1926.

NEW ZEALAND.

DEPARTMENT OF AGRICULTURE.

ANNUAL REPORT FOR 1925–26.

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

SIR,— Department of Agriculture, Wellington, 30th June, 1926.

I have the honour to forward herewith, for your Excellency's information, the report of the Department of Agriculture of the Dominion for the financial year ended 31st March last.

The agricultural year of 1925–26, although not attaining the exceptionally high all-round level of the preceding period, has given fair results. The volume of primary production was on the average fairly maintained—contraction in certain classes being offset by increases in others. The most general climatic feature was a late harsh spring, and this was followed in certain important pastoral districts by a lengthy period of exceptionally dry weather. Other districts, however, experienced favourable conditions, and the bad start of the season was very largely recovered.

In the pastoral section the year opened with a most satisfactory increase of over three-quarters of a million head of sheep, as shown in the annual returns. Moreover, the number of breeding-ewes returned was the highest on record. This promises well for further substantial recovery of the shrinkage from the peak level of the sheep-stocks recorded in 1918, and the interim returns for 1926 appear to justify these anticipations. The 1925 crop of lambs also gave an estimated increase in numbers, notwithstanding a lower lambing percentage than in the preceding year. The wool-clip produced some increase in aggregate bulk, due to the greater number of sheep shorn. Market conditions for wool were characterized by stability, in marked contrast to the fluctuations of the preceding season with its abnormally high prices, but values ruled substantially lower.

As regards the frozen-meat industry, the killings of lambs at the freezing-works of the Dominion were considerably higher than in the preceding season (the North Island being responsible), but this increase was offset by a shrinkage in mutton slaughtering. Prices ruling for freezer sheep and lambs during the season remained fairly steady, though at a level considerably lower than the record rates of 1924–25. Our wool and meat growers have therefore experienced a somewhat severe comparative shrinkage in income, consonant with what must be regarded as a more normal level of values this year. The beef output of the works showed a marked falling-off as compared with the preceding season.

Dairy cattle registered a fair increase in the 1925 statistics, and under average conditions a further advance in the output of the dairy industry might have been expected for the past season. Milk-production, however, was severely affected by

the inclement spring weather, and although the shortage was steadily reduced as the season progressed it was never quite overtaken. The grading returns indicate a decrease of between 5 and 6 per cent. in butterfat-production for export butter and cheese. It must not be overlooked, however, that the human population of the Dominion has increased by some 135,000 during the last five years, or at the rate of 27,000 per annum. Local absorption of foodstuffs is thus steadily growing in total volume, and this must be especially taken into account with a product such as butter, the *per capita* consumption of which is very high in New Zealand. During the season under review cheese-manufacture was in the ascendant, rather less butter being made than in the previous year.. This movement has coincided with market values, which distinctly favoured cheese-production. In neither branch, however, did average returns quite come up to those of the preceding season. As regards the future of the dairy industry, a very fine progressive spirit exists at all points, with a determination to keep to the front in production and quality. During the present session of Parliament it is intended to amend the Dairy Industry Act in various directions, introducing, among other new provisions, compulsory grading of cream, together with differential payment for the several grades.

In regard to cereal-production in the grain-growing districts, it was confidently hoped that the wheat crop of the year under review would be appreciably increased, the goodwill of growers generally being undoubted. Unfortunately, owing to continued wet weather during the autumn and winter sowing-period in Canterbury, arable farming operations were seriously hampered, and considerable areas could not be put down in wheat as intended. The result was a further moderate shrinkage in the total wheat area. The per-acre yield of the crop, as shown by the threshing returns, was above the average. It has been necessary, however, to continue to supplement stocks by importation. The policy of the Government is definitely for the Dominion to be self-contained in the supply of essential breadstuffs, and administrative measures have been taken towards this end. Weather and soil conditions in Canterbury during autumn of the current year were favourable for tillage and grain-sowing, and there is reason to believe that the area in wheat for next harvest will show a substantial increase. Notwithstanding suggestions to the contrary, indications are not lacking that wheat-growing will continue to find a place in the crop-rotations of Canterbury and north Otago. The satisfactory increase in oat-growing recorded for 1924–25 was not maintained during the past year, but the portion of the crop threshed for grain has given an increased per-acre yield. Importation of oats into this country should be quite unnecessary in normal seasons.

The fruitgrowing industry has been very much to the fore this year. A record crop of apples necessitated greatly increased exportation, and the total quantity shipped was over treble that of 1925. The Government guarantee of 1d. per pound net was extended to three quarters of a million cases, enabling the shipments to be readily financed. Unfortunately, this great expansion of export business has coincided with a very depressed market in Britain, especially for the later shipments, largely the result of industrial troubles, together with strong competition from North America, and heavy calls on the guarantee have become inevitable. Provision has been made for this on the estimates of the Department. Shipments to Argentina realized better prices. The importance of further developing the local market for fruit on better lines, including standardization, is becoming more generally realized, and doubtless definite action on the part of the growers' organizations will follow in the near future. Ample supplies of moderately priced good-quality fruit are essential to the health of the people, but the requisite production cannot be relied upon unless the industry is receiving reasonably profitable returns.

The poultry industry has been carried on under considerable disabilities. At the commencement of the season the strike of seamen on British overseas vessels completely held up business during the limited period suitable for export, and no shipments were made. Former difficulties in connection with feeding-stuffs have been very much eased by special facilities made available by the Government for importations of Australian wheat. By way of further aiding the industry the Department intends to establish a small poultry-research station near Wellington,

The poultry plant at Ruakura State Farm is also being remodelled with the object of specially demonstrating the possibilities of poultry-keeping as a sideline on general farms.

Attention may here be drawn to the very imperfect and often quite misleading relation between statements of exports of produce for any one year ending 31st March and actual production in the nearest agricultural year or season. This is due mainly to the period of the official year splitting two seasons. A case in point this year is that of frozen beef. Statistics of exports show a considerable increase in the shipments of this product for the year ended 31st March, 1926, as compared with the preceding twelvemonth, whereas the actual slaughterings of beef in the 1925–26 season of the frozen-meat industry (1st November to 30th June) show a heavy decrease. In this instance large quantities of beef killed in the 1924–25 season, but shipped after 31st March, were credited to the 1925–26 exports. The twelvemonth ending 30th June is a very much better period for the survey of exports and production.

With the obvious passing-away of so much of the virgin fertility of the land and the shrinkage of new areas of fertile country for bringing in, the vital importance of adequate manuring practice in the grassland farming dominant in New Zealand is becoming more generally recognized among our farmers. The Department is closely studying the matter from the scientific and experimental side, while the Government is giving earnest consideration to the wide question of supplies and costs of fertilizers, and proposals aimed at reducing prices to the producer are now under discussion. In regard to legislation, a Fertilizers Act Amendment Bill is being prepared for presentation to Parliament, and greatly improves the existing measure in several directions.

Agricultural education has had a large share of public attention during the year in connection with reports by the Board of Agriculture, the University Education Commission, and Sir Frank Heath respectively. After very thorough consideration, demanded by the important issues involved, the Government has come to the decision to establish an agricultural college of full standing and rank near Palmerston North. While this institution will undertake both higher research work and training for degree standard, it is intended to also make strong features of shorter diploma courses and special short courses for farmers. It is further hoped in time to make the Palmerston North institution a nucleus for other related educational activities.

Preliminary statistics of the census taken this year apparently show that the urban population of the Dominion continues to increase in greater degree than the rural. The best means of dealing with this problem is to maintain agriculture in a strong and prosperous condition. Assurance of a fair return for their capital and work will in this country always find men ready to take up land or carry on in farming. The assurance of such a return involves, of course, problems of great complexity, extending even to international issues in the case of a country depending so largely on its exportation of primary products. Agricultural science in its widest scope, rural finance, marketing systems, incidence of taxation, roading and other transport, postal and telephonic facilities, schooling, and home economics all have their share in developing a strongly based rural community. It will be realized that not only one but many Government Departments are directly concerned, and that the maximum degree of co-ordination is essential.

The part taken by the Department of Agriculture in this extensive work is well presented in the reports of the Director-General and heads of branches, which also form a record of much excellent service. Reference is also made in these reports to various sections of primary production which have not been touched on in my present brief review, but which have their due place in the agricultural organization of the Dominion.

I have, &c.,

O. J. Hawken,

Minister of Agriculture.

His Excellency the Governor-General.

REPORT OF THE DIRECTOR-GENERAL.

THE HON. THE MINISTER OF AGRICULTURE. Wellington, 15th June, 1926.

I beg to submit the following report upon the Department's operations during the year :—

INTRODUCTORY.

A definite expansion of the work has taken place, this being almost entirely in the direction of increasing the instructional services. The staff dealing with these services has been strengthened by the appointment of seven Assistant Instructors in Agriculture, together with additional Veterinarians, Farm Dairy Instructors, and others.

It is a satisfactory feature of the present day that, apart from the officers specifically entrusted with instruction duties, many whose work lies in the carrying-out of inspection are becoming increasingly useful to farmers in an advisory capacity, thereby assisting in the general policy of advising and assisting farmers in working their farms and handling their live-stock to the best advantage.

The detailed reports of the Divisional Directors and the Chemist are appended. These set out the varied and comprehensive activities of the Department, the work done, and the progress made.

The unfavourable weather conditions which prevailed during the spring months had a marked effect upon the condition of live-stock, particularly dairy cows, and this was reflected in a decreased yield of milk, and a consequent decrease in the quantity of dairy-produce available for export. It is fully realized that one of the pressing necessities of the Dominion, if it is to continue to progress in prosperity and to hold and strengthen its position generally, is the bringing-about of an increase in the production of marketable produce from the land. The experience of the past season affords an excellent object-lesson to farmers—especially dairy-farmers—in many districts in the necessity for providing supplies of food, supplementary to their pastures, for enabling them to carry their stock over a period of pasture-food shortage such as was experienced. Certainly it was one of the most unfavourable seasons experienced for several years, but such seasons are liable to recur.

Another point in connection with dairy-farming claims attention—namely, the use of good bulls, with good butterfat records behind them, in the ordinary milking-herds. The well-termed "scrub" bull is still too much in evidence. It is realized that many dairy-farmers rear none of the calves produced on their farms, and therefore consider that any sort of a bull which will get their cows in calf is sufficient for their purpose, but notwithstanding this the use of these inferior bulls can only be regarded as being bad in principle. Given a good bull the heifer calves of the best-milking cows can be saved for later drafting into the milking-herd, instead of vacancies having to be filled by outside purchases.

Herd-testing has fallen off slightly as regards the number of cows under test. This is not considered due to any loss of interest in testing, but is probably the result of the unfavourable conditions in the early part of the milking season, and the consequent falling-off in milk-yield causing individual farmers to drop testing for the year.

ANIMAL HUSBANDRY.

As regards animal-disease, the Dominion has maintained its relative freedon from serious diseases, and it is satisfactory to note a reduction, even though it be only a slight one, in the percentage of cattle and pigs found to be tubercular. Blackleg now causes little trouble, and the recommendation of the Director of the Live-stock Division that compulsory inoculation of all calves in Taranaki should cease, and any cases arising be dealt with as localized outbreaks, is well worthy of consideration.

The ticks found on cattle and other animals in the northern part of the Dominion have continued to be harmless so far as any ill effect upon the health of animals is concerned. A systematic series of experiments which, after several failures to get them started owing to the ticks supplied dying, have been carried out at the Queensland Government's laboratory, at Townsville, indicate that these ticks—unlike the so-called "Queensland tick"—are incapable of transmitting tick-fever from animal to animal. As these ticks progress southwards in the Dominion they seem to find it increasingly difficult to establish themselves, especially when away from the coastal areas, and a number of farms where they at one time appeared in small numbers are now quite clear of them. They damage hides when present in sufficient number, and this point needs special attention and in itself warrants farmers doing all that is possible to eradicate them.

Other disease conditions are dealt with in the report of the Live-stock Division.

The measures adopted in order to prevent the risk of introduction of foot-and-mouth disease have been strictly carried out. Breeders of stud stock, however, are beginning to feel the necessity for introducing fresh blood, and how best to meet this position will have to be considered. It is clear that if anything is done the most careful precautions will have to be taken.

The poultry industry has been affected by the high cost of poultry-food, but it is maintaining its position. The establishment of an investigation and experimental breeding-station in the Hutt Valley should prove of value to this industry, which is well worthy of assistance of this kind, and is capable of becoming a much greater asset to the Dominion.

The Veterinary Laboratory at Wallaceville, which has now been placed under the immediate control of Mr. C. S. M. Hopkirk, B.V.Sc., has done very good work during the year, a still greater amount of research and investigation having been undertaken, while the volume of routine work has considerably increased. The staff has been strengthened by transferring Mr. D. A. Gill, M.R.C.V.S., to Wallaceville.

Dairy-farmers still suffer much monetary loss through the prevalence of contagious abortion, sterility, and mammitis among their cows, though there was less abortion and mammitis than in the preceding year. The scientific officers of the veterinary staff are continuing their special investigations into these diseases in the hope of finding better and more effective means of dealing with them, especially as regards prevention. This work is done both in the field and at the Wallaceville Laboratory, the field officers working in close co-operation with the laboratory staff. Close touch is also kept with similar investigation work in other countries. Meanwhile the preventive and other methods recommended by the Department need to be adopted, and a careful observance of these will in itself go far to lessen the extent of the loss caused by these troubles.

Full details regarding the work done in the Veterinary Laboratory will be found in the report of the Live-stock Division.

Considerable attention has been drawn to the losses occurring through damage to hides through horning and through fire-brands placed on the rump, also damage to beef carcases through horning. It would be quite warrantable to introduce legislation to make dehorning compulsory in the future (except as regards stud cattle), and to prevent fire-branding on the rump; and I think the farming community generally realize the advantage which would accrue from this. An amendment of the ear-marking provisions of the Stock Act is also desirable, especially as an aid to the detection of sheep-stealing.

There has been little trouble with sheep through sickness, and the considerable increase in the number of sheep in the Dominion is gratifying.

Good work has been done by Mr. A. H. Cockayne, Director of the Fields Division, in conjunction with Mr. William Perry, of Masterton, and the officers of the Live-stock Division, in connection with the detection of faults in wool, the object especially aimed at being the general improvement of our long-woolled flocks in this respect. The sincere thanks of the Department must be extended to Mr. Perry for his greatly valued assistance in this work. An important aid to bringing about general wool-improvement will lie in the exercise of care and judgment by farmers when purchasing rams, especially for the smaller flocks, where generally insufficient care is exhibited in this respect.

Dairying.

In connection with dairying a satisfactory feature of the year's operations lies in the extension of the Farm Dairy Instruction services. These Instructors are doing good work in aiding farmers to correct errors which are responsible for milk or cream supplied to factories being in an unsatisfactory condition. One feature of their work lies in the care of milking-machines, the maintenance of cleanliness in these and the proper control of their pressure being important matters not only in connection with the collection of clean milk, but also in the matter of preventing udder troubles in the cows. The milking-machine is a valuable adjunct to the dairy farm, but if carelessly handled it can be a fruitful cause of mammitis in cows. The expenditure connected with these Instructors is borne partly by the dairy factories and partly by the Government.

The grading of butter and cheese has been well carried out, and the testing of butter for water content has been continued, with the excellent result that no complaints regarding excess water have been received from the trade in Britain. The fees received for grading have proved insufficient to meet the cost during the past year, and this matter is receiving attention.

The question of compulsory cream-grading has been under discussion for a considerable time, and, as the industry generally is in favour of it, legislation is now being prepared which if passed will bring it into force in all factories. Some other amendments of the Dairy Industry Act are also being

prepared for your consideration, these including—(*a*) In the case of leased premises, making the owner under certain conditions liable for the cost of permanent improvements necessitated by the provisions of the Act; and (*b*) more clearly defining what constitutes a co-operative dairy company.

Herd-testing has become firmly established in the dairying districts, and the large amount of it which has already been done has resulted in a number of unprofitable cows having been taken out of the herds and disposed of for food purposes. This practice could be further extended to the advantage of producers. Side by side with it, though, should go good methods of animal husbandry, particularly as regards feeding and the rearing of heifer calves from good milking-strains on both sides. It is worthy of note that cases have been observed where cows regarded as unprofitable have with good feeding and good management proved themselves to be good milkers.

The need for a special laboratory and experimental factory as a necessary part of the Dairy Division's equipment becomes more pressing as time goes on, and it has really become urgently necessary to take steps to provide these. The staff at the present Wallaceville Laboratory carry out all investigations possible for the Division, but the many difficulties met with in factory-work, and by the Division's Instructors, render separate premises and staff necessary in order to enable the Division to carry out its instructional services with complete efficiency. This work has been authorized, and the sooner it can be carried out the better.

The quality of both butter and cheese manufactured has continued at a high standard, but it is a matter for regret that cases have occurred where butter has been held too long in store, and has deteriorated in consequence.

Agricultural Instruction and Investigation.

The Fields Division has had a year of strenuous work, and all its officers have carried out their duties with zeal and energy. Details of the work done will be found in the Director's report. It is satisfactory to note that the advice of the Instructors in Agriculture is freely sought by farmers, and that already methods necessary for meeting present-day conditions are being adopted, both as regards the improvement and maintenance of pastures and crop-production. A great advance has been made in the use of top-dressings for pastures, and this is bound to show practical results in the shape of increased carrying-capacity and increased output of produce. A considerable volume of exact experimental work, both as regards pastures and field crops, is in hand, and this should yield good information in the form of established principles which can be adopted generally, varied only by the necessities created by differences in soil and weather conditions.

The instructional staff of this Division can be further increased with advantage, and recommendations to this effect will be made. In those districts where Instructors have been established for some time the calls upon their services are constant, and, moreover, are extending in volume; while in other districts where, so far, we have been unable to establish Instructors a strong desire for them is expressed. Given the right type of men, which is essential, good results would accrue from an extension of this service.

Among the other activities of the Fields Division may be mentioned the following: A capable officer has been specially detailed for work in connection with farm economics, and he is making good progress, this being greatly aided by the cordial co-operation of those farmers who have been asked to furnish data for him. Investigation work is also being carried on by specially detailed officers in (*a*) the effect upon the milk-yield of the feeding of concentrates to dairy cows; (*b*) the control and eradication of blackberry; (*c*) the pasture grasses best suited for areas reverting to second growth of native plants. A considerable amount of specialized work is also being done in connection with the effects of fertilizers, under varying conditions, upon cereal crops. The Fields Division officers are co-operating with the Lincoln College authorities in the cereal-seed selection and breeding-work being carried on there. In connection with the general question of how best to deal with country reverting to second growth, particularly in the west central portion of the North Island, the Department is, principally through the officers of the Fields Division, co-operating with the Lands Department in devising a scheme of demonstration work co-ordinating with the experimental work already done and that still in progress.

The Biological Laboratory has dealt with a large volume of useful work, and, while much of it has necessarily been of a routine nature in connection with the field activities of the Department, a good deal of research has been carried on. One result of this has been the elaboration of a system of treating seed wheat with copper carbonate in finely powdered form as a preventive of the development of smut. A considerable quantity of the seed wheat sown during the present season has received this treatment, the Lincoln College authorities and the Canterbury seed-merchants co-operating in the necessary arrangements. Following preliminary laboratory experiments, extensive field experiments are being carried out in the treatment of seed oats as a preventive of rust-development. Work is also being done in endeavouring to find better methods of controlling disease in

potatoes, field-peas, and swedes. The entomological officers have secured and imported parasites which are hoped to prove useful in combating pear-midge, and further distributions of ladybirds to eradicate the so-called blue-gum scale have been made from time to time. The seed-testing branch has continued to carry out satisfactory work. A complete summary of the activities of this laboratory is given in the report of the Fields Division.

Fruitgrowing, Horticulture, and Beekeeping.

The officers of the Horticulture Division, which covers these activities, have had very busy year, particularly during the fruit-export season, the quantity of fruit coming forward for export in the 1926 season being greatly in excess of any previous year. The best possible supervision has been maintained as regards the quality of the fruit shipped, and growers generally have done their best to assist in this direction.

Notwithstanding the large quantity of fruit exported, the figures supplied show that there will still be sufficient for local requirements under present conditions. It is a matter for regret that some better methods of marketing local fruit have so far been unobtainable to any extent, and the unfortunate position still prevails under which the consumer who buys small quantities pays a relatively high price, while the net return to the grower is very small. This is a bad condition of things from more points of view than one, as there is no doubt but that if the consumer could obtain fruit at a cheaper rate the consumption in New Zealand would increase greatly, and the surplus needing to be exported, possibly at a loss, would be correspondingly reduced. An examination of the position does not appear to disclose that in any one phase of the handling of fruit between grower and consumer unreasonable profits are being made, but indicates that it is rather the system as a whole which is responsible. The position is certainly one calling for careful thought directed towards endeavouring to bring about an improved system of marketing which will reduce the intermediate charges and enable both producer and consumer to benefit.

One phase of the industry—namely, that of lemon-production—deserves special attention. Under present conditions growers of lemons find themselves very seriously handicapped by the competition brought about by imports, and while there may be instances where the New Zealand lemon is markedly inferior in quality to the imported article, there can be no doubt that a large quantity of good fruit is produced in the Dominion, and there should be a good market provided for it. Lemons can be grown well in some of the northern districts, and this branch of the fruit industry deserves the fullest consideration from the point of view of both merchants and retailers doing their best to assist growers in marketing their fruit to advantage.

Instructional officers of the Division find their time very fully occupied in advising fruitgrowers on various matters connected with their work, and it is very satisfactory to note the excellent feeling which exists between growers and the Department.

Considerable attention has been paid to the question of the cool storage of fruit, both as regards fruit held in the Dominion for local consumption and that shipped for sale abroad. The co-operation of the Biological Laboratory staff with the officers of the Horticulture Division, aided by the ready assistance, when needed, of growers and owners of cool stores, has enabled useful and progressive investigation work to be done. It is hoped that this may ultimately result in means enabling a greater quantity of apples to be kept in good condition for a longer period, thus lessening the necessity for importations of apples from the Northern Hemisphere and enabling New Zealand to be entirely self-contained in respect of her apple supplies.

The Te Kauwhata Horticultural Station has given a good result for the financial year, this being largely due to increased sales of wine. A considerable revenue is also derived from the sale of wattle-bark from the plantation on the property. Further information regarding this station is contained in the report of the Horticulture Division.

The Orchard-tax Act will automatically expire during the coming year, and it becomes a question as to whether it should be renewed. The establishment of the Fruit-export Control Board and the collection of a levy on export fruit by the Department have largely reduced the necessity for this tax, and it is doubtful whether its renewal is desirable or necessary.

The New Zealand Institute of Horticulture is making progress, but there is still a good deal to be done before it can be looked upon as being established on a sound and permanent basis. It undoubtedly has in it possibilities for being of great benefit to horticulture generally.

Tobacco-culture has made some development, and the manufacturing plant established in Hawke's Bay has provided a means for utilizing the leaf produced. Its possibilities in this respect, however, are for the time being limited, and it is proposed to make arrangements for sending to England the samples of New Zealand leaf with a view to ascertaining whether a market is obtainable there for any surplus not required or capable of being dealt with in the Dominion.

The bee-keeping industry continues to progress, and is distinctly one of the most useful of the minor primary industries of the Dominion. Unfortunately, owing to seasonal conditions, last year's output was below normal. It is satisfactory to note that attention is given to ensuring a good standard of quality in honey exported, and the establishment of the Honey-export Control Board should aid in maintaining this quality, and also in still further improving it.

Agricultural Chemistry.

The staff of the Chemical Laboratory has had its time fully occupied with the work entailed by examinations, analysis, &c., of material forwarded by the various Divisions; and the extent to which field officers of the Department utilize the laboratory in connection with their duties well illustrates its value as a necessary factor in the carrying-out of the general investigation and instruction work of the Department as a whole.

The Chemist, Mr. B. C. Aston, visited Great Britain and Denmark during the year and obtained much valuable information, as will be noted from his appended report. One point worthy of special notice is that at a meeting of the British Association for the Advancement of Science he read a paper on bush sickness in New Zealand, and was complimented upon it, his conclusions being not only accepted, but also adopted as a basis for further investigations into a somewhat similar trouble existing in part of the border district of England and Scotland. In order to facilitate the work now in hand, aimed at endeavouring to find practicable methods of soil-treatment to correct the deficiency responsible for bush sickness, an officer of the Chemical Laboratory staff has been stationed at Rotorua, whose time will be wholly occupied with this work.

While in the United Kingdom the Chemist inquired into the working of the fertilizer legislation there, and the information he obtained has enabled an amending Bill to be drafted for New Zealand, which should, if it becomes law, prove an improvement upon our present legislation.

State Farms.

The Farm Training College at Ruakura has made satisfactory progress under the immediate direction of Mr. P. W. Smallfield, and the general scheme of instruction has shown itself to be what is needed in the Dominion for the purpose of training lads to become efficient farmers. During the year thirty-two students were in residence. Having regard to the coming establishment of an agricultural college in the North Island, which will provide a two-years diploma course as well as a degree course, consideration is now being given to the question of readjusting the instructional course entirely and making it a one-year course with an optional second year, instead of a complete two-years course as at present. This will remove any competitive element, while in no degree lessening the value of Ruakura as an educational centre. It is, in fact, anticipated that the number of students coming forward for instruction will be considerably increased under this proposed short-course system.

The farming operations at Ruakura are being carried on satisfactorily. During the year Mr. A. W. Green, who had for ten years acted as Manager, and who always had the interests of the farm very much at heart, decided to resign, and Mr. H. Munro, Principal Inspector for the Auckland Province, undertook the responsibility of the management. Mr. Munro is a capable and progressive farmer, and he is doing very good work. The expenditure for the year on both the Training College and the farm (not including salaries of permanent officers) was £10,455, while the revenue was £9,338.

The Weraroa Farm has been conducted principally on general-farming lines, and it is becoming increasingly evident that a decision needs to be made as to what shall be its function in the immediate future. It could, of course, be still used to a considerable extent for experimental and demonstration work, but experience has shown that this type of work (unless carried out on highly specialized lines by a resident scientific staff) can be made of much greater value, and give results capable of wider application, when conducted at different centres in rural districts, where the results attained can be made applicable to surrounding areas where similar, or approximately similar, soil and climate conditions exist. The very unfavourable weather conditions in spring and early summer had the effect of greatly curtailing the quantity of feed available at the Weraroa Farm, and the factory returns from the dairy herd have (in common with the surrounding district) fallen off considerably in consequence. Other grazing operations have also had to be curtailed by comparison with usual seasons. The actual expenditure, exclusive of salaries of permanent officers, was £5,779, while the revenue was £7,583. The farm has been well conducted by the Manager, Mr. J. F. Shepherd, and his staff,

Rabbit Nuisance.

The report of the Director of the Live-stock Division goes very fully into the matter of the administration of the Rabbit Nuisance Act and the present condition of the country as regards rabbit infestation. It is satisfactory to note that conditions generally show improvement. With the exercise of continuous vigilance, and of consistent work by settlers, the progressive improvement which has been evidenced during the past two or three years can be continued.

Rabbit Boards have, in most instances, proved very useful factors in rabbit control and destruction. There are some points in connection with the present legislation regarding Rabbit Boards which require consideration, including the question of the use to which the finances of Boards can be applied. Certain phases of this and of other matters have been submitted by Boards themselves, as requiring amendments of the Act. Some proposed amendments have been drafted, but, having regard to the number of amendments which have already been made in the original Act, it is submitted that it would be a much better policy to avoid the making of further detail amendments, and instead draft an up-to-date consolidating measure in the hope that it will serve requirements for a number of years to come. This, of course, would take time, and a good deal of discussion with Rabbit Boards and other organizations in connection with it would be desirable.

Noxious Weeds.

The administration of the Noxious Weeds Act, is still, as always, a matter full of difficulty. While the position of many farmers in connection with noxious-weeds control is fully realized, the fact yet remains that the extent to which good work is done is principally dependent upon the energy and enterprise of the farmers themselves. It would be a bad policy to ignore the risk and allow the more dangerous weeds, at any rate, to flourish unchecked, yet cases frequently arise where the full enforcement of the provisions of the Act on individual properties would mean bankruptcy for the occupier. The Department's officers are doing their best, by tactful and discreet methods, to get as much control work done as is possible in the circumstances, and it is satisfactory to note that many settlers do their best to meet practicable requirements.

Blackberry and ragwort are by far the most troublesome pests, and active work is in progress in the endeavour to find better methods of coping with them. Systematic experiments are being carried out in connection with blackberry-destruction. Further, Dr. Tillyard, of the Cawthron Institute, is, by arrangement with the Department, endeavouring while abroad to find a parasite which will deal with blackberry, also a parasite to deal with ragwort. The best results are naturally hoped for, but the possibility of their attainment (and there is no more than a possibility) does not warrant any cessation of other endeavours to deal with these pests as well as circumstances permit.

Nauru and Ocean Islands Phosphate.

During the nine months ended 31st March, 1926, 55,310 tons of phosphate were shipped to New Zealand, representing 21·99 per cent. of the shipments from these islands during that period. The following figures show the quantities and destination of phosphate-rock shipments during the period the British Phosphate Commission has managed the business :—

Year ended 30th June.	United Kingdom.		Australia.		New Zealand.		Other Countries.	
	Tons.	Per Cent.	Tons.	Per Cent.	Tons.	Per Cent.	Tons.	Per Cent.
1921	16,750	4·60	265,914	72·97	17,100	4·69	64,660	17·74
1922	15,550	4·30	171,286	47·39	38,500	10·65	136,150	37·66
1923	..	..	203,446	64·84	51,550	16·43	58,762	18·73
1924	..	..	320,031	70·81	60,850	13·47	71,028	15·72
1925	..	..	337,298	71·66	98,790	20·99	34,635	7·35
Nine months to 31st March, 1926	..	..	183,500	72·96	55,310	21·99	12,710	5·05

Under the Nauru Agreement New Zealand contributed 16 per cent. of the capital required for acquiring phosphate rights in Nauru and Ocean Islands; Great Britain and Australia contributed 42 per cent. each. The agreement provided that the three countries would be entitled to take phosphate rock from the islands in similar proportions annually, these quantities to be readjusted at the end of five-yearly intervals on the basis of the actual requirements of each of the three countries. During the first five years Great Britain took only a very small quantity of phosphate, and during the fifth year Australia took approximately 72 per cent. of the total output, while New Zealand took approximately 21 per cent. The question of a reallocation of proportions

for each country has been taken up with Great Britain and Australia, but after some communications had passed it was deferred at the request of Great Britain. A despatch from the Secretary of State for Dominion Affairs, in which this desire was expressed, stated that under the present arrangement the whole of the United Kingdom allotment not required by the United Kingdom is at the disposal of Australia and New Zealand, and in the event of British consumers desiring to obtain large supplies of phosphate from Nauru and Ocean Islands care would be taken to give reasonable notice of such intention. In the circumstances this request that the matter be deferred was agreed to by New Zealand, and having regard to the present position regarding phosphate-supplies available for British manufacturers it is not anticipated that Britain will require any quantity from Nauru and Ocean Islands for some years to come.

Difficulties have arisen owing to friction between the Australian Commissioner, on the one hand, and the Commissioners representing Great Britain and New Zealand respectively on the other. The Government of Australia has appointed a Commission to inquire into the matter, and an early satisfactory settlement of the matter is hoped for.

There are no harbours at the islands, the steamers during loading operations lying in the open roadstead anchored to special moorings which are in deeper water than perhaps any others in the world. Loading is carried out through the medium of lighters, hence shipping operations are governed almost entirely by weather conditions. For the first five years of the Commission's operations the weather interfered very little with loading operations, with the result that all orders from partner countries were promptly filled and surplus production disposed of to other countries at very profitable market rates. These conditions, which favoured a maximum output so necessary where heavy overhead charges are inevitable, were reflected in a gradually decreasing c.i.f. cost, with corresponding benefits to purchasers of the manufactured superphosphate. Unfortunately, very unfavourable weather conditions were experienced for a considerable portion of the year 1925–26, with the result that shipping operations were delayed, storage limits at the islands were reached, and it was impossible to supply from the islands all of the requirements of the partner countries. In order to furnish the manufacturers with raw material, and so ensure adequate supplies of superphosphate for consumers in the partner countries, the British Phosphate Commission, acting for the manufacturers, met the position by purchasing from the most favourable sources of supply (including Florida, U.S.A., and Morocco) the large quantities of phosphate rock needed to meet the deficiency. These purchases were, of course, at a greater cost than Nauru and Ocean Islands phosphate, but, in order to avoid fluctuations in the prices of superphosphate due to varying prices for the raw material, the Commission agreed to distribute the extra cost of the needed outside supplies by increasing by a small amount per ton the selling-price for the year commencing on the 1st July, 1926, and making the sales on terms convenient to the purchasers.

Extensive improvements in the storage and shipping facilities at the islands are being arranged by the Commission with the object of reducing costs of production, increasing the output, and making possible speedier loading of vessels, and so utilizing to the utmost weather conditions favourable to the loading of ships. These works will take a number of years to effect, but when completed will enable the output to be greatly increased.

Staff.

Mr. J. Lyons, M.R.C.V.S., was appointed Director of the Live-stock Division in July of last year in succession to Mr. A. R. Young, whose retirement on superannuation was recorded in my report for 1924–25. Messrs. W. M. Singleton, J. A. Campbell, and A. H. Cockayne have continued as Directors of the Dairy, Horticulture, and Fields Divisions respectively. I must express my great appreciation of the good work done by the Divisional Directors and the officers under their control. The Department's work covers a wide field, and the calls upon the services of its officers are expanding to such an extent that administrative ability of a high standard has been called for in the Divisional Directors. They have proved fully capable of meeting all requirements, and with a good staff throughout in all Divisions good team-work has been done.

The Chemist, Mr. B. C. Aston, whose Section is directly attached to the Head Office, has, with his staff, rendered valuable service, as usual.

The editorial duties connected with the Department's various publication activities—the *New Zealand Journal of Agriculture* in particular—have again been efficiently carried out by Mr. R. H. Hooper, Editor.

The Assistant Director-General, Mr. F. S. Pope, has proved a valuable colleague at head-quarters. The Head Office staff generally has done very good work and has co-ordinated excellently with the divisional organizations.

C. J. Reakes, D.V.Sc., M.R.C.V.S.,
Director-General.

LIVE-STOCK DIVISION.

REPORT OF J. LYONS, M.R.C.V.S., DIRECTOR.

Stock Conditions generally.

While the winter of 1925 was a satisfactory one and stock came through it fairly well, the months which followed did not bring good spring conditions, making the season a late and a trying one. The absence of adequate supplies of food to meet adverse conditions such as those experienced was badly felt in all parts of the Dominion, and stock-owners, particularly dairy-farmers, should profit from the experience and endeavour in the future to save abundant feed to meet such contingencies. One of the great wants, to my mind, in the wintering of stock in New Zealand is the neglect to maintain them in proper condition throughout the winter months. The animals would easily repay their owners the extra care required, and in any case it is surely no more than is due to them. In these days when higher average returns are aimed at it is imperative that the animals be well cared for or the returns will not be realized, nor will constitution be maintained. What I have said applies equally to the care of the calf—the future member of the dairy herd—which is far from what it should be. Mention of this has become almost a hardy annual, but it is year by year becoming more necessary that the Department enter upon a crusade in the interests of one of the greatest producers of the wealth of the country.

Stock Diseases.

The stock of the Dominion have remained free of any of the more serious contagious diseases which exist in most other countries, and every precaution has been maintained in the direction of safeguarding the Dominion against any such catastrophe. Owing to the continued outbreaks of foot-and-mouth disease in England, the introduction of sheep and cattle from Great Britain and Ireland is still prohibited. The necessity for this is regretted, as it is well recognized that breeders must from time to time be able to introduce fresh blood in order that their flocks and herds may be maintained, but in a case like this the continuance of the prohibition has been the only safe course to follow.

The following are my comments in regard to the diseases to which stock in New Zealand are subject:—

Blackleg.—This disease is still confined to the Taranaki district and to a portion of the Auckland Province. Inoculation of calves in the latter district is only carried out in cases where the disease has been confirmed, but in Taranaki the practice has been to vaccinate independently of whether outbreaks have been reported. The number of calves vaccinated during the year in Taranaki was 32,389, being an increase of 3,128 on the previous year. In remarking on the matter, the District Superintendent, Wellington, makes the following comment, which I commend for consideration, as from the experience gained of the result of a similar policy in the Auckland District I am satisfied it is in the best interests of all concerned: "I think the time has arrived when a relaxation in the regulations dealing with this disease could very well be introduced in Taranaki, on similar lines to the procedure adopted in the Auckland District. The number of actual deaths reported as due to blackleg is very small compared with the volume of work entailed in general vaccination. No case of blackleg has occurred in the Hawera District for over three years. In this connection Inspector Ford, Hawera, remarks, 'The present attitude of the majority of farmers in regard to vaccination would seem to be that the time could be more profitably used at some other work than general vaccination of calves for the prevention of blackleg.'"

Contagious Mammitis.—This disease has again been prevalent in dairying districts, although it would not appear to have been so troublesome as in the past. It is reported as having appeared to some extent in Otago and Southland, but mostly in the dairy herds of Southland. The Canterbury - West Coast district is comparatively free from the contagious form, but cases of the non-contagious form of mammitis have been noted. In all dairying districts in the North Island the disease is more or less prevalent, but, as stated, not to the same extent as in the past. Proprietary vaccines have been used fairly freely throughout the dairying districts as a prophylactic, and the results are being carefully watched, not with a desire to condemn, but in order that we might ascertain if they have any value as a prophylactic against this disease. The Department is unable, up to the present, to report in favour of this form of treatment. In some herds where inoculation had been practised the owners claimed an improvement as a result, but as in some cases adjoining owners had had similar experiences without the use of vaccine the claim is not substantiated. The present position, then, appears to be that generally immunity has not been conferred, and results are far from indicating any conclusive evidence of the efficacy of the particular vaccines in question. The number of samples of milk received at the Department's Veterinary Laboratory for examination for contagious mammitis was 2,097, being an increase of 484 over the previous year. Of this number 1,178, or 56·2 per cent. were found to contain the specific organism. The increase in samples, no doubt, arose on account of a greater amount of publicity centred on this disease during the earlier part of the year and as a result of lectures and general advice by veterinary officers.

Tuberculosis.—The condemnations of cattle on clinical examination and as the result of the tuberculin test numbered 4,692, being a decrease on the previous year's figures of 189. The distribution of the stock condemned for this disease was as follows: Auckland, 2,852; Wellington, (including Taranaki and Hawke's Bay), 1,308; Canterbury - West Coast, 367; Otago - South-

land, 165. The use of the tuberculin test for diagnostic purposes was availed of to the number of 4,725 head of cattle. An analysis of the results of the examination of carcases on slaughter at freezing works and abattoirs during the year discloses a decrease of 0·35 per cent. in the number of cattle found affected with tubercular disease. The number of cattle (excluding calves) examined was 364,572, of which 18,770, or 5·16 per cent. were found to be affected in varying degrees, a considerable number only very slightly. In the case of swine, a decrease of 0·50 per cent. is disclosed. The number of swine examined was 366,269, of which 31,420, or 8·57 per cent were found to be affected in varying degrees, and, as in the case of cattle, a considerable number only slightly. These figures indicate that an improvement on the past year has taken place, which it is trusted will be maintained and improved on in the years to come. While this disease is responsible for considerable monetary loss to producers in this Dominion, it is nevertheless satisfactory to note that it is held in check by our system of inspection and condemnation of all the live animals showing symptoms of the disease, and also the free use of the tuberculin test for diagnostic purposes. As has been previously mentioned, bovine tuberculosis is most prevalent in low-lying wet or swampy areas, of which there are many in the Auckland Province, and until drainage and better conditions generally can be introduced to those areas the incidence of tuberculosis may be expected to continue.

Actinomycosis.—The number of condemnations for this disease throughout the Dominion was 754, being a decrease of 97 on the previous year. The condemnations were distributed as follows: Otago - Southland, 53; Canterbury - West Coast, 64; Wellington, 252; Auckland, 385. All districts, with the exception of Auckland, which showed an increase of 5, shared in the decrease. Treatment for this disease when detected in the early stages is still the policy of the Department in lieu of slaughter, and as a result numerous cases have recovered.

Contagious Abortion and Sterility.—These troubles are still responsible for a considerable loss to dairymen, although in the case of contagious abortion most districts report a marked decrease of actual abortions as having occurred. This is probably the effect of acquired immunity, which is a particular feature of this disease. In the case of sterility, however, the trouble is still prevalent, and has been more or less general. It is a problem calling for close investigation in the field and the laboratory, and during the year a large amount of special investigational work has taken place. This is being continued, and it is hoped that with closer study of the various genital affections now existing among the cows some solution of the problem will result. A number of veterinary officers have been concentrating on this disease in association with the laboratory staff. Officers have also been giving lectures throughout the dairying districts with a view to assisting farmers to deal with these troubles to the best advantage with the knowledge already gained.

Parasitic Diseases (Sheep and Calves).—A number of cases of parasitic gastritis were reported, particularly in sheep. No doubt this trouble was accentuated owing to the very wet spring following on a wet winter, as its prevalence is largely influenced by climatic conditions. Liver-fluke has again been found to be affecting sheep in Hawke's Bay to some extent, and a special form of treatment is being given a trial in this district.

Malignant Growths.—During the year 342 cattle were condemned by Inspectors for malignant growths, and in all cases where it was possible to do so specimens were taken and sent to the Veterinary Laboratory, where examination confirmed the diagnosis.

Opthalmia (Blindness in Sheep).—This trouble was noted in some districts, particularly in the West Coast district of the South Island and in the Nelson and Wanganui districts. Further investigational work is being carried out at the Laboratory in regard to this trouble.

Ante-partum Paralysis and Extrusion of the Vagina.—This trouble of breeding-ewes appeared in some districts, but only to a slight extent compared with some past years, this no doubt being due to the bare feed conditions generally prevailing at the dropping season.

Renal Congestion affecting Lambs.—This disease was reported as prevalent and causing some mortality in Central Otago, Oamaru, some parts of Southland, and Amberley, Christchurch, and South Canterbury districts. This trouble existed and was investigated twenty years ago, and was then pronounced to be a dietetic trouble, due to overrich and abundant diet. Subsequent observation has strengthened the opinion then formed. Arrangements will be made for the trouble to be further investigated during the coming spring, particularly in Central Otago, where the conditions are somewhat unusual.

Lice on Sheep.

Sheep affected with lice are still too numerous, and far too many prosecutions for exposing lice-infected sheep at sale-yards have had to be taken. It is the general opinion of the Inspectors in the various districts where this trouble is found that it is attributable not so much to a deficient dipping solution as to carelessness in both mixing and dipping. Inquiries from careful sheep-men confirm this, and indicate that where the directions of manufacturers of well-known dips on the market are followed no trouble is experienced. It is legally a punishable offence to expose sheep affected with lice for sale in a public saleyard, and as the presence of lice can be just as readily ascertained by the owner as by the Inspector who examines them at the yards, it is an unpardonable act of neglect on the owner's part not to take proper precautions to ensure that his sheep are free from lice before taking them to a sale. The Inspector has the power to order the withdrawal of the sheep from sale, and it is a question whether we should not adopt this practice generally with a view to seeing if any better results will ensue, in place of our present practice of allowing the sheep to be sold subject to immediate dipping, followed by a prosecution.

Cattle-tick.

Although the tick does not show any diminution within the A area, it does not show any tendency to spread within the area known as B, and may actually be said to have decreased or almost disappeared from some districts where it was previously found. This satisfactory position indicates that the policy of spraying cattle or otherwise destroying the ticks when they first make their appearance is a good one. In Waitara district the quarantine area had to be enlarged owing to some ticks having been found on a farm immediately outside the original area. Within the area quarantined a few ticks were found during the season, but the prospects for complete eradication are hopeful. During the year a dip was erected by the Department at Mohakatino, near the northern boundary of Taranaki, and all cattle proceeding south are required to be dipped. A dip has also been erected at Waitara by the combined efforts of the settlers concerned, and all cattle leaving the quarantined area are dipped, and all other possible precautions have been taken to prevent the spread of the tick.

"Bush Sickness," or Soil-deficiency.

The experimental work at Mamaku Farm has been continued during the year. The season was a trying one for stock, and consequently not altogether satisfactory from the point of view of progress made. The use of citrate of iron and ammonia by way of drenching, with the addition of molasses to the food (molasses contains iron), further confirmed the efficacy of this treatment for animals, both when showing premonitory symptoms and later, but the application of citrate of iron and ammnoia as a dressing to the hay during stacking has not yet demonstrated this method as offering any solution of the difficulty of finding a more practicable method of supplying the iron deficiency. Further work in this direction will be continued. Supplies of citrate of iron and ammonia have been made available for sale in small quantities to settlers throughout the affected district at landed cost, and arrangements have also been made for some top-dressing experiments on various properties where the same or somewhat similar trouble has been experienced. These small top-dressing demonstrations on land not previously coming under experimental top-dressing might afford valuable information in connection with this trouble, and it is considered advisable to extend the experiments somewhat.

The advice given in general may be summed up in the following instructions: Farm more highly; get the plough in; compact the soil; grow plenty of winter feed, and save plenty of hay. Subdivide into smaller paddocks and keep the feed eaten short. Top-dress with phosphates containing iron as frequently as is the practice in the Waikato. Treat the stock well, especially in the matter of water-supply. Use molasses freely in the feeding of stock, especially in rearing young stock. Regard molasses as a preventive, but not as a cure. When an animal once shows signs of going back owing to bush sickness give iron-ammonium citrate as supplied by the Mamaku Farm, and by the Stock Inspectors at Rotorua and Tauranga, at cost price to *bona fide* farmers. Buy any stock from districts remote from the pumice land and under conditions which ensure that they are free from disease or parasitic infection. The lack of the mineral elements is known to predispose an animal to other diseases and ailments, which when introduced on to a farm on sick country run a rapid course in the stock.

Hæmaturia.

A trouble affecting cattle which has been existent on an area of cleared and partially cleared land on the west coast of the South Island was made the subject of investigation late in the year by Mr. J. Kerrigan, M.R.C.V.S., District Superintendent, Christchurch, and is considered by him to be that form of chronic hæmaturia studied and described by Bowhill and Hadwen in British Columbia, and by other investigators on the Continent. The matter is being further gone into, and the examination of specimens from typical cases is being completed. A report on the matter will be prepared by Mr. Kerrigan and submitted for publication in the Department's *Journal*.

Live-stock Statistics.

Sheep.—The number of sheep as shown by the returns collected on 30th April, 1925, again indicated an improved position, an increase of 772,179 sheep being recorded, making the total 24,547,955. The most satisfactory feature in the return, as shown in the table hereunder is an increase of 639,126 in the number of breeding-ewes. As indicating the rapid change that is taking place to meet the altered conditions in regard to our export industry, it is interesting to note that since April, 1922, the increase in breeding-ewes has been 1,219,169, while the total increase under all headings is 2,325,696, of which 813,263 were lambs. The figures for the past five years are shown in the table hereunder:—

Year.	Stud and Flock Rams (Two Tooth and over).	Breeding-ewes.	Other Sheep.	Lambs.	Total.
1921	322,144	12,147,788	4,980,618	5,834,481	23,285,031
1922	322,072	12,496,054	3,687,672	5,716,461	22,222,259
1923	330,055	13,063,003	3,369,559	6,318,822	23,081,439
1924	322,814	13,076,097	3,853,482	6,513,386	23,775,776
1925	355,579	13,715,223	3,947,429	6,529,724	24,547,955

Cattle.—While the total number of cattle have decreased by 59,663, the number of dairy cows and heifers of two years of age and over have increased by 10,843. The following table shows the position under the respective classes, together with the previous four years :—

Year.	Bulls.	Dairy Cows.	Other Cattle.	Total.
1921	59,348	1,004,666	2,075,209	3,139,223
1922	59,086	1,137,055	2,127,082	3,323,223
1923	60,154	1,248,643	2,171,897	3,480,694
1924	58,934	1,312,589	2,192,074	3,563,497
1925	59,820	1,323,432	2,120,492	3,503,744

Swine.—An increase of 25,844 in swine has taken place, the total number as at January, 1925, being 440,125.

Horses.—Horses have again shown a decrease, the 1925 figures being 326,830, a decrease of 3,600.

Slaughter of Stock.

The slaughtering season opened late owing to the extremely backward spring experienced generally. Last season's prices for fat sheep and lambs were not maintained, and opening prices for this season showed a tendency to further drop. They have, however, been fairly well maintained on a payable basis. Cattle-slaughterings have decreased owing to the low prices offering in the export market. Sheep-slaughterings also have decreased, but increased slaughterings of lambs more than made up for this deficiency.

The following table shows the stock slaughtered at freezing establishments alone during the year, with the previous year's figures shown also :—

Stock.	Year ended 31st March, 1926.	Year ended 31st March, 1925.	Increase.	Decrease.
Cattle	206,904	247,883	..	40,979
Sheep	2,292,257	2,564,530	..	272,273
Lambs	5,055,245	4,832,493	222,752	..
Calves	31,358	22,775	8,583	..
Swine	159,852	142,168	17,684	..

For purposes of comparison the following table shows the killings of sheep and lambs over four periods—1st October to 31st March in each year—as indicative of the slaughterings from the beginning of each season to 31st March :—

Stock.	1922–23.	1923–24.	1924–25.	1925–26.
Sheep	1,244,490	1,462,128	1,821,901	1,654,489
Lambs	3,128,415	3,492,004	3,360,761	3,574,508

These figures show a decreased slaughtering of sheep of 167,412 for the period 1st October, 1925, to 31st March, 1926, compared with the same period of 1924–25, but an increase in lambs of 213,747 more than balances the aggregate figures.

The following are the numbers of each class of animal slaughtered under direct inspection during the year ended 31st March, 1926 :—

Cattle	364,572
Calves	74,600
Sheep	2,804,772
Lambs	5,140,443
Swine	329,990

The following table indicates the respective class of premises at which these animals were slaughtered :—

Stock.	Abattoirs.	Meat-export Slaughterhouses.	Bacon-factories.
Cattle	157,668	206,904	..
Calves	43,242	31,358	..
Sheep	512,515	2,292,257	..
Lambs	85,198	5,055,245	..
Swine	127,216	159,852	42,922

At ordinary slaughterhouses for the year ended 31st March, 1926 the stock slaughtered was as follows: —

Cattle	93,259
Calves	2,670
Sheep	221,355
Lambs	20,498
Swine	28,349

In addition, 36,279 carcases of pork killed and dressed by farmers and sent into butchers' shops were examined by departmental officers.

In connection with animals shown in the table as slaughtered at meat-export slaughterhouses, the following numbers of the respective classes are returned as having gone into consumption within the Dominion: Cattle, 40,178; calves, 7,620; sheep, 139,513; lambs, 56,021; swine, 19,081.

Compensation paid for Stock and Meat condemned.

Compensation to the amount of £16,212 was paid out during the year for 5,747 animals condemned in the field for diseases under the Stock Act, and £14,671 for carcases or parts of carcases condemned for disease on examination at time of slaughter at abattoirs and meat-export slaughterhouses, &c., under the provisions of the Slaughtering and Inspection Act.

Importation of Stud Stock from Abroad.

Consequent on the continued prevalence of foot-and-mouth disease in England, the prohibition placed on cattle, sheep, and swine from Great Britain has remained.

Some swine for stud purposes, also sheep, have been introduced from those Australian States from which the importation is permitted, and some Jersey cattle from the United States of America, after having been domiciled for some months in the Dominion of Canada, arrived and are undergoing the required quarantine period. A number of horses (thoroughbreds and Clydesdales) were imported from Great Britain, and as an extra precaution against the possible introduction of foot-and-mouth disease they were all subjected to a period of quarantine. The introduction of dogs from the British Isles was considerably heavier than has been the case for some years, 154 animals of various breeds having arrived and gone into quarantine during the year.

The following is a summary of the various classes of animals which were entered into quarantine during the year: Horses, 31; cattle, 15; swine, 38; sheep, 17; dogs, 154; fowls, 6.

Exportation of Stud Stock.

The exportation of stud stock from New Zealand has for some time back been looked upon as offering great possibilities, and it is satisfactory to record that during the year a very considerable advance was made in this direction, particularly in the export of stud sheep. Climatic conditions in this country are ideal for the breeding of stud stock of good hardy constitution, and there is every reason to believe that New Zealand will, as time progresses, develop the exportation of stud stock greatly. It is, however, imperative that in building up an export business in this direction the utmost care be taken in the class of stock exported, and breeders' associations must continue to ensure that their regulations as to inspection for entry in the stud-book and for conformation, quality, &c., are strictly carried out.

The following are the numbers of stock exported for stud purposes during the year: Sheep, 2,692; cattle, 130; pigs, 10. Of the sheep exported, 353 were for the Falkland Islands, this being indirectly the result of the New Zealand Government having loaned to the Falkland Islands Administration the services of Mr. H. Munro of this Department to report on the position of the sheep industry there. The sheep sent were well chosen and should bring about a marked improvement in the flocks of the islands.

Destruction of the Kea.

The subsidy of 5s. per beak paid for the destruction of the kea totalled £974 5s., equal to 3,897 birds.

Inspection of Dairy Premises supplying Milk for Direct Consumption.

The inspection of dairy farms (premises and herds) supplying milk for direct consumption has been carried out throughout the year with energy, and in the majority of cases the position is quite satisfactory. Constant supervision is, however, necessary in order that the standard achieved may be maintained and improved where necessary. Special attention is given to the cleanliness of the premises, the methods of handling, and the cooling of the milk. A careful clinical examination of the cows is carried out, and any showing evidence of disease are destroyed; also suspicious cases are tested for tuberculosis, and if reaction occurs they, too, are destroyed. Numbers of composite samples of milk are also collected and forwarded to the Veterinary Laboratory for T.B. examination. By these methods the elimination of diseased animals is attained. The work entailed in this inspection is very considerable, requiring, particularly in the chief centres, uninterrupted attention. The chief difficulty met with in dairy inspection is in regard to premises held on short terms of lease, and when the improvements required necessitate an expenditure which the lessee is unable to undertake for the remaining term of his lease. In a number of such cases owners have given assistance in having improvements required carried out, but nevertheless the difficulty is still considerable.

In regard to a clean milk-supply the human element counts for a great deal, as, given the most up-to-date premises imaginable, if cleanliness is not maintained a first-grade milk cannot be produced.

Milking-machines have of late come into extensive use in dairies supplying milk for human consumption, and failure to regularly clean these machines after use is a source of considerable trouble. This is a matter which should be remedied. The regulations under which inspection of local milk-supplies is carried out are not sufficient to meet the position in regard to this, and consideration is being given to an addition to them.

The number of dairies registered during the year for the supply of milk for direct consumption was 4,194.

Importation of Animal-manures.

The importation from Australia and India of animal-manures sterilized under supervision did not for various reasons come up to expectations. Considerable difficulty is still experienced in obtaining freight to New Zealand for even small consignments, and in addition the seamen's and railway strike in Australia hampered, and at times entirely suspended, business in this direction with New Zealand.

The organization in regard to the supervision of the sterilization of animal-manures from India and Australia has been maintained, but it is a matter for consideration whether, in view of the limited imports to New Zealand of animal-manures, we should not now withdraw our organization from one at least of these countries and so confine the source of supply to one place.

Poultry Industry.

The poultry industry, owing largely to the high cost of foodstuffs which ruled, has not shown the progress looked for. Although a number of the more recently established plants ceased activities, some of the older plants concentrated on the production of a greater number of pullets, and it is anticipated that during the coming season the export of eggs should show a considerable advance on previous years. This is an industry admirably suited to the farm as a side line, and could be made to add considerably to the yearly income if intelligently managed.

The following is the report of the Chief Poultry Instructor:—

With the shortage of wheat-supplies and the consequent high prices charged for it the poultry industry during the past year has received a severe check. The higher cost of production has had a marked effect on plants where the modern type of bird was not kept, and where modern methods of management were not adopted. Although food-prices have been high, the prices of eggs have also ruled at a high level. Thus on plants where only highly selected stock have been kept, and where these have been properly fed and managed, the owners report a profitable year. Indeed, some of the noted poultrymen of long standing declare it to have been one of their best years.

A gratifying feature at the present time in connection with the industry is the increasing number of large plants established throughout the country, and which are proving profitable undertakings to their owners. A few years ago large commercial plants were few and far between. Now there are many, ranging from 600 to 1,000 bird-capacity, while in some cases plants are carrying upwards of 3,000 laying-birds. The advance made in this connection is almost entirely due to the improved type of laying-bird now available, and the advanced knowledge relative to the breeding, housing, feeding, and general management of poultry.

While there is ample room for the extension of large commercial plants, the industry holds out the greatest promise to the side-line poultry-keeper, especially to the small settler on the land. At the present time there are few farms in the Dominion where poultry are not kept on a moderate scale, but, unfortunately, in the majority of cases improvement is required both in regard to the quality of the stock and their management. It is a matter for regret that more farmers do not avail themselves of the free practical advice and assistance which is available to them by medium of the Poultry Instructors, and printed matter issued by the Department at a minimum of cost.

There is little need to fear that egg-production in particular can be overdone in the Dominion. There is always a keen demand for fresh eggs on the local market, while any surplus can normally be exported at payable prices to the producer. Unfortunately, owing to the shipping strike that took place last spring no eggs could be exported in the year under review. Many cases which were packed and ready to be shipped had to be diverted to the local market. It is satisfactory to note that there is ample egg-pulp in the freezing-chambers for use of large consumers in the scarce season of supply. This is evidenced by the fact that on 31st March last there were over 100 tons more pulp in store than on the corresponding day last year. In view of this it is safe to assume that there will be an excess of pulp beyond requirements for winter use. In all probability it will represent eggs in shell totalling 5,000 cases of 30 dozen each which could have been exported last season had shipping been in a normal state.

At the New Zealand and South Seas Exhibition comprehensive exhibits relative to all branches connected with poultry-keeping were made. The object aimed at was to demonstrate to poultry-keepers, particularly the women-folk on the ordinary farm, modern methods of poultry-management. This was achieved to a high degree, as during the term of the Exhibition thousands of interested persons took advantage of the outstanding educational facilities which were made available to them.

The decision to establish an experimental and breeding station in the Hutt Valley, near Wellington, will undoubtedly prove of great value in widening the knowledge of the Poultry Instructors, which in turn will be passed on for the benefit of producers and the industry generally.

During the year the instructional staff have been kept busy, chiefly in assisting producers through the medium of lectures, demonstrations, and visiting plants both large and small, and giving practical advice and assistance on the spot.

Veterinary Laboratory.

The work at the Veterinary Laboratory at Wallaceville has been carried out during the year with increased activity, and a considerable amount of useful and valuable work has been recorded, particularly in connection with such troubles as contagious mammitis, contagious abortion, and sterility in dairy cows. These diseases present difficulties which have baffled investigators not only in New Zealand but throughout the world, and if a solution is to be found for them it can only be by continued and determined efforts.

The following constitutes a summary of the year's operation by the Officer in Charge, Mr. C. S. M. Hopkirk, B.V. Sc. (Melbourne):—

During the year under review 3,513 specimens were examined, the number for the previous year being 2,649. The increase has been an all-round one, and has been due, I believe, to an increased feeling of confidence in the efforts of the Laboratory staff, rather than to an increase in disease. As more specimens have been forwarded, just so has the educational value of the Laboratory been advanced.

ROUTINE WORK.

Milk-samples for Examination for Contagious Mammitis.—2,097 separate milk-samples were examined microscopically and in many cases culturally. This total showed an increase of 484 over the previous year. 1,178, or 56·2 per cent. were found to contain the organism of contagious mammitis. From field reports there has been a better season as regards mammitis owing to the dry summer and reduced milk-output. It is satisfactory to note that the majority of farmers who send in samples are ready to keep on sending them so long as they have trouble in their herds or whenever mammitis reappears. Reference to experimental and cultural work on contagious mammitis is made later in this report.

Composite Milk-samples for Biological Examination for Tuberculosis.—190 samples in all were received, a decrease of 90 over the previous year, due to the lack of guinea-pigs, which were unprocurable. No cases were positive.

Blood-samples examined for Contagious Abortion.—During the year 740 were received, an increase of 411 samples over the previous year. In the majority of cases these samples were forwarded by the officers of this Division, only a few having been sent in by the stock-owners. 397 samples, or 53·6 per cent., gave a positive reaction, the remainder being negative. Out of the total, 94 samples were from bulls, 9 of these, or 10 per cent, gave a positive reaction.

Tumours from Stock.—Specimens from 126 tumours were received, which on miscroscopical examination proved in the majority of cases to be epitheliomata. This served to confirm the diagnoses made by the Inspectors in the field previous to the animals being slaughtered. The principal sites from which the tumours were taken were the eye, vulva, and brand area. All breeds of cattle contributed to the number.

Disinfectants.—Seven solutions were given a bacteriological examination for bactericidal properties on account of the Stores Control Board. It was found that disinfectant solutions had a much greater action on bacteria than did sheep-dips, which are in very general use for purposes of disinfecting.

Specimens from Stock.—A number of other specimens from stock have been received, largely as a result of *post mortem* examination by field officers. Many of these are of interest, and are useful as a means of keeping in touch with disease in the country. Such specimens give rise very often to interesting laboratory-work, and results of examinations are of educational value to the senders of the specimens. Figures are approximately as follows: Cattle, 145 (89 of these from cases of sterility or abortion); sheep, 33; pigs, 20; horses, 3; dogs, 7; poultry, 17.

Parasites demonstrated in Stock.—As a list of parasites—both endo and ecto—has not been compiled for New Zealand domestic animals, the following identified during the year will help towards a later compilation:—

Sheep.—	*Fannia canicularis* larvæ	Matted wool round anus.
	Oestrus ovis larvæ	Nasal cavity.
	Haemotopinus pedalis	Legs.
	Paramphystimum larvæ	Stomach and intestines.
	Cysticercus ovis	Diaphragm.
	Echinococcus polymorphus	Liver (cysts).
	Oesophagostomum columbianum larvæ and adult	Intestines.
	Chabertia ovina	,,
	Nemotodirus filicollis	,,
	Trichostrongylus retortaeformis	,,
	Bunostomum trigonocephalum	,,
	Ostertagia circumcinta	Stomach.
	Haemonochus contortus	,,
	Dictyocaulus filaria	Lung.
Cattle.—	*Oesophagostomum radiatum* larvæ	Intestines.
	Haemaphysalis bispinosa	Udder.
Pigs.—	*Demodex folliculorum*	Skin.
	Cysticercus tenuicollis	Peritoneum, liver massive infection.
Poultry.—	*Laminosioptes cysticola*	Fowl.

Dairy Division.—Work has been done, where possible, for the Dairy Division pending completion of their factory and laboratory. Eleven samples of water have been given bacteriological examination, while eight other samples of cheese, butter, and starters have also been examined.

Specimens of Interest (many resulting in Experimental Work).—Reports of the following have all been supplied at the end of examination of procurable specimens:—

Sheep: Mortality in sheep at Pukeratahi. Mastitis in ewes due to micrococcus of rivolta. Foot lesions in two-tooth rams. Ophthalmia in sheep. Mortality in sheep, Tuturau.

Cattle: Calf diphtheria. Examination of liver and kidney in icteric carcases. This condition, from the history of cases and specimens received, appearing to be due to ragwort poisoning in both cattle and sheep. Septic metritis, so-called, in cattle.

Pigs: Several cases of pasteurellosis have come in from the Manawatu district for confirmation.

Poultry: An outbreak of suspicious fowl-cholera not quite typical but of sufficient virulence to kill a number of fowls on the poultry-farm at Lower Hutt was investigated in December, 1925. Specimens of ducklings which had died as the result of toxæmia from bacilli of the dysentry group were investigated.

RESEARCH WORK.

Tuberculosis.—Two curative methods have been tried: (1.) Injection of sodium morrhuate; 0·3 per cent. solution in doses of 8 cc. to 10 cc. Sodium-morrhuate treatment was attempted on account of good results said to have been obtained in human therapy. One cow was given injections, but although the treatment seemed to be palliative, when such treatment was stopped the cow again became emaciated. It was felt that injections of this material might be useful to prevent further invasion of the disease in cows of value or pedigreed bulls. No fibrous capsules were formed round existing lesions, and active tubercular lesions were obtained from a guinea-pig inoculated with tubercular pus from the cow. (2.) Injection of increasing doses of tuberculin-adrenalin aa. This treatment was given on account of the reported good results in cattle, the theory being that the tuberculin was held locally by adrenalin and acted as a tubercular focus in causing production of immune bodies. Adrenalin also is deficient in animals suffering from chronic diseases. Practically this treatment gave palliative results in one cow, but a second had to be slaughtered before the end of the experiment. Slaughter of the first cow showed no encapsulation, and pus from lesions caused tuberculosis in the guinea-pig inoculated. Following a description of Guerin and Calmette's vaccination methods for elimination of T.B. in cattle herds, a culture is to be grown on bile media with a view to immunizing New Zealand cattle in the future.

Tuberculin Testing.—Following a report on intradermal testing of cattle, published by the Medical Research Council, advantage was taken of the presence of a number of cattle on the farm to try out tuberculin tests as far as possible with material to hand. It was found that: 1. Intradermal testing had no advantages in accuracy over the usual subcutaneous method. 2. That the time employed in carrying out the double test made the test impracticable in the field. 3. The test could not be employed easily in the modern bail. 4. The usual caudal fold test was more easily applied and gave results just as reliable. 5. Experience was required to read an intradermal test. 6. Sloughing or serous leaking through the skin occurred often at the seat of inoculation. 7. Intradermal reactions were not decisive when given too closely together as regards time. In this it was as unreliable as the subcutaneous method. The Calmette opthalmic method was found to be quite as reliable as other methods, and also had the advantage that it would give results even after several inoculations by other methods. The experiment suggested the wisdom of using more than one test in doubtful cases of tuberculosis.

Mammitis in Cows.—The year has been a busy one in connection with mammitis, and although we are no further forward as regards curative methods of treatment, yet we feel that laboratory and routine work is slowly giving us more concrete ideas on the etiology of the disease. A number of milk-samples received at the Laboratory have been put on culture media, with a result that there appear to be three species of streptococci involved in mastitis, setting up varying degrees of inflammation. The cases which continue throughout the season appear to be directly due to *Strep. mastitidis*, while those due to *Strep. lactis* and *Strep. bovis* types are of shorter duration, and often fail to produce very great changes in the udder-tissue in the milk. In such cases the cow throws off the disease in a few days and returns to full milk. It is in such outbreaks that a vaccine has *apparently* given splendid results. Much more work must be carried out for one to be quite sure of this opinion. In part-confirmation, however, of this view is the small suggestive experiment where *Strep. lactis* was inoculated into the udder of a cow, and on the first subinoculation failed to produce more than a mild inflammation. Culture and experimental work combined have shown, too, that staphylococci, which at one time were supposed to be frequent causal organisms, appear very often in large numbers following streptococci infection, and although they may possibly help to prolong the condition they do not often cause acute inflammation. It was found possible by using the agglutination test on sera from diseased cows to get reliable positive or negative results by that method. This test had to be modified to some extent to suit the streptococcus. Several methods of treatment have been tried during the year. Trials of both the Hamilton Company's and Armitage's vaccine for prevention of *Strep. mastitidis* were made. Briefly, the materials were found to convey practically no immunity towards *Strep. mastitidis*.

Sterility in Cattle.—Work has lain mostly in continued observation of herds known to be affected with abortion, granular vaginitis, or temporary sterility; in watching the result of herds feeding on calcium phosphate; and in the use of vaccines, both live and dead. This latter has been carried out only on a very small scale, because of the necessity for suitable conditions in the herds used. An experiment is in course of construction at the Laboratory to see whether (1) it is possible to build up an absolutely free herd from the affected herd; (2) abortion-free herds have the same amount of temporary sterility as affected herds.

Wool.

The wool-clip was to some extent affected by weather conditions during the latter part of the winter and throughout the spring months, but was on the whole in fair condition. Growers are paying more attention to the marketing of their wool, and complaints are less frequent. Much improvement, however, remains to be effected, and with lower prices ruling it behoves growers to pay every attention to the skirting and classing of their wool. Another point where attention is necessary is the effecting of improvement in the quality of the wool by careful selection of rams to run with the flocks. The selection of the ram from the point of view of the wool has far-reaching effects, as a badly woolled ram works ruin in any flock, whereas the right ram properly selected with regard to the purity of its wool will quickly repay for any extra price paid for it. Examination of ram-wool specimens microscopically has been carried out during the year, and reports have been supplied for the information of the owners. This work will be continued.

Prices obtained for the last clip showed a very decided drop on those of the previous season, and although some slight improvement took place the average price obtained throughout the season showed a drop of about 8d. per pound, the average recorded being slightly under 12d., as against 19·95d., in the preceding season, which constituted a record.

A further increase in the quantity of wool actually sold at local sales took place, the number of bales sold being 471,583, as against 450,587 for last season. The quantity of wool exported for the twelve months ending 31st March last was 606,660 bales, of a value of £13,284,232, as against 553,828 bales, valued at £17,379,249, for the preceding twelve months.

The services of the Department's Wool Instructor (Mr. J. G. Cook) were freely availed of throughout the year, and the very comprehensive wool exhibit at this Department's Court at the New Zealand and South Seas Exhibition held at Dunedin, which was prepared by him, created very favourable comment and provided a very valuable instructional exhibit.

Swine Husbandry.

The pork and bacon industry does not show very much change, although there is an increasing interest shown in the raising of pigs for the market. The number of pigs in the Dominion for 1925 showed an increase of 25,844 over the previous year. Exports continue on a small scale, but the quantity is insufficient and not advancing as it should. It is admitted that the high price of supplementary foodstuffs has had a deterrent effect on the industry, and that while dairy-produce, meat, and wool remained at a highly payable figure the pork industry was neglected, but in view of the present position this industry could be made to materially help fill the deficiency in the annual value of the exports.

The Department's Instructor in Swine Husbandry has been active during the past few years keeping the pig prominently before the eye of the farmer by means of articles, lectures, &c., and we know from report and through personal contact with the importer in Great Britain that New Zealand's output is sought after and would meet with a steady and sure demand.

The following extract from the letter of a correspondent in London is of interest in this connection: "Just a few words regarding the opinion in this country of the quality of the frozen pigs that we are shipping from New Zealand. I am glad to be able to say that comments are very favourable, not only from the Inspectors of the sanitary authorities, but also from shippers, and from bacon-curers, who are gradually becoming accustomed to handle this class of pork. I feel sure that if our dairy-folks will pay attention to the quality of the pigs which they ship to this country, topping the animals off well, and developing regular supplies on home markets, it will prove to be a very valuable method of using at least some of the by-products of our dairying in the Dominion. Another reason why it is worthy of the earnest attention of the farmers in New Zealand is the fact that, in view of the probable restriction of the use of boric in bacon, this will seriously affect the green ham and bacon trade as between the United States and this country. Now is the time for our farmers to get busy with their frozen-pig-export trade and get ahead of the other fellow."

Rabbit Nuisance.

Efforts towards the destruction of rabbits have been waged with unabated energy, but notwithstanding all the efforts put forth and the seemingly satisfactory position attained at the end of winter, the young rabbits again quickly show themselves, and the fight continues as an ever-recurring struggle. In spite, however, of the difficulties encountered we are able to report a considerable reduction in the pest as compared with the previous year. The very wet, cold season during the spring and early summer assisted considerably in the attainment of this, particularly in the Otago-Southland district, by drowning large numbers of young rabbits. Apart from this, however, the winter and spring months were not suitable for rabbit-destruction by means of poison, and very energetic measures had to be taken during the summer and autumn months to keep the rabbits in check.

Rabbit Boards continue, with few exceptions, to do admirable work, and the condition of the pest in the North Island, where considerable areas are now controlled by Boards, continues to be satisfactory, demonstrating that rabbits can be effectively controlled when the co-operative spirit is dominant.

Following are extracts from the reports of the District Superintendents at Dunedin, Christchurch, Wellington, and Auckland respectively in regard to the condition of their respective districts:—

District Superintendent, Dunedin.

Although the 1925 season may show an increase in the export of skins this was to be expected. The pest was recognized to be decidedly numerous throughout Otago and Southland for that year, and an increase was admitted. I am pleased to be able to report that there has apparently been a decided improvement right throughout the season, although I do not claim that this has been brought about by the nature or amount of work done. On the contrary, it is solely owing to the abnormal wet, cold season (spring and summer principally) that thousands of young rabbits were drowned. As a matter of fact a great deal less pollard poisoning appears to have been done, as the Department records for the year show a falling-off in sales of 37,736 lb., and a 1,000 lb. increase on phosphorized-oats sales, and an increase of only 867 oz. of strychnine. No doubt a great deal more of the latter commodity would have been disposed of had our supplies not become exhausted at the time of the year when most in demand. On the other hand, this was met by outside vendors of strychnine at slightly advanced rates in most instances, therefore the position did not affect results generally.

For effective fumigating results, especially in large warrens, in my opinion, nothing equals the smoke fumigator, and there are now three makers of these machines operating in Otago and Southland. All makes give excellent results if properly handled, while the cost of smoking-material is very small.

The adjournment of rabbit prosecutions by certain Magistrates and the smallness of the fines generally is still proving detrimental to good work.

There is nothing fresh to report so far as the methods of control are concerned. The same position applies. Many landowners will not pay for spring and summer work, and they merely mark time until the professional rabbiters come along in the autumn, who in turn do just sufficient to hold their block for winter-skin high prices.

The Rabbit Boards, four in number, show little or no improvement generally over previous years' operations.

District Superintendent, Christchurch.

The climatic conditions during last winter were the worst experienced for many years. Wet weather set in about the end of April and continued right throughout the winter and spring, making successful poisonings practically impossible. During the previous winter, owing to the exceptionally favourable conditions, settlers were enabled to go over the ground a second and in some cases a third time. During last winter they had the greatest difficulty in getting over the ground once. Large gangs had to stand by idle for weeks on end, and enormous quantities of poison were completely spoilt. So although farmers, and especially large runholders, expended large sums of money results were unsatisfactory. As a consequence Inspectors had to urge owners to carry on destruction work right through the summer and autumn. I am pleased to state that with the exception of those who are in extreme financial difficulties settlers complied exceedingly well with the Inspectors notices and requests. I am also pleased to report that with the exception of a few isolated areas the district reports indicate a reduction in the number of rabbits as compared with last year. This is no doubt due to the energetic steps taken early this autumn—the weather being favourable, large areas were poisoned early in March.

Strychnine and carrots and strychnine and oats are now the principal means adopted during the winter and early spring months. Phosphorized pollard was used extensively in some districts early in the autumn, but, unfortunately, the results were more or less of a failure, with the exception of a few areas where rabbits had not been disturbed during the summer. During the summer trapping, dogging, shooting, and digging out of burrows and stops were the chief methods of destruction adopted. In the Kaikoura and Rotherham districts fumigating with either carbon bisulphide or calcium cyanide has been resorted to on a fairly extensive scale with very satisfactory results. As a consequence I fully expect to see these methods carried out on a much larger scale next season. A considerable amount of trapping is still being carried out in localities adjacent to the railways—the carcases being sent to Christchurch and other towns for retail in shops. Inspectors report, however, that this season the catches are very small. The natural enemy seems to be on the increase—ferrets especially are increasing rapidly in North Canterbury and Kaikoura.

During the year approximately 42,500 lb. of phosphorized pollard and over 2,000 oz. of strychnine were distributed from the Department's depots.

All Inspectors have made special efforts to get the settlers to take united action towards keeping the pest in check during the breeding season, and I am pleased to be able to state that farmers generally are taking a keener interest in the rabbit-pest question and are now more inclined to co-operate with the Department in this matter.

District Superintendent, Wellington.

There are now 20 Rabbit Boards constituted in this district, 4 under Part II and 16 under Part III of the Act. Three of the Boards have only recently been constituted and have yet to prove their worth, but the remaining 17 have, almost without exception, shown a substantial reduction in the numbers of the pest during the course of the year in the areas under their control. One Board in particular has had a particularly hard row to hoe, and the results in its case are not so pronounced as could be wished for, but there is no cause for worry, as it is expected that much better results will be shown before long.

Rabbits throughout the district, including areas administered by this Department and by Rabbit Boards, are decidedly on the decrease, as good work has been done throughout the year. The principal means of destruction have been systematic poisoning, fumigation of burrows, digging of holes and warrens, and in some localities trapping. The latter method is not favoured by the departmental officers, but cannot be put a stop to, unfortunately. Rabbiters using this method of destruction usually leave a large percentage of the rabbits uncaught, and these quickly produce a plentiful supply to fill the place of those trapped.

The principal poisons used are strychnined carrots and phosphorized pollard and grain. The former has gained much in popularity here during the past two seasons and is now the principal poison for winter use. Only one prosecution was found necessary during the year by our Inspectors, and prosecutions instituted by Rabbit Boards' Inspectors have also largely decreased. Rabbits in Taranaki have been well controlled during the year, and it is hoped the newly constituted Whangamomona Board will effectually eradicate them.

In many portions of this district the natural enemy plays a large part in keeping the rabbits well in check, and in spite of all arguments to the contrary I consider the lifting of the protection on stoats, weasels, &c., should not be considered.

District Superintendent, Auckland.

Notwithstanding the effort put forth, and work executed per medium of poison operations with phosphorized pollard and strychnine in the autumn of 1925, and the use of carbon bisulphide and other fumigants in the late winter of the same year, the recrudescence that is customary again appeared in 1926 with the advent of a spring that was delayed in its coming. It is pleasing, however, to be able to record that throughout the province as a whole this seasonal recrudescence was much less in degree than in the previous year.

Although there is a great deal of country by nature fitted, or by its state of undevelopment made suitable, *par excellence*, as a home and breeding location for the rabbit, whereon repressive measures are difficult and costly and result in partial achievement only of the aim in view when the amount of time and money expended and the labour involved is considered, yet, nevertheless, even in such country improvement is apparent—an improvement that is pronounced in all areas throughout the province, particularly so in many localities that previously carried a considerable rabbit population. Despite this further progressive reduction it must not be inferred that the rabbit is done with, for there are still localities where it is in existence in some number, such as partly drained swamp areas, river-flats, and warm broken and partly cleared bush-clad land, which affords plentiful cover. The infestation is now patchy only in many localities, and throughout large stretches of the poorer lands rabbits are sparsely scattered. In the northern peninsula, although reports indicate their presence, they are in no part numerous, and their destruction and limitation of spread have received the close attention and supervision of the departmental officers there.

The methods of control adopted, followed on the lines of the customary poisonings with phosphorized pollard and strychnine, and the use of fumigants, ferrets, and the spade in warrened country, and dogs in the open. Territory in the administrative control of Rabbit Boards has been well dealt with during the year, and in the main most excellent work has resulted from the operations of these local authorities in the areas within their jurisdiction. The system of local-body administration has been further extended in the province during the year by the creation of additional Boards under Part III as well as Part IV of the Act.

The sales of phosphorized pollard from the Frankton Junction depot show a decrease for the year ended 31st March, 1926, of approximately 33 tons over the previous annual period. The following comparative figures represent the location of deliveries :—

	1925.	1926.
Used in Auckland Province	49 tons	26 tons.
Despatched to Wellington District	29 „	19 „

The carbon-bisulphide sales approximated 1,400 gallons.

Strychnine was used to a much greater extent than formerly during the late autumn, winter, and early spring months, and the increase in the use of this lethal agent, together with lesser infestation by reason of the progressive improvement in the condition of the country generally, has in marked degree affected the depot output of phosphorized pollard. At least this is the case in so far as sales of phosphorized materials for use in Auckland Province is concerned.

Noxious Weeds.

The administration of the Noxious Weeds Act constitutes one of the most difficult problems which the Department has to deal with. Conditions of settlement in New Zealand where large tracts of land of poor quality exist, occupied and unoccupied, all more or less weed-infested, create an extremely difficult proposition when it comes to dealing with the noxious weeds. Abandoned settlement land is also a source of considerable trouble. All that is possible is to require a reasonable amount of work to keep the weeds in check, but even this is beyond the earning-capacity of such land.

Blackberry, in addition to being the most prevalent of the weeds to deal with, is also the most difficult. Few districts are exempt from its ramifications, and the class of country on which it obtains a hold is such that control with our present knowledge seems next door to impossible. On improved lands considerable work has been carried out, but continued work is necessary to attain anything of a permanent improvement, as any slackness means the loss of former labour.

Ragwort is also a prominent weed, and during the past year it appeared to be more prevalent, no doubt due to favourable seasonal conditions. Much control work in regard to it was done, but it is admittedly difficult to do all that is required.

The work of Inspectors under the Act is by no means an enviable one, and they deserve the whole-hearted sympathetic co-operation of settlers in this respect. The Act requires amending in some directions, and the question of making provision for Noxious Weeds Boards is another matter requiring careful consideration. Certain recommendations in regard to these provisions arising out of a conference of the principal officers of the Division have been made.

Shearers' Accommodation.

The inspection of shearers' accommodation under the Shearers' Accommodation Act, 1919, has been continued during the year, and a systematic inspection of all premises coming under the provisions of the Act is being accomplished. Where improvements are required the owners are requested to have them carried out, and little difficulty is experienced in this respect. Some sheds provide excellent accommodation, while some certainly give cause for complaint, but the latter are in the minority, and when the position has been fully surveyed cause for complaint should grow less. Regulations under the Act are being brought down by the Department of Labour, for whom the work of inspection is carried out by officers of this Department.

DAIRY DIVISION.

REPORT OF W. M. SINGLETON, DIRECTOR.

The Season.

Not for many years, fortunately, has such an unfavourable dairying season been experienced throughout the Dominion as that of 1925–26. The winter, although comparatively mild in most dairying districts, was followed by a cold, bleak spring, and there was very little growth of grass until late October. Dry weather prevailed during summer and autumn in a number of districts, notably North Auckland, Wairarapa, Hawke's Bay, and Marlborough, and with the exception of Otago and Southland there has not been that "flush" of pastures to ensure a maximum production of butterfat.

Hay crops generally have been poor, and although the provision of green crops is being given some attention much more could be done towards providing sufficient winter food to ensure dairy cows entering on their lactation period in good condition.

Production.

The high-record production of the preceding year has not been maintained during the year under review. Unfavourable weather conditions, together with some reversion to sheep-grazing, have been the influencing factors in this direction. Many dairy-farmers, however, are assuredly recognizing the necessity of increasing the productive capacity of their farms by giving more attention to the top-dressing of their pastures with artificial fertilizers, together with the breeding of a higher-producing type of dairy cow.

Quality of Butter.

It is pleasing to state that the quality of butter this season has been well maintained, and that a fairly large number of dairy companies have evidenced considerable improvement. This improvement has been particularly noticeable with companies which have appointed a farm dairy instructor and have adopted cream-grading and payment according to grade. Improvement has also been influenced by the increase of the minimum points for first-grade butter from 88 to 90 points.

Probably during no season has more attention been given to the neutralization of the acidity in cream for buttermaking. Less neutralizing agent has been used, and fewer complaints have been received from the United Kingdom in reference to that objectionable flavour described as "preservative." The body and texture of butter continues to be uniform, and moisture is evenly incorporated. As a means to improving the quality of our butters the Dairy Produce Control Board is offering prizes to dairy companies which have made the most improvement in their average grade for this season over that of the previous year.

Although the quality of butter has evidenced improvement in New Zealand it would appear that the prestige of our butter has not been enhanced in the United Kingdom. It is known that too much of our butter is held for protracted periods by owners who await a higher range of prices. Such butter loses its "freshness," and in other cases it develops a "staleness" which is not appreciated. We have various reports on butters manufactured about a year prior to inspection in the United Kingdom. A system which will reduce these delays in our butter getting to the consumer is very much to be desired.

Foreign Timber for Butter-boxes and Cheese-crates.

During the year a number of dairy companies used foreign timber as cheese-crates. For this requirement it has proved comparatively suitable. Cheese is not so susceptible to taint as is butter, and no complaint was forthcoming in this connection.

Some complaints have been received from the United Kingdom regarding wood-taint in butter on the outside of the block as turned out of the box in which it had been exported. The butters affected had been exported in containers of foreign timber. Not all butters in these packages were faulted, but sufficient adverse reports were received to warrant dairying companies exercising more care in the selection of butter-box material. Dairy companies were advised to this effect by way of addresses and a circular letter.

Whey Butter.

Although factory-managers have given more attention and care during the past year in connection with the manufacture of this class of butter there is yet room for much improvement in quality. Many cheese-factory managers are inclined to look upon whey cream as merely an incident in the day's work. The exercise of more care and cleanliness in the factory in handling the cream and a more frequent delivery would be of greater assistance towards the production of a higher-quality whey butter.

International Butter Trade affected by Import Duties.

In the year under review the international butter trade has been subjected to some changes, brought about by the imposition of new or increased duties in Germany and United States of America. During our preceding financial year Germany imported a quantity of butter, which relieved the markets of the United Kingdom to a considerable extent. Much of this butter was forwarded to

Germany from Denmark, thus decreasing Denmark's export to Great Britain. London re-exported to Germany butters received from the Southern Hemisphere. Since the imposition of the duty of about 11s. per hundredweight in October last this factor, together with the low spending-power of the German people, has caused a great decrease in the imports into Germany of high-class butters. Cheaper butters from Siberia and the Baltic States have been accepted in their stead, although in lessened quantity.

The United States of America had an import duty on imported butter which at 8 cents per pound was considered by some of that country's trade journals to afford sufficient protection to their dairy industry. The duty has recently been increased by 50 per cent., to 12 cents per pound of butter, which would appear to be almost, if not altogether, prohibitive.

The reciprocal tariff with Canada came into effect during the year, and has assisted in renewing some trade in butter with that Dominion. Since, however, Canada has more recently experienced a renaissance in her export butter trade, and it is unlikely that she will require to draw on New Zealand for any important quantities.

Quality of Cheese.

The quality of cheese has evidenced a noticeable improvement, more especially in the Taranaki District. Last year in this District many dairy companies made yield their chief object irrespective of quality, the resultant cheese being weak, open, and sweet, or showing an excess of acid. It is pleasing to observe that cheese of this nature has not been so frequently met with during this year, indicating that more orthodox methods of manufacture have been followed.

Less trouble with slimy milk has been experienced, but for a short period a fluctuation of acid-development was met with.

The finish of cheese shows a considerable improvement, and a fair number of dairy companies are now turning out a rimless cheese. This is particularly noticeable in the Auckland District, where practically 95 per cent. of the factories are using the rimless hoop.

Plants for pasteurizing milk for cheesemaking are steadily being increased, the quantity of cheese this year made from pasteurized milk being equal to 76 per cent. of the output, as against 69 per cent. for the previous year. Further instalments of plant are to be made during the ensuing off season.

Storage of Cheese and Butter.

All cheese in store awaiting shipment is now held under controlled temperatures. Owing to the regulation of shipments the storage space at one or two of the ports was overtaxed for a short period, which necessitated some cheese being held at ordinary temperatures. Weather conditions, however, were cool at the time, and the cheese, fortunately, suffered no ill effects.

Suitable temperatures for butter in cold storage have been maintained at most of the freezing-stores, and close attention to temperatures at time of shipment has been given by the graders in charge. The shipping companies are also requiring that butter and cheese should be at proper temperatures when loading is being carried out. The Dairy-produce Control Board's shipping supervisor continues to do good work in this connection.

An experiment is at present being carried out to determine the keeping-quality of butter stored over a period of six months at zero, as compared with the ordinary storage temperatures, and this awaits completion.

Quantities of Butter and Cheese forwarded to Grading-stores for Years ended 31st March, 1925 and 1926.

Port.	1925–26.		1924–25.	
	Butter.	Cheese.	Butter.	Cheese.
	Cwt.	Cwt.	Cwt.	Cwt.
Auckland	759,042	224,948	824,081	119,027
Gisborne	15,250	..	18,599	..
Napier	18,854	1,876	6,714	578
New Plymouth	104,137	293,716	117,931	283,697
Patea	21,599	338,990	30,257	340,641
Wanganui	68,174	44,534	92,365	45,836
Wellington	152,866	299,422	205,465	333,534
Lyttelton	40,024	22,852	47,626	30,812
Timaru	10,191	11,735	12,394	6,678
Dunedin	26,662	35,393	31,905	35,572
Bluff	9,460	188,720	19,288	178,861
Totals	1,226,259	1,462,186	1,406,625	1,447,236

Value of Exports.

Prices for dairy-produce have, on the whole, been fairly satisfactory when compared with those ruling for the previous year. Owing, however, partly to a decreased production consequent upon the unfavourable season the total value of all classes of dairy-produce exported shows a decrease of £3,092,256. Including butter, cheese, dried milk, casein, condensed milk, and milk-sugar, a total value of £15,746,904 was reached, as compared with £18,839,160 for the previous year. Stocks of butter and cheese in store as at 31st March, 1926, were, however, greater by 1,254 and 7,059 tons respectively than at the end of the previous financial year, these quantities approximating in value £1,000,000.

Shipping-conditions.

The strike of British seamen on steamers carrying dairy-produce as part cargo between New Zealand or Australia and the United Kingdom interfered materially with the timely delivery of our spring-made butter and cheese to Britain. Not only did this factor tend to upset continuity of supplies from this Dominion to overseas customers, but it increased costs at this end by way of storage, and caused an increase in prices of dairy-produce to the British public—the advantage of which went largely to countries other than New Zealand and Australia, and such as were exporting butter to the United Kingdom at the time. The fact that the factors which influenced the seamen to strike did not pertain in any manner to New Zealand or Australia did not make the dislocation of trade any more acceptable to the losers in this Dominion.

Casein.

The quality of casein manufactured in the Dominion is now of a high standard, a noticeable improvement in the green curd being evidenced. Manufacturers are now producing a high-grade rennet casein containing a minimum quantity of butterfat. This casein has a high marketable value. Production has not been so high, this being to some extent attributable to a number of dairy companies reverting to cheese and home separation during the year. The quantities graded for export amounted to 1,126 tons lactic and 624 tons rennet casein, a total of 1,750 tons.

Testing Butter for Water Content.

The testing for moisture of a box of butter from every churning forwarded to the grading-stores is still being carried out, and it is noticeable that dairy companies have during the year paid very close attention towards maintaining a more even water content in their butters. One hundred and twenty-six thousand nine hundred and seventy-two churnings for export were tested, and these have shown an average water content of 15·174, which is slightly higher than the average of the previous year.

It is pleasing to state that no complaints have been received from the United Kingdom regarding excess of water in New Zealand butter.

Increased Minimum Points for First-grade Butter and Cheese.

The increase in the minimum points for first-grade butter and cheese from 88 to 90, which was brought into operation at the almost unanimous wish of producers, has been in operation during the whole year. Improvement in the quality of both butter and cheese during the year has been very noticeable, and many dairy companies have increased their average grade as a result.

The percentage of second-grade cheese for this year, with the 90-point minimum for first-grade, is almost identical with the percentage of two seasons since, when the minimum points for first grade was 88 points. The butters grading 90 points and over have during the two years increased from 87½ to 94½ per cent. of the total. These figures not only show that the increased minimum was politic, but they are some indication of the satisfactory improvement which has been effected.

Cream-grading.

Although the grading of cream and payment on a differential basis according to grade has made some extension on the voluntary basis during the year, the general position is still unsatisfactory in a number of our dairying districts. At factories where this method is in operation the cream-graders are doing good work, and the system is giving general satisfaction to the suppliers concerned. Although the voluntary grading of cream would be preferable, it would appear that this is not attainable, and the only alternative appears to be that grading should be made compulsory. Legislation is necessary in this respect, and it is urged by all those who have the interests of the industry at heart that this be given effect during the coming session.

Farm Dairy Instruction.

As evidence of the growing popularity of the system it may be mentioned that 38 farm dairy instructors are now employed in this important and necessary work. Of this number, 33 are located in the North Island, and 5 in the South Island. From recent inquiries received from dairy companies not yet linked up with this branch of work it is evident that a further extension of this service will be requested before the commencement of the next dairying season. The value of this work is much more widely recognized, and it is the opinion of those most qualified to judge that the greatest improvement which has taken place in the quality of the raw material is at those factories which have a farm dairy instructor.

Inspection of New Zealand Dairy-produce in the United Kingdom.

This work is still under the able direction of Mr. Walter Wright. Recognizing the necessity for an extension of this valuable service, owing to the enormous quantities of dairy-produce now

being exported to the United Kingdom and the Continent from New Zealand, arrangements were made during the year to appoint an additional officer to assist Mr. Wright. Mr. A. C. Ross, Dairy-produce Grader in charge at Dunedin, was appointed, and left New Zealand for London in November last. Mr. Ross's capabilities are well known, and his appointment has given general satisfaction to those engaged in the industry.

Preservatives in Butter.

It has now been finally decided by the Departmental Committee set up by the British Ministry of Health that the use of preservatives in butter consumed in the United Kingdom should be prohibited, and this will come into force from the 1st January, 1928. Many dairy companies in New Zealand manufacture their butter free of preservative, and will not be affected by this regulation, but the period of grace allowed is intended to give the remainder ample time to adjust their methods to meet the new requirements.

Dairy-produce Board.

Some of the Board's proposals have a direct or indirect bearing on the work of this Division. The Board or committees of the Board have consulted us on these matters, among which reference may be made to the use of a national brand on all first-grade butter and cheese for export, also the segregation from first grade of a higher class, which will probably be known as "finest."

Dairy Laboratory and Experimental Factory.

Mention was made in last year's report that the Government had sanctioned the erection and equipment of a dairy laboratory and experimental factory, and it was expected that the erection of the buildings would be proceeded with at an early date. Plans and specifications were duly prepared, and tenders invited for the erection of these buildings, but the lowest tender was considerably in excess of the architect's estimate. A modification of the plan has now been prepared, and it is hoped that the buildings will be taken in hand at an early date.

During the year the Federation of Dairy Factories in Taranaki, with assistance from the Government, established a dairy research laboratory at Hawera, and Mr. P. O Veale, B.A., M.Sc., was appointed to take charge for the Federation. The equipment of this laboratory is now practically completed, and the institution is proving of material assistance to dairy-farmers and factory-managers in the Province.

Certificate-of-Record Testing of Purebred Dairy Cows.

The official year under review has shown a decrease in the number of entries for certificate-of-record testing. The highest number of cows on this test for any one month during the past season was 786, which was for the month of September, 1925. This compares with 1,093 for November, 1924, the highest month for the 1924–25 season. Taken on a per breeder basis the number of cows works out at 2·84 for the 1925–26 season, as against 3·45 for the previous year.

Association Testing of Ordinary Herd Cows.

During the season 1924–25 some 196,850 cows were tested under this system. Statistics for the season just ended are not yet complete, but figures available to date show that there is likely to be a decrease of twenty to twenty-five thousand cows from the previous season. A proportion of the testing-work has again been carried out by officers of the Dairy Division, and returns for forty-three associations, including 9,801 cows, have been figured at the Dairy Division's headquarters. The totals for cows tested and returns figured by Dairy Division officers are fifty-nine associations, comprising some 18,000 cows.

The "group" system of testing has again extended, and it is expected that the figures for the season just ended will show about 105,000 cows tested thereunder. The figures for the preceding season for cows tested under the group system were 100,055, or some 59·9 per cent. of the cows tested by other than Dairy Division officers.

Staff.

I have pleasure in acknowledging the very helpful and valued assistance rendered by Mr. W. E. Gwillim, Assistant Director, in the work of the Division during the year. Mr. A. C. Ross was transferred to London to assist Mr. Wright, and Mr. A. Milne, who had previously resigned from the service, was reappointed as Grader in charge at Dunedin. Messrs. J. O'Dea and S. Clayton, Graders in charge at Wellington and Lyttelton respectively, were given additional duties as Supervising Graders, the former for the North Island and the latter for the South Island. In this capacity periodical visits are paid to each grading-port to ensure a uniform standard of grading being in operation throughout the Dominion.

The members of the staff of the Division have all rendered good and loyal service, and their hearty co-operation has been a very pleasing feature throughout a busy year.

Appreciation.

The Division is pleased to record its appreciation of the valuable services rendered by the Department's Chemist and the Live-stock Division Bacteriologist. Thanks are also extended to the management of the various freezing companies, which handle dairy-produce at the grading-ports, and to the secretaries of the cattle-breeding associations for their hearty co-operation and willing assistance in the work affecting their particular branches. The co-operation of the Forest Products Branch of the State Forest Service has been very helpful during the year, and we gratefully acknowledge the assistance received.

HORTICULTURE DIVISION.

REPORT OF J. A. CAMPBELL, DIRECTOR.

The Fruitgrowing Industry.

The horticultural year under review has been an exceedingly productive one as far as the grower of pip-fruit is concerned. Although unusually wet weather was experienced in the main fruitgrowing centres during the early part of the spring, the exceptionally dry conditions which prevailed during the setting and growing period resulted in the apple crop being a record one. Stone and small fruits were, however, not so well favoured, and the crops of these, generally speaking, were on the light side.

The lemon crop was a satisfactory one. The bulk of the fruit produced is of a quality which, subject to proper curing and fuller methods of distribution, bids fair to displace the imported fruit on the various markets of the Dominion.

The climatic conditions were against the development of the majority of orchard diseases and pests, and in some localities black-spot disease, which usually takes a heavy toll, was almost negligible, while brown-rot in stone-fruits was much less in evidence. It was found necessary to take legal proceedings in a few instances where growers had neglected to take the necessary steps to control such diseases as powdery mildew, codlin moth, and red spider.

Pear-midge has again been troublesome in the Auckland District, retarding growth and causing considerable loss of fruit. No satisfactory means of control has yet been arrived at, but experimental work is still being carried on by officers of the Division and private growers in co-operation with the Biological Laboratory, while the Entomologist is dealing with the question of natural enemies of the pest.

The control of fireblight has received close attention, and, beyond a slight extension in the Taranaki District, no serious headway has been made by this disease in the infected areas during the year.

Colonies of *Aphelinus mali*—the natural enemy of the woolly aphis—have now been distributed to practically all the main commercial fruitgrowing districts, and reports to hand indicate that excellent work continues to be done by this beneficial insect in eradicating the aphis.

Some 140 acres were planted in commercial orchards during the year. A number of abandoned orchards were cut out, leaving the total area in commercial orchards for the whole of the Dominion at approximately 30,000 acres.

A new departure in the spraying of orchards is the installation of stationary spraying plants in several large orchards in the Nelson District. In this system the engine providing the power is installed at a fixed point. Pipes are laid systematically throughout the orchard and the material forced through at high pressure. Reports to hand indicate that the system is giving satisfaction to the respective owners. The question as to whether any difficulty such as corrosion will be experienced in the future is a matter that only time and use will decide.

Owing to a report that fruit-fly existed in the Dominion, the Argentine Government prohibited the importation of New-Zealand-grown fruit into that country. The embargo was, however, lifted pending the report of two Argentine experts who were sent to New Zealand for the purpose of investigating the position. The two officials (Senors C. A. Lizer y Trelles and E. E. Blanchard) arrived here about the middle of February last, and were given every facility by the Department in carrying out their investigations. The different fruitgrowing districts in both the North and South Islands were visited by the experts, who, on the completion of their inquiries, confirmed the Department's statement that fruit-fly was non-existent in New Zealand, and reported to their Government accordingly.

Export of Fruit.

A total of 236,870 cases of fruit were exported during the 1925 export season. Of this total 213,371 cases of apples and 3,465 cases of pears were shipped to Great Britain; 16,675 cases apples to South America; 2,465 cases apples to Honolulu; 250 cases apples to Vancouver; 593 cases apples and 51 cases pears to the Pacific islands. The bulk of the fruit was exported under the Government guarantee of one penny per pound net return to the grower.

The earlier shipments to England arrived, with few exceptions, in very good condition, and the market opened brisk at very satisfactory prices and good demand till about the middle of June, when soft fruits caused a considerable falling-off in demand. Prices, however, maintained a satisfactory level until late in the season, when the overripe state of the later shipments resulted in a good deal of waste and lower rates. The fruit shipped to South America arrived in good condition, having been forwarded in cool storage instead of as ordinary cargo as was done in the case of previous shipments, and realized satisfactiory prices. The export season taken as a whole was a satisfactory one from the point of view of returns to growers, and claims under the guarantee did not exceed £3,425.

A scheme of advertising New Zealand fruit was carried out by Mr. T. W. Attwood, representing the New Zealand Fruitgrowers' Federation, attractive posters being displayed in all the underground stations and other prominent public places in London.

The Government guarantee has again been extended to shipments made during the 1926 season, and will apply to a total of 750,000 cases of apples and 8,500 cases of pears. As the result of a bountiful harvest it is anticipated that the quantity exported will be in the vicinity of these figures. In November last Colonel Gray proceeded to London as representative of the Fruit-export Control Board for the purpose of investigating the markets at Home, and to supervise the fruit shipments.

arriving from the Dominion during the 1926 export season. Under the Fruit Control Act, 1924, the export of fruit, with the exception of that from Otago, is controlled by the Board. The Board has not yet set up offices of its own, but is working in co-operation with the New Zealand Fruitgrowers' Federation, and has employed that body to attend to all shipping matters in which the Board is interested. The Board so far has not interfered to any great extent with fruit shipments other than to secure and allot all space required, and to provide special conditions, such as the use of the universal label, printed wrapping-papers, and the precooling of fruit prior to shipment, facilities for which the Board has brought about by arrangement with the Wellington Harbour Board.

Local Markets.

The inspection of New-Zealand-grown fruit at shops and auction-marts has been carried out during the year. Satisfactory prices were realized on the local markets for all varieties of stone and small fruits and the earlier varieties of apples and pears. The market was, however, oversupplied for a time with cool-stored fruit, a good deal of which opened up in an inferior condition, consequently the prices received were not remunerative to the grower. There was also a tendency on the part of a number of growers to forward low-grade fruit and black-spot lines, the returns for which would hardly pay for the cost of marketing.

The branding of cases is a matter which leaves room for improvement. A good many growers fail to realize that neat, methodical branding of cases attracts the eye of the keen prospective buyer, who has learned by experience that the grower who goes to a little trouble to brand his cases in an attractive manner is usually careful to see that the grade and pack of fruit is right, and that the contents are consistent with the branding.

There is a continued improvement noticeable in the packing of strawberries offered for sale in punnets, the regulations brought into operation last season having had a beneficial effect both for the producer and consumer.

Numerous acts on the part of the seller with intent to deceive the purchaser have again been noted on the various auction markets. These almost invariably consist of what is known as topping—*i.e.*, placing extremely good specimens of the particular class of vegetable in such a position as to suggest that a very high class package or line is being offered, whereas the bulk below the exposed surface is composed of inferior rubbish. The same practice applies to a lesser extent to fruit. It is highly desirable that some action be taken toward stopping this practice.

Instructional and Experimental Work.

The majority of growers whose business is to produce fruit on a commercial scale are reasonably diligent and successful in combating orchard pests and diseases. There are, however, a number—chiefly those with whom fruitgrowing is only a side line—who either by negligence or lack of knowledge of orchard-management fail to take the necessary steps to control disease, &c. The work of education and elimination which the Division is carrying on through its Orchard Instructors is, however, gradually reducing the number of neglected orchards. Much of the time of the Instructors is devoted to instructional work by means of public demonstrations and lectures, visits to orchards and packing-sheds, and correspondence.

Classes in the grading and packing of apples were continued during the year in the main commercial centres, and were well patronized. A number of those attending these classes gained the Department's certificates of competency in apple grading and packing. Examinations in pruning and spraying were also conducted, a fair percentage of the candidates being successful.

The carrying-out of tests with various spraying-compounds has been attended to, as far as it has been possible to do so, in co-operation with reliable orchardists.

An experiment in the manurial treatment of fruit-trees is being conducted in the Marlborough District. Definite results in respect to this will not be available for some time yet. The matter of establishing an experimental area in the vicinity of Whangarei for the purpose of testing the suitability of that district for the growing of subtropical fruits was taken in hand during the year. This should prove of considerable interest when the plot is properly established. The co-operative fruit-testing areas at Tanekaha (North Auckland), planted in mixed fruit-trees, and Henderson (Auckland), which is devoted to citrus-growing, are making satisfactory progress, and will be the subject of separate reports when the final results are available. The apple-trees on the Wallaceville test plot are still making very satisfactory progress and returning heavy crops. During the year grafts were made of some thirteen new varieties, and so far these are doing well.

Fruit Cool Storage.

The cool storage of fruit is a matter that has made considerable headway during recent years, with the result that at the present time large and up-to-date fruit cool stores are to be found in each of the chief commercial fruitgrowing districts. During the year further cool-storage accommodation was erected in the Hawke's Bay District. A further extension is also noticeable in the number of small cool stores erected by growers for their own use. The capacity of the bulk of the stores was fully taxed during the season, and while the greater portion of the fruit kept in good condition, some was held in store too long, resulting in considerable loss to growers and dissatisfaction to purchasers.

Less trouble has been experienced with flesh-collapse in apples. The continued investigations carried out by Mr. R. Waters of the Biological Laboratory, with the assistance of officers attached to this Division, have been of considerable help in reducing this trouble in cool-stored fruit. The investigations have been extended to cover the cool storage of pears.

Te Kauwhata Horticultural Station.

A much drier year than usual was conducive to the satisfactory carrying-out of all cultural operations at this station. However, the spring, though dry, was cold, and such conditions were entirely unsuitable for the settling and developing of certain crops.

Approximately 160 tons of dry bark were harvested in the wattle plantation, 60 tons being sold and the balance stored in sheds till required at the tanneries. A quantity of timber was disposed of on a royalty basis for mine-props, fencing-posts, and firewood. Returns from the plantations for the year were: Wattle-bark, £1,670 16s. 4d.; posts, £15 10s.; firewood, £113 11s.; royalties, £190 1s. 9d.: total, £1,989 19s. 1d.

In the vineyard the necessary cultural and maintenance work was carried out. While the season was not favourable for the setting and developing of some varieties of grapes, other varieties yielded heavier crops than usual. Owing to the cool weather experienced, the sugar content of the berries was very low, and an additional quantity of sugar will be necessary to bring the wine up to standard. About 2 acres of vineyard have been divided up for the purpose of carrying out manurial experiments, the results of which will be available later.

Wine-sales increased considerably during the year, the quantities sold being as follows:—

	Quantity. Gallons.	Value. £ s. d.
Frontignac	9,431	4,731 5 0
Madeira	3,211	1,604 0 11
Claret	289	176 1 3
	12,931	£6,511 7 2

This represents an increase of 6,210 gallons and £1,920 15s. 8d. in value as compared with the previous year's figures.

Orchard Registration and Orchard-tax.

This work has required close attention during the year. A total of 6,637 commercial orchards were registered and tax-demand notices issued to the occupiers. £1,502 was collected in orchard-tax and handed over to the New Zealand Fruitgrowers' Federation less cost of collection. The tax is computed at the rate of 1s. per acre, with a minimum charge of 2s. 6d.

Registration and Inspection of Nurseries.

A total of 593 nurseries were registered and £593 collected in registration fees. A fair number of the registrations made apply to persons raising tomato-plants for sale. The Instructors report that the bulk of the nurseries are in a clean condition, and no trouble is experienced in carrying out the requirements of the regulations.

New Zealand Institute of Horticulture.

Considerable preliminary work has been carried out by the Institute of Horticulture in collecting data relative to horticultural matters generally. The establishment of a central School of Horticulture, which has been referred to in previous reports, is a matter that is strongly advocated by the Institute. It is proposed to hold a fruit varieties conference during the coming winter, which will be attended by representatives of the Fruitgrowers' Federation, Nurserymen's Association, Institute of Horticulture, and officers of this Department.

New Zealand and South Seas Exhibition.

A suitable collection of fresh and preserved fruits, jams, pickles, wines, honey, &c., was secured by the Division for display in the Department's Court at this Exhibition. A special exhibit of New-Zealand-grown tobacco, kindly supplied by the National Tobacco Company, Auckland, attracted considerable attention, as well as the bee observation hive, which was kept in operation throughout the period of the Exhibition.

Imported Fruit, Plants, etc.

The inspection of fruit, plants, &c., imported into the Dominion through the different ports of entry has been carefully carried out during the year. There was a slight increase in the total quantity imported, both of fruit and plants, as compared with the previous year. The Fruit Inspectors report that while the bulk of the fruit shipments arrived in good condition, the grading and quality of some lines left a good deal to be desired. Generally speaking, the fruit from the Cook Islands and Fiji was of good quality and well packed. The trade with Fiji shows a substantial increase in the quantity of fruit imported, and a continued improvement is noticeable in the quality and packing. Fruit imports for the year were practically free from fruit-fly infection, only a small quantity having to be condemned and destroyed on account of this pest. A number of lines found on examination to be infected with live scale and mealy bug required fumigation before delivery could be given.

Bulb-mite infection has again been prevalent in imported bulbs, and a considerable number of packages had to be condemned and destroyed on account of this pest. In view of this diseased condition of bulbs on arrival in the Dominion the whole question of bulb-importation is at present under consideration. Three experimental lots of bulbs forwarded in three separate shipments under special conditions have been received from England through the High Commissioner. These were for the

purposes of examination as to disease, &c., on arrival here. This matter is receiving the attention of officers of the Division and the Biological Laboratory, and the results will be reported on in due course. It is also intended to arrange a conference at an early date between representatives of the Nurserymen's Association, Institute of Horticulture, private and commercial importers of bulbs, and the Department to fully consider the question of bulb-importations and the treatment of those found to be infected.

Hop-culture.

The cultivation of hops is carried out on a commercial basis in the Nelson and Motueka districts, where the climatic and other conditions are well suited. Reports to hand indicate that the past season's crop was a good average one. In well-manured and cultivated gardens heavy returns were secured. Owing to only a limited quantity of colonial-grown hops being required on the Home market at the present time, some difficulty has been experienced in satisfactorily disposing of the crop, the demand locally absorbing only a small proportion. As a result several growers have converted their gardens to other uses.

The quantities and values of hops exported during the last five years ended 31st March are as follows: 1922, 2,056 cwt., £18,054; 1923, 2,243 cwt., £21,153; 1924, 3,883 cwt., £27,615; 1925, 4,469 cwt., £31,112; 1926, 3,608 cwt., £21,780.

Tobacco-culture.

Considerable interest is still being evinced in the cultivation of tobacco as a commercial proposition, and a steady increase is noticeable in the area planted in this crop. It has been amply demonstrated that leaf of high-grade quality for pipe-smoking can be produced in certain localities in the Dominion, notably Nelson, Hawke's Bay, and Auckland. It is estimated there are now some 400 acres under cultivation, the crop being grown under contract to tobacco-manufacturers. The continued improvement that has taken place in the manufacture of locally grown tobacco has led to a considerable demand for the New Zealand product.

Viticulture and Wine-making.

The planting of vineyards, both in table and wine grapes, is steadily increasing. The past season was not favourable to the development of certain varieties of outdoor-grown table grapes, owing to the unsuitable weather conditions prevailing during the setting-period. The prices realized on the markets were, however, satisfactory to growers, especially in regard to the Albany Surprise variety.

The crop of wine-grapes equalled that of the previous year. In some localities where the weather was hardly warm enough during the ripening-period the sugar content of the grape-juice was low. Generally speaking, the vines were free of disease; this was particularly noticeable in the Hawke's Bay District, which experienced a particularly dry season. The quantity of grape-wine produced in the Dominion was approximately the same as last year—viz., 85,000 gallons, valued at £34,000.

The co-operative vine-testing plots established in 1922 at Nelson and Te Mata are making satisfactory progress. In connection with the Nelson plot, the results obtained so far indicate the possibility of ripening grapes successfully outdoors in that district.

Grape-growing under glass is gradually extending. The high prices ruling for glass and other materials during the past few years practically prohibited the erection of glasshouses. A gradual reduction in prices has, however, enabled development to take place, and several new vineries have recently been built. There is a good demand for hothouse-grown grapes, and the returns to growers have been satisfactory.

Cidermaking.

This industry is gradually extending throughout the Dominion, considerable quantities being now manufactured in the Nelson, Auckland, and Gisborne districts. As is common in connection with the commencement of a new industry, a few unsuccessful makers are falling out, but others are taking their place, and it is hoped that cidermaking will become a profitable side line with many orchardists. The experience gained since the industry commenced has given cidermakers a better knowledge of the public requirements, and has enabled them to adopt methods suitable to local conditions. It is estimated some 50,000 gallons of cider were produced during the year, valued at approximately £12,500.

The manufacture of unfermented apple-juice is also receiving attention. A satisfactory article has been placed on the market, but it is yet too early to judge whether it will prove a commercial success or not.

The Beekeeping Industry.

In line with other primary industries, beekeeping is making steady progress both in the North and South Islands. The past season was not generally favourable to the production of a good honey-flow. With the exception of the Waikato, Taranaki, Marlborough, and Nelson districts, where average returns were secured, the honey crop was below normal. On the west coast of the South Island, owing to continuous wet weather, the crop was the lightest recorded for a number of years.

The displays of New Zealand honey made at the Wembley Exhibition have been the means of attracting attention to the Dominion as a honey-producing country, and as a result a number of people from the United Kingdom have been making inquiries in New Zealand with a view to ascertaining the possibilities as to beekeeping in this country.

The work of inspecting colonies for foul-brood and other diseases has been well maintained in most districts, and reports to hand indicate that satisfactory progress has been made in the control of disease. It was found necessary, nevertheless, to take proceedings against a number of beekeepers for breaches of the Apiaries Act. The further employment of beekeepers as part-time Inspectors has proved sufficiently satisfactory to again warrant a continuation of the scheme. Apart from the main

work of inspection, instruction in all branches of apiculture has been given by the Apiary Instructors, both by private visits and by public demonstrations and lectures.

The export of honey now comes within the jurisdiction of the Control Board set up under the Honey-export Control Act, 1924. Grading of all export lines at the various grading-stores is at present carried out by one officer attached to the Division (Mr. G. V. Westbrooke, Apiary Instructor, Auckland). With the view of strengthening the position in this direction arrangements have been made for the Apiary Instructor at Hamilton (Mr. T. S. Winter) to assist in the carrying-out of the work. Other officers are also receiving instruction in grading as time and opportunity permit. A continued improvement is noticeable in the packing of honey for export, and only a small quantity had to be rejected, chiefly on account of not being in a fit state of granulation for export.

The quantity of honey exported during the year was 15,770 cwt., valued at £51,733, a considerable increase as compared with the previous year's figures. The following figures, showing quantities and values of honey exported from the Dominion during the last five years, are quoted for comparison: 1922, 8,542 cwt., £31,943; 1923, 10,605 cwt., £43,032; 1924, 9,157 cwt., £26,910; 1925, 10,836 cwt., £30,549; 1926, 15,770 cwt., £51,733.

The total number of registered apiaries now stands at approximately 7,100, representing some 99,855 colonies of bees.

Staff.

During the year three Assistant Orchard Instructors were appointed, and were stationed at Auckland, Hastings, and Nelson respectively. The help thus afforded the Orchard Instructors at these places is much appreciated, especially in view of a very busy export season. It will also enable inspection work, &c., to be more systematically carried out in the districts concerned. In conclusion, I have to thank all members of the staff for their cordial co-operation in the carrying-out of the many and varied phases of the work coming within the scope of the Division.

FIELDS DIVISION.

REPORT OF A. H. COCKAYNE, DIRECTOR.

The Agricultural Year.

The past agricultural year has not been nearly as satisfactory as the preceding year. The seasonable weather experienced during the spring, summer, and autumn of the 1924–25 season, followed by a mild and comparatively warm early winter, gave hopes for an extremely good season, but, unfortunately, abnormal weather set in in the late winter of 1925 and quite upset all calculations. Stock of all sorts wintered well as a result of the previous season's good growth of grass and supplementary crops, but as the spring advanced and weather conditions proved unfavourable growth of pastures was badly checked. A result of tardy growth in the pastures was reflected in diminished returns of dairy-produce in the earlier months of the dairying-season. Happily, in the late summer and autumn weather conditions were more seasonable and a good proportion of the leeway was made up.

Generally the cold and wet spring had a detrimental effect on the yields of hay, and this shortage, combined with smaller areas of root crops on account of unsatisfactory weather at sowing time, gives anything but a satisfactory outlook for winter feed for stock in many parts of the Dominion.

The area in cereals showed a decrease both in wheat and oats when compared with the 1924–25 season. In wheat the decrease is estimated at 10,000 acres, and in oats 90,000 acres. The result will be that importations of wheat will have to be made to meet Dominion requirements, but on account of the steadily diminishing requirement the quantity of oats available should be sufficient to meet requirements. The decrease in wheat acreage was entirely due to the inability of farmers, through unfavourable weather conditions, to prepare the land for sowing; had suitable weather prevailed the area would without doubt have been higher than the average for the past ten years.

The coldness of the spring and the dryness of the weather following played an important part in the control of cereal fungous diseases, with the result that all the grain was well filled, and the brightest sample for many years past was secured.

One of the most striking features of the year was the great increase in the top-dressing of grass-land with phosphatic fertilizers. The top-dressing of pastures, which has been for many years recognized as a profitable investment in both Taranaki and Auckland, is a movement which has become Dominion-wide, and it is very pleasing to record a large increase in the area being top-dressed each year.

Not only is top-dressing being undertaken on land where the work can be done with machinery, but quite an appreciable amount of hill sheep-country is being dealt with, and in this case the fertilizer is being applied by hand. This movement has been mainly brought about by the good results secured on about 2,000 acres of such country in the Manawatu, southern Hawke's Bay, Wairarapa, and one or two other districts top-dressed by hand at the instigation of this Department. A full report on this work is being published for general information in the Department's *Journal*.

Second-growth Country.

Much experimental work has been carried out on the hill country reverting to secondary growths in the centre of the North Island. In the inland Taranaki district nearly 300 acres of secondary burns have been sown with numerous trial mixtures in co-operation with about twenty different farmers. In addition, between 300 and 400 acres of land have been top-dressed. The trials as at present laid down are giving information with regard to the mixtures most suitable to use, and the effect of manure on grass-establishment, that will be very generally applicable over the greater part of the area where deterioration has been most marked.

While the trials mentioned have given much useful information there are still many points that should be investigated so far as country reverting to secondary growths is concerned, but these investigations can only be carried out by dealing with fairly large blocks of the country in question. Proposals for these investigations have already been placed before you.

Instructors in Agriculture.

The instructional staff was strengthened during the year by the appointment of several additional Instructors. This much-needed assistance is greatly appreciated, but more men are necessary before instruction can be as widespread as one would like. It is quite recognized that expansion must of necessity be gradual, and that sufficient staff to put instruction on an intensive basis cannot be provided with great rapidity.

Farm Economics.—In the past the almost complete lack of any knowledge of farm economics in New Zealand has made the work of rational agricultural instruction of great difficulty, but the appointment of an officer during the year to deal with this most important subject has been a matter of great pleasure to me. The officer in question has been on this work for only a short period, but I have high hopes of very valuable data being brought to light in the near future.

Experimental Areas.

Puwera.—In the past the main object of the work on this area has been to determine the best and at the same time most economic method of converting gum-land into permanently productive grass-land suitable for milk-production. The investigation showed that excellent grass-land, estimated to carry, with only a moderate extra winter-feed provision, one milking-cow to about 2½ acres, can be produced at a cost of £15 per acre, including full payment for all labour involved, provided £1 per acre is spent on annual top-dressing with phosphatic manure. With this point elucidated the next point was to discover by careful study the actual butter-fat-producing capacity of the pastures established, and with this object in view the area was converted into a dairy farm in 1925. As the season has not yet closed the results are not available, but so soon as the season has finished a detailed report will be submitted. The present indications are that a carrying-capacity of one cow to 2½ acres can easily be secured on gum-land that has been well laid down in grass and is properly managed. This means that gum-land represents, so far as dairying is concerned, the cheapest land in New Zealand, and its rapid development in this direction in the future should be assured provided the work of bringing it into profitable use can be financed.

Albany.—This area, originally established to ascertain what useful plants were suitable for gum-land soils, has now but little value, and steps are being taken for this Division to cease work on it.

Marton.—The work at Marton has been much on the same lines as last year, and comprised cereal variety testing, wild-white-clover-seed production, and an elaborate series of top-dressing trials testing the comparative efficiency of very finely ground Nauru rock phosphate and the ordinary grade of fineness respectively. Various clover-seeds were sown at Marton during the year for comparative purposes. The white clover varieties are imported wild white, imported ordinary white, colonial white, and New Zealand once-grown imported wild white; while the red clovers sown are imported genuine late-flowering red, ordinary imported red, New-Zealand-grown red, and Vale of Clywd red (from Wales).

Ashburton.—Wheat variety trials have been continued, as have also the soil-fertility-increase trials. Work in the selection of pure lines of seed potatoes is also carried out. The lucerne fields, comprising about 34 acres, have provided an excellent object-lesson, and its influence is reflected in the largely increased acreage of lucerne being sown on suitable land in the Ashburton district.

Gore.—Variety testing of roots and potatoes represents the main work of the year—in the case of roots particularly from the aspects of dry-rot and club-root.

Winton.—The main work is the comparative economics of temporary, short-rotation, and permanent grass-land under varying systems, and these trials continue to have a great effect upon the grass-land management in Southland.

Galloway.—Dairying has been carried on at Galloway during the year to demonstrate the butter-fat capacity of irrigated soil in Central Otago. So soon as the season closes a detailed report will be furnished.

Waimaunga.—A dairy herd was established during the year, and a full report on the operations will be furnished at the close of the season.

Subsidized Farms.—The subsidized farms at Stratford and Manaia have continued to do useful demonstration work. A third subsidized farm has been established at Dargaville, and good results so far as farming in the Dargaville portion of North Auckland is concerned are confidently looked for.

Co-operative Experiments.

Co-operative experimental work has, as in the previous year, been mainly confined to manurial trials. In general these are of a demonstrational character, but in some localities they are conducted on the most modern lines of field experimentation where the results can be accurately interpreted on statistical lines. This latter method means greatly increased work, but the results are much more satisfactory from an instructional standpoint. It is hoped to have this form of experimentation more generally used as fresh experiments are put in hand.

Winter Farm-schools.

During the year farmers' classes were held in 22 centres, as compared with 10 centres in 1924, and the number of farmers who attended was almost three times as great as in 1924. This was accomplished by holding in two or three districts travelling schools and limiting the time devoted to lectures to two or three days instead of spreading them over a week. The gathering together of groups of farmers, with the natural interchange of views which takes place, is, apart from the instruction given, of the greatest value.

Ruakura Farm Training College.

This institution, established in 1923 at the Ruakura Farm of Instruction, continues to fill a long-felt want, and about forty students, carrying out a two-year course of directed study and practical farm-work, are in residence.

Boys' and Girls' Agricultural Clubs.

These clubs are still conducted in the Auckland, Taranaki, Wellington - West Coast, Wairarapa, and Otago districts, and on the west coast of the South Island. A considerable increase in the number of clubs, especially in the Taranaki, Wellington - West Coast, and Wairarapa districts, has taken place.

Farmers' Field Competitions.

These competitions continue to be carried out, and have extended, particularly in the Taranaki and Wellington - West Coast and Canterbury districts. Interest in the competitions is well maintained, and their value is undoubted.

The Hemp Industry.

This industry has experienced quite a good year, and great interest is being shown in flax-cultivation, particularly in the Auckland Province, where some new companies are being formed. The amount of hemp graded for the year ended 31st March, 1926, was 93,875 bales, as compared with 85,976 for the previous year, an increase of 7,899 bales. The quantity of tow graded was 25,211 bales, as against 22,323, an increase of 2,888. Of stripper-tow 2,979 bales were graded, as against 1,318, an increase of 1,661 bales. The number of bales of stripper-slips graded was 3,430, as against 2,189, an increase of 1,241 bales. Of the hemp graded 7·32 per cent. was good-fair, 52·42 per cent. high fair, and 32·14 per cent. fair grade; 14·9 per cent. of the tow was first grade, 65·2 per cent. second grade, and 16·21 per cent. third grade: Stripper-tow was 6·8 per cent. first grade, 75·19 per cent. second grade, and 15·13 per cent. third grade: Stripper-slips were 3·12 per cent. first grade, 51·07 per cent. second grade, and 40·67 per cent. third grade.

Grass Plots at New Zealand and South Seas Exhibition.

A pasture and farm crop exhibit was arranged on an area of about three-quarters of an acre at the Exhibition. In this exhibit an effort was made to illustrate the main features of New Zealand agriculture, including all the major types of the grass-lands of New Zealand, and to deal with the autecology of pasture species and the development of pasture association under the varying conditions of grass-land management prevailing in New Zealand. The design of these plots was quite original, and to my knowledge nothing so comprehensive has ever been attempted in any other part of the world. Great interest was evinced in the work, and it has called forth innumerable laudatory remarks.

Biological Laboratory.

The twelve months just concluded stands out as a period of intense activity in the history of this laboratory. Important research and investigational work into a large variety of agricultural problems has been carried out. An exceptional amount of original work has been written up and published in the form of books, bulletins, and *Journal* articles. This, together with the large volume of advisory, instructional, and administrative work, and the usual correspondence and routine, has called for considerable self-sacrifice on the part of the staff. Moreover, there have been heavy demands in connection with the New Zealand and South Seas Exhibition. The collection of biological exhibits from all parts of both the North and South Islands, the preparation of material in the laboratory, and the special photographic and artistic work for various branches of the Department, are still further calls to which this laboratory has responded. Of immediate importance is the reconstruction of the seed-testing staff to stabilize it and enable it to fulfil those functions which the present circumstances require for the development and protection of both the local and export seed trade.

Seed-testing.—As is usual, the greater portion of the activity of the Seed-testing Station has been devoted to the testing and analysing of commercial seed-samples. A total number of 8,164 samples were tested during the twelve months ended December, 1925, showing a reduction of 102 upon the number for the previous year. On an average the quality of the seed-samples submitted showed itself to be of the usual high standard, although a series of samples not received through the usual channels turned out to be very inferior in regard to germination. There is little doubt that while certain vendors spare no efforts to supply high-quality seed there is still a considerable amount of low-quality seed being retailed in the Dominion. Chewings fescue: Full details of the Chewings-fescue investigation were published at the end of 1925, and the recommendations made then have been well followed out by the growers in Southland. This year's crop is of an unusually good quality, and as it has prospects of a fairly good market in the United States of America, the season should be a successful one. Sandon rye-grass: It was found impossible to allow sufficient time for investigation into the failure of Sandon rye-grass to germinate. As a consequence of the almost entire failure of the 1925 crop practically no seed was saved in that district this year. This problem is worthy of the Department's attention. Crested dogstail: Deterioration in germination capacity of Southern crested dogstail is believed to be caused by immaturity. Ten experimental parcels of seed at various stages of maturity were made up and sent to Canada and Great Britain for periodical testing. The results should demonstrate the holding-capacity of the more mature seed. The Southern 1926 crop is very short and of average quality only, consequently there will not be a large surplus for export. General: During the year the Canadian Department of Agriculture gave the necessary authority to allow the New Zealand Seed-testing Station to make analyses and issue certificates under the Canadian Seeds Act, 1923. This allows of export being made direct to buyers in Canada without holding in bond at the receiving port. Seed which would not be fit to pass the Canadian seed-importation standard is also by this means prevented from leaving New Zealand.

Agrostology.—The regrassing experiments on the hill country of the North Island claimed the greater amount of attention in this branch during the past year. A great deal of careful analytical work in regard to the growth and covering-capacity of each species sown has been accomplished. From data secured from such analyses the formulating of the cheapest and best grass-mixtures for primary- and secondary-growth burns of hill country will now rapidly be placed on a sound footing. A further series of grassing experiments has just been completed, approximately 123 acres being sown.

Agricultural Botany.—A great many specimens of weeds, useful grasses, and other plants have been received for identification from farmers and educational institutions in all parts of New Zealand. Particulars are usually sought as to the agricultural status of such plants, and information regarding their local peculiarities is often secured for incorporation into the book on "The Weeds of New Zealand," now in hand. Work in connection with the preparation of this book is being carried out in two directions—the collection of specimens for descriptive purposes and the preparation of drawings from the living plants. The drawings are being made to show the natural size of each weed, but any features likely to be specially useful in indentifying it are shown enlarged.

Blackberry Investigation.—Our investigations into biological, chemical, and ecological methods of control or eradication of blackberry have been continued, numerous field experiments having been laid down on the area of blackberry-infested land leased for experimental purposes in Wairoa County. Tests are also being made of top-dressing and sowing and the use of goats for the control of this weed. In Poverty Bay experiments in methods of control have been initiated on a larger scale. Here the co-operation of the owners of the land has been secured, and the practicability of employing various sprays is being demonstrated. One of these spray fluids, which is being made up according to improved methods devised in the laboratory, will no doubt prove of use for certain types of blackberry-infested land.

Entomology.—Cryptolaemus ladybird: Several large colonies of this ladybird were kept in cool storage over last winter with the idea of having sufficient material available in the spring for immediate distribution and for the rearing of this season's stock. They kept in good condition for most of the winter, but just before spring a high percentage died from some unknown cause, so that there was very little material left to work on during the spring and summer, when we were again handicapped by having to give almost constant attention to the pear-midge parasites. Reports from Hawke's Bay and Whangarei, however, show that the Cryptolaemus is now established there. Calcium cyanide: A great deal of work has been carried out with calcium-cyanide dust, and good controls have been secured against bronze-beetle, apple-leaf hopper, rose-aphis, and woolly aphis, but not red mite. Pear-midge parasites: The greater part of the summer was occupied with the rearing and establishing of shipments of parasites from Europe, the species of *Platygaster* being the one concentrated on. Routine work: An entomological exhibit showing some of the major destructive insects and also groups of typical insects was prepared for the New Zealand and South Seas Exhibition. A monograph was prepared on the biology of the genus *Odontria* in New Zealand, and deals with the adult and pre-adult stages of these insects. An illustrated bulletin on Forest and Timber Insects in New Zealand has also been published.

Mycology.—During the year investigations into the cause and control of the following diseases have been undertaken:—Diseases of cereals: A large number of experiments have been carried out in the field for the control or elimination of these diseases—some 250,000 individual seeds having been sown singly, besides several areas treated on a practical scale. The experiments carried out last year on the relative efficiency of sixteen of the most promising seed-treatments for the control of stinking-smut of wheat were repeated this year. The results in the main were confirmatory of those obtained last year, and indicate that it would be advisable to replace the formalin and bluestone methods at present in use by copper-carbonate dust. A large series of experiments was carried out in the endeavour to ascertain the factors concerned in the hot-water seed-disinfection method, which last year's work showed to be the only means for combating loose-smut of wheat. Much further investigation is required before this method can be generally applied. Experiments in the control of naked and covered smuts of barley, both under controlled and practical conditions, have been carried out. The results form a valuable starting-point for the coming season's work. Comparative trials of seed-disinfection methods for the control of the oat-smuts showed consistent and instructive results. The formalin steep method, if generally applied, would reduce to very small proportions the present severe losses from these diseases, and the hot-water method gives promise of eliminating them altogether. The life-history of the organism causing dry-rot of swedes has now been worked out in the laboratory. Cultural comparisons have been made with this organism and numerous others obtained from abroad causing similar diseases of Brassicas. A treatment, based on this life-history, has been evolved, and it is now under trial on nine farms in Southland, four in Wellington, and eight in Taranaki. Laboratory and glasshouse investigations into the life-history of take-all of wheat are nearing completion. It has been proved that the pathogen is disseminated by seed taken from infected areas, and a treatment based on this knowledge is being evolved. Field experiments on the control of corticium-disease of potatoes, with a method which proved satisfactory under laboratory conditions, were undertaken in Canterbury, Southland, Central Otago, and Wellington. The treated areas (with one exception) showed a considerable increase in growth of haulms, but yields have not yet been ascertained. White-head of barley and wheat is now under investigation in the laboratory. Field experiments in the control of another disease (loose-smut) by the hot-water method showed that control of white-head could be readily obtained by this treatment. A detailed disease survey of the cereal-growing regions of Canterbury, Otago, Southland, and Wellington was undertaken during the past summer. This survey showed that the major diseases of these crops are smuts (*Ustilago avenae, U. levis, U. Jensenii, U. Tritici, Tilletia Tritici*, and *T. levis*); rusts (*Puccinia graminis, P. Elymi, P. coronata*, and *P. anomala*), take-all of wheat, white-head of wheat and oats, *Septoria graminum* on wheat, and cereal mildew. The economic importance of each was ascertained, and particulars as to varietal susceptibility were obtained. The following diseases—hitherto unrecorded for New Zealand—were sent in for examination and report during the year: Rust (*Melampsora Lini*) on linseed found in one area in Canterbury; *Ustilago hypodytes*, found to be prevalent on *Agropyron repens* in Canterbury and North Otago; a leaf-spot of lucerne (*Pleosphaerulina Briosiana*), found to be prevalent on the Ashburton Experimental Farm. Diseases of fruit-trees: A book dealing with the life-history and control of all diseases of fruit-trees present in New Zealand was published during the year.

Bacteriology and Physiology.—Work on the control of collar-rot of peas has been continued and from a laboratory standpoint more or less completed. Last spring seed was treated with hot water for field trials, but, unfortunately, weather conditions in Marlborough did not permit the sowing of the seed. Other treatments, including dry dusting, have been tried out on a small experimental scale, and although none of the treatments will control the disease, some increase the vigour of the seedlings, probably sufficiently to maintain a healthy plant during the early stages of the disease. Inoculation with bacteria of seeds of the legume family, chiefly lucerne and peas, has been carried out on a limited experimental scale, and the indications are that this method of increasing the vigour of young plants is most advantageous. Methods of culturing the respective organisms have been devised, and cultures have been supplied to the Instructor in Agriculture at Christchurch. It is intended to develop this method of inoculation both for lucerne and peas. During the spring of 1925 a disease appeared affecting the apples (on the trees) in many of the orchards of Nelson and Motueka. An investigation was immediately begun, and although experimental proof is required the cause of the disease is now known. Detailed laboratory examinations of affected fruits are still being carried out. Cool-storage experiments are in progress in regard to this diseased fruit.

Fruit Cool Storage.—Investigations into the apple-disease known as flesh-collapse have led to extensive inquiries into the condition of New Zealand fruit cool stores, and a large volume of information concerning defects and their remedy has been secured. Cool-storage organizations throughout the Dominion have freely availed themselves of this information: in response to application for advice, visits have been paid to cool stores in Auckland, Taranaki, Hawke's Bay, Wellington, Nelson, Canterbury, and Otago, and reports have been made upon equipment and its manipulation to produce satisfactory cool-storage conditions. The information secured on the conditions necessary for cool storage for six to nine months on land is of considerable value to marine engineers in regulating the storage conditions for the much shorter time that our fruit is in transit to overseas markets. On behalf of the Cool Storage and Transport Committee most of the engineers in charge of our fruit shipments were therefore interviewed for the purpose of discussing the most favourable storage conditions, and how to secure them with the various refrigeration systems met with on board ships. Some gratifying reports have been made of the manner in which this work has contributed to the great improvement in last season's shipments. Further experimental work involving some thousands of cases of fruit has been carried out during the year, the storage of pears receiving particular attention. Certain delicate pear varieties were successfully stored in large quantities for eight to nine months.

Photography.—During the year a large amount of photographic work has been carried out in the laboratory for all sections of the Department. In addition to routine work, the bulk of the departmental photographs required for the New Zealand and South Seas Exhibition had either to be taken or printed, and most of this printing involved enlargements—a total of 700.

The routine work included printing (mainly for reproduction), approximately 2000; photographs taken, 1,368; lantern-slides, approximately 600.

Staff.

I desire to acknowledge the hearty co-operation and support of all officers of the Division. The year has been a particularly busy one, but all officers have carried out their duties in a most exemplary manner.

CHEMISTRY SECTION.

REPORT OF B. C. ASTON, F.I.C., CHEMIST.

Visit Abroad.

During the year I obtained leave of absence and visited Great Britain and Denmark, as well as the Australian and South African States when *en route*. Altogether seven months (March–October) were taken up in this trip.

Many laboratories and institutions were visited and much information obtained bearing upon agricultural chemistry. The Society of Chemical Industry meeting at Leeds, the British Association meeting at Southampton, the Royal Agricultural Show at Chester, and the Royal Horticultural Show at Chelsea were attended. Full reports were furnished from time to time to the Director-General on the subjects under investigation. Some special lines of work were at the request of the High Commissioner, undertaken, and suggestions made by me were subsequently acted upon. By conference with the officers at the High Commissioner's Office and with the Imperial Government Department's officers much valuable information was also acquired. The subjects of inquiries were very varied, as the following list shows: (1) Inquiry into laboratory fittings, glassware, and apparatus; (2) Fertilizer Acts; (3) training of Government analytical chemists; (4) agricultural soil research; (5) dairy research; (6) animal-nutrition research; (7) boric acid in butter; (8) containers for butter; (9) rodent-destruction methods; (10) condition of the New Zealand exhibits at the Imperial Institute; (11) the nitrogen question, and the possibility of the successful exploitation of nitrogen manures and other compounds manufactured by means of hydro-electric power in New Zealand; (12) New Zealand dyes from Native plants; (13) soil research.

Iron-hunger (Bush Sickness) in Ruminant Stock.

Probably the greatest good attained by the writer's seven months' furlough was in discussing this malnutrition disease and obtaining the approval of high authorities to the theories advanced by this Section to account for the trouble known previously as "bush sickness." The theory that this is caused by direct deficiency of iron in the natural herbage, although published some two years ago, has not met any serious criticism from professional sources.

At the last Rotorua Agricultural Show the exhibit of stock raised at the Department's Mamaku Farm created great interest, mingled with some incredulity. It seems from letters received from practical farmers having had long experience in this country, that the Department in its work at Mamaku is really creating astonishment in the minds of those who take the trouble to visit the farm, inspect the stock shown at the Rotorua Show, or really read the reports with intelligence and apply themselves to following out the advice given.

Soil Survey.

The soil survey of Rotorua County has been further advanced. Over 200 samples were collected by members of the staff and by the officers in charge of the topographical survey of the Rotorua district, whom I have to thank for much valuable assistance. It has now become possible to prepare a provisional soil map of the northern portion of Rotorua County, showing the different types of soil, and this map will shortly be published. Arrangements have been made to station Mr. Grimmett, of the Laboratory Staff, at Rotorua for six months, during which time it is hoped to obtain the samples required to fill in the gaps in the soil map and to extend the survey to the southern portion of the county.

In addition to the work in Rotorua County, the examination of the soils of the Wellington District has been carried a stage further, and a preliminary visit has been paid to Central Otago, where a soil survey of the fruitgrowing areas will be undertaken as soon as the necessary arrangements can be made.

A considerable amount of time was occupied in making an extensive series of analyses (fifty samples) of soils from the Samoan Crown estates, at the request of the Samoan Administration.

Investigation of Wheat and its Products.

The quality, or capacity to produce a good loaf, of flours obtained from local wheat varieties has been investigated further this year. Varieties differ considerably in quality, and though a certain variety may yield an excellent number of bushels per acre it is possible that the flour milled from that wheat may possess only medium breadmaking properties. Some thirty-two samples of different wheat varieties were tested during the year on this Section's experimental flour-mill. Most of these were grown at the Ashburton Experimental Farm, though several were obtained from Otago and other parts of Canterbury. Comparatively few of the more common varieties were received, the samples being generally of lesser-known wheats. Several of these were of considerable interest, especially the varieties Marquis, Red Fife, and Yeoman, which in the country of their origin produce bread of excellent quality.

The wheat yielding the greatest amount of flour was Hybrid W, which produced the excellent amount of 77·3 per cent. flour. This variety is said to be a possible rival to Victor, which it resembles. Victor, however, usually gives a flour of medium quality, as demonstrated by this Section in 1923, and since confirmed by practical bakers (*N.Z. Journal of Science and Technology*, 1925, vol. 8, p. 38). Outstanding varieties as regards yield of flour per bushel of wheat were Hybrid W, Zealand, and Essex Conqueror. As data on the milling and other properties of wheat are gradually collected it should be possible to obtain significant figures not only for provinces but eventually of each wheat-growing district. Chemical and experimental baking-tests were carried out by this Section and much useful information obtained. From the point of view of quality Essex Conqueror, for the third year

in succession, was the best of the miscellaneous samples from Ashburton; other undoubtedly good-quality wheats from the same locality were Yeoman, Marquis, and Red Fife. Only a few of the better-known varieties were received, but Velvet again maintained a good average quality. Certain important correlations were discovered between the chemical analyses and experimental baking-tests and these have been published.

Details of the year's work on milling and baking tests of New Zealand wheats and flours were published in the Department's *Journal* for November and December, 1925, and January and February, 1926.

Cattle-dips.

The necessity for a regular inspection of the strength of the public cattle-dips was demonstrated by the wide variations from standard strength shown by the earlier samples forwarded for examination. Under the system outlined in the last annual report 297 samples were received and reported on during the year, with very satisfactory results, it being noticeable that the dips are now much more carefully regulated, the standard strength being in most cases well maintained.

Fertilizers.

Five official samples were submitted for analysis under the Fertilizers Act during the year, while unofficial samples for comparison with the guaranteed analyses totalled eighteen. In no case was there found any deficiency to the prejudice of the purchaser.

An amending Fertilizers Bill has been drafted. The registration of vendors of fertilizers under the Fertilizers Act, 1908, has been carried out by this Section as in previous years.

The annual review of the importation of fertilizers was published in the *Journal* for May, 1925, and quarterly returns were published as usual.

Toxicological.

Thirty-two specimens were received for examination in connection with the suspected poisoning of animals. Further instances of the loss of valuable stock through the improper use of strong arsenical dipping-fluids have come under notice. In several cases of mortality in pigs there was good reason to suspect that the trouble was due to excess of sodium compounds in the food. In many cases sent for investigation there is little possibility of obtaining definite results owing to the inadequate nature of the specimens. As toxicological examinations consume much valuable time it is intended to seek the co-operation of stock officers in limiting such specimens to cases in which the results are likely to be of some general interest and value.

Lime and Limestones.

A large number of samples of calcareous deposits were received from farmers and other interested persons. Among the samples submitted were several of soft-limestone deposits of high grade which would require no grinding or treatment other than drying prior to application to the land. The periodical notes on the more useful limestone deposits of which samples had been received were brought up to date in an article in the *Journal*.

Work for other Divisions.

For the Dairy Division analyses have been made of all classes of dairy products and of various preparations offered for use in the industry. Samples of parchment paper were examined for their suitability for use in butter-wrapping. In connection with the international butter competition held at Auckland full analyses were made of the eighty-two butters entered for competition. Samples of water and dairy-factory effluents, as well as cattle-licks and dairy salts, have been reported on, and advice has been given on many chemical questions affecting the industry. For the Live-stock Division analyses of dipping-fluids, feeding-stuffs, medicinal preparations, &c., have been carried out, and the meat-marking fluid for the use of Meat Inspectors has been prepared. For the Fields Division, soils, fertilizers, fungicides, and fodder crops have been examined and reported on. The Horticulture Division submitted samples of spraying preparations and materials, and honey, for analyses and report. In consequence of the reports from Britain of excessive amounts of arsenic in imported apples it was considered desirable to make a series of determinations of arsenic in samples of export fruit from the wharf stores and other sources. The amounts of arsenic found, while they showed great variation, were in no case sufficient to amount to a harmful dose under any ordinary conditions of consumption. The Te Kauwhata Horticultural Station was visited, and after analyses of the vineyard soils a scheme of manurial experiments was submitted, and is now in progress.

Summary of Samples received during the Year.

These were as follows:—Soils, collected by Laboratory staff, 142; soils, collected by Fields officers, 126; soils, miscellaneous, 19; fertilizers under the Fertilizers Act, 5; fertilizers, unofficial samples, 18; fertilizers, miscellaneous, 9; reputed fertilizers and phosphate rocks, 61; limes and limestones, 83; paints and paint materials, 4; toxicological specimens, 32; wheats, 9; flours, pollards, and brans, 125; cheese, 19; milks and creams, 16; butters, 102; caseins, 11; honeys, 7; apples for arsenic, 10; waters, 27; fodder plants, 74; sheep and cattle dips, 297; fungicides, &c., 33; miscellaneous, 72: total, 1,301.

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