1944

NEW ZEALAND

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT FOR 1943–44

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

Office of the Minister of Agriculture,
Wellington, 20th July, 1944.

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, 1944.

This report provides a summary of the principal farming activities of the year and briefly outlines the comprehensive and numerous functions of the Department in its work of maintaining and fostering the growth of the rural industries to the full extent demanded by our wartime commitments.

The accompanying statement by the Director-General of Agriculture reviews the Dominion's agricultural production during the war years and indicates the steps being taken to assist farmers in their efforts towards greater food-production. 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

PRIMARY producers of the Dominion are now bringing to a close their fifth season under difficult wartime conditions, and factors have arisen which make it desirable to review achievements and indicate the objectives of the future. Statements have been made to the effect that primary production is on the decline, thereby inferring that farmers are not maintaining their war efforts. There are three major factors outside the control of producers which impinge directly on the volume of output, *i.e.*—

(1) Climatic conditions:
(2) Man-power:
(3) Availability of fertilizers.

CLIMATIC CONDITIONS

Conditions from 1939 to 1942 inclusive were favourable, particularly in respect to dairying. During 1942–43 and 1943–44 the reverse was the case. The season 1942–43 opened with a cold, wet spring, and ended with a short, dry autumn. Feed-supplies were deficient, and cows were in poor condition when they calved in the spring of 1943. A partial drought followed in the more important dairying districts, and the season 1943–44 was saved from disaster by a remarkable autumn recovery. These factors accentuated the effects of a reduced dairy cow population.

Man-power

A total number of 34,000 labour units have been withdrawn from primary industries for home defence or service overseas. Some of these were absent for short periods only, and at least 16,000 were returned to their former employment prior to the close of the past season. In addition, farm labour has been recruited from other occupations or from family labour, leaving a net deficiency of approximately 10,000 to 12,000 units. It is expected that arrangements now completed will rectify this shortage.

Fertilizer-supplies

The entry of Japan into the war precipitated a crisis in fertilizer-supplies. Rationing was introduced, and the limited quantity available for top-dressing pasture has had a detrimental reaction on soil fertility and pasture growth. These effects were particularly noticeable under adverse climatic conditions experienced last season.

A comparison of production under war conditions with that of the period of normal activity preceding 1939 is of interest. The following tables give average production of our principal live-stock and cropping industries for the five seasons ending in 1939 with comparable data for the war period.

Live-stock Production

Season.	Estimated Total Production in Long Tons.		
	Butterfat: Year ended 31st July.	Meat: Year ended 30th September.	Wool: Year ended 30th June.
Average of five seasons, 1934–35 to 1938–39	185,000	470,000* (Three seasons only)	134,000
1939–40	185,400	535,000†	138,000
1940–41	200,400	515,000†	148,000
1941–42	188,700	535,000†	154,000
1942–43	174,700	537,000	152,000
1943–44‡	166,000	486,000	147,000
Average of five seasons, 1939–40 to 1943–44	183,000	522,000	148,000

* Years ended 30th June. † Assessments. ‡ Forecasts.

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, 1934–35 to 1938–39	214,200	63,400	22,400	6,900	19,100	21,900	800	348,700
1939–40	257,500	49,800	25,300	8,000	21,400	20,000	800	382,800
1940–41	243,200	71,700	32,000	10,800	35,100	17,000	900	410,700
1941–42	258,000	70,800	36,000	8,800	31,300	15,200	800	420,900
1942–43	287,000	56,300	28,600	7,300	33,300	23,900	1,000	437,400
1943–44*	246,000	48,400	32,800	7,000	47,500	27,000	1,000	409,700
Average of five seasons, 1939–40 to 1943–44	258,300	59,400	31,000	8,400	33,700	20,600	900	412,300

* Forecasts.

The cumulative effect of factors beyond the control of producers is noticeable in butterfat and meat production. To some extent the meat situation is influenced by heavy killings of capital stock during 1942 and 1943 and a reversal of this tendency in the 1943–44 season. The dairying industry

has been most vulnerable to adverse conditions, as it relies almost wholly on pastures for feed-supply, and shortage of labour has a physical reaction on the number of cows which can be handled.

A comprehensive review of performance during the war period calls for appreciation of achievement rather than for pessimism. The structure of primary industries is sound. Breeding-ewes are at a high level; the position of breeding-cows of beef types is good, and dairy stock, though depleted, can be increased on sound breeding lines within a few years. Mechanization of all industries has been maintained on a satisfactory basis.

Objectives

Continuous pressure from the United Kingdom and United States of America for an increased volume of foodstuffs has necessitated a review of the Dominion's potentialities. The Government, in consultation with representatives of the respective industries, has given target figures for 1944–45 for dairy-produce and pig-meats, and tentative objectives have been set for various cash crops. The target for butterfat is set at 180,000 tons, and it is felt that under normal weather conditions this figure will be reached, if not exceeded. It is known that additional cows will be milked, and producers have expressed their intention of exerting every effort to meet the requirements of the United Kingdom and our Allies. It is expected that pig-meats will be increased by 5,000 tons to 8,000 tons, and a token increase of 10 per cent. is aimed at in overall meat-production. There will be an endeavour to increase grain, seed, and pulse crops, but it is feared that we shall still have to rely on Australia for a proportion of our internal needs of wheat and barley.

The Department of Agriculture must continue its activities in the production of vegetables for export to the Armed Forces in the Pacific, and the "Dig for Victory" campaign will be continued in an endeavour to supplement local market requirements.

Direct action has been taken by the Government to counteract two factors which tend to retard production—namely, labour and fertilizer shortages. Men are being drafted from the Pacific Division for work on farms and in allied industries, and it is already assured that no farm need be understaffed for the forthcoming season.

The Combined Food Board in Washington has accepted the recommendation of the Fertilizer Committee in London, and phosphate-supplies representing an increase of 50 per cent. over 1943–44 have been allocated. This increase is to be used for priority crops and as a direct allocation on the basis of cows to be milked. Further incentive has been provided in the form of cash payment on products, and a subsidy will be paid on crops grown specifically for pig-feeding.

The National Council of Primary Production and its subsidiary District Councils and Committees have given consistent backing to the Hon. the Minister of Agriculture and his Department, and the forthcoming season is awaited with every confidence that past efforts of primary producers will be maintained and that results will exceed expectations.

E. J. Fawcett, Director-General.

ACCOUNTS DIVISION

REPORT OF L. C. SCOTT, ACCOUNTANT

Net expenditure for 1943–44 was estimated to require £990,088, an increase of £54,088 on the 1942–43 estimated requirement. The aims were to meet the usual grants and subsidies; maintain inspectional services to control quality in produce for sale, to restrict diseases and pests, and to ensure healthy conditions in crop and animal life; afford essential advisory aids to agricultural industry; and to assist directly a vegetable-production programme. The increase in anticipated net expenditure was attributable to keen continuous inquiry for advisory aids, coupled with an expanded vegetable programme—the latter as a tangible aid to production, in contrast with the advisory aids, which must always be assessed as of a value somewhat intangible in character.

The year was cleared with a net expenditure of £1,017,400, an overexpenditure of £27,312.

Actually, gross revenue exceeded the estimate by about £20,000, there being a general buoyancy in credits from all sources except those relating to dairying. On the other hand, gross expenditure exceeded the estimates by approximately £47,000, of which lime and fertilizer carriage assistance called for £37,000, leaving "unders" and "overs" to give rise to the remaining £10,000. In this latter connection the main increases in expenditure centred on vegetable-production and advisory aids to general agricultural industry.

A summary of the vote, with 1942–43 figures in parentheses for comparative purposes, is given below:—

	Expenditure.				Revenue.			
	Appropriated.		Paid out.		Appropriated.		Received.	
	£	£	£	£	£	£	£	£
Administrative services ..	561,473	(524,087)	585,231	(501,351)	138,000	(137,605)	155,193	(141,580)
Payments under statute ..	104,500	(102,360)	108,845	(105,263)	1,250	(1,000)	2,866	(1,616)
Miscellaneous advances, &c. ..	486,570	(471,363)	505,677	(460,893)	23,205	(23,205)	24,294	(24,967)
Totals	1,152,543	(1,097,810)	1,199,753	(1,067,527)	162,455	(161,810)	182,353	(171,163)
Less credits-in-aid ..	162,455		182,353					
Net totals	990,088		1,017,400					

The usual financial transactions, mainly revenue, under special Acts and Deposit Accounts yielded about £83,000, and after dealing with outgoings under deposits, approximately a net £73,000 remained as available revenue.

War Expenses Account involved substantial expenditure, and in so far as the vegetable-production activity was concerned there was considerable revenue. In round figures, War Expenses Account expenditure amounted to £2,089,000, adjusting credits to £548,000, and vegetable-production revenue to £188,000, leaving net expenditure at £1,353,000.

Indirectly there has also been association with considerable expenditure directly brought to charge by other Departments.

LIVE-STOCK DIVISION

REPORT OF W. C. BARRY, DIRECTOR

The past year was not a very favourable one from a production point of view. Owing to a dry autumn in many parts of the country feed for the winter was scarce. The rather severe winter made extra demands on the feed available, and some reduction in stock carried was enforced on owners. A problem of some importance under such conditions was the maintenance of the liquid-milk supply to cities and towns throughout the country.

Some losses in cattle, both dairy and beef cattle, were experienced in the areas where the dry autumn was a most important factor in bringing about a scarcity of feed.

Health of Live-stock

Horses have remained healthy during the year. There has been no outbreak of serious disease in cattle and sheep.

Scheduled Diseases in Cattle

Tuberculosis.—The number of cattle condemned under the Stock Act for tuberculosis during the year ended 31st December, 1943, amounted to 5,475 head, 4,790 being condemned on clinical symptoms and 685 reactors to the tuberculin test. The tuberculin test was applied to 12,686 cattle, of which number 685 reacted, giving a percentage of 5·4. At the owners' request 5,183 cattle were tested.

Actinomycosis and Actinobacillosis.—The number of animals condemned for this disease was 631, a large number being successfully treated.

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

Anthrax.—The vaccination of animals on previously-affected farms is being carried out with satisfactory results.

Blackleg.—The number of calves vaccinated against this disease in Taranaki was 12,235 and in Auckland 31,996, making a total of 44,231. In the Auckland district there were 283 outbreaks of this disease, as compared with 161 last year.

Johne's Disease.—In the Taranaki district 49 animals affected with this disease were dealt with during the year.

Non-scheduled Diseases

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

Sheep

A late cold spring was experienced in Otago and the result was losses in ewe flocks from pregnancy toxæmia. The disease of entero-toxæmia in lambs is controlled by vaccination of the ewes. In addition, some trials were carried out by the use of specially-prepared sera injected into ambs under control methods. Losses from parasitic infestation have varied in several districts, while some losses following dipping have again been recorded.

Pigs

The incidence of disease in pigs remains about the same as in previous years. No serious disease has been reported. During the year regulations were brought down requiring all garbage fed to pigs to be boiled before use. This precaution is very necessary to prevent the possible introduction of contagious disease from the use of unboiled garbage.

Swine Husbandry

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

"During the year ending March, 1944, there has been a decrease of approximately 13 per cent. in the number of pigs slaughtered. On a tonnage basis, however, the decrease is not so serious, due to the greater percentage of baconers produced and also the increased weight range for bacon pigs.

"The present position as compared with the past five years is set out in the following table for the years ended 31st March :—

Year.	Total Pigs killed.	As Bacon.	As Pork.	As Choppers.	Tonnage of Meat.
1939	1,039,767	413,757	626,010	..	46,000
1940	829,759	462,992	366,767	..	42,000
1941	982,169	633,969	312,288	35,912	55,300
1942	998,172	473,232	500,931	24,000	52,000
1943	834,628	436,974	370,726	26,928	47,000
1944	726,282	422,849	281,163	22,270	40,000

"There is little question that the falling-off in the number of pigs slaughtered is bound up with a reduction of the number of cows milked, which, in turn, is due to a decrease in the amount of labour available and the unfavourable seasons during the past two years.

"In a forecast of production given last May it was estimated that the slaughtering of pigs would be 750,000 and 680,000 for the years ending March and September, 1944, respectively. The killing for the March period fell short by 23,718 pigs.

"*National Pig Industry Council.*—It can be said that District Pig Councils have performed valuable service to producers under very grave difficulties. From their reports it can be shown that their activities in the field have been responsible for many improvements to the accommodation and housing of pigs. The condition in which pigs arrive at the works, and the improvement in the percentage of first-quality carcasses, provide evidence of the untiring efforts of Supervisors and District Pig Councils alike."

Meat Inspection and Slaughter of Stock

In spite of staffing difficulties the standard of inspection of all meat and meat products has been effectively maintained throughout the year. The numbers of stock slaughtered at meat-export slaughterhouses were 2,807,321 sheep, 10,300,597 lambs, 428,616 cattle, 989,406 calves, and 592,940 swine ; and at abattoirs 923,581 sheep, 209,843 lambs, 191,615 cattle, 51,256 calves, and 84,142 swine.

Importation and Exportation of Stock

The following stock were imported during the year : cattle, 1 ; sheep, 159 ; horses, 2. In addition, 6 goats, 14 horses (thoroughbreds), 17 dogs, and a number of pigeons were dealt with at ports on arrival from Australia.

During the year the following animals were exported to Australia : horses, 15 ; cattle, 23 ; sheep, 129 ; pigs, 2 ; dogs, 11. In addition, a considerable number of poultry have been exported to island territories.

Dairy Inspection

The inspection of premises, plants, and herds used in the production of the milk-supply to the consuming public has been maintained. Owing to the dry autumn there was great difficulty in ensuring an adequate supply of milk for the main centres, some smaller towns also being affected. The normal registered suppliers were unable to meet the demand in several centres and milk had to be obtained from other approved sources during the weeks of acute shortage.

Poultry

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

"The main feature during the year has been a drive for increased egg-production, which appears to have met with success in the North Island, particularly in the Auckland Province, but it has received little support in the South Island.

"Thirty-six poultry-farmers in the North Island were granted Government loans for expanding their poultry plants, involving a sum of £20,790, while eighteen poultry-farmers in the South Island received £3,961 for the same purpose.

"Massey Agricultural College substantially increased its poultry department with the £5,000 granted to the college for this purpose, and Lincoln College established a new plant with a grant of £6,000. Both colleges are now in a position to assist increased production of eggs and stock.

"While some increase in production generally appears probable, there are no indications that any such increase will meet the present heavy demands for eggs and poultry.

"Considerable interest in poultry-farming is being displayed by returned servicemen, and this may ultimately assist the position, when such men have received a training."

Wool

Instructional work in connection with wool was interrupted during the year owing to the secondment of the Wool Supervisor to another Department on defence duties. On resumption of duty with this Department at the end of 1943 the Wool Supervisor was engaged in some work for the Marketing Department. In addition to routine work, classes in wool-classing were conducted twice weekly for the Army Education Welfare Service.

Rabbit Nuisance

The rabbit position as a whole can be viewed as reasonably satisfactory. There are, however, indications of not only increased numbers in some districts, but of their having spread to districts not previously rabbit-infested. Every endeavour has been made to keep the pest in check by making all obtainable agents available and giving assistance for summer work when required. The subsidy paid during the summer and autumn months by the Rabbit-skins Committee, combined with the high winter price of skins, has also contributed largely to increased numbers being killed, but these influences, while valuable under present wartime conditions, are only sporadic and cannot be viewed as offering any solution of the rabbit problem.

The supply of strychnine, while augmented during the year, is still far below requirements, but fortunately additional rabbit-traps were obtained and phosphorus has been in sufficient supply.

Rabbit Boards constituted now number 94, 11 new Boards (9 in the South Island and 2 in the North Island) having been formed during the year.

Control of the rabbit pest through Rabbit Boards is steadily gaining in popularity, and the success of this method of control as demonstrated by older-established Boards cannot be controverted.

Noxious Weeds

The man-power position and the lack of the more effective and suitable weed-destroying agents have again restricted the noxious-weed-eradication measures, but an attempt has been made with the weedicides available to maintain the control gained in previous years when sodium chlorate and atlacide were available.

It is satisfactory to note that attempts to obtain some sodium chlorate have now been successful and, while the importations will not approach the quantity that could be used, it will allow of valuable work being again carried out, particularly on dairy-farm properties.

County Councils carrying out a scheme of eradication of noxious weeds, particularly ragwort, were again provided with financial assistance, and much good work was carried out having consideration to the man-power position and the available agent.

ANIMAL RESEARCH DIVISION

REPORT OF J. F. FILMER, DIRECTOR

With the growing realization that New Zealand must play a big part in providing food for the Armed Forces during the war, and that post-war demands will be even greater, animal research is becoming increasingly important. Although a number of the staff are still on active service, every effort is being made to assist in increasing the efficiency af animal-production in New Zealand. In some of the larger projects the stage has now been reached where the results of preliminary research can be tested in the field. If the results already obtained in artificial insemination and vaccination against contagious abortion can be repeated on a large scale they will afford excellent illustrations of the value of the contribution which animal research can make to the national economy of New Zealand.

Diagnostic Section, Wallaceville

During the year reports have been issued on over 7,000 specimens submitted by officers of the Live-stock Division from diseased animals and poultry. Sixty-seven thousand doses of blackleg vaccine and 40,000 doses of scabby-mouth vaccine have been prepared and issued.

Research Work

Facial Eczema.—Very few cases of clinical facial eczema occurred this year, but the very dry summer and warm rain which fell in February and early March, 1944, resulted in some liver damage in the Waikato districts. Pasture collected from affected areas during the autumn of 1943, when dried and later fed to lambs at Wallaceville, produced typical facial-eczema liver changes, thus confirming the theory that the disease is primarily due to a toxin which forms in pasture under special climatic conditions. The knowledge that drying does not destroy the liver toxin should enable more rapid progress to be made in its chemical identification. The field experiments conducted at Wairoa have shown that

liver changes may commence within four or five days of lambs commencing to graze affected pasture; that gross distortion of the liver may take place within a period of three months without photosensitization developing; that gross distortion of the liver may occur in black lambs, thus indicating that photosensitization plays no part in causing liver damage.

Southdown Photosensitization.—It has been demonstrated conclusively that photosensitization in this condition depends on the ingestion of green pasture, and that the photosensitizing agent is almost certainly phylloerythrin.

Sheep Nutrition, Canterbury.—Studies of the various methods of winter feeding of ewes and hoggets and of feeding ewes and lambs for fat-lamb production have been continued. The value of green grazing, such as lucerne or hay aftermath, for finishing suckling fat lambs has been demonstrated. It was shown that vitamin D supplements stimulated growth in hoggets grazing on green-feed oats during the winter, even when clinical rickets did not occur in the controls.

Hogget Unthriftiness. Some preliminary experiments at Wairoa have indicated that hoggets grazing on highly-improved pasture thrive better on feed that is rather more mature than that usually recommended for them.

Sheep-breeding.—Experiments aiming at the development of practical methods of progeny testing sheep have been initiated at Ruakura. A series of experiments to determine the heritability and effectiveness of selection of important production characteristics in sheep has also been commenced. Artificial insemination is being used in these experiments.

Bone Diseases of Sheep.—Field experiments have been conducted to determine the effect of phosphatic lick in preventing a condition known as "bowie" in sheep. Results to date are inconclusive, but show that the disease incidence varies considerably between different paddocks on the same station. The study of rickets of hoggets in the Canterbury District has been continued. The phosphorus in sodium pyrophosphate has been shown to be available to sheep.

Mastitis.—Field investigations in collaboration with the Dairy Board designed to study the effect of environment on the incidence of mastitis have been actively continued. Over 40 herds are under constant observation, and a mass of valuable data is being accumulated. A small experiment was conducted at Ruakura to test the theory that sudden changes in feed induce mastitis. While experimental conditions were not ideal, the results lent no support to the theory, as a sudden change from poor feed to lush grass induced no increase in either leucocyte count or in clinical quarters, and just as much mastitis occurred in the control group of cows maintained on good feed throughout the experimental period. Experiments with intra-mammary injections of therapeutic agents have been continued, but without any very significant results.

Milking-machine Research.—The studies on rubber have been continued. In addition to the measurement of many samples to ensure compliance with the Emergency Standard Regulations, tests have been carried out on new types of rubber. This work has enabled the development of a type of claw rubber with the life greatly exceeding that normally in use. It has also demonstrated that a percentage of reclaimed rubber can be used in milk and air tubes. Studies of the physical properties of rubber used for milking machinery and the effect of butterfat on its ageing have been made. Different types of rubber have been examined for resistance to ageing in the presence of butterfat, and great difficulties were found. Laboratory methods of accelerating ageing have been developed, and these will be of value in testing the new synthetic rubbers when these become available. In order to facilitate the study of milk ejection apparatus has been developed which plots the milk delivered by a cow against the time on a graph. This is in two units, a sample measuring cylinder arrangement in the shed itself communicated by a telephone cable to a recording unit which may be situated well away from the cow-shed. By a system of relays and indicators it is possible to record the milk-flow rates for individual cows without interference in the normal milking procedure. This apparatus should enable definite measurements to be made of the effect of various milking procedures, and such studies have been commenced. Several new commercial devices have been tested, and a simple method of testing vacuum-pumps in the field has been evolved. The relief-valve developed some time ago has completed its second test season satisfactorily.

Stimulation of Milk-production in Aborted Cows.—Research commenced last season with a view to improving the yield of aborted cows gave results sufficient to justify further investigation. Of 10 cows injected with stilboestrol, 8 produced satisfactory yields. During the coming season this work will be extended to include thyroprotein, the effect of which on the production of low-producing cows will also be studied.

Bull Fertility.—The semen-testing service was again available to farmers and 180 bulls were examined. Seven per cent. were classified as sterile and a further 18 per cent. as of low fertility. In view of the importance of bull fertility to the extensive application of artificial insemination, a number of bulls under sire survey were examined with the aid of the Auckland Herd Improvement Association. Based on semen examination no sterile bulls were met with in the 32 examined, while only 9 per cent. were classified as of low fertility, and 25 per cent. as of good fertility. Interim field-mating results for the same bulls also indicated a reasonable level of fertility which appeared to be independent of age. Highly-fertile bulls, however, appear to be something of a rarity. In general, the bull-fertility work has produced some evidence of a genetic basis for certain types of sperm abnormality. The ascorbic acid survey of bulls' semen was continued. Results indicate a general but not close correlation between ascorbic-acid concentration and fertility grading based on microscopic examination.

Artificial Insemination of Dairy Cows. A field trial was organized in collaboration with the New Zealand Dairy Board, 11 herds participating and 973 cows being inseminated. As far as possible,

3 proven sires whose daughters had averaged approximately 400 lb. of butterfat on a maturity basis were used. Unfortunately, the bulls proved to be of rather low fertility and a number of cows were not made available for reservice. A total of 749 cows are believed to have conceived to artificial insemination. In general, the ratio of conceptions to inseminations was about what would have been expected from natural services with the same bulls. The value of artificial insemination is well illustrated by the fact that 467 cows are believed to be in calf to the 3 proven sires, which between them in the previous season left only 30 calves. If sufficient proven sires are available, it is intended to conduct a further field trial on a larger scale next season.

Heritable Red Blood Cell Characters of Dairy Cows. Investigations have been continued, and reagents are being prepared to enable a survey of these characters to be made in New Zealand dairy cattle with a view to exploring the possibility of their inheritance being associated with genetic characters responsible for production.

Contagious Abortion. There has been an increased demand for free vaccination of calves against contagious abortion. This year some 2,000 dairy-farmers have availed themselves of this service and 35,000 doses of vaccine have been issued. The first results from field vaccination have become available this year. In 1942, 630 calves and yearlings were vaccinated in 33 herds. Data are available for 464 of these which were mated to calve in 1943. The results shown in the following table were obtained :—

Calving Year.	Cows Three Years and over unvaccinated Both Years.		Two-year-old Heifers unvaccinated 1942, vaccinated 1943.		
	Mated.	Abortions.	Mated.	Abortions.	Empty.
1942	1,890	186 (10%)	522	139 (27%)	..
1943	1,456	183 (13%)	464	25 (5%)	35 (8%)
New Zealand average ..	..	4%	..	10%	10%

Although the numbers are small, the results are very encouraging, as vaccination has apparently reduced abortions in two-year-olds from 27 per cent. to 5 per cent. in herds in which abortions in older cows remained well above the New Zealand average.

Nutrition of Dairy Cows and Pigs.—Experimental work has been continued at Ruakura, and the following general conclusions may be recorded. Rotational grazing of calves ahead of the cows after weaning eliminates the unthriftiness, scouring, and high parasitic infestation which are such serious problems under the usual set-stocking in calf paddocks. Mature pampas grass (one year's growth) has the nutritive characteristics of poor-quality hay. The feeding of reasonable meal supplements to grass-fed pregnant cows is profitable. Restricting wintered Berkshire-type stores to 5 gallons of separated milk or buttermilk per day after they reach 130 lb live weight results in 80 per cent. to 90 per cent. of them grading No. 1 Prime as baconers. Spring weaners appear to over-fatten more readily, and optimum restriction levels are still in process of determination. The chemical investigation of the quality of pig-fats has been continued.

Copper Deficiency.—It has been shown that considerable areas of peat land in New Zealand are naturally deficient in copper. Cattle grazing on these develop "peat scours," with seriously reduced production, while the lambs develop spinal trouble. Methods of alleviation of the deficiency are being studied, and it has already been demonstrated that top-dressing with copper compounds is effective.

Cobalt Deficiency.—Experiments conducted at Mamaku have indicated that top-dressing with 20 oz. of cobalt sulphate per acre maintains a satisfactory cobalt concentration in pasture for at least three years; while one paddock top-dressed with 40 oz. per acre has remained safe for six years. These heavy top-dressings, though expensive, may be useful in hill country, where annual top-dressing is uneconomic.

Parasitology.—Investigations have been continued on parasitism in young sheep both in the field and under controlled pen conditions. Dried grass has been used as a worm-free diet in the pens where internal infestations have been studied. Phenothiazine has been used in field trials in both lambs and calves to study its effect on growth and mortality rates. Post-mortem material collected from unthrifty calves indicates that the more important parasites are *Ostertagia* spp., *Trichostrongylus axei*, *Cooperia* spp., and *Dictyocaulus viriparus*. A study has been made of the lesions produced by young cestode larvæ in sheep to determine their relationship to the so-called parasitic lesions which cause heavy condemnation for export in lambs' livers at the freezing-works. An experiment is being conducted to study the effect on the number of such lesions of raising lambs in a dog-proof paddock at Ruakura. Hydatid investigations have been continued in collaboration with the Live-stock Division and the Hydatid Research Department of the Medical School.

Poison Plants.—A study of the nitrate content of mangels and its relation to their toxicity for pigs has been initiated. A study of the toxicity of native and introduced plants has been continued. A series of papers has been published on the alkaloids of leguminous plants.

Fish-liver Oils.—Chemical investigations of fish-liver oils have been intensified with a view to assisting in establishing the New Zealand industry on a sound footing.

FIELDS DIVISION

REPORT OF P. W. SMALLFIELD, DIRECTOR

For the twelve months ended 31st March, 1944, climatic conditions were extremely variable, and whereas some districts experienced fairly good conditions, other districts suffered from unfavourable weather at some period of the year. The outstanding features were, in the main, a dry and cold autumn followed by a wet and cold winter and consequent late spring. Good conditions prevailed during the early summer, but as the season advanced it became very hot, with a consequent drying up of the pastures. Generally, however, good rains fell from late February onwards with most beneficial effects.

Crops

Arable Crops.—A drive aimed at securing an increased acreage of wheat did not meet with the success desired, largely due to the vagaries of the weather at planting-time. In actual fact, the estimated area sown is 249,000 acres, which is approximately 40,000 acres less than that for the previous season. Again the average yield per acre as disclosed by the area already threshed is down on the 1942–43 yield by slightly over 5 bushels per acre. In 1942–43 the average yield was 33·97 bushels per acre, while the area of the 1943–44 crop threshed to date shows a yield of 28·6 bushels per acre. Basing calculations on figures at present available, it is estimated the total yield of wheat for 1943–44 season will be approximately 7,250,000 bushels.

The estimated area sown to oats for 1943–44 is 220,000 acres. This is also a decrease on the area sown the previous year. In that year 242,365 acres were sown.

The estimated area sown in barley in 1943–44 increased from 35,261 to 41,000 acres.

Potatoes.—The area planted in potatoes for 1943–44 is estimated at 25,000 acres. This is a slight increase on the previous season's acreage of 23,860. It is yet too early to give a definite indication of what the yield will be, but it is expected this will be lighter than the previous year, due largely to the dry weather during the growing season.

Services' Vegetable-production

During the past year a considerable proportion of the professional officers of the Fields Division have been occupied with the supervision of Services' vegetable-production projects, the total number of such projects now being twenty-seven, embracing an area of 5,200 acres. Although the developmental period has passed, this total acreage is not yet fully in production, as more than half this acreage came into occupation during the past year. At the end of February, 1944, approximately 3,000 acres of the total area occupied was in crop. From this effective acreage the following vegetables were delivered to the Armed Forces for the period ending 31st March, 1944:—

	Tons.
Army	6,409 (approx.)
Navy	270 (approx.)
Air Force	1,706 (approx.)
Other, including United States Forces	11,175
Total	19,560

Supply.—During the past year all supply arrangements, other than to New Zealand Army and Air Force, have been under the direction and control of the Internal Marketing Division. Under this arrangement all produce from Services' vegetable-production areas is made available first to the Armed Services, including the United States Forces, and, in the event of insufficient demand from these Services, the remaining consumable vegetables are being distributed by the Internal Marketing Division on the civilian market.

Councils of Primary Production

The District Councils of Primary Production have been helpful in many directions, and their services have been largely availed of in the matter of keeping up and increasing, where possible, the production of foodstuffs.

Man-power on Farms.—During the year District Councils have been engaged to a very large extent in looking into the man-power position on farms. Much time has been spent in appealing for the retention of full-time farmers and farm workers and in making representations for the release of these from the Armed Forces. They have also been called on by many Appeal Boards to report on the validity of personal appeals connected with primary production. District Councils have had to estimate the number of Territorials required to assist with the harvesting.

Lease-lend Materials.—District Councils have now additional duties in reporting on the release of lease-lend materials to individual farmers.

Field Experiments

The drastic curtailment of this work is shown by the number of trials listed below:—

1941–42	945
1942–43	477
1943–44	228

Pasture Trials.—The work now in hand on this project includes mowing trials at Marton, where yields from areas top-dressed with serpentine-superphosphate and other phosphatic fertilizers are being compared and a number of observational trials laid down throughout the Dominion. In Southland the value of Clarendon phosphate on grassland is also being investigated. At Marton and Winton production from various pasture species is also being measured and a new series of trials with H1 rye-grass is being established. The rate-of-growth trials at Ruakura and Stratford are being continued.

Crop Trials.—The value of serpentine-superphosphate on wheat and potatoes is being investigated, and trials using Clarendon phosphate are being conducted in Otago and Southland. Serpentine-superphosphate applied at the same rate as superphosphate is giving equal yields, while Clarendon used at double rate of sowing as other fertilizers appears to be giving equivalent yields on brassica crops.

Problems in connection with cauliflower-production on Services' vegetable-production areas are being investigated through small-scale field trials involving applications of a number of plant nutrients. A general survey covering all cauliflower and broccoli crops is also in operation.

A series of pot experiments was carried out at Ruakura, where the value of serpentine-superphosphate, Clarendon phosphate, and other fertilizers on turnips was investigated.

Experimental Technique.—Plots of white clover have been established to study the effect of lime, phosphate, and potash on plant-growth.

A range of plants is also being grown in pots and plots with a view to ascertaining the most suitable indications to show optimum responses to lime and fertilizer applications. It is proposed to extend the scope of this work in order to employ a suitable technique in future field trials.

Fertilizers

Rationing.—The fact that supplies of rock phosphate coming forward are limited has necessitated the continuation of rationing. The method of rationing has remained unchanged and farmers are obtaining the same allocation as last year—*i.e.*, 28 per cent. of the annual average quantity of fertilizer used for top-dressing during the two-year period ended 31st May, 1941. Provision was made at the start of the rationing year (1st July, 1943) to consider cases of hardship. Returned servicemen are given special consideration by fertilizer committees.

Importations.—Limited quantities of sulphate of potash, sulphate of ammonia, muriate of potash, and nitrate of ammonia continue to be imported into New Zealand. With the exception of muriate of potash, the use of the majority of the e materials has been restricted to market and home gardeners, tobacco-growers, and orchardists.

Clarendon Phosphate.—The British Phosphate Commissioners have continued to deliver limited quantities of rock phosphate from the Clarendon deposits to manufacturers. It appears that supplies from this source cannot be expected to continue to come forward, as further workable deposits have not been found.

Investigational work on the deposits of phosphatic sandstone (10 per cent. to 12 per cent. P_2O_5) has been continued, but drilling failed to confirm the existence of large quantities of material of a sufficiently high grade to be economically workable under present conditions. One quarry was, however, opened, and some 10,000 tons of ground material has been delivered to mixing plants and farmers in the Otago and Southland districts.

Official Samples.—A further seventy-six official samples of fertilizers have been taken and analysed.

Seed Certification

The production of certified seeds has continued to increase in volume, while the proportion of seeds of pedigree strain included in that certified has risen very appreciably.

Pedigree strains of the five major grass and clover seeds—perennial and Italian rye-grasses, cocksfoot, and red and white clovers—are now firmly established and in demand by farmers.

Brassica-seed Production.—As a result of the steps taken at the outbreak of war, New Zealand continues to be independent of overseas supplies of the various brassica seeds. There has been no complaint as to the strain quality of the seeds produced, but nevertheless careful selection work in all lines is in progress in order to further improve the quality of the seed being produced.

Linen Flax. The linen-flax acreage for the 1943–44 season, which is grown under the direct supervision of Fields Division officers, has fallen to approximately 10,000 acres. This reduction is accounted for, firstly, by a reduced acreage required to maintain factory production in those areas where crops in past years have been universally successful and where reserves of straw have been built up, and secondly, by the difficulty in obtaining an adequate acreage of land suitable for flax-production in those districts showing a relatively low proportion of successful crops in past seasons.

Medicinal-plant Production.—The United Kingdom having indicated that internal production of dried medicinal-plant leaf had increased sufficiently to meet the demand, it was decided, with the concurrence of the British Ministry, to discontinue the production of this material locally. The material which has been produced has been very satisfactory from a quality aspect, but production costs have been high in comparison with material produced elsewhere.

Seed-testing Station

Routine Operations.—For the calendar year ending December, 1943, a record total of 23,964 samples were tested, necessitating the working of approximately 76,000 separate tests.

The number of samples received for the purposes of certification were approximately as for the year previous, with the exception of Montgomery red clover, the total of which was nearly three times that of the previous year. A large proportion of the samples contained an unusually high percentage of internally-fractured embryos, which fact not only reduced the commercial value of some hundreds—possibly thousands—of sacks, but also rendered the seed unfit for export. The weekly output of the Station was also substantially reduced through the handling of this difficult material. The question of "broken growths" arising from internal fractures has been widely discussed, mainly with the trade, and as a result necessary attention will this year be paid to the drum-setting of the header-harvester combines.

With the exception of perennial rye-grass, the quality of all other seed was about normal. The incidence of blind-seed disease was relatively fairly high in all districts, South Canterbury and Otago and Southland especially so.

Seed Trade.—Owing to an active export demand for all lines on a short-supplied market, prices for all seeds firmed throughout the year. The 1944 harvest of rye-grass came on to an almost bare market, and with improving prices growers have been unwilling sellers. This fact, together with an extraordinarily strong overseas inquiry during the first quarter of this year, plus strong competition between exporters to cover export sales, led to fantastic ruling wholesale prices in the South Island not only for rye-grass, but also for the now apparently extinct cow-grass. North Island prices moved up more slowly, but at times f.o.b. South Island wholesale prices were higher than North Island retail prices.

Seeds-purchasing.—Although over 600 requisitions were completed, the total quantity of seed purchased did not equal that of pre-war years. The policy of exploiting quiet markets and taking advantage of uncertain holders in October–November resulted in substantial savings in expenditure.

Wheat-moisture Testing.—In conjunction with the Wheat Research Institute a moisture-testing service was operated in 1943 for the North Island wheat growers and brokers, which service was widely appreciated during a most difficult season. A total of 614 samples were received and reported on.

Chemical Laboratory

The analytical work of the Division has been handled in a satisfactory manner. A large number of samples were analysed, the main ones being: Fertilizers, 63 samples; serpentine-superphosphate, 22; limestones, 42; soils, 117; and pastures (dry-matter content), 450.

DAIRY DIVISION

REPORT OF W. M. SINGLETON, DIRECTOR

Quantities of butter and cheese graded for export showed a further decline during the year under review. In terms of butterfat the decrease was 22,722 tons, or 16·80 per cent., from the 1942–43 figure, which in turn showed a decrease of 15,353 tons, or 10·26 per cent., over 1941–42.

Creamery butter received for grading for export during the year amounted to 94,972 tons and cheese to 85,100 tons, as compared with 110,542 tons butter and 109,955 tons cheese for the preceding twelve months, a decrease of 15,570 tons butter, or 14·08 per cent., and of 24,855 tons cheese, or 22·60 per cent.

It should be made clear that the figures used in this report are grading figures, not production figures, and, moreover, relate only to gradings for export. The percentage decrease in gradings should therefore not be interpreted as representing the true percentage decrease in production. The provision of dairy products for the Armed Forces over the past few years has considerably increased the quantities tabulated under the heading of local consumption, but these do not come within the scope of this report. On the other hand, this position would be offset to some extent by the rationing of butter for the local market to 8 oz. *per capita* per week as from the end of October, 1943.

While several factors have contributed to a decline in production, the principal cause was probably climate. In this regard we are in the unfortunate position, and one perhaps unparalleled in our dairying history, of having experienced the third unfavourable dairying season in succession. Moreover, the inimical effect of climate on the present season was accentuated by the shortage of feed during the winter of 1943, leading to some mortality among dairy cows and the poor wintering of stock generally, so that in many districts they commenced the new season in poorer condition than usual. Fortunately, however, weather in the late period of the season took a most favourable turn, with the result that the falling-off in production has been definitely retarded, and the final production figures for the dairying season are likely to be more favourable that was expected. The reduction in fertilizers and the continued shortage of farm labour are also factors which should be taken into account.

Export Values

The total valuation, for Customs purposes, of all dairy-produce exported from the Dominion during the past financial year was £24,013,294, a decrease of £5,080,466 over the 1942–43 valuation of £29,093,760. Butter, cheese, casein, dried milk, milk sugar, and condensed milk and cream are included under this heading.

Taking butter and cheese separately, butter exported during the year was valued at £15,487,668 and cheese at £7,974,547.

Creamery Butter

The average grade of creamery butter graded for export during the year under review was 93·391 points, as compared with 93·173 points for 1942–43. Of the 94,972 tons received for grading, 79,457 tons, or 83·66 per cent., was classed as finest grade, 15,229 tons, or 16·03 per cent., as first grade, and 286 tons, or 0·30 per cent., as under first grade. The comparative percentages for 1942–43 were 77·87, 21·66, and 0·46, so that butter qualifying for the finest grade increased by 5·79 per cent., and only about 16·34 per cent. failed to reach finest class. Feed taint, which is confined principally to the Auckland Province, was experienced for a shorter period than usual.

pH Testing of Butter.—The number of tests made during the year at the various grading-stores were: Auckland, 1,417; New Plymouth, 856; Wanganui, 346; Wellington, 1,260; Lyttelton, 58; Bluff, 14; a total of 3,951. (The pH test is a test for discovering the addition of excessive neutralizer to cream).

Samples of butter submitted to bacteriological and chemical examination from the various grading stores numbered 4,034—Auckland, 1,286; Gisborne, 242; New Plymouth, 856; Wanganui, 310; Wellington, 1,176; Lyttelton, 164. The previous year's total was 2,714.

Testing Butter for Moisture and Salt

Some 110,164 churnings of butter were tested for moisture at grading-stores, and only 0·30 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.

Of the 107,087 samples tested for salt, only 0·25 per cent. failed to comply with the regulations.

Whey Butter

Gradings of whey butter increased slightly from 2,274 tons in 1942-43 to 2,343 tons in 1943 44. Some 91·88 per cent. was classified as first grade, compared with 92·74 per cent. for the preceding financial year. Whey butter is again being shipped to England, and the better qualities used to assist in maintaining the ration of 2 oz. per week.

Cheese

Cheese quality has been well maintained, except for some falling off during the dry weather. No great difficulty has been experienced with starter failures.

During the season a method of air filtration attached to the starter cans was devised by Mr. C. S. Martin, Dairy Instructor, Hamilton, which promises to be a simple and efficient method of preventing starter failures.

The lack of temperature control in cheese-curing rooms has been much in evidence during the present season, owing to the long-continued spell of hot weather, and much cheese has deteriorated in quality through storage in cheese-factory curing-rooms at excessively high temperatures. This matter is worthy of serious consideration by dairy companies. The shortage of suitable labour in cheese-factories has been fairly acute, thereby throwing a heavy load on the comparatively few experienced men available.

The average grade of cheese graded for export during the year was 92·064 points, as compared with 92·032 points for the year ended 31st March, 1943. Of the 85,100 tons received for grading, 18,242 tons, or 21·43 per cent., was graded as finest grade, 63,158 tons, or 74·21 per cent., as first grade, and 3,700 tons, or 4·35 per cent., as below first grade. The comparative percentages for 1942–43 were 18·69, 77·33, and 3·97, so that there was an increase of 2·74 per cent. in the finest class.

Butter-boxes

There has been difficulty, owing to conditions arising from the war, in maintaining supplies of suitable wooden butter-boxes, and to meet the position more than 2,000,000 Fiberite boxes were imported. Most of these came from the United States, though some were imported from Canada. In addition, the Whakatane Paper-mills imported a supply of pulp from which they manufactured a quantity of fibre-board. Reports from England have, in the main, been favourable, despite unavoidable delays in transit and severe handling under present conditions.

Farm Dairy Instruction

The necessity to conserve petrol-supplies, and the absence of several officers on military leave and of others because of sickness, have placed some restriction on the farm dairy instruction service. By the use of other means of transport where possible, however, and with the assistance of neighbouring officers in the case of absentees, although some districts are too large for the most satisfactory working, this work has been carried on with a minimum of dislocation and actually shows an increase in the number of visits.

The number of new milking-sheds erected during the year was 547, while the number substantially reconstructed was 735.

Check Testing of Milk and Cream Samples

Dairy Instructors and Special Inspectors checked the factory testing during 655 visits, and during these visits checked 4,345 samples.

Cream Grading

Most factories have come a little closer to official standards during the year, and this has brought some criticism from suppliers, more particularly in the Auckland Province. One result was the holding of a number of meetings, mostly sponsored by dairy companies, at which Mr. W. G. Batt, Special Inspector, Hamilton, addressed suppliers. Attendance totalled approximately 1,000 dairy-farmers. The strict grading standard and more vigorous inspection by Farm-dairy Instructors, combined with the talks and demonstrations given by Mr. Batt, have brought about marked improvement in the quality of cream supplied to some dairy factories in the Auckland Provincial District. The co-operation of the dairy companies has been a gratifying factor.

Milking-machines

A total of 2,781 applications for permits for milking-machines or parts of milking-machines were received, and 1,954 issued. Of these, 1,483 permits were for complete plants, including new and used, and the balance of 471 for parts of milking-machines.

Milking Machinery Control Order 1942

This Order was revoked on the 4th April, 1944. The 1942 Order, which was administered by the Dairy Division, required dairy-farmers to obtain permits from authorized officers of the Division for the purchase of milking-machines, parts, and rubberware, the object being to conserve the limited stocks available. While the Order achieved a great deal by way of economy and toward putting the distribution of parts on a sound basis, the detailed administration required very considerable time and work, and many difficult problems of a minor nature arose. While, however, the Order of 1942 has been revoked, control continues inasmuch as the Factory Controller rations milking-machine manufacturers on the basis of their average normal sales.

Redundant Cheese Plant

The settling of claims for compensation for cheese-factory plant and buildings which became redundant as a result of the change back from cheese to butter production at the beginning of the 1942-43 dairying season has been under action by the State Advances Corporation. After settlement has been made the Department of Agriculture is responsible for the custody and disposal of the plant and equipment, the buildings remaining under the jurisdiction of the Corporation.

A total of 80 claims from individual factories on account of plant have been received, 5 of which were subsequently withdrawn, these factories deciding to retain the additional plant installed.

To date 57 claims, to the value of approximately £51,800, have been settled, while 18 claims, representing £34,600, have yet to be finalized. The value of plant taken over by the Department from 75 factories is £64,000, of which approximately £18,000 worth has been sold.

Arrangements have been completed for the National Dairy Association to act as principal selling agents for all redundant plant in the North Island, while the South Island Dairy Association will act in a similar capacity in respect of the South Island.

Transfer of Supply

The matter of transfer of suppliers between butter and cheese factories has presented fewer problems during the year, the position now having become practically stabilized, principally owing to the fact that the major portion of the reversion to butter took place during the preceding season. The Division has, however, continued to receive a number of requests for transfers, though most of these have been more or less of a routine nature and inspired mainly by personal or transport reasons.

Butter is still regarded by the United Kingdom as first in priority, although both butter and cheese are desired in maximum quantities.

Inspection of New Zealand Dairy-produce in Britain

Two officers of the Division remain in England as Inspectors of New Zealand dairy-produce. Mr. F. H. Taylor, the Senior Inspector, has his headquarters in London, while Mr. G. V. Were is stationed in Liverpool. Because of the difficulty and uncertainty of shipping, most of the routine examinations of butter and cheese have to be made at short notice and at the ship's side. Under the circumstances a surprisingly large number of inspections have been made, enabling very useful reports to be sent forward. These officers have continued to render help to the Ministry of Food in respect of selection and distribution of butter and cheese. Much time has been devoted to the inspection of fibre-board butter-boxes, and reports and photographs sent out from England have proved invaluable in the perfecting of this substitute for wood. The experiments have proved, as previously stated, that butter packed in fibre-board boxes can, even under existing transport difficulties, land in England in satisfactory condition. The saving in shipping-space and in charges is a material factor in favour of fibre-board containers.

Dairy Laboratory, Wallaceville

The number of samples dealt with shows an increase over the previous year, and also exceeded the highest total of pre-war years.

The principal chemical work was the analysis of cream and butter for copper contamination, and with improved methods more rapid progress has been made. For the analysis of sour milk a new method has been evolved, which appears to be more reliable than the procedure which has for many years been relied on.

Samples of butter to be tested for bacterial content have again provided the largest proportion of the bacteriological work.

Examination of cheese-factory starters for contamination has been continued. Progress in keeping and handling starters under the best conditions appears to have been intensive rather than extensive.

In continuation of previous investigations, much time and effort have been devoted to milking-machine rubber problems, and some progress made.

During the winter Dr. Moir met Farm Dairy Instructors in the principal North Island centres and discussed with them the latest results of laboratory work on rubber, and also explained some aspects of water-supplies and the different nature of alkali compounds, which are the principal tools Instructors must use in the cleaning of milking-machines.

Dairy Factory Managers' Registration Board

Some 43 applications for registration were dealt with during the year, 31 certificates being granted. There are at present 737 holders of certificates on the register, 37 of whom are serving with the Armed Forces.

Certificate-of-record and Government Official Herd-testing

The co-operation of Farm Dairy Instructors, some 40 of whom carry out monthly testing visits to breeders, has enabled this work to be carried out for practically all breeders offering cows for test.

First-class certificates-of-record issued during the calendar year 1943 number 472, as compared with 605 in 1942. In addition, 75 second-class certificates were issued. Of the cows which received first-class certificates, 355 were in the yearly division and the remaining 117 in the 305-day division, average production being 523·14 lb. and 430·78 lb. fat respectively. Of the cows which received second-class certificates, 65 were in the yearly division and averaged 532·33 lb. fat, while the remaining 10, which were in the 305-day division, averaged 352·84 lb. fat.

The number of cows tested under the Government official herd-test during the year was 3,184, compared with 2,595 for the preceding year.

HORTICULTURE DIVISION

REPORT OF W. K. DALLAS, DIRECTOR

Under the prevailing war conditions the Division has maintained as far as possible the more important of its activities, especially those connected with the production of fruit and vegetables for the Armed Forces and civilians. The passing of the Commercial Gardens Registration Act, 1943, has increased the work of the instructional staff, due to the necessity to have the registration of gardens checked. Their duties have been added to also by the inspection of vegetables grown under contract for the Internal Marketing Division and in visits to market gardens to secure data for the compilation of monthly statistics of production.

The field staff has been engaged in making crop surveys of apples, pears, and citrus fruits, inspection at assembly points, and later the examination of fruit in cool storage and at the auction-rooms.

A considerable amount of time was occupied in preparation of statements of the cost of producing various classes of fruit and vegetables. This work was necessitated by the policy of stabilization and the fixing of ceiling and contract prices.

The Second-hand Fruit-case Control Order was gazetted on the 20th May, 1943. It has for its object the conservation of fruit-case timber, and comes under the administration of this Division.

The Rotenone Insecticide Control Order was gazetted on the 23rd December, 1943, and it comes under the administration of this Division. It has for its object the conservation of available supply of rotenone insecticide for market-gardeners.

The selection of bud-wood of stone-fruits for the nursery newly established at Levin by the New Zealand Fruitgrowers' Federation, Ltd., has been given attention, and many thousands of buds, mainly apricots, have been packed and despatched to the nursery. The preliminary work associated with selection was attended to by Bud Selection Committees in the various districts working in co-operation with officers of the Plant Diseases Division of the Department of Scientific and Industrial Research.

Other matters which received attention comprised, *inter alia*, those relating to rehabilitation, stabilization, importation and exportation of vegetable seeds, " Dig for Victory " vegetable-production scheme for home gardeners, investigations into applications for rationed goods used in orchards, market gardens, nurseries, and apiaries, and co-operation with the Fields Division of the Department in connection with its Services' vegetable-production projects.

Climatic Conditions

The climatic conditions during the year under review, on the whole, have not been so favourable as during the previous year. Not only the fruit industry but all horticultural activities were adversely affected. These abnormal conditions were characterized by periods of excessive moisture and drought, and both had a detrimental effect on production. An unusually wet winter and spring, practically Dominion-wide, left the soil in a cold and sodden condition. This resulted in late cultivation in orchards, and delay in the preparation of the ground for garden crops. Then followed a period of dry weather with high temperatures, and these drought conditions continued until the end of January, and in some cases until February. Rains were then experienced which, while they were of great benefit to all crops, have had the effect of depreciating the storage quality of apples and pears.

Diseases of Horticultural Crops

The control of plant diseases by orchardists, market-gardeners, and nurserymen has been attended to generally in a satisfactory manner—better than was expected in view of the wartime circumstances, such as shortage of labour and the temporary shortage of lead arsenate.

Black-spot.—Owing to the wet spring inducing a heavy spore discharge and the interruption to spraying through broken weather, black-spot infection was general in the Nelson, Canterbury, and Otago districts, while in the North, where more efficient spraying was carried out, it was possible to keep the disease well in check.

Codling-moth.—In the southern districts codling-moth control has been good where the approved programme of spraying was followed. Reports from the North, however, indicate that high summer temperatures brought about a heavy infection, and considerable quantities of infected fruit had to be discarded during picking and grading operations.

Citrus Canker.—The citrus trees in suspected canker-infected areas have continued to receive careful inspection. While no citrus canker was found in commercial orchards during the year, a slight infection was located in a domestic orchard in the Waiuku area. Immediate action was taken, and there has been no further outbreak of infection.

Fireblight.—After a fairly general attack in some areas last season, the amount of fireblight infection this year has been relatively insignificant. The work done in cleaning out cankers has had a good effect, and the disease has not been nearly so troublesome, and confined to only isolated cases.

Brown-rot.—In the Central Otago district the past season has been the worst on record of brown-rot infection of stone-fruits. All varieties of stone-fruits have been equally severely affected. The disease developed in the early spring, taking heavy toll of the blossoms. The main infection occurred from the middle of February onwards, and there were few orchards which did not suffer a serious loss of fruit. Fortunately, in the Alexandra district the bulk of the apricot crop had been harvested. The periods of infection coincided very closely with the weather conditions prevailing, in every instance the higher infection being correlated with moist, warm atmospheric conditions. Heavy rains near the maturity period not only increased infection, but was also the cause of much cracking of fruit and a considerable amount of wet-rot infection. Better measures for the control of this disease are being studied in co-operation with the Department of Scientific and Industrial Research.

Spotted wilt and other virus troubles of tomatoes have again been prevalent, but their incidence was probably less than last year.

Diamond-back moth and white butterfly have given trouble in some commercial vegetable gardens, especially where proper methods of control were not thoroughly carried out.

Bacterial Spot of Plums.—This disease has been discovered in many orchards affecting Japanese plums, particularly the Omega variety. The Plant Diseases Division, Auckland, has done much experimental control work, and has obtained promising results from the use of Bordeaux mixture.

"*Ripe Spot*" *of Apples.*—This disease has caused apple-growers, particularly in the Nelson district, concern for the past four years. The Plant Diseases Division, Auckland, reports that satisfactory control may be obtained by the application of Bordeaux mixture prior to picking during the months of January and February.

Orchard and Nursery Inspection

The inspection of orchards, as in the previous year, has been somewhat restricted owing to the need to economize in tires and petrol, also because of the staff shortage and the necessity to give first attention to matters connected with the war effort. While the attention given was largely confined to orchards in commercial areas, fireblight and citrus-canker inspection, however, was not neglected. The annual inspection was made of all nurseries, which, generally, were reported to be in good condition.

Fruit and Vegetable Instruction Service

Instruction in all phases of orchard work has been carried out where practicable, but had to be curtailed somewhat in order to make closer contact with commercial growers of vegetables, who have been given advice by visit and by letter, especially on the matters of production and the control of pests and diseases.

Experimental Work

Owing to war conditions the restriction on field experimental work has continued, only a few existing ones, such as root-stock investigations, variety trials, filbert-nut trials, and ripe-spot-control investigations, being proceeded with in association with the Plant Diseases Division.

One important experiment this year was the dipping of stone-fruit in a fungicidal solution with the object of inhibiting the development of brown-rot. The results are not yet available.

Experiments in connection with storage of fruit are being carried out in co-operation with the Department of Scientific and Industrial Research.

Trials in the dry-heat storage of onions in the Canterbury district were again undertaken with successful results, and the experiments are being developed further.

Marketing of Apple and Pear Crop

This year the Government again purchased the major portion of the apple and pear crop at prices agreed upon between the Government and representatives of the fruit industry.

Production of fruit for the 1943 season was as follows:—

	Bushel Cases.
Apples	2,261,000
Pears	414,000

No apples were exported other than those for the Armed Forces overseas.

For the 1944 season the Dominion production of apples and pears, according to estimates supplied by officers in the respective districts, is likely to be less than that of the previous season owing to unfavourable weather conditions.

Citrus Fruit

The following are the estimated Dominion totals for citrus-production for the calendar year, 1943: Lemons, 108,300 bushels; New Zealand grapefruit, 50,100 bushels; sweet oranges, 9,800 bushels. This production was above normal. The New Zealand grapefruit industry is expanding and likely to exceed the production of lemons in the course of a few years.

Standardization of Grades of Apples, Pears, and Lemons

During the current year (1944) three grades—viz., "Fancy," "Commercial," and "Minimum"—are being accepted by the Internal Marketing Division. The "Fancy" grade includes both "Extra Fancy" and "Fancy" as set out in the New-Zealand-grown Fruit Regulations 1940. Price Orders cover the sale of all apples and pears.

The marketing of New-Zealand-grown lemons has continued to be administered by the Internal Marketing Division. A Price Order covers all lemons, whether sold wholesale or retail.

Apricots, peaches, nectarines, and raspberries are covered by wholesale and retail Price Orders.

Cool Storage

The cool-storage space available for apples and pears during the current season is 941,000 cases; this is an increase on the space available during the previous year. Additional space is also available for short-term storage.

Fruit Processing (Drying and Canning)

The quantity of stone-fruits dehydrated in Otago Central has been considerably curtailed this year owing to brown-rot infection. However, a fair tonnage of apples were dried. In Nelson, Auckland, and Hawke's Bay districts the established factories have worked to full capacity in processing fruit and vegetables, and additional quantities of tomatoes, peas, beans, &c., were grown for this purpose. Considerable success has been achieved in the dehydration of apples and several varieties of vegetables. Additional dehydration factories are in the process of construction in the Auckland, Motueka, and Canterbury districts.

Nurseries

Six hundred nurseries were registered throughout the Dominion for the year, an increase of 16 registrations compared with last year.

All nurseries were inspected, and were generally found to be in a satisfactory condition. The stocks of many plants were depleted, especially the stocks of most varieties of fruit-trees.

Market-gardening Industry

In its organization the market-gardening industry is now on a sounder footing as a result of the coming into operation of the Commercial Gardens' Registration Act, 1943. During the year 2,292 registrations were effected, involving approximately 17,000 acres.

The supply of vegetable seeds has been well maintained through the activities of seed-merchants, the co-operation of the Ministry of Supply, and the helpfulness of overseas authorities.

This Division has continued its co-operation with the Fields Division in the Services' vegetable-projects operations. These projects provide a considerable tonnage of vegetables for the Armed Forces, including the American Services, and much of the supply, fresh and dehydrated, is shipped overseas.

Instructors in the field are making closer contact with the vegetable-growers in order to encourage production and to deal with problems of diseases affecting crops. The growing of tomatoes, especially those suitable for processing, is now an expanding industry.

In order to meet the increased demand for vegetables, the Government, through the Internal Marketing Division, entered into contracts with many gardeners to grow basic vegetables such as carrots, parsnips, cabbages, and swedes. These vegetables are standardized into grades, and on delivery have to be inspected by an officer of this Division.

The officers of the Division have been actively associated with the encouragement of home gardeners through the "Dig for Victory" campaign to grow more and better vegetables for their use. Emphasis has been laid upon planning the garden to ensure that a variety of vegetables is available throughout the year. The assistance rendered in conducting lectures, demonstrations, shows, and exhibitions by members of the respective committees associated with the campaign and by those who prepared papers for the radio is gratefully acknowledged.

Viticulture: Wine and Cider Making

There has been no reduction in the area under outdoor grapes. Owing to shortage of building-material, no new glasshouses have been constructed. The pests and diseases of vines and grapes generally have been kept satisfactorily under control. The rains experienced during the vintage period (March and April) caused some loss of grapes. Small birds were also troublesome in most localities.

Building of wineries, cellars, and distilleries was continued during the year, especially in Hawke's Bay, Waikato, and Henderson districts. A further four distillation licenses were issued by the Customs Department.

The strong demand for New-Zealand-made wines has continued.

Te Kauwhata Horticultural Station.—The Horticultural Station at Te Kauwhata continues to make steady progress, and improvements to buildings and plant have been made during the year. An extension is being made in the area under grapes.

A successful year was experienced in the sale of wines produced at Te Kauwhata, and the demand is in excess of the mature wine available.

Tobacco Industry

Shortage of labour and material is preventing any large-scale increase in tobacco-production, but the acreage planted is being maintained at about 3,000 acres per year. The 1942–43 season provided a record yield of 3,185,000 lb. of tobacco. The tobacco-manufacturing companies are maintaining contact with their respective contracting growers, while the Tobacco Board and the Tobacco Research Station at Riwaka have contributed considerably to the stabilization of this industry.

Hop Industry

No material change has occurred in the hop industry during the year, the area under cultivation remaining at approximately 650 acres. The hop gardens are being well maintained and are not affected by war conditions. Harvesting labour has been sufficient, and has been recruited by the National Service Department. The yield for the current season is estimated to be in the vicinity of 2,000 bales, which is about 60 per cent. of a normal crop.

Beekeeping Industry

Climatic conditions generally were favourable for honey-production during the past season, with the exception of Canterbury, where the pastures in some localities dried up much earlier than usual. In Westland, also, the long dry spell reduced the honey flow in the rata, which greatly reduced the main crop of honey. On the whole, however, the crop of honey and beeswax for the whole Dominion is above the average.

There are at present registered 5,646 beekeepers in New Zealand. The general trend is a slight reduction in the number of hives operated by commercial apiarists, owing to insufficient labour available, but there is an increase in the number of persons taking up beekeeping on a domestic or semi-commercial basis.

The departmental grading of honey has received the usual attention.

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