheep from the properties concerned.

Research Work for the Beekeeping Industry.—The main research problem commenced was that of finding a satisfactory method of preventing absorption of moisture by honey during extraction in the Whangarei district. Here, much honey is spoiled by fermentation due to this cause. The trouble appears to have been overcome satisfactorily in the honey-house by the use of a heated room with low humidity for treating the frames of honey prior to extraction, and a similar room enclosing the honey-tanks. The success of the method is being tested by carrying out yeast-counts on honey samples taken at various stages throughout extracting, the counts being correlated against specific-gravity determinations. Samples were taken in triplicate, and their keeping qualities are being watched at Wallaceville under different conditions of humidity. The use of pollen substitutes in a pollen-deficient area of Otago has been investigated, and a promising substitute selected for test on a wider scale next season. The trapping of natural pollen by means of a pollen-trap was tested at Wallaceville, and a satisfactory type of trap evolved. The toxicity of D.D.T. to bees is undergoing extensive testing. Methods of estimating creosote in honey have been tried. Bacteriological work has been carried out in connection with estimating yeasts in honey and diagnosing *Bacillus* larvæ. Diagnostic work on samples submitted by Apiary Instructors is increasing.

FIELDS DIVISION

REPORT OF J. M. SMITH, DIRECTOR

Climatic conditions, in marked contrast to the previous season, which tended to be dry, were generally wet. A fairly good winter was followed by a fair spring, although in some districts much trouble was experienced in having land cultivation carried out. Frequent summer rain resulted in good, though soft, pasture growth and abnormal growth in connection with crops generally. The saving of hay was a long and tedious business, with much low-quality material being saved. The autumn was disastrous for harvesting. Prolonged spells of wet weather, with much flooding in some districts, made it impossible to proceed normally with the harvest, and much crop was lost as a result. Floods in the Gisborne district were followed by similar conditions in the Whakatane area, and in February the most disastrous floods recorded were experienced in Canterbury and Otago, South Canterbury being the worst affected area.

CROPS

Comparative figures for 1943–44 and 1944–45 are as follows :—

	1943–44. Acres.	1944–45 (Estimated). Acres.
Wheat	239,183	184,000
Oats (all purposes)	228,887	235,000
Barley (all purposes)	36,310	44,600
Potatoes	27,178	31,500
Onions	1,023	2,000
Peas	44,690	45,000

Seasonal conditions, which interfered seriously with cultural work in the spring and made mid-season harvesting almost impossible, turned what once promised to be a record season with certain crops into one with below-average production. Wheat, oat, barley, and potato yields in particular would possibly have constituted a record had harvesting conditions been normal. Much lodging occurred with grain crops, and, while many of these could have been headed had weather conditions permitted, continued rains led to sprouting in the heads. Where crops were stooked, this same sprouting occurred in the sheaf. Moisture content of many lines was high at threshing, while considerable losses occurred as a result of flooding in Canterbury.

Potato crops promised well, but conditions in the field have led to disastrous results, and although a record acreage is shown the resulting crop has been most disappointing. Onion crops yielded well, but here again conditions made drying of the crop difficult, and many "wet necks" are making storage difficult.

The delay in the harvest of crops generally has meant that much ground that would normally have been prepared for autumn sowing of grain has had to stand over for spring sowing of alternative crops, and this, added to other troubles such as shortage of man-power and equipment, will have a detrimental effect on the 1945-46 harvest figures.

Grass and clover seed harvesting was also carried out under difficult conditions, with heavy individual losses.

Services' Vegetable Production

The growing of vegetables by the Department to ensure a continuous supply of fresh vegetables to the Armed Forces without such supply interfering with civilian requirements was undertaken in 1942.

An initial area of 1,800 acres envisaged supply only to New Zealand Forces, but with the entry of the United States of America into the war and the arrival in this country and in the Pacific area of United States Forces, the area leased for vegetable production was stepped up to 5,200 acres, of which 4,172 acres were actually cropped. With the progress of the war, which saw United States Forces removed to a more advanced base and the better organization of the commercial growers, the need for Services' vegetable production areas decreased, and as the commercial growers stepped up their acreage so the Department reduced the number and acreage of its projects. In the spring of 1944 an area of 214 acres was released, while the autumn of 1945 saw 3,281 acres grassed out and handed back to the lessors, leaving an area of 1,686 acres still in vegetable production.

Production.—A range of 27 varieties of vegetables was produced, and production planned to even out supply during each month of the year. The total tonnage produced during the year ending 31st March, 1945, was 22,526 tons. A considerable proportion of this was handled by the Internal Marketing Division processing plant at Pukekohe, where cabbage and carrots were supplied for dehydration and peas and beans for quick-freeze. The change in location of huge troop numbers from within this country to the Pacific area meant sudden changes in production schedules, as only certain types of vegetables produced were suitable for export in fresh condition or processing. These sudden changes led to inevitable loss, but under war conditions such loss is to be preferred to acute shortages.

Supply.—Details of supply are as follows:—

	Tons.
Army	1,511
Navy	256
Air Force	1,234
Others, including United States Forces	19,526
Total	22,527

The supply to the Armed Services other than New Zealand Army, Navy, and Air Force in the country has been under the direction and control of the Internal Marketing Division, which, after satisfying the requirements of these Services, has placed the balance on the civilian markets. With the very favourable season experienced, total production from Services' vegetable production and commercial growers was exceptionally high, and as a result there were at times an over-supply of vegetables. Where possible, such surplus vegetables were made available free to various charitable institutions.

Councils of Primary Production

The District Councils of Primary Production have again been helpful in many directions, and their services have been of inestimable value in maintaining and, where possible, increasing production. The Councils have been called upon to make recommendations in connection with the release of farm labour to the Armed Forces, and also to assist in making the best use of the available farm labour. District Councils have, as in past years, estimated the number of Service personnel required for harvesting work.

Allocation of Supplies.—District Councils have continued to act as liaison officers for the distribution of fertilizer, tires, gum boots, &c., and the allocation of tractors. They have also reported on applications for accommodation under the Rural Housing Emergency Scheme, and have generally assisted the farmer over a difficult period.

Appointment of Supervising Organizer of District Councils of Primary Production.—The appointment of an officer to this position in June, 1944, has contributed to the smooth working of the District Councils.

Flock House Farm of Instruction

The training of lads in agriculture was continued during the year. At the commencement of the year difficulty was experienced in securing sufficient trainees, but during recent months this position has greatly improved, and at present there are 35 trainees in residence.

Field Experiments

The number of trials undertaken during the year under review showed a slight increase. Details are as follows:—

1941–42	945
1942–43	477
1943–44	228
1944–45	241

Pasture Trials.—These include the mowing trials for measurement of production under the enclosure technique at Marton, where responses from superphosphate are compared with those from serpentine-superphosphate and other phosphatic fertilizers and lime. In addition, the long-term investigation under the mowing and grazing technique by which residual effects from fertilizer applications which were discontinued in 1940 are being studied is providing useful data. At Marton the value of H1 rye-grass and other herbage species is also being investigated under the enclosure technique, while additional information on herbage plants is being secured from grazing trials on this area. At Stratford, Ruakura, and Wairoa, trials under the enclosure technique are providing useful information on pasture production generally, and at Winton the responses from serpentine-superphosphate and reverted superphosphate are being compared under the enclosure technique.

Responses from serpentine superphosphate and other phosphatic fertilizers, including Clarendon (Kapiti) phosphate and lime, are also being studied by means of observational top-dressing trials and grazing trials laid down over a wide range of soil and climatic conditions throughout the Dominion. The value of H1 rye-grass and other herbage plants is also being studied in observational trials, while on high country areas and on the Pisa area the value of imported pasture plants is being investigated. At Coromandel a trial with edible mimosa, which is valued as a stock food and for erosion control, is in progress.

Crop Trials.—The value of serpentine-superphosphate and Clarendon (Kapiti) phosphate was investigated in a number of crops, including wheat, turnips, swedes, and rape. A series of trials in which an improved strain of rape was compared with the standard line is also in progress. A large number of trials in connection with vegetable production have been in progress on a special experimental area at Papatoetoe and extended to a number of projects. Useful data in regard to varieties, cultivation, and manurial practices generally have been secured, and future work can be planned on the results obtained. In addition, the relation between soil deficiencies, particularly in respect of minor elements, and plant diseases has been studied.

Linen Flax.—On an area leased by the Linen Flax Section a number of trials with linen flax were carried out during the year, and in these such problems as rate and method of sowing, fertilizer with the seed and as a top-dressing, and various methods of harvesting were investigated. The carrying-out of these trials on a special area is a marked improvement over the former system of co-operative field experiments, and it is hoped to continue this work.

Weed Control.—A series of trials in which a number of weedicides were applied was carried out. On vegetable crops, kerosene, sulphuric acid, and two imported proprietary weedicides gave satisfactory results, and this work will be continued. Work on ragwort control, both by dry dusting and spraying, is also in progress, and will be extended this year.

Experimental Technique.—The trial in which plots planted with white clover from a single parent have been top-dressed with lime, superphosphate, and potash and the production from each measured by mowing and weighing has supplied useful data, and will be finalized in the near future. The work on indicator plants in assessing soil deficiencies in both pots and plots gave useful information of a preliminary nature.

Fertilizer Research Station.—Plans are in hand for the establishment of this Station near Hamilton. It is proposed to carry out intensive investigations on experimental technique for use in pot, small plot, and field trials, and the aim is to introduce the technique finally adopted on to trials either on leased areas or in co-operative field experiments on surrounding farms. A wide range of problems in connection with cultivation practices, pasture mixtures, pasture establishment and management, liming, and top-dressing will also be investigated. In addition, the various kinds and forms of fertilizer for crops, and fertilizer placement, will be studied.

Programme of Future Work.—Investigational work will be greatly expanded in the coming year, and will include combined variety and manurial trials with wheat, and wheat and barley variety trials, in all of which yields will be compared. In addition, the number of mowing trials on pastures will be increased, and a considerable number of observational top-dressing trials will be laid down on pastures on soil types not yet investigated. The work on erosion control by the introduction of suitable herbage species will also be continued on a wider scale.

Fertilizers

Rationing. Although the total quantity of rock phosphate imported during the year showed a substantial increase over the tonnage imported during the same period last year, it has still been necessary to retain the rationing scheme. Some degree of relief has, however, been possible, and although the basic ration has remained at 28 per cent. of the average annual quantity of fertilizer used during the two-year period ended 31st May, 1941, the following additional quantities have been made available: —

(1) An extra 1 cwt. for each dairy cow milked this season:
(2) An additional allocation for each of the principal fodder crops, such as turnips, swedes, rape, mangels, and chou moellier:
(3) Additional quantities granted as a result of reopening the appeal procedure.

Special provisions continue to exist for returned servicemen to be allocated a supply of fertilizer upon application to the Secretaries of District Councils of Primary Production.

Importations. Materials such as muriate of potash and sulphate of ammonia continue to be imported in small quantities. Sulphate of potash is at present unprocurable except for tobacco-growing, where its use is imperative.

Clarendon Phosphate.—During the year operations on the higher-grade phosphate undertaken by the British Phosphate Commissioners ceased after extracting a total of 7,489 tons. Investigational and quarrying operations on the low-grade phosphate (10–12 per cent. P_2O_5) were continued, and a total of approximately 22,000 tons of this material was extracted.

Organic Fertilizer.—The continuation of the policy of growing large quantities of vegetables for supply both locally and to the Armed Forces in the Pacific has made it necessary to institute control over the distribution of organic fertilizers.

Official Samples.—A further 110 official samples of fertilizers have been taken and analysed. In addition, a considerable number of samples suspected of being valuable fertilizers have been reported on.

Seed Certification

The activities associated with the Department's scheme of seed certification continue to expand, and increased quantities of certified seeds are being produced each year. A feature of the season's activities has been the inclusion in the list of certified seeds for the first time of the new strain of rye-grass developed by the Plant Research Bureau and released under the description "H1 ryegrass."

Increased demands from overseas are being received for locally grown grass and clover seeds, particular emphasis being placed on certified lines. As the supplies of seed of pedigree strain are increased, so these are given greater prominence in the certification scheme. As a result, the following quantities of seed certified from the 1940 harvest were identified as of pedigree origin:—

Perennial rye-grass	160,000 bushels.
Italian rye-grass	20,000 bushels.
Cocksfoot	70,000 lb.
White clover	25,000 lb.
Red clover	30,000 lb.

Similar developments are taking place in respect of crop seeds. All the wheat now accepted for certification is of reselected origin, with the result that whereas previously rejections on account of foreign varieties or high loose smut were numerous, last season not one crop was rejected for either of these reasons.

Contract Growing of Seeds.—As a prerequisite to the inclusion in the certification scheme of seeds of pedigree or selected origin, it has been necessary to develop a system of contract growing of the material produced by the Plant Research Bureau. This process is essential in order that the stocks of any particular line may be multiplied up to a quantity which will permit of satisfactory distribution throughout the seed-producing areas.

Commencing with perennial rye-grass and white clover in 1935, contract growing has now been extended to a stage where the following seeds were being produced in 1945: perennial rye-grass, Italian rye-grass, H1 rye-grass, white clover, Montgomery red clover, broad red clover, lucerne, oats, sweet lupins, field peas, linseed.

All seeds produced under contract by the Department are distributed to the best advantage either—as in the case of grasses and clovers—under certification to the farming community generally or—as exemplified by linseed—to a limited organization capable of making the best use of the material available.

Supervision of Seed Production.—In addition to any supervision of seed production given as an adjunct of the certification scheme generally, particular supervision is given to the production locally of the Dominion's requirements of rape, turnip, swede, chou moellier, and kale seeds. The production of all these has developed as an outcome of war conditions, but the results have shown that, given proper supervision, seeds of quality can be produced in New Zealand, thus opening the way to the establishment of a post-war activity in brassica seed production.

Linen Flax.—Officers of the Fields Division have again in the 1944–45 season been responsible for obtaining suitable land for the growing of linen flax. They have contacted farmers and arranged contracts, supervised the sowing of the areas, organized the harvesting of the crops in the various districts, and given assistance in the valuation and stacking of the produce.

Seed-testing Station

Routine Services.—For the year ending December, 1944, 26,960 samples were recorded, representing an increase of 3,000 on the previous year's record total. An analysis of the total shows that samples were worked as follows: purity tests, 22,350; germination tests, 26,710; ultra-violet-light examinations, 4,675; picric acid tests, 3,455: total, 57,190. This total required the working of well over 100,000 separate testing operations.

It is a matter of some satisfaction that the Station's working average must be unequalled, and that, on capacity, the New Zealand Station ranks with the world's largest stations.

Seed Quality.—Generally, the 1944 production could be described as good average, and improvement in the quality of red clovers being especially evident. The seriousness of header-harvester damage during the previous season was responsible for timely publicity in the matter of the proper and careful use of headers. This season much of the large crop of blue lupins has been damaged in heading, and some criticism of the standard of testing this seed has resulted. However, notwithstanding the widely expressed opinion that damaged seed would establish under field conditions—apparently this view had some official support—the Station has been able convincingly to establish the reliability of its work.

Wheat.—Following investigations last year into wheat germination failures in the Rangitikei, the information thus gained was applied this year to sprouted and debilitated seed wheat in the South Island. All wheat samples now forwarded for germination test are reported upon in terms of seedling vigour, with some indication as to the possible proportion of seedling emergence under varying soil conditions.

Perennial Rye-grass.—The unusually wet season in the perennial rye grass production districts was responsible for a heavy infestation of blind-seed disease, with the result that new season's perennial rye-grass of high germination is at a premium. The pre-harvest examination service provided by the Station each year was utilized far beyond the capacity of the trained staff. A temporary examination centre was set up at Christchurch and reported upon 820 samples, which, with the 719 samples examined at Palmerston North, gave a total of 1,539.

Some publicity has been given to the practicability of the use of appropriately priced low germinating seed at proportionately increased sowing rates. This procedure, from the aspect of both cost and resultant pasture, has been followed satisfactorily by Government Departments for some years.

Seed Trade.—A continued active export demand led to short supplies locally of almost all lines, there being very little available in December over and above firmly held retail supplies. The short 1945 crop of indifferent quality has failed to return the position to normal, especially as some growers are not anxious sellers even at North Island retail prices. Although the present trading position is far from satisfactory, the greater part of the North Island early autumn demand has been satisfied, and in the South Island stocks admittedly of indifferent quality are being offered. It is fairly obvious that high-grade lines of rye-grass, cocksfoot, and clovers are being held by both growers and merchants against the prospect of the export embargo being lifted. The total value of the seed export of £1,466,835 represented a record, and was approximately double that of the previous record year.

Seed Purchasing.—The number of requisitions (464) showed a reduction on the number for the previous year, although the total value of seed purchased (£62,000) represented a slight increase. Following usual procedure, the larger consumer Departments were encouraged to place autumn sowing requisitions in October, when very advantageous purchases were made.

General.—Visits from various farmers and educational and commercial bodies have been received. A notable feature is the increasing interest in the Seed-testing Station displayed by South Island seed-growers during visits to the North Island.

Chemical Laboratory

The Chemical Laboratory at Fairlie Terrace, Kelburn, has continued to handle the analytical work of the Division. This covers analysis of official samples of fertilizers (110), assorted fertilizer samples (23), limestone (61), pasture samples (848), and miscellaneous soils, &c. (68).

Serpentine-superphosphate.—Fineness of grinding of the crushed serpentine rock and fineness of the finished product were thoroughly investigated during the year. Tests in connection with the solubility of the serpentine rock particles were also carried out.

Tissue Tests.—An investigation into the technique of tissue tests was commenced, work being done with sweet corn, cauliflowers, and white clover.

General.—"Whiptail" disease in cauliflowers from the soil angle was investigated, and soil work in connection with the Ahuriri reclamation, Napier, continued. A profile study of soils at Rongotea was made, and work on the transference of fertility carried on. Investigations into minor element deficiencies have been continued and some interesting progress made. Preparations are at present being made for the transference of this Laboratory to Hamilton, where it will be enlarged and, with better facilities, should be of greater value to the research work of the Division.

Young Farmers' Clubs

Now that many members are returning from service overseas there has been a decided revival in club activities generally, and a number of clubs which found it necessary to go into recess in the early days of the war have again been brought into being.

It is of interest to record that young farmers' clubs have been active in the Middle East, Italy, the Pacific islands, and in Germany at a prisoner-of-war camp.

DAIRY DIVISION

REPORT OF G. M. VALENTINE, DIRECTOR

From a productive point of view the season has been the most favourable for three years, particularly in the North Island. A mild spring, with good rains at intervals throughout the summer, provided excellent dairying conditions. In the South Island, especially in Southland, the spring was backward, cold and wet weather prevailing for some time. Conditions improved later, however, and production in the South Island should be at least equal to that of last season. In the South Canterbury and South Otago districts, severe floods were experienced in February. The flooded areas, however, recovered quickly, and the loss of production will not be so serious as was at first anticipated. The most serious result in these districts is likely to be the loss of root crops and hay, and the consequent shortage of feed for dairy stock during the coming winter.

Output

It is pleasing, after a period of steady decline in production to be able to report an increase in the quantities of butter and cheese graded for export. In terms of butterfat the increase was 24,219 tons, or 21·52 per cent. over the 1943–44 figure, which showed a decrease of 22,722 tons, or 16·8 per cent., from the 1942–43 figure.

Creamery butter received for grading for export during the year ended 31st March amounted to 119,781 tons, and cheese to 94,140 tons, as compared with 94,972 tons of butter, and 85,100 tons of cheese for the preceding twelve months, an increase of 24,809 tons of butter, or 26·12 per cent., and of 9,050 tons of cheese, or 10·62 per cent.

It is again pointed out that the figures used in this report are grading figures, not production figures, and, moreover, relate only to gradings for export. The provision of dairy products for the Armed Forces during the war years has considerably increased the quantities tabulated under the heading of local consumption, but these do not come within the scope of this report. The rationing of butter for the local market to 8 oz. *per capita* per week as from the end of October, 1943, would serve to offset this position to some extent.

Export Values

The total value, for Customs purposes, of all dairy-produce exported from the Dominion during the 1944–45 financial year was £29,184,719, an increase of £5,171,425 over the 1943–44 valuation of £24,013,294. The products included under this heading are butter, cheese, casein, dried milk, milk sugar, and condensed milk and cream.

Taking butter and cheese separately, butter exported during the year was valued at £18,754,698 and cheese at £9,643,013. The values for the previous year were £15,487,668 and £7,974,547 respectively.

Creamery Butter

The average grade of creamery butter graded during the year under review was 93·402 points, as compared with 93·391 points for 1943–44. Of the 119,781 tons received for grading, 101,487 tons, or 84·72 per cent., was classed as finest grade, 18,094 tons, or 15·10 per cent., as first grade, and 200 tons, or 0·17 per cent., as under first grade. The comparative percentages for 1943–44 were 83·66, 16·03, and 0·30, so that butter qualifying for the finest grade increased by 1·06 per cent. and only about 15·27 per cent. failed to reach the finest class. Feed taint, which is confined principally to the Auckland Province, was again experienced for a short period, and this year was more general and persistent in the Opotiki district than elsewhere.

pH Testing of Butter.—The number of tests made during the year at the various grading stores were: Auckland, 1,571; Gisborne, 20; New Plymouth, 704; Wanganui, 206; Wellington, 1,395; Lyttelton, 187; Bluff, 14; a total of 4,097. The previous year's total was 3,951. (The pH test is used to determine the relative acidity or alkalinity of the butter, and thus assist in discovering the addition of excessive neutralizer to cream.)

The bacteriological and chemical examination of samples of butter was continued, the numbers handled at the various grading stores being as follows: Auckland, 1,358; Gisborne, 291; Napier, 6; New Plymouth, 795; Wanganui, 424; Wellington, 1,387; Lyttelton, 397; Dunedin, 6; a total of 4,664. The previous year's total was 4,034.

Testing Butter for Moisture and Salt.—Churnings of butter tested for moisture totalled 128,694, of which only 0·27 per cent. were found to exceed the legal limit of 16 per cent. allowed by the Dairy Industry Act, and were returned to the companies for reworking to bring them within the legal requirement. Churnings tested during the previous year were 110,164, of which 0·30 per cent. were over-moisture.

Some 127,082 samples were tested for salt, of which 0·36 per cent. failed to comply with the regulations. For the previous year 107,087 samples were tested, 0·25 per cent. failing to comply with the regulations.

Whey Butter

Grading of whey butter again showed a slight increase, being 2,779 tons, as compared with 2,343 tons in 1943–44. Some 94·26 per cent. were classed as first grade, compared with 91·88 per cent. for the preceding year. Whey butter continues to be shipped to England, and the better qualities thereby assist to maintain the ration of 2 oz. butter per week.

Cheese

The quality of cheese has been well maintained, weather conditions assisting uniformity of manufacture. Starter trouble was less prevalent than in previous seasons. Although no protracted spells of warm weather were experienced, difficulty was on occasions observed through high curing-room temperatures. The matter of temperature control in cheese-curing rooms is well worthy of consideration by all cheese-manufacturing companies. Where curing-room temperatures are not controlled, factory managers naturally endeavour to manufacture cheese to suit prevailing conditions. Sudden changes in the weather are, however, liable to upset all efforts in this direction. It is evident, therefore, that greater uniformity in cheese quality would be obtained if all cheese-curing rooms were fitted with temperature and humidity control.

Although the shortage of labour in cheese-factories has not been so acute as during the previous season, the class of labour available is in many cases not satisfactory. This is indicated by the fact that a fair amount of badly finished cheese was forwarded to grading stores, the defect being particularly in evidence in the South Taranaki district.

The average grade of cheese graded for export during the year was 92·121 points, as compared with 92·064 points for the preceding year. Of the 94,140 tons received for grading, 24,421 tons, or 25·94 per cent., was graded as finest grade, 65,633 tons, or 69·71 per cent., as first grade, and 4,086 tons, or 4·34 per cent., as under first grade. The comparative percentages for 1943–44 were 21·43, 74·21, and 4·35, so that there was an increase of 4·51 per cent. in the finest class.

Butter Containers

While there has been no material increase in the number of containers, other than wooden boxes, used in connection with the export of butter, the position with regard to fibre containers of various origins has been somewhat consolidated, and a further year's experience with this type of container will prove of material assistance in determining future policy with regard to the packaging of butter. Experience in New Zealand and the reports from the London Office of the Dairy Division indicate that the fibre container has definite possibilities. When trading conditions in the United Kingdom assume a more normal aspect, the reaction to this type of container of those trading in our produce will be an important factor. During the war in Europe the abnormal handling and transport conditions have enabled much useful information to be obtained regarding the ability of the fibre container to withstand usage. In the main, this package has shown a satisfactory out-turn. With timber supplies for butter-boxes becoming increasingly inaccessible, attention must continue to be focused on an alternative type of container for our export butter. Rimu timber has not proved a really satisfactory substitute for white-pine.

Grading in Hawke's Bay

Owing to the closing-down of Messrs. J. J. Niven and Co., Ltd., Port Ahuriri, the grading of dairy-produce has since August, 1944, been transferred to the freezing-works premises of Messrs. Nelsons (N.Z.), Ltd., Tomoana. The conditions at this place are very suitable for the storage and handling of dairy-produce. Permission to use these premises as a grading store has been limited to the factories which previously shipped their produce through the gazetted premises of Messrs. Niven and Co. It should be recorded that Messrs. Niven and Co. co-operated most efficiently since their premises were first gazetted as a grading store.

Farm Dairy Instruction

The numerical strength of the Farm Dairy Instruction Section of the Division has been built up a little nearer to the pre-war standard with new appointments and the return to duty of several officers serving with the Armed Forces. There are now 76 officers engaged on this work. Petrol restrictions have, however, made it necessary to continue to restrict the service to farmers to a point lower than would be desired. Instructors have given a good deal of assistance, apart from the inspection side of their duties, by giving advice and practical aid to farmers in connection with the planning and construction of milking sheds. The aspect of instruction as distinct from that of pure inspection is an important factor in the general acceptance by the dairy-farmer of farm dairy instruction and the good will existing generally.

The number of new milking sheds erected during the year was 777, while the number substantially reconstructed was 874.

With the object of checking up the work being done by the various Farm Dairy Instructors from the point of view of ensuring a Dominion-wide uniformity of classification standards in respect of the condition of milking sheds and machines, Mr. W. G. Batt, Special Inspector, recently visited most of the principal dairying districts throughout both Islands. During these visits Mr. Batt, accompanied by the local Farm Dairy Instructor and also the Supervising Dairy Instructor for the district, made inspections of a representative selection of sheds and plants.

Milking-machines and Separators

During the year 1,028 new and 1,002 used milking-machines, making a total of 2,030 machines, were installed. In addition, 123 permits were issued for the installation of separators.

Check Testing of Milk and Cream Samples

Dairy Instructors and special Inspectors checked the factory testing during 517 visits, and during these visits checked 3,229 samples.

Redundant Cheese Plant

The settlement of claims for compensation to dairy companies has now been finalized by the State Advances Corporation. In all, 76 claims on account of plant to the value of £94,000 have been settled.

The sale of redundant plant taken over by the Department has proceeded steadily throughout the year, when plant to the value of £17,000 has been disposed of through the selling agents. The listed value of plant still on hand is approximately £29,000.

Transfer of Supply

The Dairy Supply Control Order 1942, which has as its primary purpose the retention of supply in butter, has continued to be in force and has mainly involved the consideration of applications to change to cheese supply by dairy-farmers owing to various personal reasons. The United Kingdom's requirements still necessitate butter having the first priority, although a large quantity of cheese is also needed.

The Order also had as an objective, and complementary to the Transport Zoning Order, the stabilizing of supply at creameries and involved some administration in the case of suppliers who considered they were suffering hardship or, on the other hand, were reluctant to submit to the terms of the Order.

Inspection of Dairy-produce in Britain

Both Messrs. F. H. Taylor and G. V. Were, stationed in London and Liverpool respectively, remain actively engaged in the inspection of New Zealand produce in Britain, and, apart also from their valuable work as liaison officers on behalf of the technical side of the dairy industry, continue to devote a large portion of their time to the quality aspect of dairy-produce on behalf of the British Ministry of Food. In addition to the assistance given to the Ministry, these officers have the opportunity of materially increasing their personal knowledge of the marketing and distribution of dairy-produce generally in Britain. This work has resulted, also, in closer relationship with dairy officers from other countries, particularly Australia, to the advantage of all.

Dairy Laboratory, Wallaceville

The number of chemical samples dealt with showed a slight increase to 705, besides which additional work on many cream, butter, and water samples was done to provide more information for the Dairy Instructors.

The majority of the chemical samples were again butter and cream to be analysed for copper and iron contamination. Improved methods of handling the samples have been perfected.

On account of wartime conditions it has become necessary to sell for table purposes in England some of the best available whey butter, and to meet this position as many samples of whey butter as possible were, during the past summer, examined for copper and iron.

Only a small number of water samples from dairy factories were chemically examined during the year, but opportunity was taken to do rather fuller chemical analysis and thus provide more complete information in respect of the suitability of the water for factory purposes.

The principal bacteriological work has continued to be the examination of butter samples forwarded by the grading stores, 3,303 samples being handled.

The examination of starters for bacterial contamination has been continued as in previous years, while a small number of water samples have been examined for bacterial purity. In addition, some investigations have been undertaken in connection with the cleaning of milking-machines.

An important development during the year was the initiation of arrangements for several Dairy Instructors to be provided with facilities for making extensive trials of the Resazurin test upon milk and cream, and especially to endeavour to link up the results with the condition of the milking equipment.

Dairy Factory Managers' Registration Board

Applications for registration dealt with by the Board during the year totalled 43, certificates being granted in 33 cases. There are at present 754 holders of certificates on the register, 36 of whom are serving with the Armed Forces.

Certificate-of-Record and Government Official Herd-testing

Entries for both C.O.R. and O.H.T. showed a considerable increase over the preceding year, and only by the continued co-operation of Farm Dairy Instructors, 42 of whom carry out monthly testing visits to breeders, has it been possible to avoid declining acceptance of a considerable number of applications. As it was, several applications could not be accepted because of the inability of our staff to undertake the testing. While two additional Testing Officers have been appointed, the difficulty of providing suitable locomotion has precluded a further extension of the testing staff in the meantime.

First-class certificates-of-record issued during the calendar year 1944 number 674, as compared with 472 in 1943. In addition, 128 second-class certificates were issued. Of the cows which received first-class certificates, 470 were in the yearly division and the remaining 204 in the 305-day division, average production being 513·05 lb. and 416·34 lb. fat respectively. Of the cows which received second-class certificates, 87 were in the yearly division and averaged 509·13 lb. fat, while the remaining 41, which were in the 305-day division, averaged 378·64 lb. fat.

The number of cows tested under Government official herd-test showed a substantial increase from 3,184 in 1943 to 4,471 in 1944. The 1942 figure was 2,595, so that the upward trend is clearly apparent.

Retirement of Director

On the 31st July, 1944, Mr. W. M. Singleton, Director of the Dairy Division, retired after forty-three years' service, having joined the Division in 1901 as a Dairy Instructor. He was appointed Assistant Director of the Dairy Division in 1909, and on Mr. D. Cuddie's retirement in 1921 became Director.

While carrying out duties as an Instructor he introduced to New Zealand cheesemakers the curd test, the acidimeter, and prepared pure culture starters, all of which are still of major importance in cheese manufacture. He played an important part in establishing the herd-testing movement, and was responsible for the introduction of systematic testing of dairy herds for yield by medium of the "association" test in 1909, and also for the certificate-of-record testing of pure-bred dairy cows in 1912, and the Government official herd-test in 1928. Among other important reforms for which he was responsible were the compulsory grading of milk and cream with differential payments according to grade, the check testing of milk and cream at dairy factories by officers especially appointed for the work, the establishment of a dairy laboratory attached to the Dairy Division, and the introduction of a Dominion-wide farm dairy instruction service.

Mr. Singleton was an officer of outstanding ability, personality, and character, whose service to the Department and the dairy industry of New Zealand can scarcely be over-estimated.

HORTICULTURE DIVISION

REPORT OF W. K. DALLAS, DIRECTOR

As a result of the war the horticultural industry, in common with other primary production industries, has now a number of problems to face which will require careful planning to ensure that the fullest effort is maintained in producing foodstuffs which the people in various parts of the world require.

With the improvement in prices to the producer, the removal of many restrictions, the greater availability of labour, and increased quantities of new types of implements and machinery for cultivating the land and handling the crops, together with fertilizers and general replacements, a higher production per unit of area may be expected. So far as orcharding is concerned, such an increase will to a limited measure assist in meeting the increased demand while the trees for the new orchard areas are being raised and brought to the producing stage.

Climatic Conditions

A year of abnormal weather with high rainfall and a minimum of sunshine has been experienced. In Canterbury hail storms occurred in almost every part of the district, but in varying degrees of intensity. At Loburn severe damage by hail which occurred early in December ruined practically the whole of the apple crop.

In Central and North Otago in the spring were experienced disastrous frosts which severely affected the production of stone-fruit in the Roxburgh and Alexandra area. Later in the year the Roxburgh district suffered severely from hail storms, lowering the grade of fruit to a considerable extent.

In the North Island and Nelson the lack of sunshine was offset to some extent by the increased rainfall. Free growth was phenomenal and fruit sized well. Appreciable loss in fruit resulted from heavy hail storms in the Nelson Province during the early summer.

Small fruits, in the main, benefited by the extra rainfall.

Area under Cultivation

The fruit industry in the Dominion provides a livelihood for a considerable number of primary producers and their families, and also provides employment for many permanent employees and seasonal workers both within itself and in allied industries.

For the year under review the number of orchards recorded in the official register was 4,787, comprised as follows:—

Taxable orchards (comprising 120 and more trees)	2,160
Non-taxable orchards (less than 120 trees)	2,627
Total	4,787

The total acreage devoted to pip, stone, and citrus fruit trees is approximately 19,000. The areas (approximate) under commercial production of the principal kinds of fruit under cultivation are :—

	Acres.
Apples	11,000
Pears	1,200
Stone-fruit	4,800
Lemons	900
Other citrus	900
Other tree fruits	200

The average economic orchard unit is in the vicinity of 12 acres. The fertility of the soil upon which the trees are established has an important bearing upon the area of an economic unit.

The relative sizes of taxable orchards in New Zealand are :—

9	orchards over 50 acres.
57	,, 26 to 50 acres.
41	,, 21 to 25 ,,
105	,, 16 to 20 ,,
253	,, 11 to 15 ,,
561	,, 6 to 10 ,,
1,134	,, 1 to 5 ,,
2,160	orchards aggregating 16,182 acres.

The production for the 1944 season was as under : —

	Bushels.
Apples	2,540,770
Pears	351,914
Stone-fruit	453,385
Lemons	112,000
Other citrus	85,000

The total of apples and pears (bushels) was distributed as follows :—

	Apples.	Pears.	Total.
Internal Marketing Division receipts	2,217,668½	269,803½	2,487,472
Private sales	151,660½	25,683	177,343½
Sold to canning factories	138,958	56,327½	195,285½
Sold for pulping, cider, &c.	101,003	100	101,103
Totals	2,609,290	351,914	2,961,204

The district of Hawke's Bay produced a record crop, a total of 1,089,280 cases passing through the Internal Marketing Division receiving depot. This did not include private sales and fruit sold for canning, pupling, &c.

For the current harvesting season the original estimates showed indications of a normal crop for the Dominion, but one that was slightly less than that of the previous year. However, a series of hail storms which caused damage to the crops in several districts, particularly in Canterbury and Nelson, necessitated an adjustment of the estimates.

The latest estimates indicate a crop of 2,097,626 bushel cases of apples and 345,308 of pears.

Citrus Fruit

Estimated totals for citrus production for the season 1944–45 are—

	Packed Bushels.
Lemons	112,000
New Zealand grapefruit	62,000
Sweet oranges	23,000

Although these figures indicate an increase, the supplies are insufficient to meet the demand. As importations are restricted under wartime conditions, largely on account of the lack of shipping space, the markets have been short-supplied throughout the year.

Stone-fruits

While the production of stone-fruits in the North Island for the present year shows an increase over last season, severe losses were sustained in the Otago and Canterbury districts through early frosts, and Kurow growers suffered an almost total loss. In the Roxburgh district the early crops were only 15 per cent. of normal, while the mid-season varieties were less affected.

In the Alexandra district, where more frost-fighting was carried out, much better results were obtained.

The estimated production of stone fruits for the 1944–45 season is—

	Bushels.
Peaches	286,800
Nectarines	27,135
Apricots	27,350
Plums	33,730
Plums (Japanese)	66,625
Cherries	11,745

Standardization of Grades of Apples, Pears, and Lemons

The standard grades operating are "Fancy," "Commercial," and "Minimum." The New-Zealand-grown Fruit Regulations 1940 have been amended to include extensions of allowances for small defects in "Commercial" and "Minimum" grades. These extensions are confined to the inclusion of sound, marketable fruit showing a greater percentage of certain defects than previously. The supplies of fruit needed for marketing to meet the local demand have been somewhat augmented by these concessions. It has also had the effect of making available for supply to the Armed Forces relatively larger quantities of apples.

Fruit Cool Storage

Fruit cool storage space has been increased since 1936 from 840,700 bushel case capacity to 1,105,100 cases. This increase of 264,400 bushel cases has mostly been erected since the 1939 season to meet the need for additional storage arising from the temporary cessation of export shipments to Europe. The additional space has been provided by growers and public cool store companies. Increasing interest by cool store operators is being shown in obtaining even temperature and relative humidity control, which is provided by the direct expansion ceiling cooling system with the addition of forced convectional air circulation. Ventilation of the storage chambers is also being closely studied by grower proprietors with a view to obtaining some control of the carbon dioxide concentration in the storage atmosphere.

Orchard Instruction Service

The increase in the other activities of the Division and staff shortage have somewhat curtailed instructional visits as far as the older-established orchardists were concerned to permit special attention being given to new growers, some of whom are rehabilitated ex-servicemen. Addresses and demonstrations have been given throughout the whole of the districts.

Orchard and Nursery Inspection

Although transport restrictions and shortage of staff hampered the work to no small extent, a considerable amount of inspection has been undertaken throughout the Dominion. All registered nurseries have been made the subject of at least one inspection per annum.

Both commercial and domestic orchards have received visits of inspection as frequently as circumstances permitted, work in connection with fireblight necessitating a great deal of attention. Citrus canker inspection was continued throughout the appropriate season.

The inspection of nurseries has shown that they are being kept in a satisfactory condition and free from disease.

Six hundred and forty-three nurseries were registered throughout the Dominion for the year, an increase of 43 compared with the previous year.

Diseases of Horticultural Crops

The humid weather was conducive to fungous diseases, and in some districts effective control could not be maintained owing to rain, with consequent interruptions in spraying, and to shortage of man-power.

Black-spot.—The season in the Nelson, Manawatu, and Wairarapa districts has favoured the development of black-spot, which was more prevalent than in recent years in these areas. In other districts good control was obtained when growers were able to maintain their usual spray programmes.

Brown-rot.—The incidence of brown-rot generally was very severe this year. In Otago, although bad in some stone fruit orchards, it was much less in evidence than last year.

Bacterial Spot of Plums.—Bacterial spot of plums has shown a marked increase this season.

Fireblight.—Fireblight has reappeared this season in most districts. Shortage of labour has, no doubt, been responsible for growers being unable to attend to the cutting-out of carry-over cankers. Where the work of cutting out has been carried out effectively, as in Nelson and Alexandra districts, the infection has been considerably reduced.

Ripe-spot on Apples.—Spraying for ripe-spot on apples is becoming a general practice, and is having the effect of greatly reducing the incidence of this disease.

Codling-moth.—Generally, codling-moth has been more prevalent than usual this season. This would appear to be due to weather conditions preventing the full spraying programme being carried out or to delay in applying sprays.

White Butterfly and Diamond-back Moth.—Where plants have not been effectively treated, damage has been caused in vegetable gardens by the white butterfly and diamond-back moth. Growers are realizing the necessity for applying proper methods of control. With the easing of the war situation, an improvement in supplies of insecticides for control purposes is looked for.

Late Blight.—Late blight has severely affected potato crops this year, resulting in loss of crops and in many growers digging their potatoes earlier than usual to prevent the disease affecting the tubers.

Citrus Canker.—A close watch has been kept on citrus areas for canker infection, and the situation has shown improvement. No further outbreaks have occurred in the North Auckland (Kerikeri) orchards, and it has been possible to remove planting restrictions which had been imposed on certain orchards in that area. The position in the Tauranga district is being kept under close observation, and any recurrence of the disease is being promptly dealt with. Only a few individual diseased trees have been recorded.

Small Fruits

Small fruits, such as strawberries, raspberries, currants, gooseberries, and loganberries, are produced in sheltered localities of most districts. The commercial areas under this class of fruit are distributed as under :—

District.	Area (in Acres).					
	Strawberries.	Raspberries.	Loganberries.	Gooseberries.	Currants.	Other Berries.
Auckland	148	..	8	37	..	..
Poverty Bay ..	..	..	1	..	..	..
Hawke's Bay ..	7	4	4	3	6	..
Wairarapa	3	45	3	28	36	1
Manawatu	2	18	2	1	2	3
Nelson	5	290	2	8	15	55
Canterbury	35	186	3	26	65	..
Otago	20	32	..	7	5	..
Otago Central ..	10	25	2	..	1	1
Total area ..	230	600	25	110	130	60
Estimated production (in tons)	250	750	40	150	150	120

Viticulture

Grapes are grown out of doors in considerable quantities, mainly in the districts of Auckland and Hawke's Bay, while under glass they are grown in many localities throughout the Dominion. The approximate area under outdoor grapes grown for winemaking is 700 acres, 250 acres of which have not yet reached the bearing stage.

Grapes.—The crop of outdoor grapes was very good in all districts, the condition of the grapes which reached the market being at least 50 per cent. higher than that of the previous season.

No extension in the area of outdoor table grapes occurred during the year, and on account of the high prices being paid by the winemakers for grapes a considerable tonnage which would normally reach the market for dessert purposes was used for winemaking.

In most districts the crop of indoor grapes was in good condition, and growers with heated houses carried late crops through to July. A shortage of labour in some vineries resulted in neglect, but not to the serious detriment of the total crops. No new glasshouses were erected.

The crop of wine grapes in the Waikato and Henderson areas was comparatively good. Hawke's Bay suffered a severe setback when heavy flooding occurred just prior to vintage. Slight frost damage at Greenmeadows and a hail storm at Gisborne at the beginning of the season caused considerable losses.

Assistance is rendered to grape-growers by the Department in the way of free bulletins and practical instruction in all phases of viticulture.

Diseases of Grapes under Glass.—Very little trouble was experienced with any fungous diseases. Mealy bug, however, still continues to do considerable damage, but improved fumigation methods are proving effective. Experiments in this connection are being conducted by the Plant Diseases Division, and with the experience gained therefrom further improvement in control may be expected.

Diseases of Outdoor Grapes.—Downy mildew, powdery mildew, and black-spot were again prevalent, but in vineyards where full spray schedules were maintained a control was easily gained and there was very little actual loss. Winemakers in the Waikato and Henderson districts are being advised to plant the Franco-American hybrid varieties of grapes, which, being more resistant to disease, are far better suited to the damp, humid conditions experienced in those districts.

Winemaking

Sixty individual units are engaged in the manufacture of approximately 85 per cent. of the Dominion's wine production, 50 per cent. of these units being engaged solely in grape-growing and winemaking. The balance of the winemakers are operating on a smaller scale, making from 30 gallons to 300 gallons of wine each per annum, their main incomes being derived from other sources. The types of wine produced are mostly sweet red and sweet white wines, only from 5 per cent. to 7 per cent. of the wine manufactured being of the dry types.

The approximate total quantity of wine produced and consumed in New Zealand since 1940 is as follows :—

	Gallons.
1940	185,000
1941	186,000
1942	207,000
1943	309,000
1944	348,000

Building of wineries, distilleries, and vineyards continued during the year, approximately £15,000 being expended in the Hawke's Bay, Waikato, and Henderson areas. Four new wine distillery licenses were granted by the Customs Department during the year.

A considerable area of land was purchased during the past year for the future planting of vineyards.

The position of the wine industry is still showing improvement.

Te Kauwhata Horticultural Station

The grape crop on the Station was light this year, fruit being available only from the established grape-producing blocks. The new blocks of vines planted are in good condition, and it is expected to complete these plantings during the coming season.

Depredations by birds were the worst experienced for many years. In general, fungous diseases were kept under control by the application of a thorough spraying programme.

A successful year was experienced in the sales of wines, and stocks maturing during the period under review have all been disposed of.

Cidermaking.—Throughout the Dominion there are about 40 manufacturers of cider. The annual production of New Zealand apple wines and cider is estimated to be about 60,000 gallons.

Market Gardening Industry

Commercial vegetable production is carried on throughout both Islands and, in the main, is confined to the better-class lands. Considerable areas are cropped under leasehold tenure, these generally being broken from the pasture, cultivated in vegetable crops for a few years, and then again sown in grass.

Market Garden Registration (exclusive of Potatoes, Onions, Kumaras, and Swedes).—The increasing economic importance of commercial vegetable production can be appreciated from the registrations for the current year, which number 2,936, representing 21,135 acres of commercial gardens ranging from ½ acre upwards, being an increase of 4,000 acres on that recorded for the previous year.

The season proved a very suitable one for the main basic vegetables, good yields, generally, having been obtained. Many of the crops produced during the year were grown under contract to the Internal Marketing Division for use by the Armed Forces in both fresh condition and dehydrated form.

The transition from horse to mechanical methods of production which has been taking place for some considerable time has been particularly noticeable during the past year, and it would be difficult to find any appreciable number of commercial vegetable-producing areas on which motor-propelled implements are not in operation. By the use of this modern machinery larger areas of land have been brought under cultivation than would have been possible by the methods which previously obtained. This was an important factor in enabling the Dominion to meet its commitments of vegetables for Armed Forces and civilian requirements.

The "Dig for Victory" campaign to encourage home gardeners in the production of more vegetables on a planned basis was this year an unqualified success. Members of all committees showed a great deal of enthusiasm, and the results of the various competitions which were arranged justified the campaign, especially in the Canterbury and Otago districts. Demonstrations, shows, garden competitions, and instructional pamphlets were arranged, and full use was made of the broadcasting facilities.

Vegetable instruction work has expanded considerably during the past year owing to the increase in the number of commercial gardens through persons with land and implements answering the call for a greatly increased production of vegetables and to more or less experienced growers taking up this branch of production. Advice has been given on crop production, diseases of crops, and glasshouse construction. Rehabilitated ex-servicemen have been instructed in vegetable culture and advised regarding the suitability or otherwise of land to be acquired for this work.

Standardization of Grades of Vegetables

The Emergency Standard Specifications for vegetables prepared by the New Zealand Standards Institute were used by the Department's Inspectors.

All vegetables grown under contract to the Internal Marketing Division have been inspected by officers of this Division, mainly at the appointed inspection points. The extent of this work has increased tremendously during the year.

The Standardization Officer of this Division has visited the various districts to ensure uniformity of grading and to discuss problems associated with grading. Every opportunity was taken to explain to growers the specifications of the Standards.

Dehydration

Vegetable dehydration factories are operating at Pukekohe, Hastings, and Christchurch, the last named having been opened this year. At Motueka the dehydration factory for apples has been in operation this year. Owing to the great loss of stone-fruit in Central Otago on account of frosts, the dehydration plant at Roxburgh has operated only for making a small quantity of jam.

Fertilizer Rationing

Rationing was introduced and extended to market gardeners to ensure that the limited amounts of blood and bone and superphosphate available were equitably distributed among users in accordance with their respective needs. Unless some regulation of delivery of supplies to primary producers had been undertaken, it might have been difficult for many to have secured sufficient to maintain their normal production or to make increases in certain kinds of crops when they were asked to step up production.

Tobacco Industry

The acreage planted, which is located in the Nelson district, is being maintained at about 3,000 acres per annum. The total yield is in the vicinity of 3,185,000 lb. Growers are required to obtain a license to grow tobacco, which is produced under contract to several tobacco-manufacturing companies. The Tobacco Board, which controls the industry and the Tobacco Research Station located at Riwaka, has contributed considerably to the stabilization of the industry. It is expected that there will be a gradual increase in acreage, which is likely to be accelerated through rehabilitation of ex-servicemen and as soon as additional harvesting labour can be assured.

The 1944 crop was approximately 3,100,000 lb. from 3,093 acres.

Hop Industry

The hop-growing industry changes very little. The acreage stands at approximately 650 acres, and is located in the Nelson district. The average annual yield is in the vicinity of 3,500 bales (9,375 cwt.). Some slight increase in area has been made through an export demand.

The 1945 season promises to be a good one with an estimated yield of 3,500 bales.

The National Service Department has done much in recruiting labour for this industry, but there has been a shortage of female labour which, it is expected, may be overcome when normal conditions are restored.

Beekeeping Industry

There are at present 6,097 beekeepers in New Zealand who own 8,888 registered apiaries containing 133,326 colonies.

The present distribution of beekeeping in the various apiary inspection districts throughout the Dominion is as follows:—

Apiary Inspection District.	Number of Beekeepers.	Number of Apiaries.	Number of Colonies.
Auckland	1,390	1,631	15,724
Hamilton	741	1,289	34,342
Hastings	766	1,092	12,731
Palmerston North	1,237	1,856	23,220
Nelson	416	506	5,510
Christchurch	654	1,215	22,038
Dunedin and Invercargill	893	1,299	19,761
Totals	6,097	8,888	133,326

The estimated total production of honey in a normal season is in the vicinity of 3,400 tons.

Unseasonable weather conditions at critical periods during the past season in Auckland, Hamilton, Palmerston North, Wairarapa, and parts of Southland adversely affected nectar secretion; consequently, honey crops in these areas range from poor to almost a complete failure in some localities.

In North Otago and Marlborough exceptionally heavy crops of excellent-quality honey were harvested. Elsewhere, payable crops have been secured.

In the main, crops so far made available for marketing purposes are of excellent quality, but the quantity is far short of all requirements.

To ensure the progress of the beekeeping industry, particular attention is being given to the possibility of using pollen substitutes to offset serious shortages of natural pollen in some areas.

The work of classifying and grading of honey has been carried out as usual at the Honey Depot of the Internal Marketing Division at Auckland.

Rehabilitation

The rehabilitation of ex-servicemen in all branches of horticulture has been carefully studied. Arrangements have been made for direct contact to be established with those who may be engaged in growing small fruits, vegetables on a commercial scale, and the production of grapes for the manufacture of beverage wines and brandy. Those who have taken over orchards are receiving special attention from the Instructors with regard to cultural problems, and considerable assistance is also being rendered in the selection of suitable areas of land for commercial vegetable production.

Experimental Work

Field experimental work has been continued, to a limited extent, in conjunction with the Plant Diseases Division in connection with variety trials and the growing of filbert nuts.

Experiments in connection with the dipping of stone-fruit in certain solutions with the object of combating brown-rot in transit to the market were also continued in conjunction with the Department of Scientific and Industrial Research. The results obtained have not been very promising, although useful information has been gained.

Trials on pre-storage heat treatments of onions were continued in Canterbury, and useful information was obtained from this trial.

RURAL DEVELOPMENT DIVISION

REPORT OF P. W. SMALLFIELD, DIRECTOR

The Division was formed on 1st December, 1944, but as only a few months elapsed before the close of the financial year this report will deal with the set-up of the Division and the plans made for the ensuing year.

In recent years it has become more and more evident throughout the world that the success of the agriculture of any country does not depend merely on its soils and climate and the technical efficiency of its farmers, with which work the Department has been primarily concerned in the past. It has been gradually realized that agricultural economics and the sociological aspects of farming are equally important and play their part in determining the success or failure of our agricultural industries.

The Department had previously endeavoured to cope with the economic situation through a small Farm Economics and Statistical Section; the sociological aspect remained a virgin field, apart from a few investigations in rural areas by other Departments. The setting-up of the Organization for National Development by the Government, however, showed quite clearly that a full divisional organization would be necessary to cope with the post-war problems.

Staff

Some difficulty was experienced in securing a complete qualified staff to handle the new activity, but a nucleus was formed with a Director, Assistant Rural Economist, Senior Investigational Officer, three Field Economists, three Rural Sociologists, a General Assistant, and a Machinery Officer. The office staff comprised mainly the Statistical Section, which was transferred from the Accounts Division.

Agricultural Development Committee

Through this Committee, of which the Minister of Agriculture is the Chairman and which includes producers' and employees' representatives, the Department maintains close co-operation with the Organization for National Development, which was formed during the year for the purpose of concentrating on all problems associated with post-war reconstruction and long-range planning of the Dominion's economy. The Division supplies the secretariat for the Committee, and is thus able to provide research staff to collect and tabulate data to enable the Committee to submit recommendations on such problems as the following, which are at present under consideration:—

Agricultural import requirements in the immediate post-war years.
Lime industry.
Co-operative farm machinery pools.
Scope for expansion of poultry-keeping; beekeeping; citrus, pip, and stone fruits; and market gardening.
Scope for expansion of production of butter, cheese, meat, wool, and seeds.

Farm Management Surveys

Actual survey work was not commenced during the year, though plans have now been made to undertake the following work as soon as possible:—

Collection of data on the relationship of prices and the volume of production of various commodities.
Irrigation.
Grass- and clover-seed production.
The problem of wintering-off dairy cows from Hauraki Plains and Northern Wairoa farms.
Chilled-beef and fat-lamb production.
Small holdings based on ten to twelve cows with a sideline such as poultry, garden or orchard to bring income up to a living wage.
Probable trends in New Zealand farming.

Rural Sociology

This venture is into a field that is practically unexplored in New Zealand, and it is confidently expected that the work planned will be of great value to the rural community. The main object will be to develop better living conditions in the country and to co-ordinate the farm gardening and sideline undertakings with the requirements of the farmer's home.

The following aspects of rural living have been selected for the early attention of the rural sociologists:—

Farm home.
Home management.
Nutrition and food production.
Clothing of the family.
Rural family life.
Rural community life.

Research and investigation in co-operation with existing rural organizations will be commenced as soon as possible to obtain factual data on New Zealand conditions to form a basis of the extension work. A farm housing survey will be undertaken in selected districts shortly.

Farm Machinery

Even though mechanization in farming is widely practised in New Zealand, little research has been done in the past to evaluate trends as the result of such use, nor has any real attempt been made to determine the suitability of the various types for different classes of farming. Work in this direction has been suspended temporarily owing to the entry into the Armed Forces of the officer being trained to specialize in farm machinery.

Farm Buildings and Equipment

This Section will undertake the work of planning all types of farm buildings and other improvements, such as water-supply and fencing, &c. Working in conjunction with Ministry of Works, it should be possible to prepare complete information for farmers contemplating the erection of buildings or other improvements. No officer has been appointed for this work.

Land Utilization

The Division will work closely with the Land Utilization Officer of the Fields Division in collecting data on land utilization and land development.

Statistical Section

This Section will be augmented, when necessary, to cope with the compilation and tabulation of data arising from the Division's activities. A Research Statistician has been appointed and will take up duty at an early date. The current work dealt with by the Section included—

Preparation of special reports on all phases of production.
Compilation of quarterly statistical statements of primary production.
Forecasts of live-stock numbers and production.
Compilation of fertilizer statistics.
Butterfat production devoted to butter and cheese manufacture.
Wool-pull returns.
Live-stock slaughterings.
Costs of production.

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