1924.

NEW ZEALAND.

DEPARTMENT OF AGRICULTURE.

ANNUAL REPORT FOR 1923-24.

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

My Lord,— Department of Agriculture, Wellington, 15th July, 1924.

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.

I have, &c.,

W. Nosworthy,

His Excellency the Governor-General. Minister of Agriculture.

MINISTER'S REPORT.

It is pleasing to be able to record another generally prosperous year for the agricultural industries. Output of our main export staples has been well maintained, while market values have either averaged much on a par with or exceeded those of the preceding year. The weather conditions—which count for so much in farming—exhibited marked contrasts as between different parts of the country or season, lengthy dry spells and abundance of rain having both been experienced. All the important rural districts, however, at least enjoyed favourable periods in which to make good in one or other form of production—with the satisfactory general result just stated.

Perhaps the chief feature of the year was the remarkable rise in the wool-market. All classes of wool were in strong demand, crossbreds sharing in the advance even in greater proportion than the finer sorts. The fifteen or sixteen millions sterling realized by the clip has therefore been well distributed over both Islands. The great bulk of the clip was marketed at the Dominion local sales, which were characterized by strength and advancing prices throughout the season. The slight recession from the top level since reported from London does not appear to possess much permanent significance in view of the statistical position existing with regard to world sheep-stocks and supplies of wool. The practical disappearance of the immense post-war accumulation of Australian and New Zealand wools is a factor of great strength. The present outlook for wool should encourage growers to maintain quality by careful breeding and selection based on the best practical experience combined with scientific knowledge on this subject.

On the meat side of the sheep industry market conditions also favoured the producer, prices for fat lambs and sheep having been maintained at a high level

throughout the freezing-season. Slaughtering of lambs for export was very heavy, although weather conditions led to a somewhat undue proportion of unfinished carcases reaching the works. Mutton-killings were on a fair scale. Even more satisfactory, from a basic aspect, has been the reversal of the regrettable downward movement in our sheep-stocks which had marked the preceding four or five years. The returns for 1923 showed an increase of some 850,000 head, with, moreover, the number of breeding-ewes at great strength; and the 1924 enumeration has added another half-million to the flocks of the Dominion. Another good feature was the high average lambing percentage of 1923, with a correspondingly large crop of lambs. On the year's returns—in wool, mutton, lamb, and by-products combined—the sheep stands out as still the leading primary wealth producer in the Dominion's agricultural industry. Altogether 1923–24 will be remembered as a sheep-farmers' year *par excellence*.

On the other hand, the period under review brought no great improvement for the beef-producer. This was reflected in the reduced volume of exports, although several large shipments of North Island live fat cattle to Australia retrieved the situation to some extent. It must be recognized, however, that the local market absorbs the larger part of the country's beef-production, also that exportation provides a fair outlet for cow beef (largely in the boned form), which may be considered as to a great extent a by-product of the dairy industry. Fortunately, the beef trade is one of lesser importance to New Zealand, and the maintenance of cattle-raising largely finds its warrant in connection with pasture-management, particularly in North Island broken country. So far the total number of cattle, apart from dairy cows, has been well maintained. It is worthy of note that the consumption of beef in the Dominion increased substantially during the past year.

The dairy industry has continued to develop, and recent statistics indicate that New Zealand still holds its gradually achieved position as the largest exporter of dairy-produce in the world. During the past season the industry operated with an increased number of dairy cows, but owing to less favourable weather conditions the production of butterfat has remained practically stationary at the very high level attained in 1922–23. Cheesemaking was practised by most of the large dual-plant factories, with a result that the cheese branch of the industry has shown an increased output of about 21 per cent., while the butter-output has decreased by some 9 per cent. The British markets have experienced great fluctuations, but it is anticipated that the average returns to factory-suppliers will be much on a par with those of the preceding year. The export value of milk-products for the past year is placed in round numbers at the great sum of 18½ millions sterling, chiefly representing butter and cheese, but also including substantial quantities of milk-powder, preserved milk, and casein. It is satisfactory to be able to record a further large development in the herd-testing movement, bringing the total number of cows so dealt with up to, roundly, 150,000. The complementary "C.O.R." system of testing purebred dairy cows has also shown further expansion.

An industry with considerable potentialities, and largely allied to dairying, is that of pig-raising. The number of pigs in the Dominion continues to increase, this year by another 20,000—but comparatively little progress can be recorded in the export trade to Britain. Surplus bacon and hams found a good outlet in Australia, while only limited shipments of frozen pork were made to the British market.

Animal husbandry is so paramount in New Zealand farming that the health of all live-stock is a matter of first importance. The Dominion may be congratulated on its continued freedom from such scourges as foot-and-mouth disease, tick fever, pleuro-pneumonia, and others. During the year precautionary measures designed to minimize the danger of introducing such diseases from overseas have been tightened up all round.

With regard to cereal-production, a heavy decrease again took place in the areas sown in wheat and oats for threshing purposes, while dry weather caused a reduction in the per-acre yields of both these crops to considerably below average New Zealand figures. Oats for chaff increased in area, but gave a much lower total yield

compared with the preceding season. Barley showed a fair increase in area as compared with the previous year's much reduced sowings, but the yield was also affected by adverse weather conditions. Maize for grain, which is essentially a North Island crop, recorded increases in both area and yield. Linseed again increased in area, but yielded less per acre. The same applies to rye-grass seed. Cocksfoot was again less in area, with a per-acre yield of seed much on a par with the preceding year's. Potatoes showed a slight increase in area, but a somewhat lower yield. The areas in turnips and mangolds were again a little lower. After careful consideration, the Government decided not to renew the system of guaranteed prices for wheat which had obtained for several years. It is proposed that the existing duty on wheat shall remain unaltered, but Parliament is being asked to increase the duty on flour. Owing to the decreased local production substantial importations of both wheat and oats will be necessary before next season's harvest. Inquiries indicate that the area sown in wheat in the autumn of the current year is about the same as the total area sown in 1923; further, that preparations are being made by farmers for considerable additional sowings in the ensuing spring. There are thus grounds for hoping that the total wheat area for the 1924-25 season will meet the Dominion's requirements for next year, provided a normal yield is secured. Full self-support as regards essential breadstuffs is very desirable considered from a broad viewpoint.

An improved tone is apparent in the fruitgrowing industry, largely as a result of more successful export operations and better organization of the local market. Shipments of apples to Great Britain in the 1924 season have shown another large increase, and satisfactory average prices have been reported. The Government guarantee of 1d. per pound net return on shipments was renewed this year, but it is hoped that claims will be reduced to a mimimum. The results of the 1923 business necessitated substantial assistance to shippers under the guarantee. The principle of legislative control has been endorsed by the fruitgrowing industry generally, and a Bill which has been prepared for that purpose will come before Parliament during the current session.

The outstanding feature in connection with the poultry industry during the year was the successful initiation of an export business in eggs to the British market. Provided quality and other essential factors are maintained, excellent prospects now exist for the maintenance of a regular outlet for our surplus egg-production. Legislation pertaining to the export trade and other related phases of the poultry industry is also in view. During the year importations of fowl-wheat from Australia were authorized, and difficulties connected with feeding thus greatly eased. Commercial egg-production, especially where followed as an independent business, demands aptitude and skill on the part of the poultryman, but it has been amply demonstrated that success can be attained. Poultry-keeping as a well-conducted side-line on general farms is, however, likely to remain the principal source of supply.

The beekeeping industry has progressed steadily during the year, and is overcoming the export marketing difficulties which have handicapped it for some time. A measure of control is contemplated also in connection with the honey trade. Various minor activities connected with horticulture—market-gardening, glasshouse products, &c.—continue to expand, and form in the aggregate a large volume of rural or semi-rural industry. This production is almost entirely for the local market; but supply of the food requirements of, say, a million consumers is no small affair, and such business will continue to steadily increase in importance with the growth of the Dominion's population. The latter consideration, of course, also applies to other food products such as meat and dairy-produce, cereals, and so forth.

A distinct revival has appeared to mark the hemp (phormium-fibre) industry during the year. Disease affecting the plant-leaf has largely disappeared, the output has increased substantially from its recent low-water mark, and the market has shown steadiness at reasonably remunerative prices. Improved methods of cutting the leaf promise to further advance the industry, and it is to be hoped that careful milling practice will also receive more general attention.

Boards of control are now taking an important part in connection with our primary industries. An event of the year was the enactment of the Dairy-produce

Export Control Act, and its bringing into operation by a large majority vote of the whole industry. The Dairy-produce Control Board subsequently elected got to work quietly and effectively, and a delegation of its members is now on a tour of investigation covering Britain, the Continent of Europe, and America, prior to definite formulation of the Board's policy and plans of action. The Meat-producers' Board has completed a second year of useful and varied work for the pastoral industries it represents. The Board's policy, as summed up in its annual report for 1923–24, is "to obtain the highest net prices for the producer, and to establish a standard of quality that will put our meat in a class by itself." As regards wool, the New Zealand Wool Committee has continued to do good work in regulating offerings at the local sales, and arrangements for its continuance in a reconstituted form are now having attention.

The Board of Agriculture, presided over by Sir James Wilson, has functioned as usual in its valued advisory capacity. The practical experience of members, covering various farming interests and different districts of the Dominion, has afforded much guidance and support in connection with the Department's operations. According to precedent the annual report of the Board is presented to Parliament as a separate paper.

The subject of agricultural education in its several grades has received during the year an increasing measure of attention from various authorities. The establishment of a Chair of Agriculture at Victoria University College, Wellington, as a result of the fine monetary gift made by the late Sir Walter Buchanan and subsidized by the Government, forms a landmark in the Dominion's agricultural annals which it is hoped will be the beginning of much further development on related lines. Government support has been promised for the establishment of at least one, and possibly two, well staffed and equipped agricultural colleges. The beneficial effects of these measures on primary production in future years cannot fail to make themselves felt.

It seems evident that this country must be prepared in the near future to meet increasing competition with most of its staple exports on the world's markets, accompanied probably by a lower range of values. The self-reliant course for meeting this position is by increased efficiency at all points—by better farming practice, increased output, higher quality of produce, and lower cost of production, handling transport, and marketing. There is also room for greatly extended sound co-operative effort along the chain from producer to consumer. Well-directed scientific research can be of great and far-reaching assistance at all points. We should not presume too much on the natural advantages of our country, but build well and soundly on the fine foundation they have given us.

The accompanying statement by the Director-General of the Department, in which are also embodied reports by the heads of the various branches, indicates the wide range covered by the organization, and records briefly a large amount of useful work carried out during the year. Development of the Department's instructional activities has continued with satisfactory results. The scientific specialists on the staff have also placed much valuable work to their credit. A steady strengthening of this side will be necessary, both as regards existing activities and in other fields of investigation hitherto unrepresented. The staff of the Department as a whole has done excellent service, of which I record my full appreciation.

W. Nosworthy, Minister of Agriculture.

REPORT OF THE DIRECTOR-GENERAL.

THE HON. MINISTER OF AGRICULTURE. Wellington, 30th June, 1924.

I beg to submit the following report upon the operations of the past year:—

A general survey of the work done indicates that the Department has made distinct progress, and this has been brought about without additional expenditure having been incurred, the gross expenditure having been, in fact, only very little more than in the preceding year, while the net expenditure was slightly less. In recording this I desire to specially bring to your notice the sound assistance which has been rendered by Directors of Divisions and their staffs in maintaining the efficiency of the work done, while at the same time closely watching their expenditure and observing economy wherever possible to do so without impairing efficiency. The Live-stock, Dairy, and Horticulture Divisions, and the Chemistry Section have all given excellent service, while the newly organized Fields Division, established as a separate unit in May, 1923, quickly settled down to good work, the Director and his staff exhibiting both energy and thoroughness in carrying out their duties.

A marked feature of the year's work lay in the expansion of instructional services in various directions, and it is satisfactory to note that farmers generally have appreciated what has been done in this respect, it having evidently been realized that the facilities made available for obtaining knowledge based upon scientific facts, and made applicable to everyday farming operations, are of material assistance in bringing about an increased output of produce. In this instructional work all Divisions and Sections have participated in varying degrees, according to the particular responsibilities entrusted to them. The provision of special courses, each of a week's duration, for farmers themselves, initiated in 1921–22, developed considerably, six such courses being held during the year at different centres in both Islands, while in the present winter this number will be considerably increased. These courses have proved successful in every way, and have been well attended and well appreciated. They are organized by the Fields Division, specialist officers of other Divisions and Sections co-operating in the instruction given.

The permanent farm-school established at Ruakura was opened in August, 1923, with twenty pupils, an additional twenty going in February, 1924. A two-years course is provided, the students spending approximately half their time in receiving instruction by means of lectures and demonstrations, and half in practical work under instruction. The syllabus is sufficiently comprehensive to enable a good knowledge of the application of scientific principles to practical farming to be obtained, as well as practical knowledge of general farming practice.

In other branches of primary production the requests for assistance have markedly increased, the specialist officers of the Live-stock, Dairy, Horticulture, and Fields Divisions having been fully occupied in meeting the calls made upon their services. This is satisfactory in more senses than one, and it can reasonably be assumed that as instructional work increases, and greater knowledge in matters necessary for safeguarding their stock, crops, pastures, &c., from disease or deterioration, and for controlling pests and weeds, is acquired by farmers, the necessity for inspection work will gradually lessen.

THE STATE FARMS.

The large State farms at Ruakura, Weraroa, and Moumahaki have had a good year from a farming point of view, and as the result of efficient work on the part of the management, combined with the good prices which have ruled for the main products, the financial returns may be looked upon as showing marked improvement. These may be summarized as follows, but it must be noted that the expenditure shown is the expenditure from the farm votes on the estimates, which do not include the salaries of the permanent officers employed on the farms. On this basis the expenditure at Ruakura was £10,282 and the receipts £8,718; at Weraroa the expenditure was £5,754 and the receipts £7,980; at Moumahaki the expenditure was £2,520 and the receipts £4,225. So far as the Ruakura figures are concerned it must be borne in mind that a considerable volume of educational work is carried on there, and, in addition, the permanent farm-school was in operation for some seven months of the financial year. Apart from the fees paid by the students at this school, which do not cover more than about half the cost of their maintenance, this educational work naturally does not give a direct monetary return.

In addition to the above-mentioned establishments the Te Kauwhata Farm, devoted chiefly to vine-culture and wine-making, showed an expenditure from the vote of £3,973, with receipts amounting to £5,729. Apart from the educational work at Ruakura, and some instructional work carried out at Weraroa, these places, together with Moumahaki, have continued to be

operated on more or less commercial lines, and the question of settling upon a definite policy for Weraroa and Te Kauwhata needs to be considered. So far as Moumahaki is concerned, arrangements are in hand for subdividing it and placing settlers upon the subdivided areas, the intention being that the revenue derived from it shall be expended upon educational and instructional work in the area extending from Wanganui to New Plymouth.

The herds of stud cattle at Ruakura and Weraroa have been maintained at a high standard of quality, and the farms generally kept in good order throughout.

RABBITS.

The position regarding rabbits is fully gone into by the Director of the Live-stock Division in a later portion of this report. It is evident that this question of rabbit-control must receive further attention from the point of view of endeavouring to bring about better co-ordination of work between Inspectors and occupiers of land in certain districts where trapping for the purpose of securing rabbit-skins is becoming an established industry and quite a lucrative one for those engaged in it. In some North Island areas very excellent work has been dome in rabbit-destruction, Rabbit Boards having proved successful in their operations, thus demonstrating that with farmers themselves actively determined to cope effectively with the pest good results can be obtained.

The question of the rabbit-skin export industry in the South, however, is one needing to be thoroughly gone into from all points of view, in order that a settled policy can be adopted which will hold out a prospect of meeting the present unsatisfactory position from a rabbit-control point of view to the best advantage. Under present conditions the inspection staff is placed in an extremely unsatisfactory position in these particular districts, and while its officers are doing their best to carry out their duties efficiently, the conditions resulting from the rabbit-skin export trade undoubtedly exert an influence which renders the work of the Inspectors difficult to carry out on the lines one would like to see it carried out—namely, proper co-operation of farmers and departmental officers.

NAURU AND OCEAN ISLANDS PHOSPHATE.

The conduct of the business of arranging for the shipment and selling of phosphate rock from these islands was placed in the hands of the Phosphate Commissioners as from 1st July, 1923, and has been carried out by them quite satisfactorily. This alteration in control has rendered it no longer necessary for the Government to vote money for the purchase of phosphate rock for resale to manufacturers of fertilizers, and the vote asked for in the Nauru and Ocean Islands Account has been reduced to £1,000. This sum is provided to meet such expenditure as is necessary in connection with Government supervision, together with possible contingencies. The quantity of phosphate rock imported during the year ended 30th June, 1924, was approximately 65,000 tons, but this did not by any means represent the total quantity of this material coming into the Dominion, as 24,644 tons were imported during the financial year from Makatea Island, the company operating there having, it is understood, quoted very low prices in an effort to obtain a share of the New Zealand business.

The Phosphate Commission's financial year ends on 30th June, and it is understood that for the year ending 30th June, 1925, contracts have been made under which all phosphate rock required for New Zealand manufacturers will be derived from Nauru and Ocean Islands. It is estimated that up to 80,000 or 85,000 tons will be imported during that period. The total output of the two islands increased considerably during the year, and at 30th June, 1924, it had reached 451,909 tons, as compared with 313,758 tons for the preceding twelve months. This increase is greatly due to the extensive development of the business in Australia, and it seems evident that the New Zealand business will also develop considerably from now onwards.

The good work done by the New Zealand Commissioner, Mr. A. F. Ellis, has been highly appreciated.

NEW ZEALAND WOOL COMMITTEE.

This committee, which was originally appointed by the Producers' Committee to deal particularly with the control of the quantities of wool offered at auction sales in the Dominion, in order to co-operate with the work of the "Bawra" organization in disposing of the over-carried wool belonging to the Imperial Government, continued to function during the year. Its personnel consisted of Messrs. O. Hawken and L. Rutherford, representing North and South Island sheep-farmers respectively; Messrs. W. S. Bennett and A. E. Mabin, representing the

wool-brokers; with myself as chairman. As the whole of the "Bawra" stocks of wool have now been disposed of, the special object for which the committee was set up no longer exists, but there is evidently a strong feeling throughout the country that the control of offerings at New Zealand wool-sales should continue, and that it should be in the hands of this committee, either in its present or in a reconstituted form.

Having regard to the fact that anything of this kind now done is a matter specially for wool-producers, together with wool-brokers, so far as the actual selling arrangements are concerned, it seems no longer necessary for the Government itself to be represented on the committee by one of its officers, and it would appear desirable therefore that a newly constituted committee should be established. The matter is being referred to the Board of Agriculture, in order that it may be fully considered from the producers' standpoint.

AGRICULTURAL INSTRUCTION.

The report of the Fields Division, which follows later, goes fully into agricultural instruction in its general aspects, this being a marked feature of the new Division's activities. It is evident that a much greater interest in this important subject is now being taken throughout the Dominion, and in this connection it is gratifying to record the fact that a generous donation of £10,000 has been made by Sir Walter Buchanan for the purpose of establishing a Chair of Agriculture at Victoria College, Wellington. Some three years since the question of the relative responsibilities of the Education Department and this Department in connection with agricultural education was fully discussed at a conference attended by representatives of both Departments, together with the Director of the Lincoln Agricultural College, and other gentlemen directly associated with this branch of instructional work. At that conference it was decided that the educational activities of the Department of Agriculture would deal with agricultural instruction only so far as it affected youths after leaving primary or secondary schools, and this still seems to be a satisfactory arrangement. Apart from any departmental arrangements, however, there is apparently some confusion of ideas in the country as to what is the best line to adopt in connection with agricultural instruction in institutions specially established for the purpose. We already have an excellent institution in Lincoln College, which has done a great deal of good practical training work, and has also furnished training facilities for students studying for University degrees. The establishment of the Chair of Agriculture in Wellington will doubtless result in an agricultural college being established in connection with it in due course, and the question of the extent to which higher training in agriculture, designed to equip students for the purpose of becoming instructors in agriculture, requires to be provided for in the Dominion demands consideration. So far as shorter courses of study are concerned, the farm-school, giving a two-years course particularly devoted to training in practical farm-work and the study of the principles of scientific agriculture and their application to farming practice, should afford a good means of training lads to become first-class farmers as distinct from instructors.

There is undoubtedly a great deal of scope in New Zealand for farm-schools of this kind, and given good management and good facilities for instruction they should, in the future, exert an important influence in raising the general standard of farm production throughout the Dominion.

LIVE-STOCK DIVISION.

The Director of the Live-stock Division, Mr. A. R. Young, and his staff have done good work throughout. Animal-disease has been kept well in hand, the meat and dairy-inspection services have been efficiently conducted, and the difficult task of administering the Rabbit Nuisance and the Noxious Weeds Acts has been carried out energetically and tactfully. In addition, the instructional work of the Division has shown marked development—a very satisfactory feature.

Following is the Director's report:—

Stock Conditions Generally.

The weather conditions during the past year can best be described as erratic and very variable. Extreme seasonal conditions ruled in the southern districts and in parts of Canterbury, and to a less extent perhaps in the North, while the southern portion of the North Island experienced almost ideal conditions throughout the year both winter and summer. Stock losses occurred in parts of the South Island from snow and flood, and assistance in the way of providing free carriage of fodder was found necessary in some instances. The long spell of dry weather in the South throughout the summer and autumn has been serious as regards the provision of winter food, and this will be

seriously felt in the districts chiefly affected—Otago and South Canterbury—and also in the remainder of Canterbury, although perhaps not to the same extent, but, nevertheless, seriously enough to cause concern should the winter be a severe one. In spite of the exceptions mentioned, stock on the whole have done well, and a very considerable increase took place in the numbers slaughtered for export.

Stock-diseases.

It is satisfactory to report that the Dominion remains free from the most serious diseases. True, some further deaths from anthrax on the farm where the deaths were reported last year were recorded, but no further deaths have taken place since June last (1923). To ensure a greater measure of safety the regulations pertaining to the introducing of stock, &c., have been strengthened, and where necessary total prohibition of stock and fodder has been imposed.

The matter of the possibility of the introduction of disease—foot-and-mouth disease in particular—through the medium of packing-material such as straw, hay, and chaff has not been overlooked, and regulations requiring a certificate of sterilization if from the United Kingdom, or its total destruction by burning if from that or any other affected country, came into force shortly before the close of the year under review.

With respect to a number of what we have heretofore called minor diseases or troubles, but which have rapidly assumed too large proportions to be longer so designated, I am afraid that we have been experiencing some of the effects of years of neglect in the proper rearing of the young stock retained to take the place of their sires and dams in the future production of the Dominion. The manner in which a very considerable number of the calves are reared leaves much to be desired, and if production is to continue to expand as it should more attention must be paid to the rearing of the young stock so as to retain the constitution and resistance-powers so necessary to animals which under present-day conditions must produce the maximum. There is no gainsaying the fact that weakened constitutional powers render animals more prone to infection from such diseases as contagious mammitis, tuberculosis, &c.

Blackleg.—The inoculation of calves for the prevention of blackleg in the districts affected and defined in the regulations was carried out during the year, and a total of 45,440 calves were vaccinated in the Taranaki District area. This is a slight decrease on the figures for the previous year. The need for the vaccination of calves is still apparent, but it is satisfactory to report that the disease does not show any increase, nor has it extended to other districts. A continuance of the restrictions on the movement of calves out of the quarantine area is necessary in order to safeguard clean districts.

Contagious Mammitis.—While this disease gave a considerable amount of trouble and was no doubt the cause of great financial loss, it did not appear to be quite as prevalent as during the two previous seasons, this being particularly marked in the Canterbury-West Coast and the Otago-Southland Districts, and an improvement was also noticeable in the Wellington District. Observations have again shown the disease to be more troublesome where milking-machines are in use, and, as I have before stated, want of ordinary care in regard to cleanliness and sterilization of machine-cups, &c., and want of constant care in the daily hand examination of the udders, are a very important factor in the spread of this disease throughout the herd. During the year 794 samples of milk were received at the Veterinary Laboratory, Wallaceville, from cases of suspected mammitis. Of these 343, or 43 per cent., were found on examination to be from cases of contagious mammitis, 226 were of the non-contagious type, and the remaining 225 were normal.

Contagious Abortion and Sterility.—A further diminution in regard to contagious abortion would appear to have taken place, but the question of sterility still remains a serious one for the dairy-farmer, and also for the officers of the Department to control. In his annual report to me the District Superintendent, Auckland, makes the following interesting observation under this heading in referring to an apparent decrease in cases noticed: "However, if the actual numbers of aborting cases would appear to have been less, the problem of sterility, or delayed conception, appears more acute. From this one is inclined to wonder if we are arriving at a stage where through immunity the actual abortions are becoming less whereas the phase of sterility is becoming more active." The treatment recommended by the Department is reported to be giving good results when carefully and sensibly applied. To assist in the diagnosis of this disease use is being made of the method of examination of blood specimens, and during the year 241 blood samples were examined at the Veterinary Laboratory. Of these 122 gave positive reactions.

Vaginitis.—A considerable amount of trouble has again been experienced throughout the dairy herds from vaginitis in its various forms, often accompanied by sterility, and this has undoubtedly been the cause of more concern to owners than any other trouble they have had to contend with. Fortunately, although indications point otherwise, a number of the cows affected continue to hold and come into profit at the usual time, but others do not, and the loss is severe. The treatment advised by the departmental officers has been found to give satisfactory results, but, owing to failure in many cases to detect it in its early stages, the treatment has to be continued over a much longer period, and it is sometimes difficult to get farmers to conscientiously carry it out over the period necessary.

Tuberculosis.—The statistics taken out regarding this disease in regard to cattle and swine examined on slaughter at freezing-works and abattoirs indicate that a slight reduction has taken place in the percentage of affected animals when compared with the figures for the previous year. This reduction is certainly slight, but a tendency downwards, however small, is an encouraging sign, as the two previous years had shown some increase. In respect to the condemnation of cattle by Stock Inspectors in the field for tubercular infection, on clinical examination, and as a result of the tuberculin test, while the aggregate figures show a decrease of 115 animals, an examination reveals an increase in condemnations in the Auckland District of 296, and a smaller increase in Otago-Southland District

of fifteen, Wellington and Canterbury Districts both showing a decrease. The decrease in the Wellington District is not altogether general, being confined to a few inspectorates—some of the others showing an increase. The condemnations of cattle by Stock Inspectors for this disease were distributed as follows: Auckland District, 2,571; Wellington, 1,168; Canterbury-West Coast, 387; Otago-Southland, 207.

The number of cattle (excluding calves) examined on slaughter by Inspectors at freezing-works and abattoirs was 328,809. Of these, 18,456, or 5·32 per cent., were found affected with tuberculosis in varying degrees, those only very slightly affected being included.

Actinomycosis.—A considerable number of animals are still found suffering from this disease, and during the year it was found necessary to deal with 802 animals, distributed as follows: Auckland District, 387; Wellington District, 237; Canterbury-West Coast District, 85; Otago-Southland District, 102. These figures show an increase of 75 over those of the previous year.

Cattle-tick.—Every endeavour has been made to carry out the reasonable requirements of the regulations as regards the control of the cattle-tick in the affected areas without causing undue hardship, and while the question of reducing the ticks in the area A was not overlooked, special attention was devoted to the question of preventing its spread into clean areas and endeavouring to clean up Area B. In the interests of these districts, it was necessary to institute a number of prosecutions (forty-eight) for failing to obtain permits from the Inspectors as required under the regulations. Up to the end of the year fifty-two dips have in all been constructed, and some others are under construction. Although the principle of control of dips by the settlers in the district seemed to be the ideal, it has not worked out in practice as satisfactorily as desired, and it would appear that control by local authorities might be more advantageous to the settlers as a whole. One of the difficulties is the marked difference between the dipping-charges to subscribers and non-subscribers.

Bush-sickness Investigation.

During the past two years considerable progress has been made with the investigations into the causes of, and remedies for, bush sickness. Mr. B. C. Aston, Departmental Chemist, is at the present time engaged in the work of reviewing the whole of the experiments, and operations in this connection which have been conducted during the past five years at the Mamaku Experimental Farm. His articles are now appearing in the *Journal of Agriculture*, and when completed they will indicate what has been done.

The Department has now reached that stage where it can in a practical manner demonstrate to a farmer how he can take up a section of bush-sick land and secure a living by successfully rearing stock during the process of breaking in the land. Full details cannot be given here in this report, but they may be found in Mr. Aston's articles referred to above. In this connection, however, it is advis ble for any one interested to visit the Experimental Farm at Mamaku, where considerable valuable information upon this subject may be obtained.

In addition to dairying, the rearing of calves has received close attention at Mamaku. It has been ascertained that most of the deaths of calves which occurred on bush-sick pasture in past years were evidently not entirely due to bush sickness, but rather to the fact that parasitic intestinal disorders played a big part. Successful experiments have now revealed the fact that calves that are free from parasitic infestation can be satisfactorily reared by the simple treatment of allowing a daily supply of molasses. This method will carry them on until they are ready to sell off the bush-sick country. If, on the other hand, it is intended to retain them on the bush-sick country it is essential that medicinal treatment with citrate of iron and ammonia be adopted, the drug being given mixed with food or by means of brick licks.

The Department has tried many preparations in the course of its experiments, and a process of elimination of unsuitable or too expensive specifics has reduced the list of remedies to two—namely, citrate of iron and ammonia, and molasses. The fundamental principle throughout these investigations in connection with any suggested remedy has been that the expense involved, including labour, must show a profit, however small. The experiments would lose their best practical value otherwise.

Dairying was recommenced on the farm during the past year, with a view to demonstrating that a dairy farm could be managed successfully on what is known as bush-sick country. So far the project promises well, and ultimate success is hoped for. A herd of about a dozen cows, not specially selected, has been set aside for this purpose. One of the most important factors to ensure the success of this scheme is that the cows must not be allowed to fall bush-sick during pregnancy, as otherwise dead calves, retention of the afterbirth, and other undesirable effects may be looked for. The calves that are born must never be permitted to go back in condition; their steady growth and development must be maintained from birth.

For a long time it has been a recognized fact that horses, pigs, and poultry can be reared upon bush-sick land without contracting the sickness that inevitably overtakes cattle and sheep. Calves can now be reared with special treatment, and adult cattle, if attacked by bush sickness, will recover with the right treatment. In order to follow up its progressive policy the Department will now require to turn its attention to preventive and remedial measures in so far as sheep are concerned. Our past experience with cattle should prove invaluable in this connection.

Live-stock Statistics.

Sheep.—The sheep returns as at 30th April, 1923, showed a total of 23,081,439 head, the first increase for any year since 1918, when our flocks reached 26,538,302, the highest yet recorded. The increase reached the substantial figure of 859,180, but an even more satisfactory feature is the large increment that has taken place in the breeding-ewes, 566,949 of the increase being breeding-ewes. It is

also satisfactory to report that last season's lambing was estimated to produce 11,498,456 lambs, being an increase of 602,935 over that of the previous year. In connection with the decrease in the total sheep, it should not be overlooked that although we are slaughtering less adult sheep we are producing and freezing lambs for export greatly in excess of previous years, and this to a very considerable degree accounts for the decreased total, showing that the general tendency is to develop fat-lamb production, for which the Dominion is so eminently fitted. (Since the close of the official year the 1924 sheep returns have recorded a further increase of over 500,000 head in the Dominion's flocks.)

Cattle.—A further increase in the number of dairy cows and heifers, and also in the numbers of other cattle, as compared with the previous year, is revealed in the statistics collected in January, 1923. The numbers of the respective classes are as follows: Bulls, 60,154; dairy cows, 1,248,643; other cattle, 2,171,897; total, 3,480,694.

Swine.—A further increase has taken place in the numbers of swine as at January, 1923, the figures recorded—400,889 head—being the highest yet on record.

Horses.—Although the enumeration of horses as taken in January, 1923, again show a decrease, it is much less marked than formerly, and might indicate that we have about reached the lowest point. The 1923 figures show a total of 330,818 head.

Slaughter of Stock for Export.

The season again opened with prospects bright for the sheep-farmer, and these conditions have continued. Lambs commanded a high price right from the opening of the works, and on the prices offering on the London market the price paid to farmers by buyers at this end must be considered as being very good. As will be seen from the table following, an increase has taken place in regard to all classes of stock slaughtered at freezing-works during the year compared with the previous year's figures.

	31st March, 1924.	31st March, 1923.	Increase.
Cattle	184,848	155,881	28,967
Sheep	1,932,259	1,927,317	4,942
Lambs	5,118,981	4,410,895	708,086
Calves	18,776	7,504	11,272
Swine	113,200	86,351	26,849

For comparative purposes the following table is given, showing the killings of sheep and lambs for three periods, October to March, in each year, as indicative of the slaughterings from the beginning of each season to the 31st March:—

	1st October to 31st March.		
	1921–22.	1922–23.	1923–24.
Sheep	2,091,840	1,244,490	1,462,128
Lambs	3,011,695	3,128,415	3,492,004

These figures, as will be noted, indicate an increase in the number of lambs slaughtered compared with each of the two previous periods; and, while an increase in the number of sheep slaughtered compared with the previous 1922–23 period is shown, the decrease on those slaughtered during the 1921–22 period is well marked.

Inspection of Meat.

The inspection of all carcases of animals slaughtered at meat-export works, abattoirs, and bacon-factories was carried out satisfactorily during the year. The following are the numbers of each class of stock slaughtered under direct inspection during the year ended 31st March, 1924: Cattle, 328,809; calves, 53,151; sheep, 2,502,609; lambs, 5,203,527; swine, 242,918. With the exception of sheep, which show a slight decrease, increases in all the other classes of stock have taken place. It is noticeable that a very substantial increased consumption of beef has taken place within the Dominion, and this accounts for a decreased consumption of both mutton and lamb. The following table indicates the respective class of premises at which these animals were slaughtered, those slaughtered at abattoirs being almost wholly for local consumption, except perhaps in the case of swine, and those slaughtered at meat-export slaughterhouses being intended principally for export:—

	Abattoirs.	Meat-export Slaughterhouses.	Bacon-factories.
Cattle	143,961	184,848	..
Calves	35,375	18,776	..
Sheep	570,350	1,932,259	..
Lambs	84,546	5,118,981	..
Swine	99,635	113,200	30,083

At ordinary slaughterhouses the stock slaughtered was as follows: Cattle, 82,225; calves, 2,372; sheep, 271,434; lambs, 23,323; swine, 23,466. In addition 41,685 carcases of pork killed and dressed by farmers and sent in to butchers' shops were examined by departmental officers. In connection with the animals shown in the table as slaughtered at meat-export slaughterhouses, the following numbers of the respective classes are returned as consumed locally: Cattle, 34,821; calves, 5,389; sheep, 135,295; lambs, 62,479; swine, 18,022.

Compensation paid for Stock Condemned.

Compensation to the amount of £12,918 was paid out during the year for £5,363 animals condemned in the field for disease under the Stock Act, and £13,266 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. This made the total amount for which the Consolidated Fund became liable during the year £26,189, being an increase of £591 on the previous year's figures.

Importation of Stud Stock from Abroad.

The prohibition on the importation of cattle and sheep from the United Kingdom was lifted temporarily in June last (1923), but owing to further serious outbreaks of foot-and-mouth disease the embargo had to be quickly reimposed. During the period the prohibition was lifted, considerable numbers of valuable stud stock—sheep and cattle—were imported from the United Kingdom, and some cattle of dairy breeds were also imported from Canada, and (by special permission of the Hon. Minister) from the United States of America. The following are the importations, not including sheep (principally Merinos), from Australia, of which there were a number: Cattle (dairy breeds), 105; sheep, 140; swine, 6. In addition a number of horses were imported.

Destruction of the Kea.

During the year the subsidy of 5s. per beak was continued to be paid for the destruction of the kea, and 4,023 beaks were paid for. Since the subsidy was raised to 5s. in October, 1920, 16,644 keas have been paid for.

Inspection of Dairy Premises supplying Milk for Consumption.

The inspection and licensing of all dairy premises and herds supplying milk for local consumption has been energetically carried on throughout the year. The work, including the inspection of the herds, so far as the chief centres of population are concerned, is carried out under the direct control of capable Veterinary Officers, and a considerable improvement generally in the conditions is reported. Many of the premises are still more or less short of present-day requirements, but so long as they are kept in a clean condition, and reasonable improvements, as conditions will allow, are effected, the officers cannot act in too arbitrary a manner in the matter of condemning them outright. Up-to-date and model premises are in their way very necessary and advisable but in milk-production, more perhaps than anything else, the human element must be reckoned with. A naturally dirty and careless person can never be made clean, and so it happens that milk coming from older premises often compares more than favourably with milk coming from new and up-to-date premises; but notwithstanding this the need for improvement is never lost sight of.

With a view of eliminating any possible risk of tubercular animals being retained in dairy herds, the utmost care is taken by the Inspectors by subjecting the cows to careful clinical examination, testing any suspicious animals, and also collecting samples of the collective milk from the dairy for submitting to the test for tubercle bacilli. In addition to testing suspicious animals, use is often made of the tuberculin test to test whole herds, with the acquiescence of owners, or a percentage of the herds, and owing to the precautions taken the risk of conveying disease by means of the tubercular cow is reduced to a minimum.

Importation of Animal-manures.

The supervision of the sterilization of all animal-manures for shipment to New Zealand from licensed mills in New South Wales and in India, with the object of prevention of the introduction of anthrax through the medium of imported animal-manure, was carried out as usual during the year. The importation of bone manure from New South Wales was in excess of that for the previous year by 1,309 tons, while that from India amounted to 825 tons, being 75 tons in excess of the previous year's supplies.

Veterinary Laboratory.

Mr. H. A. Reid, F.R.C.V.S., Officer in Charge of the Veterinary Laboratory, has been absent from the Dominion during most of the year under review, but the work has been carried on during his absence with unceasing energy by the permanent Laboratory staff. In December, Mr. C. S. M. Hopkirk, who was formerly Assistant at the Laboratory, and had returned to New Zealand from the Melbourne Veterinary School where he had obtained his degree in Veterinary Surgery, was appointed Acting Officer in Charge.

A very satisfactory amount of work has been performed, both in the ordinary bacteriological examination of specimens received, and in prosecuting research and investigational work. During the year, 1,522 specimens were received for examination, comprising 794 milk specimens for examination for contagious mammitis, 155 for the biological test for tubercle bacilli, 241 blood specimens for examination for contagious abortion, 119 specimens from Stock Inspectors, the remainder being of a miscellaneous pathological nature. There were also received a number of specimens connected with dairy bacteriology, concerning which some work has been undertaken of late in conjunction with the Dairy Division. An investigation as to the cause underlying the complaint of sterility in dairy cows, now troublesome among cows in dairying districts, is in progress. Field Officers' observations had narrowed the field of work to granular vaginitis and contagious abortion, but the *Bacillus abortus* (Bang) has now been eliminated as a factor in sterility as the result of the examination of a number of blood specimens from herds where vaginitis was prevalent. The form of sterility present therefore appears to be the result of granular vaginitis. Various methods of treatment of affected animals have been tried, but nothing better than simple astringents used in the acute stage has so far been ascertained. During the year, 71,250 doses of blackleg vaccine prepared at the Laboratory were sent out to officers. An improvement in the method of putting up this material for use in the field was inaugurated by Mr. A. Kidd, Chief Assistant.

The work attaching to the Laboratory farm has been carried out satisfactorily during the year, and the manurial top-dressing tests for mutton-production have been continued during the year under the supervision of Mr. B. C. Aston, Chemist.

Poultry Industry.

The following is the report of the Chief Poultry Instructor (Mr. F. C. Brown) for the year under review :—

The common view in regard to poultry-keeping is changing. It is now being considered an industry capable of being a considerable wealth-creating medium to the Dominion. While it has been proved that poultry-keeping is capable of providing an independent means of livelihood, the old reservations still exist. Capital is essential, but even more so is experience and the desired temperament. Unfortunately, poultry-keeping, more than any other industry of the soil, suffers greatly from the opinion in which it is regarded as an industry by many people, who, thinking it can be conducted as a sole means of livelihood without any previous knowledge, rush into it without capital, experience, or the other essentials to success. The knowledge is now available of how to manage poultry profitably on a large scale, but to apply this knowledge it is essential that it be first tested in practice, and it is certainly suicidal to do this otherwise than in a small way. Already the great bulk of the eggs and birds in the Dominion are produced as a side line on the small farms where land is comparatively cheap and the conditions are present for its economical working. It is from these places that the chief production must be expected to come in the future.

Export of eggs : During recent years small consignments of eggs were sent to London and elsewhere chiefly as a means of ascertaining whether these could be landed in a satisfactory condition on the overseas markets. In a general way the experiments proved satisfactory. Last year, however, an endeavour was made to test the London market on a commercial scale. In all three shipments were made, comprising 106,214 dozen eggs in shell, valued at £6,895, together with 5,450 lb. of egg-pulp, valued at £429. While the price for the eggs shipped in shell was a payable one, it is to be regretted that the price received for the pulp proved unpayable, and reports go to show that the prospect of establishing an export trade in pulp is very remote. The landing on the London market of these three shipments in good order and condition, and the favourable reception accorded them, has made the year under review the most eventful one in the history of the industry. The improved position of the industry is one for congratulation —indeed, its future success appears to be more promising than ever before. The local consuming public are now well supplied with eggs, and at a most moderate price, except for a short time in early winter, while it is gratifying to know that we have the prospect of a good market for unloading any future summer surplus of eggs.

There being yet no legislation to enforce compulsory Government grading of eggs for export, an arrangement was made between the Department and the New Zealand Poultry Association whereby the grading, testing, packing, &c. was supervised by the Poultry Instructors and a Government certificate given them accordingly. Whilst the eggs exported were of good quality, it is to be regretted that owing to lack of knowledge or carelessness on the part of producers, by far too many eggs had to be gone through to secure the desired quality at the trading depots. Owing to being undersized, or in a dirty, stale condition, it was not uncommon to have to reject from 50 per cent. upwards of the eggs coming forward. If producers can be induced to send their eggs to the grading-depots in a proper manner it is quite possible that the overhead charges can be considerably reduced during the coming export season. With a view of improving matters in this connection the Poultry Instructors (whose work in grading was largely responsible for the quality of eggs exported last year) are continuing their efforts in this direction by delivering lectures and giving demonstrations in various parts of the Dominion, as a means of teaching the producer how to properly grade his eggs for the export trade. In addition, the Department has arranged to again distribute to producers this year (through the New Zealand Poultry Association) a quantity of bulletins, setting forth in a clear manner the class of eggs desired for export and those that are not.

The following extract from a report of a buyer, dated the 13th December, 1923, gives some indication as to the fine impression that last season's shipments of New Zealand eggs created on the London market : "As an instance of how the eggs were received on this market it may be said that no sooner had they been cleared than buyers wanted further quantities, and in many cases they were asking as to when further shipments would be coming forward. There is no doubt that if the standard of grading and packing are maintained, good prices can be realized here for these eggs."

With a view to protecting our future export trade I would strongly recommend that legislation be brought down at the earliest possible moment enforcing compulsory Government grading of all eggs that leave the Dominion. As it is there is nothing to prevent egg-dealers and others during the coming season exporting ungraded eggs and injuring the good name which New Zealand now possesses for its eggs.

Poultry-stations : As the Avonhead Poultry Station situated at Christchurch, originally established for the Repatriation Department, was not suitable for fulfilling the objects of breeding and distributing tested stock of various breeds of poultry throughout the country, and also unsuitable for the conduct of research and experimental work, it was closed down during the year. The one remaining poultry plant now operated by the Department is that run in connection with the Ruakura Farm of Instruction.

Wool.

The wool-clip for the 1923–24 season was a good one. The wool, being clean, gave a high yield, and considerable improvement was shown as regards classing, &c. The local sales opened with satisfactory prices on a rising market, and several Dominion records were established. The highest prices obtained were 33¾d. for half-bred, 33½d. for Merino, and 32½d. for Corriedale. The average price realized for the Dominion was 16d. per pound, as against 10½d. for the previous year. The quantity of wool sold locally was a record for the Dominion, the sum realized being estimated at £11,200,000, which sum becoming almost immediately available to growers is a consideration, and demonstrates the financial benefit accruing to the Dominion through the enhanced offerings at local sales which has developed during the past two seasons. The quantity of wool exported for the twelve months was 259,668,642 lb., of a declared value of £15,265,264, as against £11,955,567 for the previous twelve months.

The Wool Instructor, Mr. J. G. Cook, has been kept fully occupied in giving lectures and demonstrations throughout the Dominion, and the demands upon his time for these purposes indicate that this instructional work is well appreciated.

Swine.

The year has shown a further increase in the swine industry, and the increased interest being manifested indicates a more satisfactory position as likely to result in the near future. The Instructor in Swine Husbandry attached to the Division, Mr. K. W. Gorringe, has given instruction by way of

lectures and personal visits to plants, in addition to that given in answer to correspondence; and a general desire, as evidenced by the correspondence received, to use higher-grade animals of a more suitable type to meet the market requirements is an encouraging sign, and should result in a better-class article being prepared for export. The quantity of pork and bacon exported was 4,583,933 lb., of a value of £135,508, being an increase of over 100 per cent. on the exports of the previous twelve months.

Rabbit Nuisance.

The end of the winter of 1923 saw the rabbit pest very considerably reduced in very many districts, and had systematic and simultaneous following-up work been the rule rabbits would not to-day be in such large numbers as they are. The winter was followed by ideal breeding conditions, and breeding continued practically right throughout the summer and early autumn months; and although, on the whole, a good season for poisoning, it was nevertheless difficult to hold the rabbits in check, and the end of the year arrived with rabbits more numerous than was desirable.

There is a very genuine and praiseworthy desire on the part of a considerable number of land-occupiers to have rabbits reduced to a minimum, but, unfortunately, on the part of others there seems an utter lack of any serious attempt at improvement, and this is greatly retarding the work of the others and the efforts of the Department. The high price of rabbit-skins is still a marked factor in blocking the way to the improved conditions necessary, and undoubtedly the effect of the trapping industry, combined with dilatory owners, unfinancial and bad farmers, is very largely responsible for retarding increased production of live-stock and live-stock products to the extent of millions of pounds in value. The total value of the export trade in rabbits and their skins is scarcely half a million sterling, in spite of the high price of skins; but if the food which went to feed the fourteen million rabbits which supplied the skins to that value (without calculating the additional numbers killed and not collected and those left to "carry on") had been feeding sheep, it does not require a financer to estimate the yearly loss which the Dominion is suffering through the rabbit pest. The question is of great national economic importance, and something needs to be done, as, although there is undoubtedly an improvement on the position as existing a few years ago, there do not appear to be sufficient indications of that future improvement so necessary if we are ever to reap permanent benefit in the direction of a greatly reduced rabbit pest. It is something to be able to hold our own against the extraordinary breeding propensities of the rabbit, but more progress than that is desired, and it is indisputable that the work of eradication has been made much more difficult owing to the high commercial value attaching to the skins.

Rabbit Boards formed in the North Island are entitled to a considerable amount of praise for the manner in which they have dealt with the matter of suppression of the rabbits within the areas controlled by them, and it is largely to their credit that the pest in the North Island has been so considerably reduced. The absence of the commercial element in the North has also been of assistance in the work of the Inspectors. I very much regret that the reports of the work of the majority of the Boards formed in the Otago-Southland District are not so satisfactory, and I regret to say that these Boards are not giving the results anticipated. Something more is wanted than merely standing between the Department in its work and the settlers. It has been clearly shown in the case of quite a number of the Boards in the North that good work is possible of fulfilment, and I am compelled to adduce from the reports received that there is not the necessary spirit shown by the members of many of the Boards in the districts mentioned.

A very considerable increase in poison materials despatched from the Department's poison-depots has taken place, principally in the North Island, the large amounts purchased by Rabbit Boards being to some extent responsible for the increase. The quantity of phosphorized pollard sent out alone amounted to 487,000 lb. (over 217 tons), besides considerable quantities of phosphorized oats, strychnine, carbon bisulphide, &c.

Noxious Weeds.

During the year the Noxious Weeds Act was amended in some important directions, one of the new provisions giving power to County Councils to declare that certain weeds—Californian thistle, ragwort, gorse, &c.—already declared to be noxious weeds within the county, shall not be noxious weeds in that county or part of the county, as the case might be, in the future, or until again redeclared weeds. A number of the counties, more especially in the South, have already taken advantage of the provision, particularly in so far as Californian thistle is concerned, and others are likely to follow. The new definition of "clear" in the amended Act allows of weeds such as blackberry and sweetbrier, which spread from the roots as well as by seed, to be dealt with by the Inspectors at any time throughout the year, and not at flowering or seeding time alone. The amendments are too recent to yet allow of any remarks as to their actual effect on the work of weed-eradication, and I will therefore not comment further on that aspect of the matter.

Blackberry is the worst of the weeds the settler and the Department have to contend with, being the most widespread and troublesome of all the plants scheduled. The class of country generally on which blackberry has obtained such a strong hold is such that control is difficult, and in some instances almost impossible. Much of the land is rough and broken and of inferior quality; and cutting and burning being the only methods of dealing with the plant, the problem is a difficult one owing to the fact that no finality is reached by these practices, and the expense becomes more than the land can carry. A considerable amount of good work has been accomplished in the eradication of weeds on arable land, where the same excuse does not exist for their presence, and every effort has been put forth to improve the condition of the rougher lands. Under this category large tracts of Native lands throughout the North Island are the worst to deal with, and Crown lands are also considerably affected. The money provided by the Lands Department for the eradication of noxious weeds on Crown

lands is spent to the best advantage, but it is insufficient when the weed-infested lands are taken into account. The Native Department does not grant any money for the eradication of weeds on Native unoccupied or unindividualized lands, and unless some such system as that of leasing such lands free for a term of years on condition that a sum of money is annually expended on weed-destruction work is adopted, it will eventually be found hard to get occupiers under any circumstances whatever. The question is a serious one, and greatly retards the work of weed-eradication throughout the Dominion. A special effort is being made to deal with Native occupied lands, with some fair amount of success, and experimental work in regard to the best method of dealing with large tracts of blackberry-infested land is being conducted by the Fields Division (Biological Laboratory Branch) in the various districts.

Prosecutions for breaches of the Noxious Weeds Act to the number of 153 were instituted during the year.

DAIRY DIVISION.

The Dairy Division, under the direction of Mr. W. M. Singleton, has had a very busy year, and has carried out its responsibilities most satisfactorily. The farm dairy instruction service carried out in co-operation with dairy-factory companies has shown a marked development, and a further extension of this service is certain to come about, as it undoubtedly is an important factor in assisting in improving the standard of our dairy-products. Herd-testing has gone ahead greatly, and is bound to extend still more. The need for a properly equipped laboratory for investigation and research work on manufacturing problems and difficulties has become very apparent. The Wallaceville Laboratory and staff have been utilized for the purpose of dealing with these matters, and some good work has been done, but the real requirements of the industry are far in excess of the capacity of that institution, and a separate laboratory is needed. The following is the Director's report:—

The Season and Production.

The season under review has not been so favourable for production of dairy-products, either in quantity or quality, as its predecessor. The good autumn in 1923 was succeeded by a very wet winter, a late spring in many districts, and a dry summer. Some districts fared worse than others during the summer period. The districts of Canterbury, Otago, Wairarapa, Hawke's Bay, and portions of the Wellington, Taranaki, and Waikato districts, suffered most severely from insufficient summer rainfall. The forecasts of production made in the earlier spring on the assumption of a normal season were therefore not realized. Instead of an increased production of butterfat for export as anticipated, the official year has, on the contrary, evidenced a decrease. (Favourable weather since the 1st April has enabled the season's total output to reach a normal aggregate quantity.)

Butter.

Quality of butter has not been fully maintained during the past season by most of our butter-factories. Climatic conditions have been unfavourable, as the high temperatures facilitate the development of undesirable flavours. Reports have been received commenting on some butter evidencing the flavour of the agent used in the partial neutralizing of the acidity in the cream. Doubtless many of these reports were justified, and buttermakers have in many instances failed to give the necessary attention in the partial neutralizing of the acidity in the cream. A test has been suggested by the Department's Chemist which, it is anticipated, will place the Dairy Instructors, Graders, and factory-managers in a better position to combat this trouble in future.

Water in butter: During the 1922–23 season considerable complaint was made by importers of New Zealand butter into the United Kingdom regarding butters found to contain a water content over the legal limit. During the past financial year extra staff was engaged, and since August last the Division has followed the practice of testing for water one box of butter from each churning. Graders have, as the result of this testing, prevented a good deal of butter containing excess of water from being exported until after being reconditioned. It is satisfactory to know that not one official complaint has since been received respecting New Zealand butter containing an excess of water on b ing analysed in the United Kingdom. Throughout the financial year some 106,786 samples have been tested for water content.

Salt in butter: A considerable amount of samples of export butter have been tested for salt content. The results evidence too much variation not only as between different dairy factories, but between different churnings from the same factory. While there is a tendency for some dairy as companies to salt too heavily, a number could with advantage incorporate more salt without prejudicing the quality of their butter. On the other hand, the tendency of some buttermakers to add too much salt is likely to prejudice consumption.

Whey butter: There is room for considerable improvement in the manufacture of butter from whey cream. Too little care is in many instances given to the care of the cream between the time of separation and its being manufactured into butter. A number of dairy companies have forwarded for export whey butter of good quality, thus emphasizing the fact that good quality may be made.

Cheese.

The higher temperatures which prevailed during the summer period made the manufacture of cheese of the best quality a very difficult task. Many competent to express an opinion consider this

season the most trying for cheese-manufacture New Zealand has experienced for decades. Quality of cheese has therefore shown some falling-off in the major portion of the cheesemaking districts. Canterbury Province evidences some improvement as the result of the extension of the practice of pasteurizing the milk for cheesemaking purposes. While lack of uniformity was prominent amongst the defects, too much openness in body and shortness in texture were of more frequent occurrence than hitherto. "Slimy" milk was in some districts difficult to contend with, but experience tends to indicate that this trouble can, in a great measure, be rectified by proper cleansing methods of the utensils on the dairy farm. Coloured cheese were in some cases defective in colour. This trouble does not appear to be due to inferior colouring, and the cause is being sought for in the milk-supply. The Officer in Charge of the Bacteriological Laboratory at Wallaceville is at present working on the matter.

Paraffin-waxing of cheese: A number of years ago the Dairy Division made a trial shipment of cheese coated with paraffin-wax. The use of the wax on the cheese, after the rind has dried out properly, prevents much of the loss of moisture which usually accompanies the curing and further holding of the cheese. That experiment was in some respects disappointing. Since then many cheese-manufacturing dairy companies have installed plants for pasteurizing the milk prior to the making of the cheese. This pasteurizing of the milk causes the cheese to retain its keeping-qualities for a longer period. It also permits of the manufacture of a cheese containing more water without interfering unduly with the keeping-qualities, and this softer cheese is more desired by the consumer in the United Kingdom. The manufacture of a cheese containing a higher water content has, however, tended to increase the percentage of shrinkage. The Dairy Division therefore arranged another trial shipment of paraffined cheese this season, in order that the saving in shrinkage might be noted, and a report obtained regarding the acceptability of the wax-coated cheese in the cheese trade of London. The London report has not yet been received.

Casein content of milk for cheesemaking: with the co-operation of several dairy companies and the Agricultural Chemist, experiments were commenced this season with two practical tests for ascertaining the casein content of milk for cheesemaking, with the object of obtaining data which, in conjunction with the known fat content of the milk, and the moisture content of the cheese, will tend to establish the yield of cheese obtainable from the milk supplied to dairy factories. Results obtained so far indicate that the object in view may be realized. An account of the experiments will be published in due course.

Quantities of Butter and Cheese forwarded to Grading-stores for Grading.

Port.	Year 1923–24.		Year 1922–23.	
	Butter.	Cheese.	Butter.	Cheese.
	Cwt.	Cwt.	Cwt.	Cwt.
Auckland	554,337	203,091	707,146	168,127
Gisborne	17,273	..	19,045	..
New Plymouth	99,496	257,534	132,303	188,927
Patea	27,868	302,728	58,371	238,166
Wanganui	75,008	26,421	41,815	19,416
Wellington	182,441	341,770	252,429	312,350
Lyttelton	47,026	35,097	54,079	28,673
Timaru	11,303	14,661	12,301	11,358
Dunedin	34,964	42,584	38,397	43,426
Bluff	18,471	203,879	27,250	190,886
Totals	1,168,187	1,427,765	1,343,146	1,201,329

Value of Exports.

Prices of dairy-produce for the year under review have on the whole been satisfactory, as is indicated by the Customs statistics of the values of exports. Including butter, cheese, dried milk, casein, condensed milk, and milk-sugar, a total value of £18,567,474 was reached, as compared with £16,207,053 for these products during the previous year.

Casein.

The manufacture of casein has evidenced a considerable increase. New uses for casein are being brought forward; the advantages attained by its use are causing it to be availed of, in the stead of other commodities, for a number of purposes in various industries. The quality is understood to be giving satisfaction. The major portion graded for shipment has been lactic casein. This variety has been improved considerably in quality during recent years, while rennet casein manufactured in New Zealand has in a number of instances been said to equal the best in the world.

Farm-dairy Instruction.

The work of instruction respecting the milking and care of milk and cream on the dairy farm appears to be growing in popularity. The tendency for dairy-farmers to regard the Farm-dairy

Instructor as a friend and helper, rather than an inspector, is growing to such an extent that dairy-farmers now frequently send for the officer. The farm-dairy instruction work in conjunction with the efficient grading of cream and milk, with differential payments according to quality, is a very effective combination in the interests of improved quality of milk and cream. I expect the farm-dairy instruction work will, if given the necessary encouragement, become general throughout New Zealand.

Inspection in United Kingdom.

Mr. W. Wright, Inspector of New Zealand Dairy-products in London, who is attached to the High Commissioner's Office, has done good service to the industry since he again took up the duties. Many reports have been received from him, and passed on to the dairy companies concerned. General defects have been pointed out, and these are receiving attention. It is believed that, in connection with some of the major defects, remedial measures can and will be taken at this end. A number of Mr. Wright's special reports have contained matter which is calculated to be of special assistance to Dairy Instructors and Graders, and these have been passed on to such officers for their guidance.

Testing of Purebred Dairy Cows.

The highest number of purebred cows on certificate-of-record test for any one month of the past season was 1,185, as against 1,061, for the previous season, or an increase of 11·7 per cent. In the 1923–24 season the number of cows per breeder in November was 3·56, and in the 1922–23 season for January was 3·83, these being the highest months for each financial year. Many outstanding records have been made, and the yield of the average cow has shown a satisfactory increase—an exceptionally dry year has of course to be considered in this connection. There have been a large number of purebred-stock sales throughout the country, and it is pleasing to see many sires with butterfat backing purchased by owners of grade and ordinary herds—this being one of the primary objects of the certificate-of-record testing of purebred cows.

Association Testing of Ordinary Herd Cows.

For the season under review statistics collected indicate that 146,637 cows have been tested under this system, as compared with about 85,000 for the previous season. The increase represents 73 per cent., and this year's total is some 12 per cent. of New Zealand's total dairy cows in milk and dry. The percentage for the previous season was 7·5 per cent. Of the 146,637 cows which have been under test, officers of the Dairy Division have controlled the testing of 37,242 cows. It must not be overlooked, of course, that the Dominion's dairy-cow population is increasing annually, and that the number of cows tested consequently should rise. At the same time the rapidly increasing percentage of cows tested to cows in the country shows that this branch of our work is progressing satisfactorily.

Staff.

The volume of dairy-produce now being manufactured has entailed increasing work on the members of the staff, which is still numerically too small. All have given good and loyal service. I also desire to recognize the able and valued assistance rendered by Mr. W. E. Gwillim, Assistant Director, in the direction of the general work of the Division.

HORTICULTURE DIVISION.

Mr. J. A. Campbell, Director of the Horticulture Division, and his staff have gone through a strenuous year and have throughout done good work. The fruit industry has needed special attention, particularly in connection with the grading and other arrangements necessitated by the large exports made during the year, and the excellent movement started in the Nelson District for the better organization of local marketing conditions. One of the senior officers of the Division has been sent to the Argentine for the purpose of keeping in touch with the condition and the marketing of fruit exported to that country, and of gaining information regarding marketing-conditions, which is calculated to assist in making the South American market a good one for New Zealand fruitgrowers. There should be great possibilities for a successful export trade in fruit to South America, and his report will be awaited with interest.

Following is the Director's report:—

The Fruitgrowing Industry.

The fruitgrowing industry, in common with other of our primary industries, has not yet emerged from the critical stage of its existence resulting from war and post-war disturbances, though it is satisfactory to report that the outlook is brighter. The establishment of a Fruit Export Advisory Committee, the function of which is to co-ordinate as far as possible the fruit-export trade of the Dominion, and the inauguration of the voluntary fruit-control scheme which has been adopted by the bulk of the fruitgrowers in the Nelson Province, together with the sale of fruit on the local market under the "sticker" system, brought into operation by the Department in co-operation with the auctioneers, should materially assist in placing the industry on a more satisfactory basis. There has been a noticeable improvement in the quality of the fruit coming forward on the local markets during the year.

The estimated area planted in commercial orchards during the 1923 planting season was not large, the total area being approximately 180 acres. A number of orchards in different localities, moreover, were cut out, having been abandoned by the respective owners, who were unable to carry on through lack of finance. The total area of commercial orchards throughout the Dominion stands at approximately 30,000 acres.

Reports received from the field officers of the Division indicate that the past season's crop of both pip and stone fruit was, generally speaking, a satisfactory one, and considerable improvement was noticeable in the prices received by growers for good-quality fruit. Small-fruits, such as strawberries, raspberries, &c., suffered somewhat from the continued dry weather experienced during the fruiting season, and as a result the crop was below the average. Owing to damage by frosts the citrus crop in the Auckland District was only moderate. Lemon-culture is extending in the Bay of Plenty and Gisborne Districts, where considerable areas have been planted out in this fruit. Extensive floods experienced in the Marlborough District did considerable damage to orchards in the locality, some growers losing heavily.

In the majority of commercial orchards the control of orchard pests and diseases has been satisfactorily carried out. It was found necessary, however, to take proceedings during the year against a number of persons who had failed to comply with the regulations. Black-spot disease was much less in evidence, due, no doubt, to the fine weather which prevailed during the growing season. The conditions, however, were favourable to the spread of insect pests, and codlin-moth, red mite, and leaf-roller caterpillar did damage in those orchards where proper measures were not taken for the control of these pests. Brown-rot, for which no suitable control measures have yet been devised, has been very persistent, especially in the Auckland District, where considerable damage to stone-fruits was inflicted by this serious fungoid disease. In some localities mealy bug is giving a good deal of trouble, and tests are at present being conducted with the view of arriving at some satisfactory method of dealing with this pest. Reports to hand indicate that the natural enemy of the woolly aphis (*Aphelinus mali*), colonies of which were received last year from the Cawthron Institute and liberated in several districts, is doing good work in controlling the aphis. The operations of this beneficial insect will be watched with interest during the next season or two.

It is satisfactory to be able to report that no serious spread of fireblight disease has taken place during the past season. The control measures taken by the Department within the prescribed fruit areas affected by the disease have resulted in reducing the infection to a minimum in such localities, and there is every prospect of the disease being kept in check in these areas, with constant vigilance and attention on the part of the fruitgrowers concerned in co-operation with the Department's officers. In the non-commercial areas where the disease is existent the position remains about the same as last season, the infection mainly being confined to hawthorn hedges and such susceptible fruit-trees that have not been previously killed through the attacks of the disease. The infection, however, has not spread any further afield during the past season than those districts wherein it was previously located.

The accommodation in the main fruit cool stores has been fully taxed during the past season. Unfortunately, flesh-collapse was again in evidence in a number of the stores, and serious losses were incurred from this affection, particularly in regard to the Sturmer variety of apple. Although extensive investigations have been continued during the year by officers of the Biological Laboratory in co-operation with this Division, no definite results have yet been arrived at. It is hoped, however, from the information now gathered, that a solution of the difficulty will be reached before long.

Export of Fruit.

A considerable development has taken place in the export phase of the industry, the quantity exported during the 1923 export season being considerably in excess of that of previous years, the total number of cases shipped being 147,972. Of this number 102,490 cases were shipped to Great Britain, 40,970 to South America, and 4,512 to Honolulu. Practically the whole of this fruit was shipped under the Government guarantee of 1d. per pound net return to the growers. The returns received on the Home markets were more satisfactory than those of the previous year, and as a result the claims made under the guarantee showed a marked decrease. Although a percentage of the fruit shipped to South America realized good prices, the greater portion was sold at a loss. There were various causes for this failure, and it was made evident that more systematic methods of marketing were necessary.

The guarantee has been extended to shipments of apples made during the 1924 export season, and up to the end of March last some 98,874 cases have been exported—81,059 to Great Britain and 17,815 cases to South America. It is expected that by the end of the season the total will have reached 250,000 cases. The bulk of the fruit is being sent from the Nelson Province, with smaller consignments from Central Otago, Marlborough, Wairarapa, Hawke's Bay, and Auckland districts. In connection with the shipments to South America this year, a *c.i.f.* offer, Monte Video, for 50,000 cases of apples at satisfactory prices was received, and was recommended for acceptance by the Fruit Export Advisory Committee. There is a good prospect of this order being fulfilled. In order that reliable information would be available as to the condition, &c., of the fruit on arrival at Monte Video, arrangements were made for an officer of this Department to proceed to South America in February last. His duties were to inspect and report on the various shipments coming to hand, and also to inquire fully into the conditions prevailing on the South American markets.

Instructional and Experimental Work.

The usual practice of giving practical demonstrations on matters relative to orchard-management generally—spraying, pruning, &c.—has been continued during the year by the Orchard Instructors in

their respective districts. Fruitgrowers and others manifest a keen interest in these demonstrations, and the attendances, as a rule, are very satisfactory. Apple grading and packing classes have been continued during the year in the main commercial centres, and were well attended.

The practice of carrying-out experiments with spray compounds for the control of orchard pests and diseases has been necessarily curtailed since the closing-down in the interests of economy of the Horticultural Stations at Arataki and Tauranga. A few tests on a limited scale were carried out during the year in co-operation with two or three leading fruitgrowers. This system, however, is not satisfactory as very few growers will give the necessary time and attention required in carrying-out the details. Better co-operation is hoped for.

Four co-operative fruit-testing areas now remain in operation, and are situated at Tanekaha (North Auckland), Henderson (Auckland), Matatoki (Thames), and Hillersden (Marlborough). The citrus-testing plot established at Henderson in 1919 has reached an interesting stage, and the results obtainable at an early date should prove of value in connection with citrus-culture generally in New Zealand. The co-operative vine-testing areas established at Te Mata (Hawke's Bay) and Whakatu (Nelson) are receiving satisfactory attention. Definite results from these will not be available for a season or two.

Orchard Registration and Orchard-tax.

The number of commercial orchards registered during the year was 6,673, representing a total of some 30,000 acres. Tax demand notices were sent out to all registered orchardists, and the amount of £1,953 collected in orchard-tax. This amount, less cost of collection, was paid over to the New Zealand Fruitgrowers' Federation, Limited, to be utilized in furthering the interests of the fruitgrowing industry in the Dominion in accordance with the requirements of the regulations under the Orchard-tax Act.

Registration and Inspection of Nurseries.

The annual registration and inspection of nurseries was satisfactorily carried out. A total of 562 nurseries were registered and inspected, and certificates issued. £562 was collected in registration fees.

Proposed School of Horticulture.

The establishment of a central School of Horticulture in the Dominion is a matter that has been brought up during the past few years, and one that should not be lost sight of. The New Zealand Institute of Horticulture (Incorporated), which was established during the year, is now on a proper working basis, and a good deal of preliminary work has already been carried out by the secretary (Mr. G. A. Green). The Institute proposes to issue in due course a record of its transactions in the form of a three-monthly report. The usefulness of such a body has been recognized by the Government, which has agreed to subsidize it for one year on the basis of pound for pound raised by the Institute up to £150.

Horticultural Stations, etc.

Te Kauwhata (Lower Waikato): The weather experienced at this station during the early part of the year was exceptionally wet, and seriously interfered with outdoor operations. Better conditions, however, existed during the spring and summer months. Very little wattle-bark was taken from the plantations during the year, the ravages of a gall fungus interfering to a large extent with the peeling-off of the bark. It is feared, notwithstanding the efforts made to combat it, that this disease may in time destroy the plantation. Sales of wine produced from the station vineyard gave a gross return of £4,388 16s. 9d.

Papanui Experimental Orchard (Christchurch): The usual spraying calendar was adhered to in regard to this orchard during the past year, with good results both on apples and pears. The trees are looking remarkably well, and with but few exceptions are carrying a good crop of clean fruit. The lease of the orchard expires on 30th June, the property having been taken over for a term of five years in May, 1919, and as it has now fulfilled its purpose the lease will not be renewed. When taken in hand the trees comprising the orchard were old and considerably neglected. The objects the Department had in view were (1) to demonstrate that pests and diseases of fruit-trees could be successfully controlled by the spraying-compounds recommended by the Department for the purpose, (2) to test new spraying-compounds, and (3) to try out theories in reference to the control of orchard pests and diseases. The results obtained have been most successful, both from the viewpoint of the Department and that of the fruitgrower, the present highly improved condition of the trees serving as a valuable object-lesson of what can be done by adopting correct and up-to-date methods.

Imported Fruit, Plants, etc.

The examination of all fruit, plants, &c., imported into the Dominion through the recognized ports of entry—viz., Auckland, Wellington, Lyttelton, Dunedin, and Bluff—was carefully carried out by the Port Inspectors during the year. The bulk of the consignments arrived in good order and condition. The fruit inspected was practically clear of fruit-fly infection, only a small quantity being condemned on account of this pest. Fumigation was necessary in connection with a number of lines found on examination to be affected with live scale and mealy bug. Several consignments of almonds badly attacked by the Indian meal-moth (*Plodia interpunctella*) had either to be reshipped or destroyed, and similar action was necessary in regard to a quantity of imported bulbs infected with bulb-mite. A matter which is receiving the consideration of the Department is a scheme of quarantine for imported plants, &c. It is expected that definite proposals may be submitted at an early date. The export trade in plants, &c., has now assumed fairly large proportions, and the examination and issue of certificates covering such has taken up a good deal of the Inspectors' time. The following table gives

the quantities of fruit, plants, &c., which arrived at the different ports of entry during the year, and shows the numbers specially dealt with for disease-control purposes :—

Port of Entry.	Fruit.				Plants, Vegetables, &c.				
	Total.	Destroyed.	Fumigated.	Reshipped.	Total.	Destroyed.	Fumigated.	Reshipped.	Grand Total.
	Cases.	Cases.	Cases.	Cases.	Packages.	Packages.	Packages.	Packages.	Packages.
Auckland ..	401,721	2,848	206	92	41,947	95	436	1	443,668
Wellington ..	196,445	126	..	..	46,315	104	..	..	242,760
Christchurch	46,136	40	200	..	10,606	86	..	..	56,742
Dunedin ..	21,726	21	..	..	9,936	3	..	..	31,662
Bluff ..	5,373	40	20	..	2,606	1	..	..	7,979

Hop-culture.

According to the Customs figures 3,883 cwt. of hops, valued at £27,615, were exported from the Dominion during the year. The crop was above the average, heavy yields being obtained in some of the gardens, and the returns to growers were satisfactory. The bulk of the crop is grown in the Nelson and Motueka districts. The quantities and values of hops exported during the last five years are as follows: 1920: 1,946 cwt., value £14,903. 1921: 1,765 cwt., value £19,201. 1922: 2,056 cwt., value £18,054. 1923: 2,243 cwt., value £21,153. 1924: 3,883 cwt., value £27,615.

Viticulture and Wine-making.

A good season has been experienced in the growing of all kinds of grapes, and crops have been above the average and comparatively free from disease. Dessert grapes grown both under glass and outdoor have realized very satisfactory prices. A good demand exists for grafted vines of both table and wine varieties. It is estimated wine grapes will yield 80,000 gallons of wine, which at a conservative estimate represents a value of £32,000. The returns from grapes grown under glass are set down at approximately £30,000.

Cider-making: An industry which has made considerable development during the year, particularly in the Nelson District, is that of cider-making. The quantity of cider manufactured amounts to approximately 40,000 gallons, most of this being produced from a grade of apples which in former seasons was allowed to rot in the orchards or fed to stock. In this connection the cider industry promises to be of great value to the apple-growers of the Dominion as a means of making a profitable use of their low-grade apples, and it deserves every encouragement from that point of view alone. Up to the present the bulk of the cider produced has been consumed locally, and judging from the amount disposed of in the Nelson District it should command a ready sale throughout New Zealand when the business has been properly developed.

Beekeeping Industry.

The beekeeping industry in the Dominion continues to progress steadily. Owing to unfavourable weather conditions which prevailed during the past honey season, the crop in most districts was a light one, with the exception of Taranaki, Otago, and Southland, where good returns were secured. Reports received from the Apiary Inspectors indicate that steady progress has been made in the eradication of foul-brood disease. A scheme of concentrating on certain areas was adopted last season with the view of cleaning up disease in the localities concerned in a systematic manner. For this purpose a number of reliable beekeepers were engaged as part-time Inspectors to assist in carrying-out the work. The districts operated on were portions of the Waikato, Wairarapa, and Southland. Whilst it has not been possible to completely eradicate disease from the areas dealt with, the results obtained have amply warranted the scheme being given a further trial next season. Although the majority of beekeepers are complying with the requirements of the regulations under the Apiaries Act, there are still a number, chiefly those owning a few hives, who will not take the necessary steps to control disease, &c. Proceedings had to be taken against several delinquents in the various districts during the year. Information and advice on up-to-date methods in beekeeping by means of lectures and practical demonstrations have been continued as far as it has been possible to do so by the present staff. The queen-rearing apiary at Tauranga having been closed down, arrangements were made for the raising of queens at the Ruakura Farm of Instruction, Hamilton. Tested and specially selected queens and nucleus colonies of bees were available for purchase by the public at reasonable prices during the season. Investigations undertaken at the Biological Laboratory indicate that *Nosema apis* disease in bees is in existence in New Zealand. Further tests are being conducted, and consignments of bees from various districts are being forwarded to the Laboratory by officers of the Division for this purpose. Further research work is urgently required in connection with fermented honeys, as large losses are incurred annually on this account. It is hoped that this can be arranged for at an early date.

Export of Honey: The quantity of honey exported during the year was 9,157 cwt., valued at £26,910. The honey-export figures for the last five years ending 31st March, as supplied by the

Customs Department, are as follows: 1920: 9,975 cwt., value £34,141. 1921: 7,633 cwt., value £30,962. 1922: 8,542 cwt., value £31,943. 1923: 10,605 cwt., value £43,032. 1924: 9,157 cwt., value £26,910. The bulk of the honey exported from the Dominion is shipped through the New Zealand Co-operative Honey-producers' Association, Auckland. The following shows the quantity of honey graded for export at the various grading-stores during the year: Auckland, 4,218 cases; Wanganui, 464 cases; Wellington, 129 cases; Lyttelton, 576 cases; Timaru, 896 cases; Dunedin, 345 cases; Bluff, 501 cases: a total of 7,130 cases for the whole of the Dominion. The standard of packing has been well maintained throughout. Liquid honey, fermentation, and honey of two classes in one case, led to the rejection of a number of cases for export.

Registration of Apiaries: The triennial registration of all apiaries took place in June last. The total number of apiaries registered was 6,174, representing a total of 88,127 colonies. Although the majority of persons keeping bees took the necessary steps to register their apiaries, there are still a number who have failed to meet their obligations in this respect. Proceedings were taken by the Department against several such offenders, and it is trusted that the action taken will serve as a warning to others who have neglected to comply with the regulations governing this matter.

Staff.

During the year Mr. W. H. Taylor, Horticulturist, retired on superannuation, and was succeeded by Mr. W. C. Hyde, of the orchard instructional staff. Mr. Taylor was connected with the Department for a considerable number of years, and this opportunity is taken to record a hearty appreciation of his valuable services.

FIELDS DIVISION.

The newly constituted Fields Division, under the directorship of Mr. A. H. Cockayne, was established as from 1st May, 1923, and has already proved itself an efficient branch of the Department's services. Its work is mainly instructional and developmental as regards activities in the field, combined with experimental and investigational work at the Biological Laboratory, and in both directions the officers have shown marked keenness and energy. The developments taking place in agricultural instruction and the great interest in this subject now being exhibited throughout the Dominion will increase the demands upon the services of the staff (at present a comparatively small one), and it seems evident that it will need to be strengthened as regards numbers. Among the various activities of the Division special mention may be made of the excellent work done in connection with pasture-improvement and farmers' short courses of instruction, together with excellent investigational work by members of the Biological Laboratory staff.

Following is the report of the Director:—

Introduction.

The duties of the Fields Division comprise agricultural instruction, the control of experimental areas, the laying-out of experimental work on State farms, advice regarding crops, pastures, and farm management, co-operative experimental work, agricultural investigations generally, including crop-management and the control of crop-diseases and crop-pests, seed-testing, hemp-grading, and grain-grading.

At the commencement the fields instruction staff was small in numbers, and, even although during the year three additional appointments were made, the present staff is still below requirements, and further appointments are essential if the work of the Division is to be carried out efficiently. At present the instructorates are far too large, and it is quite impossible for the Instructors to attend to many important matters that require trained men to carry out. The specialist staff attached to the Biological Laboratory is likewise inadequate with regard to the importance and the scope of the work which could be carried out by it. Proposals in the direction of strengthening the staff will be later submitted.

The agricultural year has been signalized by an abnormal duration of dry weather during the summer months—so much so that in some parts the absence of rain approximated to a drought. Following this dry spell, however, abundant rains fell throughout the country. The dry spell had an unfavourable effect on cereal and turnip crops, and with the drying-up of pastures the outlook at one stage from the point of view of autumn and winter feed was disquieting. However, the result of the rains referred to was an abundance of late-grown feed, and the prospects for the wintering of stock appear bright except in South Canterbury and North Otago. Nevertheless it is a well-known fact that the average farmer, even in favourable seasons, does not make sufficient provision for winter feed for his stock. In the spring and early summer an immense wastage of grass occurs, which should be made use of either by an increase in cropping to enable adequate feeding to be carried out when grass-production is low, or should be preserved in some form and be available later on in the season. At the present time it is safe to say that were it possible to make full use of all grass produced, the number of live-stock in New Zealand could be vastly increased.

Agricultural Instruction generally.

During the year a very large number of lectures at meetings of farmers and others interested in New Zealand agriculture were delivered by officers of the Division (including the Biological Laboratory)

throughout the Dominion. Instructors are as far as possible supplied with lecture-lanterns, and the addresses are generally illustrated by means of slides. The demand for this class of instruction has increased to such an extent that numerous requests have either been unavoidably refused or many months have to elapse before they can be acceded to. Apart from the lectures, instruction is imparted to the farming community by personal visits, field days on the experimental farms and experimental areas, and also by correspondence. The call for personal visits is very great, and beyond the capacity of the present staff. The problem of rapid means of locomotion for Instructors in Agriculture is a very pressing one. In order to secure the maximum of efficiency each Instructor should be provided with a motor-car, as is customary in all countries where this system of farmer instruction is being carried out.

Farm-school Courses.

A rather new feature of the Division's activities is the holding of farm-school courses for farmers at centres throughout the Dominion. These schools are generally of one week's duration and take the form of lectures and demonstrations given by the fields instruction staff, the staff of the Biological Laboratory, and by officers of the other divisions of the Department. I would here like to place on record appreciation of the services of the officers of the Live-stock, Dairy, and Horticulture Divisions at these schools. In every case where assistance has been desired it has always been willingly and cheerfully given. That these schools are getting more and more appreciated is evidenced by the fact that the requests for them are very much on the increase, and by the attendances at the courses. During the year six schools were held, at (1) Ruakura Farm of Instruction, (2) Stratford, (3) Central Development Farm, Weraroa, (4) Ashburton, (5) Dunedin, and (6) Hokitika. In every case both the attendances and the keenness displayed were most gratifying.

Permanent Farm-school for Youths, Ruakura Farm of Instruction.

During the year a permanent farm-school for youths was established at the Ruakura Farm of Instruction. The object of the school is not to educate students up to the B.Ag. degree standard, but to turn out young men well versed in practical farming and live-stock management with at the same time a good grounding in the sciences essential in the planning and management of the modern farm. At the present time there are approximately forty students in residence.

Boys' and Girls' Agricultural Clubs.

These clubs are now conducted in various centres throughout the country—in Auckland, Taranaki, Wellington-West Coast, Wairarapa, Otago, and the west coast of the South Island. The strongest centre is Taranaki. Here the number of entries in the root-growing competitions reaches four figures, and the work of judging the crops is a heavy drain on the time of the Instructors in this particular part of the Dominion. This is accentuated by the fact that the judging must, of course, be done in the late autumn and early winter, when, in addition to the days being short, the weather is often very broken, thus causing delays and inconvenience. However, the best possible is done. Exhibits of the roots grown in these competitions are made at the local shows, and always cause much complimentary comment.

Farmers' Field Competitions.

Farmers' field competitions in the growing of mangolds, carrots, swedes, soft turnips, lucerne, and maize have developed enormously, especially in the Taranaki and Wellington-West Coast Districts. In the great majority of these competitions the judging is done by the fields instruction staff. The competitions are certainly very much in favour, and the results that accrue are of very great value. Up to a certain point these competitions, especially in the Taranaki and Wellington-West Coast Districts, take the place of co-operative experimental plots. I think it must be agreed that the results are more far-reaching than would be the results of co-operative trials, for the reason that large numbers of farmers visit the different crops at judging-time and see for themselves the results obtained from different cultural methods, different manures, and different seeds. All the information respecting cultural methods, manures and seeds used, &c., is tabulated and made available to those interested.

Co-operative Experimental Plots.

The system of conducting experimental plots, previously undertaken by the Department, has not as yet been carried out very extensively. This system is not altogether satisfactory, owing to the tenure of the ground not always being secure enough, due, of course, mainly to the farms changing hands. As stated in another part of my report, farmers' field competitions have to a large extent replaced these co-operative trials, particularly in regard to the growing of fodder crops, and with regard to that type of co-operative work that may be termed crop demonstration work. Co-operative experimental areas will in the immediate future be planned to secure definite and accurate information mainly on a manurial or variety basis. The system now being adopted was agreed upon at a conference of representatives of this Department, Lincoln Agricultural College, Cawthron Institute, and other institutions dealing with agricultural education. On this system the results can be subjected to statistical examination and the results should be scientifically accurate, a condition that has but rarely been secured in past work in New Zealand. The most conspicuous work carried out during the past year has been with regard to the manuring of wheat and top-dressing of pastures, carried out in conjunction with the Canterbury Soils Improvement Committee. Modern experimental field trials necessitate a vast amount of work, and in consequence, so long as the staff available remains small, only a limited programme can be carried out.

Experimental Areas.

The experimental areas at Puwera, Albany, Marton, Ashburton, Winton, Gore, and Galloway have been carried on during the year, and I think it can fairly be claimed that the work done at each of the areas has been of great benefit to the surrounding districts.

The two subsidized demonstration farms—at Manaia and Stratford—have continued to do good work, but the time is arriving when work on these farms should be put on modern experimental lines if correct deductions are to be drawn from their work.

Hemp.

The production of hemp for the twelve months ended 31st March, 1924, showed an increase of 5,921 bales when compared with the production for the previous twelve months. The production of tow showed an increase of 589 bales. The average f.o.b. Wellington prices obtained for our fibre during the past year were: Hemp—Good-fair, £29 11s. per ton; high-fair, £27 11s. per ton; fair, £25 7s. per ton. Tow—First grade, £14 11s. per ton; second grade, £13 11s. per ton.

The quality of the fibre has not, on the whole, been of a high standard, the main fault being badly scutched tails. It may be that men not properly trained to the work and employed on the strippers at the mills are responsible. An endeavour was made during the year to detail one of the Hemp Graders for instruction work round the mills, but the services of the Grader concerned could not be conveniently spared, as he was wanted at the grading-sheds, owing to shortage of staff. It is considered that if another Hemp Grader is appointed one of the present staff could be appointed "Instructor and Grader" and a fair proportion of his time devoted to instruction work. That this would result in great benefit to the hemp industry is evidenced by the fact that in every case where instruction was given at the mill during the past season the quality of the fibre produced since has graded from one to two grades higher than formerly.

"Yellow-leaf" disease was formerly very prevalent, especially in the flax swamps in the Manawatu District. It appears, however, to have run its course, and areas that were rather badly affected are now comparatively free from the disease. During the year a new method of cutting the green leaf has been adopted by several millers. The system is known as "side-cutting." In this system the outside leaves only are harvested, leaving the two centre blades, and thus allowing the leaf to be cut every year instead of every four years as formerly. It is estimated that the "side-cutting" system will produce over a given period at least two and a half times as much leaf to the acre as the old system. In addition to this increased yield the leaf secured will be of a superior quality. It will thus be recognized that the new system will be of immense benefit to the industry.

Grading: The total number of bales of hemp graded in the Dominion for the year ended 31st March, 1924, was 63,779, as compared with 57,958 for the previous year, an increase of 5,921 bales. The quantity of tow graded was 15,563 bales, as against 14,974, an increase of 589. Of stripper tow 1,204 bales were graded, as compared with nil for the previous year. The number of bales of stripper-slips graded was 161, as compared with 129, an increase of 32.

Biological Laboratory.

Pasture Experiments.—There are large tracts of hill country in the North Island on which the pasture originally sown on the bush-burns has deteriorated, and the country is rapidly reverting to fern, manuka, and other secondary growths. Experimental work to try and devise some means of bringing this country back to a good state of production was started during the year. Nearly 100 acres have been laid down for experimental study, and there is good reason to hope that results of great value to the future prosperity of New Zealand will be secured.

Blackberry Investigation.—The extent to which blackberry is spreading in certain parts of New Zealand is a matter of rather national importance, and a comprehensive set of experiments to discover means for the eradication or control of the blackberry was commenced during the year. These experiments are in the main being conducted in the Wairoa County. Blackberry control constitutes a problem different in kind from that presented by any other weed in New Zealand, and it involves a careful study of the plant in the field. It is quite possible that before long the services of more officers will be required in connection with the investigations. The work being carried out includes the ploughing and regrassing of certain areas with a view to the replacement of the weed by useful grasses. On unploughable country an intensive study of the effects of goats is being carried out, and these animals certainly give evidence of being most valuable in some localities in eradicating blackberry. Besides these experiments others are being devised, employing (1) chemical methods, and (2) biological means against the weed. Under the heading of (2) come insects and fungi, and all that are likely to be in any way valuable are being studied.

Agrostology.—Research work in the establishment and maintenance of pastures has been continued, and a bulletin on the "Grasslands of New Zealand: Principles of Pasture-establishment" (Series I) has been published. A second series, dealing especially with the grasslands of the Taranaki back-country is now appearing in the *Journal of Agriculture*. Reports received at the Biological Laboratory from many farmers and teachers of agriculture in colleges and secondary schools indicate that these publications are proving very useful in the agricultural education of the country. The position of the *Agrostis* species in New Zealand has now been fully dealt with, and an illustrated article appeared in a recent issue of the *Journal*. The completion of this work clears up a general confusion as to the identity and agricultural significance of these species. There are, however, many important problems regarding the grasslands of New Zealand that are greatly in need of investigation; at present only a single officer is available for this work.

Agricultural Botany.—As in previous years, large numbers of plants, including weeds, grasses, &c., have been received for identification and report. In answering inquiries of this kind, besides the mere naming of the specimen, a short account is given of the properties of the plant from the farmers' point of view.

Entomology.—The number of applicants for advice on general entomological problems has again shown a decided increase, and numerous specimens of destructive insects and their injurious effects have been collected and preserved for reference.

Orchard investigations: Soil-fumigation experiments with calcium cyanamide for the control of pear-midge are being arranged. Assistance of the greatest value has been continually given by the Bureau of Entomology, London, and that organization is going to further trouble and expense in order to secure for us the natural enemy of the pear-midge in Europe, a matter of great difficulty. Laboratory experiments with certain chemical compounds used as insecticides upon the winter eggs of the red mite have been carried out with some success, and the results obtained are now awaiting verification in the field. Colonies of the *Cryptolaemus* ladybird for the control of apple mealy-bug were received from Australia and California; from these large broods are being raised in our insectary, and are periodically despatched for liberation in various parts of the Dominion. Attempts to acclimatize two other beneficial insects for the destruction of the mealy bug have so far not succeeded. Leaf-hopper has made its appearance in our orchards in alarming abundance this year; there is a great need for investigational work regarding its successful control. Information on the life-histories and the control in New Zealand of orchard pests is being assembled for incorporation in a publication on this subject.

Field-crop investigations: The need for study of the insects attacking the turnip and other cruciferous plants has never been more keenly felt throughout the Dominion than at present. The results of the so-called "turnip-fly" investigations have been published, and further work on the diamond-back moth and cabbage-aphis is in progress.

Animal parasites: The cattle-tick investigation has advanced considerably, and has afforded the necessary foundation for much-improved measures of control. The position in regard to sheep-fly maggot has not yet materially altered, but the parasites liberated for the control of these insects have become established, so results may be looked for in due course.

Forest and timber investigations: The life-history of the gum-tree scale has been worked out, and the distribution of its natural enemy—the *Rhizobius* ladybird—in many districts has resulted in a marked improvement in infected plantations and shelter-belts. Regulations have been drafted for the control of the injurious insects in imported timber. A bulletin embodying the results of the investigations into the injurious insects of forest-trees and forest-products is now nearing completion, and negotiations are being made for its publication.

Mycology and Plant Pathology.—The increase in the number of trained Instructors in the Agriculture, Education, and Forestry Departments in the field has led to a better recognition of the enormous losses in New Zealand through fungous diseases and a considerable increase in the applications for investigation and advice regarding the plant-disease problems of all branches of agriculture. To the mycological and plant pathological herbaria have been added many specimens, collected as opportunity offered, or obtained by means of exchanges with authorities in various parts of the world. The manuscript of a book on the fruit-tree diseases of New Zealand has been completed by the Mycologist in collaboration with the Plant Pathologist and the Director and officers of the Horticulture Division, and now awaits publication. This manual will be the most complete practical guide to the diseases of fruit-trees and their control that has appeared in any country, and the placing of this information in the hands of Instructors and Graders should result in a reduction in the routine work, and thus admit of increased attention being devoted to the diseases of field crops. The increased area of distribution and virulence of certain field-crop diseases, more particularly club-root and dry rot in the cruciferae, smuts in the cereals, and fungous and bacterial diseases in potatoes, are proving such a menace to production in New Zealand that farmers and farming organizations are demanding investigations for better methods of control. Researches into the control of cereal smuts are in hand, and a very complete series of field trials have been started on the Ashburton Experimental Area. The preliminary results of this work has already been published. During the ensuing seasons it is proposed to devote the main strength of the mycological service to the investigation of means for the control of field-crop diseases.

Microbiology.—A number of bee specimens have been sent in to be examined for the presence of *Nosema apis*, a protozoon occupying the epithelial cells of the chyle stomach, but otherwise it has been impossible to bestow much attention to bee diseases and honey fermentation during the year. Work has been done in connection with wet starters for dairy-factory use, and useful data secured regarding the progressive increase of acidity and bacterial numbers in a developing starter. At the Wellington City Milk Depot, bacteriological tests of apparatus and the efficiency of the sterilizing process have been made. Further progress has been made with the study of bacteria for the conversion of insoluble to soluble phosphate.

Fruit Cool Storage.—In connection with export fruit shipments this (1924) season, the Plant Pathologist was appointed to the Cool Storage and Fruit Carriage Committee in connection with the Fruitgrowers' Federation. This committee acted in concert with representatives of shipping companies in endeavouring to see that the best arrangements possible were made to avoid the risk of loss through brown heart and other diseases. The estimated damage through apple flesh-collapse in our local cool stores this year has again been heavy. Experiments in the temperature-humidity ratio of cool stores involving over five thousand cases of apples are now being initiated. The results of preliminary investigation along these lines have been published under the title of "Loss in Weight of Stored Apples." There are some prospects of heavy demands being made on the carrying-capacity of the cool stores this season, and if this eventuates the utmost vigilance will be required in certain stores to avoid a repetition of the losses in past years.

Seed-testing.—During the year 9,100 seed-samples were tested for germination and 1,600 for purity. The fees received amounted to approximately £800. The seed trade has shown every confidence in the work, and is looking to the station more than ever for information and advice. New Zealand produces approximately £1,000,000 worth of grass and clover seed annually, and practically the whole of this is handled upon the certificates issued from the Department's seed-testing station. In addition, a large percentage of the £250,000 worth of seed annually imported is tested and reported on. New Zealand possesses all the characteristics of a seed-growing country, and were such an industry fostered a very valuable export trade could be permanently maintained. The question of reducing the present comparatively high fees for seed-testing should be seriously considered. This year's seed harvest has turned out to be a very light one, and after our domestic requirements have been fulfilled there will be very little left over for export. Last year considerable quantities of white clover where shipped from New Zealand, and in many cases serious complaints were received of the presence of small quantities of dodder. Such a reputation may do considerable harm to this promising export commodity. It would appear that some form of seed-crop inspection is necessary, as is successfully carried out in the United States of America. The merchant could then buy under a guarantee that the crop was clean and free from dodder. Agriculturally New Zealand white clover is looked upon very favourably in all countries. Work on the investigation into the loss of vitality of Chewings fescue is still being carried out, and the results received on the latest parcels to England are very encouraging.

Some research work affecting the routine methods of testing various seeds have been carried out, but shortage of staff has prevented more being undertaken during the year. Work on the relation between ordinary germination tests, soil tests, and field tests of various agricultural seeds requires attention. For this and other purposes, such as the determination of the species of Brassicas, the satisfactory testing of certain vegetable, forest-tree, and other seeds, and the checking of certain doubtful germination tests, a portable glasshouse should be erected as soon as possible.

In addition to ordinary work, 500 seed-cards have been prepared for distribution by sale, numerous individual weed and other seeds identified, statistical information collected and issued to all merchants, and information and advice given to farmers and the trade generally.

Staff.

It is a source of great satisfaction to be able to report that, without a single exception, the staff of the Fields Division of the Department have carried out their duties during the year in a most exemplary manner, and any success that may have attended the work of this branch of the Department is largely due to the earnestness and hearty co-operation of the officers.

CHEMISTRY SECTION.

The Chemistry Section, under the direction of Mr. B. C. Aston, F.I.C., F.C.S., has dealt with a large volume of work during the year, and has maintained a high standard of efficiency.

Following is Mr. Aston's report:—

Introduction.

The past year has been the busiest since the inauguration of the Chemical Laboratory, which has now been in active operation for a quarter of a century. Chemical work is unlike many other kinds of scientific work—it cannot be dropped and picked up again at a moment's notice without suffering in quality. The amount of work now coming in necessitates that it shall be done in series as far as possible. This often necessitates the holding of samples until such time as a number can be done at the same time. 1,235 samples were received during the year, but arrangements were made by the Director of the Dairy Division whereby most of the butter-testing for the Wellington District which was done in this Laboratory during the previous year should be done at the grading-rooms of his Division, check samples, where necessary, being examined at this Laboratory. This arrangement has enabled the officers who formerly performed the whole of this work in the Laboratory to be employed in work requiring greater skill.

Soil Survey.

This work, which was interrupted by the war and the financial stress resulting thereafter, has been resumed, and 225 samples of carefully selected samples have been collected by the officers of the Laboratory in the field. An article was published in the *Journal of Agriculture* for September, 1923, explaining exactly what was meant by a soil survey. Other soil articles published during the year included one on "The Soils of the Otago Peninsula" (October, 1923), one on "Mica-schist Soils of Central Otago" (June, 1923), one on "Littoral Soils" (November, 1923), and one on "The Organic Matter of the Soil" (August, 1923). Other departmental officers have submitted fifty-four soil-samples, and eight miscellaneous soils have been received from other sources. The soil-survey work has been confined to two areas upon which some work had previously been done—the thermal district and the south-western portion of the North Island.

Yellow-leaf Disease in Flax (Phormium).

In connection with the occurrence of yellow-leaf in the different flax-growing areas of the Manawatu, thirty-two samples of swamp soils were collected and analysed. Most of these soils were found to be adequately supplied with the usual plant-foods, but in some cases flax affected with yellow-leaf was found to be growing on soils in a lower state of oxidation than is usual: this points to lack of aeration in the soil as a possible contributory cause of this disease.

Lime and Limestone.

The work of advising farmers and others on the quality of limestone occurring in the different localities where lime is required, and the best methods of dealing with the supply required, has been continued, and sixty-one samples have been analysed in this connection. An account of the most interesting samples was printed in the *Journal* for July, 1923.

Fertilizers.

Fertilizers have been analysed as follows: ten samples received from Inspectors under the Fertilizers Act, thirty-three samples from departmental officers, and eight from miscellaneous sources. The quarterly returns of importations of fertilizers have been prepared and published in the *Journal* from time to time, and the year's returns were summarized in the May, 1923, number. More frequent examination of the fertilizers on the market is most desirable.

An interesting discovery has been made by Mr. Furkert, Engineer in Chief, Public Works Department, in a deposit of phosphate of aluminium at the Three Kings Islands. Samples contained from 14·81 to 31·55 per cent. of phosphoric anhydride, but no calcium was present. From White Island was also received a sample of guano containing 1·4 per cent. nitrogen and 7·13 per cent. phosphoric anhydride. This would be worth £2 to £3 per ton after grinding. Both of these island phosphates were evidently derived from bird-dung.

Investigation of Wheat and its Products.

The results of the examination in this Laboratory of the wheats of the Dominion have this year been made public by a series of articles published in the July, August, and September numbers of the *Journal* by Mr. L. D. Foster, Analyst. The results are highly instructive, and have been appreciated by those interested or employed in wheat-growing. In this work, milling tests, baking tests, and chemical tests have been employed. The whole investigation constitutes pioneer work of a very necessary and potential kind. Mr. Foster attended the annual conference of the Master Bakers' Association at Christchurch in January..

To ascertain if pollard as sold in the Dominion was being adulterated with bran, which is cheaper, the Board of Trade arranged to collect samples and to forward them for analysis and report. Fourteen samples were received. One of these was a genuine bran; the others were reputed to be genuine pollards. Eight of these came up to the required standard, one was a doubtful sample though probably genuine, and four undoubtedly contained more branny matter than is usually the case with fair average pollards. This may have been due to separation in the mill of the bran from the pollard on a coarser sieve than usual, or to adulteration. A sample of pollard produced in one mill may differ in feeding-value from a sample obtained in another—this is owing to differences in milling practice—and while such differences exist it is practically impossible to tell from an analysis when deliberate adulteration is taking place. When bran and pollard, however, are separated always according to uniform methods they yield grades which are characterized by distinctive chemical composition. Any adulteration of pollard with bran can in such cases be detected by analysis. For the protection of the farmer and the miller, and to make possible the detection of adulteration, it is desirable that methods of separation in the mill should, as far as possible, be uniform.

Toxicological.

Unusually droughty seasons have been responsible for some poisoning cases during the past year. An interesting case of a number of fowls being fatally poisoned by the leaves of the African boxthorn (*Lycium* sp.) occurred at Wanganui in August. The fowls were confined in a bare run, but got access to the leaves of the shrub through the fence, and had eaten them as far up as they could reach. The identification of a couple of leaves of this plant in the crop of a fowl led to the detection of this uncommon cause of mortality. Further cases have come under notice of lead poisoning in cattle through access to newly painted buildings or old paint-cans. Cases of poisoning of sheep after dipping were submitted, but the account given and the specimens were too meagre to arrive at any definite opinion on the matter. Interesting cases of dermatitis through handling parsnip-seed in harvesting it were reported from the Moa Seed Farm, Otago. The cases were very similar to some reported from the United States. An article was prepared and published in the *Journal* for March, 1924, dealing comprehensively with the strychnine method of poisoning rabbits and the steps to be taken in case accidental poisoning in those handling the strychnine should result. The series of poisonous-plant articles were brought to a conclusion in the April, 1923, *Journal*.

Sheep-dips.

The compulsory registration of sheep-dips was the subject of a report submitted in November last. In the examination of powder dips it has been found that instructions should be given that the dip should be made up for twenty-four to forty-eight hours before using, to enable the active compounds of the dip to get fully into solution. The non-fulfilment of these necessary conditions may result in the dipping proving ineffective.

Bush Sickness.

This important research had been continued, and the whole of the past five years' work at the Mamaku Demonstration Farm has been summarized for publication. Further experimentation with curative medicines has been carried out, and several visits have been paid to the affected country.

Work for Live-stock and Dairy Divisions not otherwise mentioned, etc.

The Wallaceville pasture and mutton-production experiments have been continued, and visits of inspection have been paid to this farm. The making of medicinal licks in brick form has been

supervised. The dye and other material having been obtained, all the meat-marking fluid required by the Live-stock Division for branding inspected meat is now made in this Laboratory. The fluid from cattle-dips has been tested from time to time as required, and reagents for testing the strength of dips at the dip-side have been supplied as required to the stock officers. All casein for export has been examined chemically, as well as many other samples of dairy-produce throughout the year.

Much work of a consulting nature has also been carried on between officers of this Laboratory and other Departments and with the public.

Summary of Samples received during the Year.

These were as follows: Soils collected by Chemist (soil surveys), 225; soils collected by Fields officers, 54; soils, miscellaneous, 17; fertilizers under the Fertilizers Act, 10; fertilizers (unofficial) from Fields officers, 33; fertilizers, miscellaneous, 8; reputed fertilizers and phosphate rocks, 25; limestones, 61; paints and paint materials, 12; toxicological specimens, 23; sugar-beet, 5; wheats, 42; flours, pollards, and brans, 18; cheese, 4; milks and creams, 10; butters, 556; caseins, 10; waters, 18; fodder plants, 15; sheep and cattle dips, 17; spraying-materials, 2; miscellaneous, 70: total, 1,235.

PUBLICATIONS SECTION.

This branch of the Department's activities, with Mr. R. H. Hooper as Editor, was efficiently carried on during the year.

The *New Zealand Journal of Agriculture* has been maintained at a high standard, publishing authoritative original articles on all phases of our agricultural industry, while also supplying simple instructional matter month by month. Besides circulating among the agricultural and allied commercial communities in every part of the Dominion, the *Journal* is also in regular use in many educational institutions; it is also supplied to all public libraries. The foreign list continues to grow, largely by way of exchange with the publications of agricultural and other scientific institutions in all parts of the world. Correspondence shows that the *Journal* is regularly bound and preserved in many such institutional libraries. The standing of the *Journal* abroad is reflected in the frequent notices or summaries of its articles in such periodicals as those of the International Institute of Agriculture and in various other scientific publications. It is gratifying to know that, in addition to its primary purpose in our own country, the Department's organ thus serves as a good publicity medium for New Zealand abroad.

There has been a continued steady demand for the Department's bulletins, necessitating the revision and reissue of many of those already listed. Among new bulletins issued during the year may be mentioned "The Grasslands of New Zealand: Series I, Principles of Pasture-establishment," a publication of 140 pages, with 112 illustrations, which is in wide request. Another publication issued meriting notice is a "Consolidated Index of the New Zealand Journal of Agriculture," covering the first ten years of the periodical. This index had been compiled some time previously, but owing to necessary financial economies the printing had to be deferred.

Miscellaneous publications handled during the year include the Annual List of Dairy-factories, catalogues for the Ruakura and Weraroa stud-stock sales, and various posters, leaflets, &c.

A considerable amount of special work was also carried out by the Editor.

DEPARTMENTAL LIBRARY.

The Department's central library at headquarters has continued under the general supervision of Mr. B. C. Aston, with Mr. E. McCarthy in immediate charge. Good progress has been made in classification and indexing work, &c., but the library is already somewhat handicapped by limited accommodation. A large amount of binding of periodicals and other publications is still required, and it is hoped to carry out this important work shortly.

Among other accessions to the library during the year special note must be made of a very extensive and valuable collection of American agricultural publications obtained by Mr. John E. Moran, then United States Vice-Consul at Wellington, from his Government at our request. It is a pleasure to here place on record the great appreciation of the Department for this gift.

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

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