SESSION I (23RD PARLIAMENT).
1928.
NEW ZEALAND.

REPORT ON THE RECENT WORK OF THE DEPARTMENT OF AGRICULTURE

BY THE RIGHT HON. J. G. COATES, MINISTER OF AGRICULTURE.

Laid on the Table by Leave of the House.

A MARKED feature of the recent progress of the Department of Agriculture lies in the extension of its instructional and scientific services, with a gradually lessening volume of work necessary for the carrying-out of restrictive measures. This last is consequent upon the instructional activities having given farmers a greater appreciation of the advantages of themselves adopting and carrying out the precautionary and preventive measures necessary for combating animal and plant diseases dealing with insect pests, rabbits, noxious weeds, &c. Some of the objects to which the instructional services of the Department have been specially directed may be summarized as follows:—

(*a*) The improvement of grasslands, and of grain and seed crops; the intelligent and properly systematized use of fertilizers forming a marked feature of this:
(*b*) Improved methods of feed and management of farm-animals, and of disease-control:
(*c*) Better methods of production and manufacture of dairy-products:
(*d*) Improvements in methods of fruit-culture and of preparation of fruit for marketing purposes:
(*e*) Progress in the improvement of the average quality of wool produced:
(*f*) Advice and assistance to the flax, poultry, bee, and tobacco industries, and to horticulture generally.

Some credit may also fairly be taken for helping, by instruction and advice, towards the gradual increase in the output of primary products which has taken place of late years, as shown by the following statistical figures, showing the increase in volume of our total live-stock products: 1924–25, 4·1 per cent. increase over previous year; 1925–26, 0·1 per cent. increase over previous year; 1926–27, 6·4 per cent. increase over previous year. (The data necessary for preparing the 1927–28 figures are not yet fully available, but an increase will be shown.)

When the Scientific and Industrial Research Department was established, steps were taken to endeavour to bring about the best possible co-operation between it and the scientific services of the Department of Agriculture in the utilization of the grants made for research by the Government and by the Empire Marketing Board, thus enabling arrangements to be made under which the whole of the scientific personnel available, both in the Department and in institutions such as Lincoln College, Massey College, and the Cawthron Institute, could be mobilized, so to speak, in one co-operative whole, and bring about as far as possible co-ordination of effort and working methods calculated to give the best results to the Dominion.

Following are more detailed particulars of the work done and in hand:—

Farm Economics.—A Farm Economics Section of the Department of Agriculture has recently been inaugurated. The securing of data and their manipulation to enable deductions to be made is a lengthy business, but already the results of several dairying investigations have been published, and much other material is well in hand, including other branches of New Zealand agriculture. All data supplied by farmers are regarded and treated as confidential.

Agricultural Instruction.—The Department's instruction service—a feature of which is personal advice on the farm—has been considerably strengthened of late by the appointment of additional officers. The desire is to provide more intensive instruction where required.

Plant Research Station at Palmerston North.—In association with the Research Department a Plant Research Station has been established this year (1928) on an area reserved at the Massey Agricultural College farm at Palmerston North. The Biological Laboratory of the Fields Division has been merged in the new institution, of which it will be the nucleus. This station will be the centre of the Department's research work in connection with pastures and field crops, and it is confidently anticipated that results of great benefit to farmers will accrue from its investigations.

Crop Certification.—The object of certification is to render available to merchants and growers lines of seeds reasonably pure and free from disease. So far certification has been confined to wheat and potatoes, but it is contemplated to extend the work to include other crops, such as certain clover and grass seeds. By certification it is hoped to stimulate the production of such seed and establish the fact that its use will render yields more stable and the produce more readily saleable, and will bring about a marked improvement in the general standard of New-Zealand-grown seeds.

Field-crop Experiments.—Formerly field-crop experimental work was largely of a demonstrational and observational character. Recently, however, this work has been remodelled and placed on a basis which enables the results to be statistically examined. This feature is important as correct deductions can be practically assured.

Dry-rot in Swedes.—The matter of discovering a remedy for this serious trouble has been given very careful attention during the past two or three years. The Department's mycologists discovered that the disease is seed-borne; and, further, that it is capable of being controlled by the treatment of "mother" seed, and the gradual raising-up of sufficient seed for requirements from such "mother" seed. Various difficulties have to be surmounted, but it is hoped to have this method on a proper basis in the near future.

Elimination of Disease in Barley.—The mycological officers of the Department have also developed the hot-water treatment of seed barley for the smut and other diseases commonly attacking that cereal. This treatment has been put into actual practice in co-operation with the Canterbury Seed Co., of Christchurch, which largely controls the barley grown in Canterbury. The result has been that disease-free crops and also greatly increased yields have been secured.

Maize Improvement.—Maize, which is mainly grown for grain on the east coast of the North Island, has become badly mixed, and the Department is working, with the co-operation of farmers, to select strains most suitable for the district, and at the same time to keep the strains pure.

Assistance in connection with Deteriorated Lands.—The officers of the Agriculture Department closely co-operate with those of the Lands Department in putting into effect the recommendations of the various Deteriorated Lands Boards. In districts where deteriorated lands are located the staff has been strengthened, and in all cases the officers give prompt attention to any matters arising out of the Deteriorated Lands Act.

Regrassing of Deteriorated Lands.—Comprehensive experiments have been carried on in connection with the regrassing of deteriorated lands in the North Island. The work consists in the main of top-gressing of existing grassland, sowing of various grasses and grass-seed mixtures, top-dressing of new sowings, and experimental work in connection with the eradication of the very troublesome "hard" fern.

Instruction at Flax-mills.—Two instructors in the milling of phormium (New Zealand flax) were recently appointed to visit the various mills throughout the country and tender advice with a view to improving the milling of phormium. It is pleasing to note that a general improvement in the fibre coming forward from mills in the districts visited is becoming apparent.

Wheat Research.—An investigation of the milling properties of New Zealand wheats, and testing of the resultant flours, carried out by chemists of the Department, has been largely instrumental in the establishment of a Cereal Research Institute in Canterbury, which should greatly benefit wheat-growers.

Biological Control of Insect Pests and Noxious Weeds.—The introduction, breeding, and distribution of insect parasites to combat a number of troublesome pests is being actively continued. Considerable success has been attained with natural enemies of the pearmidge, sheep maggot-flies, gum-tree weevil, &c.

Instruction by Wireless.—During the past year or two frequent radio broadcast lecturettes for farmers, fruitgrowers, bee-keepers, horticulturists, &c., have been given by officers of the Department by arrangement with the Broadcasting Company. Much evidence as to the usefulness of this service has come to hand.

DAIRY INDUSTRY SYSTEMIZATION AND BETTERMENT.

New general regulations under the Dairy Industry Act came into operation in November, 1926, and were a complete revision of regulations dating back to 1899, with the addition of a number of new ones. The latter were mostly for the purpose of making general the best practices in vogue in connection with the handling of milk and milk products, and to give effect to provisions of existing Acts. Among the more important are—

(1) Provision for an additional grade classification for export butter and cheese, to be known as "finest" grade.

(2) The national brand is to be used on packages of "finest" grade and "first" grade butter and cheese.

(3) Milking-machine plants are to be properly installed and operated under such conditions as will effectively prevent contamination of the milk. Adequate supply of hot water to be available for cleaning the machines and other dairy appurtenances.

(4) The separation of cream must be done in a separate room, and no internal-combustion or steam engine shall be in the same room.

(5) Cream is required to be graded, and differential payments made according to grade. At least ½d. more must be paid per pound of butterfat for finest-grade cream than for first grade, and not less than 1d. per pound of butterfat lower for second grade than for first; and in addition ½d. per pound lower must be paid for cream containing less than 35 per cent. of butterfat, irrespective of grade.

(6) The grading of cream must be done by graders holding a certificate of competency issued by the Department of Agriculture, the graders to keep certain records of their work.

(7) A number of regulations deal with the testing of milk and cream supplied to dairy factories. Owners of dairy factories are required to take samples of milk and cream and make tests for butterfat in a prescribed way, to use accurate scales, and the graduated glassware used for making the tests must be such as has been tested by the Department and found correct.

Subsidy to Herd-testing Associations.—A subsidy of £8,000 was granted for the season 1927–28, and gave a decided impetus to the important work of cow-testing. The subsidy was distributed by a special Board in order to secure the fairest and most effective allocation. The subsidy has been renewed for 1928–29, the sum granted being £10,500. The numbers of cows under herd test (not including the official herd-test system) for the past three seasons is as follows: 1925–26, 169,776; 1926–27, 170,150; 1927–28, 224,130.

Official Herd-testing of Purebred Cows.—This recently instituted scheme (an adjunct to the certificate-of-record system), has met with a gratifying amount of success. The sampling of the milk is carried out by C.O.R. officers at the time of their visits to breeders.

CONTROL OF ANIMAL DISEASE.

The careful supervision maintained and the strict precautions taken in connection with importations have enabled the Dominion to continue free from many serious diseases of live-stock which cause loss in other countries, and no new trouble of any kind has gained entrance. Active measures for combating to the best advantage those diseases present here have been carried out, these consisting of research at the Wallaceville Veterinary Laboratory, closely linked up with investigations, experiments, and general observations in the field by the field staff. Those troublesome-dairy-cow diseases, contagious abortion, mammitis, and temporary sterility, have been the subject of an organized attack, specially skilled officers devoting their entire attention to this. In addition, the Director-General during his recent visit abroad made a special point of gathering all the information he could regarding what has been done in the way of research in other countries, bringing back all the new knowledge obtainable, and establishing direct contact with scientific workers similarly engaged abroad. Medicinal treatment for temporary sterility is being given a good trial. The adoption of a special blood test which enables it to be determined whether a cow is harbouring the germs of contagious abortion is proving of considerable value in aiding farmers to take precautionary measures against the spread of this disease. In the year 1926–27 the number of tests made was 837, while in 1927–28 the number was 1,953. A special vaccine for contagious abortion is being given a thorough trial.

As regards contagious mammitis, much research work has been done, and special vaccines have been and are being tested out. It is evident that management methods have a good deal to do with the prevalence of this trouble, and advice in this connection forms a feature of the activities of the field officers.

In order to increase the staff at the Wallaceville Laboratory a skilled Veterinary Bacteriologist has been engaged in Great Britain, and he is now spending some months in visiting research institutions in the United Kingdom, the Continent of Europe, and South Africa before coming on to New Zealand.

Apart from dairy-cow diseases, various troubles affecting sheep and lambs have been the subject of investigation, and in the case of a sheep-disease resembling braxy these have enabled preventive measures to be adopted which are already showing good results.

A considerable increase in our knowledge regarding the influence of the mineral content of pasture plants upon the health and productiveness of farm-animals has been brought about by research in the United Kingdom and elsewhere, including New Zealand, and this knowledge is being applied here, both in instruction to farmers on established facts, and in continued research regarding the influence of food constituents upon the incidence, control, and eradication of disease, and the maintenance of a high standard of health and productiveness. A good instance of this is shown by the successful result of the Department's lengthy investigation into bush sickness (iron-hunger) of ruminant stock, which has proved that by providing medicinally the needed constituents the trouble can be effectively prevented, or, in animals already affected, completely cured. As regards bush sickness, the Department has not been content to stop at successful medicinal treatment, but has been carrying out in a more comprehensive manner work aimed at finding a method by which the soil and the pastures can be so treated as to enable the pasture plants to provide stock with all the food-constituents necessary for the maintenance of health and vigour. This includes a soil survey of the known affected areas.

Other important investigational work which has been in progress during the past two years is being carried out in a King-country area where a definite lime deficiency has been found to exist in the soil, and this is aimed at determining the most economically effective method by which the trouble can be so overcome as to enable grazing stock to be kept in sound health and condition. In this, as in the bush-sickness investigations, the Veterinary and the Chemistry Branches of the Department have been working in unison, and of late, through the medium of the Department of Scientific and Industrial Research, the Cawthron Institute has co-operated in similar work in the Nelson Province.

All research work in animal-disease is centred at the Wallaceville Laboratory, though the whole field staff of the Live-stock Division is linked up with it. A large volume of work is done at Wallaceville, 3,513 specimens of animal origin being received there for examination in the year 1925–26, 3,292 in 1926–27, and 4,685 in 1927–28.

In addition to the engagement of the Veterinary Bacteriologist already mentioned, arrangements are also in progress for one of the present Laboratory staff to visit Great Britain, Europe, and America in search of more knowledge and experience, and for a good man engaged in similar work in Great Britain to come to New Zealand for a time by way of exchange.

ANIMAL HUSBANDRY.

Animal-management has an important bearing upon the maintenance of a high standard of production and upon the prevention of many forms of animal-disease, and a new branch of the Department has been established to deal with animal husbandry. The existing field staff is being utilized to convey advice to stockowners, and this, combined with the dissemination of information through the press and through the Department's *Journal*, is already giving evidence of being of practical assistance to farmers.

THE PORK INDUSTRY.

In order to encourage the pork industry and to assist in building up an export trade, arrangements were made in 1927 for the granting of financial assistance in the form of a subsidy of ½d. per pound on all pork carcasses of suitable weights shipped to the United Kingdom, this subsidy to continue for a period of three years.

In addition, investigations have been carried out on the rather difficult question, in the North Island, of the economics of pig-feeding, so far as the provision of foods other than dairy by-products is concerned. In the South Island the Lincoln College authorities have conducted some extensive and good work in this direction.

THE POULTRY INDUSTRY.

Considerable attention has been given to this well-established and very useful industry, which, largely owing to the high cost of poultry-foods, has been passing through a rather difficult time. In order to assist in the marketing of surplus eggs a guarantee on eggs exported was arranged this year and it is hoped that this may assist in keeping the industry on a stable footing.

A poultry-breeding and experimental station has been established at Wallaceville, from which poultry-farmers can obtain birds, or sittings of eggs, of good utility strain, and where experimental work aimed at obtaining knowledge calculated to assist the forward progress of the industry can be carried out.

FERTILIZERS.

The provision of an ample supply of good fertilizers at a reasonable cost is an outstanding essential to high and increasing production from all classes of farming, and the ensuring of such a supply has been given full attention. Through the Phosphate Commission established by Great Britain, Australia, and New Zealand to handle the supplies of phosphate from Nauru and Ocean Islands, phosphate rock sufficient to meet the requirements of our manufacturers has been brought in at a very moderate cost. Negotiations have also been initiated for the securing, in conjunction with Australia (with Great Britain as a possible future partner), of a further large source of supply of high-grade phosphate. Apart from this, a large reduction, amounting to 40 per cent., was made some two years since in the charges on the carriage by rail of all fertilizers for the use of farmers, and this has undoubtedly had the effect of considerably increasing the quantity of fertilizers used, with a resultant increase in production. The large part of this freight concession is provided for on the Agriculture Department's vote.

INSPECTION OF MILK-SUPPLIES OF CITIES AND BOROUGHS.

In the inspection of dairy premises special attention has been given to cleanliness, methods of handling, and cooling of the milk. A careful examination of the cows is carried out, and any showing clinical evidence of serious scheduled disease are destroyed. Cases suspicious of tuberculosis are subjected to the tuberculin test, and if a reaction takes place they too are destroyed. In addition owners are encouraged to submit their cows to the tuberculin test, which is applied by the Department's officers free of charge, and during the past three years 12,469 animals were subjected to this test.

As a further precautionary measure composite samples of milk are taken and subjected to biological examination for tubercular infection at the Department's Veterinary Laboratory, and during the past three years, out of approximately 1,500 such samples examined, only eight gave a positive result. The herds from which these eight infected samples were obtained were followed up, and the affected cows detected and condemned.

INSPECTION OF MEAT.

The number of sheep in the Dominion has shown a substantial increase each year, as shown by the following table:—

Year.	Stud and Flock Rams, Two-tooth and over.	Breeding-ewes.	Other Sheep.	Lambs.	Total.
1926	370,535	13,948,252	4,292,056	6,294,036	24,904,993
1927	388,274	14,831,730	3,906,665	6,522,347	25,649,016
1928	396,351	15,534,051	3,893,774	7,309,634	27,133,810

This increase in the sheep flocks has been reflected in a large increase in the number of lambs slaughtered, as indicated in the following table, showing the respective classes of stock slaughtered and subjected to inspection at freezing establishments and abattoirs throughout the Dominion during the past three seasons:—

Year.	Cattle.	Calves.	Sheep.	Lambs.	Swine.
Oct.–Sept.					
1925–26	344,485	108,429	2,865,549	5,216,836	361,981
1926–27	311,881	149,485	3,071,800	5,260,051	367,764
1927–28	382,605	355,499	2,927,773	6,165,088	449,765

The inspection of cattle in slaughter gives a valuable indication of the extent of tubercular infection among the cattle of the Dominion, and it is satisfactory that the records over a period of years show a downward tendency in the percentage affected, indicating that the method of control adopted by the Department is giving results in the desired direction.

The figures for the past three years show the percentage of all classes of cattle except calves affected in any degree to be—1925–26, 5·16 per cent.; 1926–27, 5·08 per cent.; 1927–28, 5·10 per cent.; as compared with 6·87 per cent. for the year 1918–19.

CONTROL OF RABBIT PEST.

In connection with the administration of those repressive measures which are necessary in order to maintain our agricultural and pastoral industries on a sound footing, the control of the rabbit pest has been carried out strenuously and with a minimum of friction. Rabbits are now fewer and less troublesome than has been the case for many years past; and although the good work of Rabbit Boards has been of material assistance in this, and the commercial value of rabbit-skins has been another important factor, the inspection service maintained must also be given its full measure of credit for the present extremely satisfactory position.

THE FRUITGROWING AND HORTICULTURAL INDUSTRIES.

The Horticulture Division of the Department is carrying out tests of fruit-tree stocks, experimenting for the control of fruit-tree diseases, conducting manurial and cover-crop trials, and testing commercial sprays.

Successful work under the Department's advice is being carried out in New Zealand cool stores in preventing waste and controlling " flesh-collapse " disease of apples. In association with the Scientific and Industrial Research Department and the Low-temperature Research Station of Cambridge, England, investigations are also being made into the carriage of fruit overseas.

The Government guarantee on the export of apples and pears has been of great benefit in building up our present overseas fruit trade, amounting in the season of 1928 to over a million cases. Although the guarantee has now been so adjusted as to practically ensure the Government against loss, short of quite abnormal conditions prevailing in the overseas markets, it still remains of very great value in the financing of shipments.

Frost-fighting, Central Otago.—In the spring of 1926 practically the whole of the important stone-fruit crop of this district was destroyed by a late frost. The usual large apricot crop was a very special loss. This meant not only severe embarrassment to the growers, but a material loss of freight to the railways and others incidentally engaged. At the request of the local Fruit-growers' Association the Department imported special oil-burners and other apparatus, and demonstrated methods of frost-fighting in the spring of 1927. The practical work of frost-fighting was attended to by the local Orchard Instructor, while valuable technical co-operation was rendered by Dr. Kidson, Government Meteorologist, and others. The growers now have a good knowledge of the methods, costs, and possibilities of frost-prevention under their local conditions.

New Zealand-grown Lemons.—Rough uncured local lemons formerly often placed on the market gave a bad reputation to the New Zealand-grown fruit. Growers have been encouraged and assisted to cure, grade, and properly pack their lemons before marketing. It has been demonstrated that when this is done—as it is in countries which ship their lemons to New Zealand—the local crop is equally attractive. This ideal has made much progress among lemon-growers, and the central packing and curing sheds are effecting a great improvement in this direction.

Pear-midge Parasites.—The insect pest known as the pear-midge has done serious damage in pear-orchards, particularly in the Auckland and Nelson Provinces. As a result of inquiries the Department was enabled to introduce into the Dominion a parasite which at the present time gives every promise of controlling the midge. This will be a boon to those growers who in the past have been unable to secure a reasonable crop of fruit.

New Varieties of Grape-vines.—Contrary to the general opinion, grapes can be grown outdoors in almost all districts in New Zealand, provided a proper selection of varieties is made. The Department has imported new varieties from Europe and America to make such selections more readily possible.

TOBACCO-GROWING INDUSTRY.

The cultivation of tobacco-leaf has been very profitable to the few engaged in it, and their success led to numerous inquiries from various parts of the Dominion. An instructor in tobacco-culture has been appointed, and those interested have been supplied with suitable seed and directions for making tests of their land and climate for this crop. There are indications that a considerable area in many localities is suitable for this class of production. In many instances it is the poorer class of land, which has otherwise very limited possibilities of becoming profitable.

In 1926 tobacco-growers were producing more leaf than the local demand required, and approached the Government for assistance to test the London market. For this purpose samples of graded leaf were obtained from London, and a guarantee was given for a parity price with the local market. Although this test shipment was of limited dimensions, a very useful report was obtained, which will be of great assistance when the time comes for developing the export trade.

PUBLICITY.

Results of or progress reports on the Department's work in all branches continue to be published for the information of farmers and others in the *New Zealand Journal of Agriculture*. Large numbers of leaflets and bulletins covering a wide range of agricultural subjects are also printed and distributed gratis.

ORGANIZATION AND FUNCTIONS OF THE DEPARTMENT OF AGRICULTURE.

Following is an outline of all the principal activities of the Department under the Director-General, Assistant Director-General, Divisional Directors, &c. :—

Live-stock Division :—

- Investigation and control of diseases of animals.
- Inspection of live-stock, meat, slaughterhouses, and town-supply dairies.
- Rabbits and noxious-weeds inspection.
- Animal husbandry and advice to stockowners ; instruction in poultry-keeping, pig-raising, and wool-growing.
- Operation of live-stock quarantine stations.
- Inspection of shearers' accommodation.
- Registration of live-stock brands.
- Wallaceville Veterinary Laboratory.

Dairy Division :—

- Instruction in manufacture of butter, cheese, casein, &c.
- Inspection of dairy factories and factory-supply dairies.
- Advice regarding formation of co-operative dairy companies, and factory buildings and plant.
- Grading of dairy-produce for export.
- Supervision of herd-testing associations, C.O.R. testing of purebred dairy cows, official herd tests.
- Registration of dairy factories, &c.

Horticulture Division :—

- Instruction in fruit-production ; horticulture advice ; viticulture.
- Direction of experimental orchards.
- Inspection of orchards, vineyards, nurseries, and imported fruit and plants.
- Instruction in beekeeping ; inspection of apiaries ; grading of honey for export.
- Advice regarding orchard shelter, hedges, &c.
- Registration of orchards, nurseries, and apiaries.
- Te Kauwhata Horticultural Station.

Fields Division :—

Agricultural instruction.
Direction of experimental areas and co-operative experiments.
Farm economics.
Investigation and advice in agrostology, plant pathology, entomology, and agricultural botany.
Identification of economic plant specimens, insects, &c.
Seed-testing.
Hemp-grading for export, and instruction in milling.
Grain-grading.
Plant Research Station, Palmerston North.
Ruakura Farm Training College.

Chemistry Section :—

Analysis of soils, limestones, fertilizers, stock-foods, fodder plants, water, &c., and related advice generally.
Soil survey.
Chemical investigation relating to agriculture.
Testing of wheats and flours.
Registration of fertilizers.
Chemical Laboratory.

Publications Service :—

Edits and issues the *New Zealand Journal of Agriculture,* bulletins, reports, and other publications of the Department.

State Farms :—

Ruakura Farm of Instruction, Hamilton ; Central Development Farm, Weraroa.

Approximate Cost of Paper.—Preparation, not given; printing (500 copies), £7 12s. 6d.

By Authority : W. A. G. SKINNER, Government Printer, Wellington.—1928.

Price 6d.]