

REPORT  
OF THE  
MINISTER OF AGRICULTURE  
FOR THE  
DOMINION OF CANADA  
FOR THE  
YEAR ENDING MARCH 31, 1919

*PRINTED BY ORDER OF PARLIAMENT*



OTTAWA  
J. DE LABROQUERIE TACHÉ  
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1919

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REPORT  
OF THE  
MINISTER OF AGRICULTURE  
1918-1919

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc., etc.,  
Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit to Your Excellency a report of the Department of Agriculture for the fiscal year ended March 31, 1919.

**I. GENERAL REMARKS.**

The work of the département was carried out in a most efficient and satisfactory way and there will be found included herein a summary of the operations of the different branches of the department, all of which is laid before Your Excellency under their respective headings.

The legislation affecting the department during this period consisted of:—

Chapter 8, 8-9 George V, intituled "An Act to amend the Animal Contagious Diseases Act." (Assented to May 24, 1918.)

Chapter, 8-9 George V, intituled "An Act to amend the Inspection and Sale Act (Fruit, Fruit Marks and Potatoes)." (Assented to May 24, 1918.)

Chapter 31, 8-9 George V, intituled "An Act to amend the Meat and Canned Foods Act." (Assented to May 24, 1918.)

By an Order in Council approved under date the 5th day of April, 1918, regulations were established respecting the grading and marking of eggs, under subsection (c) of section 9 of "The Live Stock and Live Stock Products Act."

*Vide Canada Gazette*, vol.-LI, p. 3670.

By an Order in Council approved under date the 3rd June, 1918, the administration of the Trade Mark and Design Act and the Timber Marking Act was transferred from the Department of Agriculture to the Department of Trade and Commerce, together with the officials solely engaged in the administration of the said Acts.

By an Order in Council approved under date the 3rd day of June, 1918, the management of Canada's participation in international expositions abroad, the administration of quarantine regulations and matters connected with public health, together with the officials solely concerned in the administration thereof, were transferred from the Department of Agriculture to the Department of Immigration and Colonization.

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By Order in Council approved under date the 6th June, 1918, the general regulations under "The Destructive Insect and Pest Act," established under date July 17, 1917, and amendments thereto, were further amended.

*Vide Canada Gazette*, vol. LI, p. 4385.

By an Order in Council approved under date the 15th day of June, 1918, the regulations governing the Inspection of Preserved Fruits, Vegetables and Milk, approved under date the 6th July, 1910, were repealed and new regulations substituted in lieu thereof.

Supplement to *Canada Gazette* of date June 29, 1918.

By Order in Council approved under date June 17, 1918, the administration of the law in regard to patents and copyright was transferred from the Department of Agriculture to the Department of Trade and Commerce, together with all officials solely engaged in the administration thereof.

By Order in Council approved under date the 17th day of June, 1918, Mr. Jos. H. Grisdale, B. Agr., the Director of Experimental Farms, was appointed Acting Deputy Minister of the Department of Agriculture.

By Order in Council approved under date the 18th July, 1918, regulations were established providing for the importation into Canada and the permitting of the manufacture, sale, and possession within Canada, of oleomargarine and establishing the conditions of such importation, manufacture, sale and possession, etc. These regulations were made in virtue of the provisions of the War Measures Act.

*Vide Canada Gazette*, vol. LII, p. 351.

By Order in Council approved under date the 5th August, 1918, the regulations established under "The Destructive Insect and Pest Act," approved under date July 17, 1917, and amendments thereto, were further amended.

*Vide Canada Gazette*, vol. LI, p. 1560.

By Order in Council approved under date August 10, 1918, regulations were made under the War Measures Act to prevent the burning of straw remaining from the crops of last year or the product of the crops of the present year, in the provinces of Manitoba, Saskatchewan or Alberta, without written authority from the Deputy Minister of Agriculture of the province in which such straw is situate. These regulations were made in order to conserve all possible feed for live stock owing to the critical crop situation in those provinces.

*Vide Canada Gazette*, vol. LII, p. 672.

By Order in Council approved under date 10th August, 1918, the regulations in force at that time under "The Dairy Industry Act," were rescinded and new regulations substituted in lieu thereof, which came into force on the 1st of September.

*Vide Canada Gazette*, vol. LII, p. 751.

By Order in Council approved under date the 30th day of September, 1918, regulations were established in regard to the sale of butter. These regulations were put into effect owing to an urgent request having been received from the British Ministry of Food for increased shipments of butter owing to the scarcity of butter or oleomargarine in Great Britain.

*Vide Canada Gazette*, vol. LII, p. 1280.

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By Order in Council approved under date 23rd of October, 1918, all surplus fibre flax seed in Canada over and above such quantities as were needed to seed an area for each mill in 1919 equal to the area seed in 1918, was commandeered and placed under the control of the Dominion Government for the British Government.

*Vide Canada Gazette*, vol. LII, p. 1614.

By Order in Council approved under date the 26th October, 1918, regulations were established under "The Seed Control Act," respecting the importation of seeds into Canada.

*Vide Canada Gazette*, vol. LII, p. 1561.

By Order in Council approved under date the 26th October, 1918, the Order in Council of date the 7th of October, 1916, establishing special grades of grain, was amended by rescinding that portion thereof establishing the nomenclature of grades of grain for seed purposes and substituting certain definitions in lieu thereof.

*Vide Canada Gazette*, vol. LII, p. 1562.

By Order in Council approved under date the 21st December, 1918, the regulations under "The Animal Contagious Diseases Act," approved on the 30th November, 1909, and amendments thereof, were further amended.

*Vide Canada Gazette*, vol. LII, p. 2100.

By Order in Council approved under date the 3rd March, 1919, the regulations under "The Destructive Insect and Pest Act," approved under date 17th July, 1917, and amendments thereto, were further amended.

*Vide Canada Gazette*, vol. LII, p. 2772.

## II. ARTS AND AGRICULTURE.

### DAIRY AND COLD STORAGE.

New records were made for prices of dairy produce during the season of 1918. Under the stimulus of these high prices production was well maintained, notwithstanding the severe shortage of labour in many districts. There was some decrease in the production of cheese, but this was more than offset by the increase in the production of butter and condensed milk. The total value of all dairy products exported during the calendar year 1918 amounted to \$50,558,005.

#### DAIRY PRODUCE COMMISSION.

The Dairy Produce Commission of 1918, representing the British Ministry of Food, succeeded the Cheese Commission of 1917, and handled the exportable surplus of cheese, butter, condensed milk and eggs. The members of the Commission were:—

James Alexander, Montreal.

J. A. Ruddick, Dairy and Cold Storage Commissioner, representing the Department of Agriculture;

Dr. Jas. W. Robertson, representing the Canada Food Board;

A. J. Mills, Liverpool, representing the British Ministry of Food;

Jas. Donaldson, Atwood, Ont., and A. Gerin, Coaticooke, Que., representing the Canadian producers.

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The following table shows the total quantities and values of the different products handled by the Cheese Commission of 1917 and by the Dairy Produce Commission of 1918:—

	1917-18.		1918-19.	
	Quantities.	Values.	Quantities.	Values.
		8		
Cheese . . . . . lbs.	157,603,281	34,275,497	148,795,362	34,756,950
Butter . . . . . "			9,780,252	4,586,194
Cond. Milk . . . . . cases.			582,116	3,810,711
Eggs . . . . . "			17,621	268,134
		34,275,497		43,421,989
Values for 1917-18 . . . . .			\$34,275,497	
Values for 1918-19 . . . . .			43,421,989	
			\$77,697,486	

\*48 tins of 14 ounces. †30 dozen.

The price which the commission was authorized to pay for cheese during the first part of the season of 1918 was 23 cents. Authority was issued later to pay 25 cents for all cheese offered to the commission after September 30. The average works out at 23.35 cents per pound for the season.

#### THE SCARCITY OF RENNET.

The supply of rennet to be used as a coagulant in the manufacture of cheese was much larger in 1918 than during the two previous seasons, and the indications are that the danger of an actual shortage of coagulants which threatened the cheese industry for some time after the outbreak of the war is now a thing of the past, although the prices are still abnormally high.

#### FINCH DAIRY STATION.

The Finch dairy station operated as a model cheese factory and creamery and milk and cream shipping station. The quantity of milk received during 1918 shows a large increase over any previous year, the total quantity being 3,859,217 pounds. The total quantity received in 1914 was 2,356,202 pounds. The net value of the milk to the patrons in 1918 was \$2.14½ per 100 pounds, delivered at the factory, plus the value of skim-milk and whey returned to them. The revenue on manufacturing account at the Finch dairy station in 1918 exceeded the total expenditure, including \$701.25 on capital account, by \$429.50, thus enabling the department to conduct a useful demonstration in the proper methods of operating cheese factories and creameries, and affording at the same time the facilities for experimental work not only without cost but with an actual profit.

#### MADAWASKA CREAMERY.

The Madawaska creamery at St. Hilaire, N.B., was again operated as a demonstration station. The number of patrons and the output both increased during the year. This establishment will be on a self-sustaining basis in 1919 and will be turned over to the local company.

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## COW TESTING.

The cow testing has made good progress under the new plan inaugurated in May, 1918. The services of 35 dairy recorders were dispensed with, and provincial supervisors appointed in New Brunswick, Nova Scotia, Prince Edward Island, Manitoba, Saskatchewan and Alberta, in addition to those already employed in Ontario and Quebec. Arrangements were made to have the samples tested at cheese factories, creameries and other places.

Under this plan the work covers the whole country instead of being confined to localities, and the cost of carrying it on has been very materially reduced. As was to be expected under the change of system, there was a temporary decrease in the number of cows under test in 1918 (22,412 as compared with 27,280 in 1917), but the foundation was laid for a much greater extension of the work than was possible under the former plan of operation.

Statistics show that there has been a very large increase in the average production of milk per cow since the keeping of records was first advocated and established by the Dairy Branch.

## INSPECTION OF DAIRY PRODUCTS.

The suspension by Order in Council of December 5, 1917, of subsection (a) of the Dairy Industry Act, thus permitting, temporarily, the importation, manufacture and sale of oleomargarine in Canada has added to the importance of the dairy laws and regulations thereunder, and at the same time has increased the work of administration.

There were twenty-nine convictions for violation of the Dairy Industry Act during the year.

## GRIMSBY PRECOOLING AND EXPERIMENTAL FRUIT STORAGE WAREHOUSE.

This establishment is still being operated on commercial lines, to demonstrate the value of the precooling of fruit for long distance shipments, and also the importance of having refrigerated space available for short time storage of tender fruits. A considerable quantity of berries were stored for periods varying from one to seven days, until such time as the canning factories could handle them. Several thousand dollars worth of strawberries and raspberries were saved from being a total loss in this way. The growers also use the warehouse for storage purposes while accumulating carload shipments, or Saturday pickings which are held over until Monday.

The capacity of the Grimsby plant is now taxed to its utmost, and a great deal more fruit would be offered if storage space were available. It is proposed, therefore, to instal mechanical refrigeration in place of the Gravity Brine system with which the warehouse is now equipped. In this way a large amount of space now used for the storage of ice will be available for fruit storage, and with mechanical refrigeration the capacity of the precooling rooms will be increased by using lower temperatures, and by having a greater reserve of refrigeration.

## CREAMERY COLD STORAGE BONUSES.

Twenty-seven applications were received during the year for the bonus of \$100 paid to creameries to assist in the erection of suitable refrigerators for the storage of butter awaiting shipment. There were nineteen applications approved and paid in full, four were held for further consideration, and four were refused for various reasons.

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## REFRIGERATOR CAR SERVICES FOR BUTTER AND CHEESE.

The usual special refrigerator car service for the carriage of butter in less than earload lots was in operation, by arrangement with the railway companies, from May to October. The iced-cheese car service, by which shippers are enabled to secure iced cars for the shipment of cheese in car lots, was also in operation during the hot weather.

## SMALL COLD STORAGES.

The Dairy Branch continues to receive many inquiries for plans and specifications for small refrigerators, suitable for the use of farmers, country stores, summer homes, and other places where ice is stored for domestic purposes.

## COLD STORAGE ACT.

There were no contracts entered into during the year for the payment of subsidies under the Cold Storage Act.

## NEW PUBLIC COLD STORAGE WAREHOUSE AT MONTREAL.

The Harbour Commissioners of Montreal have been authorized to erect a large modern cold storage warehouse on the harbour front at Montreal, to be designed especially for the export trade. Building operations will be begun at an early date. This warehouse is to be of the very latest and most approved construction, and should be of great advantage to the export trade in perishable food products.

## CARGO INSPECTION.

The disorganized state of shipping, due to the war, has interfered to some extent with the efficiency of the cargo inspection service. The irregularity of the service made it difficult to secure thermograph records, and the secrecy with which the sailing of steamers was surrounded often prevented proper inspection being made. It is hoped, with a return to more normal conditions in the shipping world, that it will be possible to bring cargo inspection work, both at Canadian and United Kingdom ports, back to normal efficiency during the season of 1919.

## DOMINION EDUCATIONAL BUTTER SCORING CONTEST.

I have authorized the Dairy Commissioner to inaugurate a Dominion Educational Butter Scoring Contest, to be carried on throughout the season of 1919. Samples are to be sent once a month throughout the summer from creameries selected by the authorities in the different provinces to a central grading room at Montreal. After careful scoring a report will be sent to all the creameries participating, and to others who are interested in such matters. The samples will be paid for by the department, and retained for the purpose of re-scoring every month. A full record of the churning of each sample will be furnished with the report of the scoring.

The object of this undertaking is to promote uniformity in the character and quality of Canadian butter, and to bring the methods which produce the best results to the notice of all concerned.



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## DAIRY PRODUCE MARKET REPORT.

A suggestion of the Dairy Commissioner to inaugurate a Dairy Produce Market Report also has my approval. The service will consist of a weekly letter issued every Monday and sent free to any person who applies for it. Telegraphic reports will be sent free on Mondays and Fridays to designated officials in different localities, and collect telegrams will be sent to any person on request.

## GENERAL NOTES.

The services of Mr. Joseph Burgess were loaned to the Dairy Produce Commission of 1918, for whom he acted as chief grader of butter and cheese. Mr. Burgess also filled a similar position with the Cheese Commission in 1917.

The Canada Food Board requisitioned Mr. J. F. Singleton, chief inspector of dairy products, for part of the year. Mr. Singleton was given an important position in the produce section.

## PUBLICATIONS.

The following publications in the Dairy and Cold Storage Series have been issued during the year:—

Bulletin No. 54, "List of Cheese Factories, Creameries and Skimming Stations."

Circular No. 25, "Keeping Dairy Herd Records."

Circular No. 26, "The Care of Cream for Buttermaking."

A Report of the Proceedings of a Dominion Dairy Conference held at Ottawa, November 25-28, 1918.

## THE SEED COMMISSIONER'S BRANCH.

The work of the Seed Branch has been continued under the divisions of Seed Production, Markets Intelligence; Seed Testing, Seed Inspection and Seed Purchasing Commission.

Seed production in Canada has been modified by war conditions. Formerly many kinds of seeds needed for planting in Canada were imported from other countries. Because of war-time difficulties in securing supplies, pronounced efforts were made to stimulate home production, and with a fair measure of success.

Information regarding seed markets for the producers and sources of supply for buyers of seeds has been much in demand for several years. It was thought advisable to organize this service under an experienced officer, so that the service may be extended and made of the greatest possible assistance to seed growers in Canada.

The work of seed testing has continued to increase each year about 10 per cent over that of the preceding year. It has been found expedient, during the past year, to establish an additional laboratory at Winnipeg, Man., for the service of north-western Ontario, Manitoba, and Saskatchewan.

Enlargement of the Seed Inspection Division has been made necessary because of the need for more effective control over the quality of grass, clover, and other seeds

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imported for use in Canada. In other respects the seed inspection work has continued as in previous years, including the maintenance of a service at the Canadian Government interior terminal elevators.

The war-time work of the Seed Purchasing Commission, with a personnel of experienced Seed Branch officers, has been of much benefit in maintaining a high standard of crop production during the period of the war. During the past season this commission has purchased, assembled, cleaned and distributed seed grain to the value of more than six million dollars. It is not anticipated that the service of this commission may be needed following the conclusion of the war.

## SEED PRODUCTION.

Field crop competitions, local seed fairs, and provincial seed exhibitions are encouraged by subventions to the provincial Departments of Agriculture amounting to approximately one-half of the total cost of conducting these services. They continue to prove a very important means toward the production of superior seed crops, and are being extended in some of the provinces.

## FIELD CROP COMPETITIONS.

During the summer of 1918 field crop competitions were held in the various provinces and subventions claimed as follows:—

	Number.	Subvention Paid.
Prince Edward Island.....	9	\$ 710 23
Nova Scotia.....	11	1,024 33
New Brunswick.....	12	570 00
Quebec.....	96	4,280 00
Ontario.....	198	13,948 67
Manitoba.....	27	1,791 25
Saskatchewan.....	15	1,568 04
British Columbia.....	32	1,040 00
	<hr/> 400	<hr/> \$23,932 52

The total subvention paid for field crop competitions was about \$2,300 less than in the previous year, which is due to no claims having been received from Alberta. In the rest of Canada the number of competitions was increased by twenty-four, principally in Quebec and Manitoba.

## LOCAL SEED FAIRS.

Local seed fairs were held during the calendar year 1918 and subventions paid as follows:—

	Number.	Subvention Paid.
Prince Edward Island.....	3	\$ 135 43
Nova Scotia.....	5	293 34
New Brunswick.....	7	345 33
Quebec.....	61	2,889 50
Manitoba.....	18	582 31
Saskatchewan.....	27	1,143 41
Alberta.....	32	1,559 00
	<hr/> 153	<hr/> \$6,948 32

The number of seed fairs was increased in Quebec by ten, but the total amount of subvention remained practically the same as the previous year.

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## PROVINCIAL SEED EXHIBITIONS.

Following are the provincial seed exhibitions and subventions paid thereon:—

Prince Edward Island.....	\$ 403 49
Nova Scotia.....	232 33
New Brunswick.....	385 84
Quebec.....	462 66
Ontario, Guelph.....	600 00
"    Kemptville.....	236 00
Manitoba.....	600 00
Alberta.....	400 00
	\$3,320 32

The amount of these subventions is about \$300 less than the previous year, which was approximately the sum paid to Saskatchewan toward her 1917 exhibition prizes.

## ASSISTANCE TO C.S.G.A.

Financial support to the work of the Canadian Seed Growers' Association was continued during the fiscal year 1918-19 to the extent of \$7,500 from the Seed Branch appropriation. The last annual report of the association shows 393 members and 1,411 other growers engaged in the production of registered and improved seeds.

## FIELD-ROOT AND VEGETABLE SEEDS.

The situation in Europe had become very serious during the winter of 1917-18 and exports of field-root and vegetable seeds, already very restricted by embargoes in the interest of food production, were practically cut off altogether. Supplies in Canada while sufficient for the 1918 crop, were falling to the danger limit. Under the circumstances unusual efforts were made to stimulate the home production of these essential seeds.

Field officer, Mr. A. McMeans, visited the more important seed-growing farms in the United States and gained valuable information for the use of Canadian growers. Further co-operation in production was sought and obtained from Dominion and provincial experimental farms and stations and minimum prices calculated to cover the war-time cost of production were guaranteed to growers in British Columbia, which had proven to be exceedingly well adapted to the production of these seeds.

Seed stocks for growers were supplied or approved by the Experimental Farms Branch, which in 1917 had undertaken field-root seed production in quantity for commerce. The Agricultural Department of the University of British Columbia supervised provincial efforts and took over the inspection of both their growing seed crops and reclaimed seed. Valuable seed stocks were obtained from the Field Husbandry and Horticulture Departments of the Ontario Agricultural College, and the corresponding departments of Macdonald College gave support in Quebec. Growers were offered seed stocks and growing contracts by the trade. The results of united effort in the production of these biennial seed crops will be more apparent in 1919.

But the total quantity of home-grown seeds produced in 1918 is about 100 tons, being over three times that of 1917. The Experimental Farms Branch harvested nearly 80,000 pounds. At writing, returns from British Columbia are incomplete but the estimated production is 40,000 pounds. Over 96,000 pounds

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passed our inspection in Eastern Canada, and subventions were paid thereon to private growers amounting to \$6,877.98. - The kinds and amounts produced under Seed Branch supervision in Eastern Canada were: sugar beet, 61,780 pounds; swede turnip, 26,668; mangel, 1,841; carrot, 312; onion, 2,742; radish, 1,518; parsnip, 835; garden beet, 267; and smaller quantities of tomato, celery and cabbage. The principal kinds produced in British Columbia are sugar beet, mangel, onion and radish.

#### WESTERN CANADA TIMOTHY SEED.

The Alberta timothy seed crops of 1916 and 1917, amounting to approximately one million pounds for each season, were assembled at the Canadian Government terminal elevator at Calgary, where they were handled on the same general basis as flaxseed and the cereal grains. Each grower's product was received separately and, on being cleaned to the grades defined under the Seed Control Act standards, was binned accordingly and a warehouse receipt issued. Elevator charges were made very moderate by the Board of Grain Commissioners with a view to the encouragement of the industry, and the service proved very valuable by enabling the growers to put their seed on the market in a finished condition. The South Alberta Hay growers were the heaviest producers and sold their entire 1917 crop of cleaned seed at favourable prices for each grade.

The drought of 1918 wrought havoc on the timothy seed crop as on cereal grains generally in southern Alberta. Practically no timothy seed came forward to the elevator, but this service with that of our seed analysis, grading and inspection staff at Calgary are again available for the 1919 seed crop.

Efforts are being made to promote the growing of timothy seed in the more northern districts of the three prairie provinces, especially in localities where cereal grains do not mature successfully in the average year. The timothy seed crop is considered a by-product of ranching or mixed farming, and is quite remunerative in favourable seasons.

#### MARKETS INTELLIGENCE.

The Markets Intelligence Division of this branch has been instituted with a view to extend more efficient service to seed producers, and also to merchants and co-operative organizations of farmers who are in need of seed supplies. Northern-grown seed supplies when of superior quality have come to be quite popular and are much in demand, both for domestic trade and for export. A great deal of useful work has been undertaken and good results obtained from the encouragement extended to seed growers to increase supplies and improve the quality of the seeds grown by them. The increased help that may now be extended to them in the marketing of their seed will doubtless prove to be of decided advantage.

#### SEED TESTING.

The object of seed testing is to determine as accurately as possible before seed is sown the nature and vigour of the crop that will result from its use.

Farmers send samples to the seed laboratory to determine their suitability to be used on their farms or to be sold to their neighbours. Merchants use the laboratory to

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learn how their seeds should be graded or labelled to comply with the requirements of the Seed Control Act. Samples are also tested for various organizations whose object is the improvement of Canadian agriculture. The Canadian Seed Growers' Association, the Seed Purchasing Commission, various seed fairs and institutions have had free seed tests made during the past year. The number of samples received from merchants, farmers and institutions at the Ottawa and Calgary seed laboratories during each of the past few years, was as follows:—

	1917-18	1916-17.	1915-16.	1914-15.
Ottawa . . . . .	13,084	12,431	13,248	11,517
Calgary . . . . .	11,892	13,547	8,215	8,412

From July 1, 1918, when the present laboratory year commenced, to March 31, 1919, 27,239 samples were received in the three laboratories, as follows:—

Ottawa . . . . .	10,425
Winnipeg . . . . .	8,073
Calgary . . . . .	8,741

The Winnipeg laboratory was opened in October, 1918. That there was need for a seed control station at this point is shown by the fact that such a large number of samples was received within the first few months the laboratory was in operation.

*Testing for Farmers.*

Seed testing is especially important to the Western grain grower because the vitality of his grain is more often impaired by frost than is that in other parts of Canada. About 85 per cent of the samples received at Calgary and Winnipeg are sent by farmers or agricultural organizations, and consist chiefly of grain to be tested to determine its vitality. A considerable proportion of the samples are tested for purity as well as vitality, and the sender is advised as to the kinds and numbers of weed seeds which his grain contains.

Of the samples of western oats examined last season nearly 90 per cent contained noxious weed seeds of one or more kinds. About 80 per cent contained wild oats at the average rate of 65 per pound of grain. A very low percentage of the samples of oats received during the average season will make first class seed. The proportion is higher in the case of barley and wheat especially the latter.

In Eastern Canada the vitality of the grain produced is usually satisfactory, although it is always advisable for farmers to have every lot of seed tested for purity and vitality before it is sown. Most of the testing required of the Ottawa laboratory is in connection with the grading of timothy, red clover, alsike and alfalfa. During the seed testing season of 1917-18 2,712 samples of timothy, 2,199 red clover and 1,730 alsike were tested at Ottawa. A large proportion of the samples are sent by dealers, but an increasing number of farmers are having their clover and grass seeds tested before using or selling them.

*Tests of Imported Seed.*

The testing of samples of seeds required in the enforcement of the Order in Council regulating importation, has added very materially to the work of the seed laboratory during the past season. At Ottawa, for instance, 2,143 samples were received from the Customs Department up to March 31, 1919.

*Official and Investigation Tests.*

During the last seed testing season 563 official samples taken by seed inspectors in connection with the enforcement of the Seed Control Act, and 1,199 samples of vegetable seeds in paper packets, were tested. Several thousand other tests were made in connection with investigations into the quality of seed being used by farmers, methods of sampling bulk lots of seed to secure representative samples, and other lines of research.

The three laboratories are co-operating with the Association of Official Seed Analysts of North America in the study of improved methods of seed testing. Mr. H. B. Sifton, M.A., of the Ottawa laboratory, attended the annual meeting of the association in Baltimore in December, 1918.

*Frozen Oat Investigation.*

Last summer Mr. J. R. Fryer, M.A., of the Calgary laboratory, commenced a study of the effect of frost on the vitality of oats. The aim of this work is to determine the injury to the vitality of oats at different stages of maturity caused by frosts of different degrees, and to learn the precise physical effects of such frosts, so that, if possible, frost injury may be recognized and its extent approximately determined by inspection. The work done last season was preliminary and it is unsafe to draw any conclusions from the work of one year, but in general it may be said that there are strong reasons for suspecting that some very prevalent ideas in regard to the effect of frost on oats are erroneous. The investigation is being continued and enlarged.

*Educational Work.*

The laboratories are continuing the work of supplying material and other assistance to schools where seed studies are taken up. By this means, and through the agency of official publications and the farm press, it is aimed gradually to improve the knowledge possessed by our farmers in regard to qualities of good seed and the importance of using only the best.

## FEED ANALYSIS.

*Research in Microscopic Analysis.*

This is an outgrowth of the work of examining ground feeding stuffs for weed seeds, there having been reason to believe that weeds were being spread through the medium of such feeds. As a result of these analyses and of investigations into the feeding value of elevator screenings, the custom was established of forwarding to the Seed Branch samples of feeds reported to be unpalatable or to have caused injury or death to the animals fed.

It is known that many of our common weed seeds are very unpalatable, and that others are poisonous. In order effectively to analyze feeds from this standpoint it was necessary to find means of identifying such seeds when ground. Investigation has been undertaken with this end in view, and it is now possible, by means of the microscope, to analyze ground feeds and report their constituents, harmful or otherwise.

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*Investigation of Canadian Feeding Stuffs.*

In co-operation with the Experimental Farms Branch, an investigation of the composition of the concentrated feeds on sale in Canada has been undertaken. Some four hundred samples of various feeds have been collected to date. Of those so far examined 36 per cent contain seeds of the mustard family, and these are the seeds which give most trouble to stockmen. In a few feeds other harmful seeds, such as purple cockle and cow cockle, were found. Their occurrence is rare, however, when compared with that of the mustards.

*Analysis for Farmers.*

The service of the microscopic laboratory has not been announced, but notwithstanding this, a considerable number of farmers' samples are received for analysis. Many of them are forwarded by various institutions who have received them and are not in a position to make the analyses. Practically all are from feeds alleged to have been found harmful and unpalatable, and the majority contain seeds known to be poisonous. In some cases the seeds are finely ground so that they cannot be detected and identified without the use of the microscope. Other feeds contain them in a coarsely ground or unground condition, and are thus dangerous from the standpoint of spreading weeds.

*Study of Animal Food Laws.*

This state of affairs, aggravated by the present high cost of feeding stuffs, has suggested the need of an addition to our present legislation with respect to the sale of animal foods. With this in view a comprehensive study has been made of the laws of various countries and states, the object being to ascertain what portions of these laws would be suitable for Canadian conditions, and what modifications and additions would be advisable.

*Educational Work.*

In this field a small beginning has been made. A description of our common poison weed seeds and their effects has been published, and distributed among the members of the veterinary profession in Canada. The subject has also been taken up with the Ontario Veterinary College in Toronto, and we have the assurance that special studies along these lines are to be added to their curriculum.

## SEED INSPECTION.

The regular activities of the Seed Inspection Division have been conducted along much the same lines as in previous seasons, with the introduction of some new work which was rendered necessary for the protection of Canadian agriculture, largely on account of the ordinary sources of seed supply being greatly interfered with in respect to both quality and quantity because of war conditions.

*Import Regulations.*

It was found that considerable quantities of seed low in germination or containing large quantities of noxious weed seeds were being imported into Canada. Some lots

of red clover seed which were very low in vitality and had been refused admittance into the United States on this account were imported by Canadian dealers. To protect Canadian agriculture against low quality seed, an Order in Council was recommended and passed prohibiting the importation into Canada of any seed which was not fit for seeding purposes within the terms of the Seed Control Act. Samples of all lots of seed entered for consumption in Canada are now taken by Customs officials and forwarded to the Seed Laboratories for test. Where satisfactory evidence is furnished that the seed has been tested and is suitable for seeding in Canada the shipments are immediately released, but where evidence of this sort is not furnished release is not given until reports are received from the seed laboratory. Previous to the passing of this Order in Council there were no restrictions on the quality of seed which might be imported into Canada. The present regulations have been applied with very little delay in delivery of shipments and have afforded means of preventing the importation and distribution of considerable seed which would be useless or dangerous for use on Canadian farms. The Order also provides means for securing statistics which previously were not available on the imports of the most important kinds of seeds.

#### *Seed Surveys.*

Seed surveys have been conducted concurrently with those made by the Bureau of Markets of the United States Department of Agriculture. Schedules are sent to seed merchants for July 1 and January 1 to secure information respecting stocks on hand, purchasing, requirements, etc., of various kinds of seed. By this means valuable information was secured respecting general conditions of the seed trade in Canada and the United States which was of great benefit to the department for its own use and in connection with recommendations to the Canada Food Board on applications for import and export licenses for seed shipments.

#### *Grading for Trade and Farmers.*

The regular work of the Seed Inspection Division during the past year has included the grading of seed samples, after the purity tests had been made, and reporting to the seed merchants or farmers who submitted the samples for test. The policy in respect to grading timothy and clover seeds has been to place less emphasis on appearance and to grade largely on weed-seed content, so long as the seed is reasonably good in respect to general quality, including colour, plumpness, etc. The object has been to prevent discrimination against Canadian grown seed which may not appear quite so attractive on account of the presence of some discoloured seeds as certain imported stock, but is probably more valuable for seeding purposes on account of being acclimatized.

#### *Advice on Seed Cleaning.*

When sending reports to farmers information is given respecting the best means to use in fitting their seed for market. From the impurities in the samples submitted information can be given regarding the sieves with which fanning mills should be equipped to make the best and most economical separations.



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*General Inspection.*

The general field inspection has been conducted along much the same lines as in previous years. The territory has been rather more thoroughly covered this season than was possible during the war. Each district officer is directly responsible for the inspection work in his territory. During the trade season temporary inspectors are employed to assist the district officers. Seed merchants and farmers who are selling seed are visited and samples of any lots suspected of being offered for sale in violation of the Seed Control Act are taken and forwarded to the seed laboratory for test. The inspection has shown that for the most part the Seed Control Act regulations are being well observed, particularly by the wholesale trade. Where violations have occurred they are principally in seed producing districts where the local dealers or farmers are not familiar with or have not strictly followed the requirements.

*Paper Packet Inspection.*

The inspection of seeds put up in paper packets has been made principally through securing representative packets of the different kinds and varieties of seeds put out by various seed merchants and testing them for germination. In this way a good general idea of the quality of the seed being distributed is obtained and if any particular kinds or varieties are found to be inferior further investigation is made. The quality of seed sold in paper packets during the past few seasons has been good, for the most part, considering the difficulties in securing stocks.

*Inspection for Seed Purchasing Commission.*

During the past season a large proportion of the seed inspection work has been in connection with the inspection of seed grain being purchased and distributed by the Seed Purchasing Commission. Seed inspectors were placed in each of the elevators where the commission was purchasing and cleaning seed grain. All cars coming into the elevators were inspected and if within the seed standards, certificates were issued and the grain separately binned. When seed grain was ordered from these elevators it was all subject to inspection during the process of cleaning, and ex-elevator certificates were issued when the seed was cleaned to the standards defined for the guidance of the inspectors. Inspection was also provided at shipping points for the oats purchased by the commission in Ontario for shipment to the Port Arthur elevator.

## SEED PURCHASING COMMISSION.

The Canadian Government Seed Purchasing Commission was established in the autumn of 1916, practically as a division of the Seed Branch, to provide against seed shortages in districts where unfavourable climatic conditions had seriously injured the principal field crops. During the seed seasons 1916-17 and 1917-18, practically six million dollars worth of field seeds, including wheat, oats, barley, rye, peas, beans, and corn, were purchased, assembled, stored, cleaned, and distributed to farmers, farmers' organizations, municipal governing bodies, Provincial Governments, and seed dealers. Working capital was made available to the commission by Orders in Council, and the moneys received from sales of seed were returned to the Government.

*1918 Crop Conditions.*

Summer and autumn surveys of crop conditions in respect to seed supply revealed grave conditions in the southern parts of Alberta, Saskatchewan, and south-western Manitoba, where dry weather had very seriously injured the cereal grain crops. Northern districts, too, had in certain cases, suffered from late summer and autumn frosts. In the eastern and northern parts of the province of Quebec grain crops were badly damaged by prolonged wet weather during harvest. Fortunately grain crops were excellent in Ontario, and the Maritime Provinces had an abundant supply of seed grain with a surplus for export from Prince Edward Island.

*Emergency Requirements and Supplies.*

Estimates of probable seed shortages in districts where grain crops had been virtually destroyed by drought or frost were obtained by provincial Departments of Agriculture, in part through their officers of municipalities, and made available to the commission. This data was carefully checked by agents of the commission who visited most of the areas in need of seed grain, as well as those districts from which a surplus of good seed might reasonably be expected.

Ultimately sufficient seed grain was obtained in central and northern Alberta to supply the demands on the commission from southern Alberta and the frost-injured districts. In northern Saskatchewan and Manitoba, however, the oats were so badly polluted with wild oats that only a very limited quantity would qualify as No. 1 seed. Sufficient No. 2 seed oats, which may contain up to ten wild oats per pound, were obtained to meet the requirements of these provinces, but practically a half million bushels of No. 1 seed oats had to be purchased in eastern Canada, including a limited quantity in Minnesota.

More than thirty thousand bushels of these oats were the Banner variety grown from registered seed in Prince Edward Island and Ontario, and obtained by request of Mr. W. M. Graham, Commissioner of the Department of Indian Affairs, Regina. They were to be seeded on the new and clean lands of the Indian reserves that were brought under cultivation in 1918, and it is the intention that the crop therefrom will be assembled, cleaned, and distributed for seed purposes for the 1920 crop in Alberta and Saskatchewan. The advantage of making provision for a probable supply of over 300,000 bushels of seed oats of the best known variety and free from wild oats will be obvious to all who understand the needs of the prairie provinces.

*Co-operation of Government and Other Agencies.*

Mention has already been made of provincial Departments of Agriculture estimates of seed requirements. The Saskatchewan Department of Agriculture placed orders and took direct charge of seed distribution to homesteaders in the unorganized municipalities of the province; and the Ontario Department of Agriculture, through its district representatives rendered most valuable assistance in assembling and inspecting seed oats for shipment. The work of the commission was facilitated by the regulations issued as Orders by the Board of Grain Supervisors, and the hearty co-operation of the Board of Grain Commissioners, Department of Trade and Commerce, who made available their system of interior terminal elevators at Calgary,

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Moosejaw, Saskatoon, and Port Arthur for the assembling, storing and cleaning of seed grain. The Canadian Government elevators under the Harbour Commissioners at Quebec and Montreal were also made use of by the commission. Special freight rates on seed grain were given by the Canadian railways.

*Procedure and Business.*

The grain was cleaned to seed grade standards, defined by Order in Council, and inspected by Seed Branch officers, who issued ex-elevator seed certificates on each carlot shipped out on the order of the Seed Purchasing Commission. The prices asked by the commission were calculated to cover the average cost of the seed grain, including the premiums paid for the superior stocks which could be cleaned to the seed grades, also charges for storage, cleaning, shrinkage in cleaning, sacks and sacking where required. The services both of the permanent officers of the Seed Branch who formed the personnel of the commission and of the Seed Inspection staff were not charged against the cost of the seed grain.

The business of the past season represents a turnover of approximately six million dollars. The transactions of the commission for the year ending June 30, 1919, are not closed at writing, but it is known that every dollar authorized for seed purchases during the past three years will have been returned when the war-time duties of the commission are concluded, and in addition there will be a small balance to cover operating expenses and interest on capital while employed.

## THE LIVE STOCK BRANCH.

## HORSE DIVISION.

*Federal Assistance to Horse Breeding.*

Under this policy a number of breeders in any district may form a club for the purpose of hiring a stallion for the use of the members, and all complying with the regulations receive a certain percentage of the service fee from the Live Stock Branch.

This scheme was inaugurated in 1915, and in that year only nine clubs qualified for the Federal grant. Since that time it has steadily grown, particularly in the Western Provinces, where the scheme has appealed specially to the breeders.

By co-operation, communities have been able not only to obtain but retain the services of good stallions at a very reasonable service fee. Although this scheme has only been four years in operation, one or two districts have kept the same stallion for the whole period. Others have had the same horse for three years. Many who have had the same horse for the last two years have again secured his services for the present season. In this way community breeding has been established and the systematic adherence to one breed made possible.

Stallion owners whose horses are hired to clubs are assured of a guaranteed number of mares and prompt payment of the service fees at a specified time. The payment of one-third the service fee at the end of the service season should give the stallion owner sufficient ready cash to, generally speaking, pay for the season's expenses.

One advantage which has been clearly demonstrated is the fact that club stallions leave a high percentage of strong, healthy, vigorous colts. After four years it has been established that at least 80 per cent of the club horses have left over 50 per cent of their mares in foal. Some have left as high as 90 per cent, while the average has been around 65. This is undoubtedly due to the fact that club members, generally speaking, breed a better class of mares and take better care of them. The stallion owner through having a guaranteed number is able to so divide the season that he does not have to overbreed his horse on any one day or during any one week. Thus, the stallion is at all times strong and vigorous and capable of transmitting same to his progeny.

The putting of the horse breeding business on a financial basis is encouraging owners to buy better horses than heretofore. The inspection, which all stallions have to undergo, and the regulating as far as possible of the service fee, is also having a beneficial effect.

The experience gathered during the last four years is emphatically to the effect that clubs should organize early. In fact, organization should not be put off later than the middle of January and better if it is done before that date. Those that are in a position to hire early get the pick of the best horse. The experience of the Branch is that horses hired early invariably pass inspection and are with few exceptions up to the required standard.

In Scotland, where the Scottish premium system has made the Clyde horse what he is to-day, it is not an uncommon thing to find the best horses hired two and even three years in advance. In fact, some are to-day hired as far ahead as 1923.

Federal assistance to horse breeding was inaugurated for the purpose of stabilizing the business and of helping equally both the breeder and the stallion owner. That it has met with the approval of the parties interested is evidenced by the recognition it has received from various sources. The following resolution passed at a recent meeting of the Western Canada Live Stock Union speaks for itself:—

“Whereas: It is desirable in the interests of the horse-breeding industry of Western Canada that in order to improve the standard of horses the services of better, pure bred sires should be made available;

“And whereas: In comparison with all other schemes which have been tried, the plan now followed by the Dominion Government in giving aid in the hiring of stallions has proved, wherever adopted, to be the only satisfactory and permanent method of bringing about the results desired;

“Therefore: The Western Canada Live Stock Union desires to place itself on record as recommending to all governments wishing to assist the horse-breeding industry in this way, the endorsement and encouragement of that plan.”

#### DISTRIBUTION OF PURE-BRED STALLIONS.

As stated in a previous report, no stallions have been purchased for distribution to associations since 1916. The majority of the horses have been sold from time to time. The few that are left are loaned to associations in districts where they are greatly needed. Many of the associations have given up the stallions owned by the Branch, and formed clubs for the purpose of hiring. The community breeding idea

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started by the associations has given such good results that the districts are still carrying it on, though under another scheme.

Stallions owned by the Branch have been particularly healthy, only one horse having died during the year, although these animals are placed under conditions far from being ideal. That they have proven to be good as well as sure foal getters is evident from the fact that a number of them have been sold to parties in the districts where they had stood for three and even four years. It is also evident that the value of the pure-bred sire is appreciated in these sections. The community idea carried on to-day in many districts through clubs, was started and fostered very largely by the first scheme of loaning stallions where greatly needed.

## CATTLE DIVISION.

## DISTRIBUTION OF PURE-BRED BULLS.

Under the distribution policy which has been in operation since 1913 pure-bred bulls owned by the Live Stock Branch are loaned to specially-organized associations in newly-settled districts and in backward sections in some of the older provinces where farmers are unable to purchase pure-bred sires for themselves. Up to the end of December, 1918, the number of bulls so loaned totalled 2,152.

In districts which have been obtaining the benefit of this policy for several seasons the improvement in the live stock is already very apparent. This form of assistance has been warmly endorsed at various farmers' meetings during the past year and letters received from secretaries of interested associations have been very appreciative. Commission men, drovers, and dealers at the various stockyards have also been very favourably impressed with the gradual improvement in the quality of the stock coming from districts which have been using the department's sires for several seasons.

It is of interest to note that when a bull's usefulness as a sire is over he is by no means a total loss to the department. During the calendar year of 1918, 325 bulls were sold for beef purposes. The net proceeds received from the sale of these bulls amounted to 66 per cent of their original cost as registered sires.

The following table indicates the total number of bulls in the hands of associations on December 31, 1918:—

TOTAL Number of Bulls in Hands of Associations.

Breed.	B.C.	Alta	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	Total.
Shorthorn.....	35	214	234	112	84	98	1	9	12	799
Ayrshire.....	13	2	2	.....	5	186	13	14	6	241
Holstein.....	11	4	6	5	12	35	2	3	1	79
Hereford.....	2	23	23	5	3	3	.....	1	.....	60
A. Angus.....	3	9	13	10	.....	.....	.....	.....	.....	35
Fr. Can.....	.....	.....	.....	.....	.....	36	.....	.....	.....	36
Jersey.....	10	.....	.....	.....	.....	.....	1	.....	.....	11
Guernsey.....	3	.....	.....	.....	.....	.....	.....	2	.....	5
Red Polled.....	.....	.....	2	.....	.....	.....	.....	.....	.....	2
Galloway.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Total.....	78	252	280	132	104	348	17	29	19	1,250

## CARLOT POLICY.

The Live Stock Branch under the terms of the carlot policy pays reasonable travelling expenses of a farmer residing in Canada, or the authorized agent of farmers residing in Canada, purchasing stock at central stock-yards for return to country points. In Eastern Canada assistance under the policy is confined to stock-yards' purchases of female breeding stock, cattle, sheep, or hogs. In Western Canada it covers stocker and feeder cattle in addition to breeding stock.

This policy has been in effect at three stockyards in Western Canada during the past three seasons and has been instrumental in turning back to country points an increasing number of stocker and feeder cattle and breeding stock and of young ewes received at these yards. This has been particularly the case at Winnipeg. In 1915, in which year the policy was not in effect, 82 per cent of the stockers and feeders received at Winnipeg yards were shipped south. In 1916 only 42 per cent went south and in 1917 only 30 per cent; despite the fact that the total receipts of this class of cattle were 50 per cent greater in 1917 than in 1916. In 1918 the percentage shipped to the United States was greater than in 1917, due to a further increase of 70 per cent in receipts and to inability to greatly expand the absorbing capacity of Western Canada farms owing to the scarcity of feed. Nevertheless, the total number of cattle returned to Canadian points in 1918, from Winnipeg alone, was 8 per cent greater than in 1917. In addition the number returned from both Calgary and Edmonton was, last year, practically equivalent to that from Winnipeg.

During the calendar year of 1918, 2,703 steers, 18,745 heifers, 7,978 sheep, and 205 sows were purchased under the terms of the car lot policy. Since October 10, 1916, 102,150 head of cattle, sheep and swine have been shipped under its terms to farmers in Western Canada alone. The cost to the department for stock shipped back under this policy during the year 1918 averaged only fifty cents per head.

## FREE FREIGHT POLICY.

The free freight policy was inaugurated in the fall of 1917 by the Live Stock Branch in co-operation with the railway companies of Canada to supplement the carlot policy in preventing, as far as possible, the slaughter or exportation of useful heifers, young ewes and young sows offered for sale on the open market at central stock yards. It has been possible under this policy to ship from the stock yards to country points female breeding stock of the classes mentioned without payment by the purchaser of freight charges on same, provided the stock was not purchased for speculative purposes.

Twenty-five per cent of the ordinary freight charges on such shipments has been borne by the railway companies and the other seventy-five per cent has been collected by the railway companies direct from the Live Stock Branch. The introduction of this policy has had a tremendous influence on trading at the different yards and, during the eighteen months that the policy has been in operation, practically all of the young heifers and ewes of good quality offered for sale on the three western yards have gone back to the country for breeding purposes. Shipments returned to country points

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under the terms of the policy between the date of its inception, September 21, 1917, and March 31, 1919, were as follows:—

Name of Stock Yards.	No. of Cattle.	No. of Ewes.	No. of Sows.
Edmonton .....	11,966	6,231	155
Calgary .....	12,220	18,422	
Winnipeg .....	12,284	3,674	191
Toronto .....	1,414	7,672	
Montreal .....	164	452	
Total .....	38,078	36,451	346

## RECORD OF PERFORMANCE.

Owing to the scarcity of help on the farms, the number of cows entered for the record of performance test during the summer and fall of 1918 was considerably less than would have been under normal conditions, however, more applications for entry were received during the first three months of 1919 than during the same period of any previous year.

The yearly test is now conceded to be the most reliable method of acquiring information regarding the production of milk and butter fat. Purchasers of dairy cattle in nearly all cases require to know the records of the cattle or of their ancestry. A large proportion of the male progeny of tested animals are used in grade herds where their influence cannot fail to be beneficial. This is tending to increase the average production of dairy cattle and is, therefore, fulfilling the main object of the record of performance test.

The record of performance inspectors, visiting as they do, a number of the highest producing herds in the Dominion, are in a position to obtain reliable information as to the best methods of feeding and caring for dairy cattle; this information is of great benefit to a large number of the owners of cows entered for the test, especially those who have not had considerable experience with dairying.

The following is a brief summary of the work for the year:—

Number of cows entered for the test:—

Ayrshires .....	568
French-Canadians .....	36
Guernseys .....	25
Holstein-Friesians .....	598
Jerseys .....	245
Shorthorns .....	141
Total .....	1,611

Number of cows qualified:—

Ayrshires .....	194
French-Canadians .....	1
Guernseys .....	3
Holstein-Friesians .....	175
Jerseys .....	76
Shorthorns .....	45
Total .....	496

## Number of bulls qualified:—

Ayrshire . . . . .	8
Holstein-Friesians . . . . .	18
Jerseys . . . . .	4
Shorthorns . . . . .	2
Total . . . . .	<u>32</u>

*Appendix.*

The records tabulated in the appendix to the annual report are for cows which have produced sufficient milk and butter fat to qualify, but which have failed to freshen within fifteen months after the commencement of the test. .

Ayrshires . . . . .	43
French-Canadians . . . . .	2
Holstein-Friesians . . . . .	70
Jerseys . . . . .	17
Shorthorns . . . . .	12
Total . . . . .	<u>144</u>

## SHEEP AND GOAT DIVISION.

## DISTRIBUTION OF RAMS AND BOARS.

The policy of loaning pure-bred rams and boars to farmers' live stock associations has been in vogue for six years. The assistance under this policy is extended to those districts where the farmers experience considerable difficulty in obtaining pure-bred sires or are in such a financial position that they are unable to purchase for themselves the most suitable sire. The policy of restricting an association to one breed and, further, maintaining the breed first selected, thus making the breeding in that district uniform, has been adhered to. Evidences are now apparent that this principle has brought about and is bringing the desired results. This is the basis of community breeding which has been the foundation of success in live stock centres the world over.

Since this policy has been in operation upwards of 1,800 rams and 500 boars have been bought and placed in the hands of farmers who otherwise could not have benefitted by the use of a pure-bred sire. A tabulated statement follows which gives the numbers of the breed distributed and the Provinces in which the distribution took place.

*Boars.*

Breed.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total.
Yorkshire . . . . .	2	10	4	120	24	9	24	21	4	218
Berkshire . . . . .	6	1	1	6	18	19	39	54	9	153
Poland China . . . . .					1	1	9	6	1	18
Duroc Jersey . . . . .						1	8	20	3	32
Chester White . . . . .		5	1	37	5				1	49
Tanworth . . . . .				5		2	1	1		9
Total . . . . .	8	16	6	168	48	32	81	102	18	479



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*Rams.*

Breed.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total.
Shropshire . . . . .	86	108	23	240	36	14	5	93	6	611
Oxford Down . . . . .	32	222	12	110	16	57	2	107	6	644
Leicester . . . . .	15	8	14	297	70	7	4			415
Cheviot . . . . .	5	4	3	21						33
South Down . . . . .	8	19	1	12	2				4	46
Hampshire . . . . .			7	63						70
Lincoln . . . . .			3	15	8					26
Suffolk . . . . .						6				6
Cotswold . . . . .				1	2				1	4
Total . . . . .	146	361	63	759	134	84	11	290	17	1,775

In so far as the Maritime Provinces were concerned it was decided last year to change this policy. The Sheep Division purchased and transported to four distributing centres within the Maritime Provinces 254 rams. The provincial Departments of Agriculture took on the work of distributing these rams to sheep raisers. All the rams previously loaned to associations in Nova Scotia, New Brunswick and Prince Edward Island were sold to such farmers as were desirous of owning a pure-bred ram. Over two hundred rams were sold in this way which means that upward of five hundred pure-bred rams were placed in the hands of sheep raisers at below actual cost; the difference between cost and selling prices was borne by the Live Stock Branch.

## CO-OPERATIVE MARKETING OF WOOL.

In the report of the Sheep Commissioner issued in 1911 attention was called to the poor quality of Canadian wool and the deplorable system of marketing this commodity. These two defects were given as the greatest weaknesses of the industry. Therefore, the selling of wool on a quality basis was inaugurated. This movement has grown until the local associations which were first formed combined their efforts in February, 1918, and formed a central co-operative selling agency known as the Canadian Co-operative Wool Growers, Limited, with its head office in Toronto, Ont.

Wool is collected by the various local wool growers associations or sheep breeders associations or in some instances under the auspices of the provincial Government and then graded or prepared for selling on a quality basis by a staff of graders employed by the Sheep Division. During the season of 1918 fourteen of these qualified wool graders were engaged on this work. During 1914 206,129 pounds of wool were graded for associations in four provinces. In 1903, approximately 4,550,000 pounds of wool were graded and sold co-operatively throughout the Dominion. The wool clip of Canada is estimated at 15,000,000 pounds and that portion of it which comes on the market for sale through the usual channels of dealers and wool-growers associations is 10,000,000 pounds. From this it will be seen that the wool graders graded approximately 45 per cent of this wool which comes on to the market and, further, that 45 per cent of this wool was sold on a quality basis by co-operative means.

## EDUCATIONAL PROPAGANDA.

This work divides itself into two main features: (1) that of exhibits at the leading agricultural fairs throughout the Dominion and (2) practical demonstrations by representatives of the Sheep Division situated in the various provinces. An exhibit advocating co-operative marketing and grading of wool visited the larger exhibitions, including Calgary, Edmonton, Brandon, Regina, Saskatoon, Vancouver and Ottawa. Other exhibits showing the manufacture of wool in the various stages, together with the defects of wool fleece sometimes encountered in the marketing and their remedies were shown at the following exhibitions: Three Rivers, Sherbrooke, Valleyfield, Quebec, Ottawa Winter Fair, Windsor, London, Welland and Charlottetown. Experts accompanied these exhibits in order to give first-hand information on all matters pertaining to the sheep industry and the marketing of wool. In this way those virtually interested were helped.

Demonstrations in dipping, shearing, castration, docking and correct preparation of wool for the market were carried out by the various representatives stationed within the provinces. In the work of dipping a portable dipping tank was carried from one centre to another where small flocks were dipped in front of an audience of interested sheep raisers. This work was very successful. One representative dipped between 3,500 and 4,000 sheep in a period of a little over two months last summer. This would have very beneficial results especially in the province of Quebec, where a very small percentage of the sheep are dipped annually with the result that internal parasites are very prevalent and in some cases external parasitic diseases.

## THE GOAT INDUSTRY.

Interest in goats is being increased each year. The goat has a place in the live-stock industry in spite of the many puerile jokes which are constantly being made at the goat's expense. The milk-consuming public are now realizing the terrible percentage of tubercular milk cows and are becoming seriously alarmed. The goat is to all intents and purposes immune from this scourge, therefore, it is being used more and more for supplying milk for infants and invalids. This division has been instrumental in introducing goats as milk producers in one or two hospitals and sanitariums. Record of performance work has been extended to goats, but at the present time there are not sufficient members to make a big start. There are now four societies in Canada interested solely in goats: one national, the Canadian Goat Society, and three provincial ones, namely, British Columbia, Alberta and Manitoba. The societies in Alberta and Manitoba were formed during the year of 1918.

## POULTRY DIVISION.

The work of the Poultry Division centres around, principally:—

1. The marketing of a standardized product, inspected and guaranteed.
2. The distribution of markets intelligence.
3. The encouragement of co-operation, giving despatch in collection and marketing.
4. Economic production through stock improvement.

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Important assistance has also been rendered in furthering the sale of Canadian eggs and poultry in an export way, and representations made, which have resulted in improved facilities for trading between the different section of the Dominion. In light of the world-wide interest being evinced in poultry-keeping, attention has also been given to the matter of increasing the per capita consumption of eggs and poultry. Special effort was made in this direction through the medium of exhibits at fairs.

THE ENFORCEMENT OF THE EGG REGULATIONS UNDER THE "LIVE STOCK AND LIVE STOCK PRODUCTS ACT."

The egg regulations under the "Live Stock and Live Stock Products Act" became effective on May 28, 1918. For purposes of administration, Canada was divided into two sections: the western section including, and west of, Port Arthur; the eastern section, east of Port Arthur.

The following is a statement of the inspections made during the seven months ending December 31, last:—

Section.	No. inspections.	No. cases inspected.	No. shipments approved.	No. not approved.
Eastern . . . . .	289	53,374	251	38
Western . . . . .	180	75,998	167	13
Totals . . . . .	469	129,372	418	51

The principle followed in the matter of inspection is inspection by approval at point of shipment. That is, eggs in carlots cannot be shipped for export or inter-provincial shipment unless the quality is found to be as represented, at point of shipment. The relatively larger number of shipments not approved in the eastern section is due to the fact that the eggs shipped from eastern points were, as a rule, of a much higher grade than those from the west, and the fact that the requirements of the higher grades are much more exacting than those of the lower.

The beneficial effects of the regulations are clearly apparent in two ways, first, the marked improvement in the quality of the stock shipped by the western provinces and, second, the reports coming back respecting the quality of the eggs shipped to Great Britain last year.

Previously, eastern firms bought eggs in Chicago in preference to western Canadian points. Last year, however, the fact that even seconds could not be shipped which contained more than two per cent of cracked, bad and dirty eggs, gave eastern buyers an assurance of quality which they were not able to obtain on even the largest United States markets.

In an export way, no better proof can be obtained than the satisfactory reports coming back of shipments made. A large firm in Bristol has stated that the Canadian eggs which they received last year were not only the best storage eggs but the best graded eggs which they have ever received. And following the satisfactory reports of last year and the endeavours that have been made to further the sale of Canadian eggs in Great Britain this year, the prospects for an enlarged and important demand from Great Britain are very bright.

## EGG AND POULTRY MARKETS REPORTING.

During the year this work has progressed apace. The results are now clearly evident. During the past year more eggs have been sold throughout the Dominion than ever before. The custom in the past has been for producers, country shippers and others to take whatever price was offered, but now with definite, tangible information in their hands of what the prevailing prices are on all principal markets, of what the trend of trade is, these people have been able to make up their mind as to the price their product should bring, and instead of accepting what was offered, have sold their eggs for what they thought they should get. Naturally, such a condition has had a distinct reflection in the attitude of producers and original shippers toward the poultry business and has emphasized its comparative profitableness to them as a part of their activities. The situation with respect to the poultry business throughout the country never was more favourable. Outside of some districts in the West and in the non-producing areas of the East it is estimated that farmers are keeping over this year from twenty-five to thirty per cent more females than last. Prices are very favourable and there is the satisfaction in feeling that with the assistance being given, the producer is obtaining more and more his just proportion of the ultimate selling price.

At present the Weekly and Daily Egg and Poultry Markets Reports are issued from Ottawa only. These, by mail, do not reach producers and shippers in Saskatchewan, Alberta and British Columbia until after four or five days, by which time most of the information is too old to be of the greatest advantage. The logical solution is to issue these reports simultaneously from several different centres. Plans for this purpose are already under consideration, and steps in this direction will be undertaken at an early date.

## CO-OPERATIVE MARKETING.

From holding the reputation of a few years ago of offering for sale possibly the poorest eggs, the province of Prince Edward Island has attained the place where it is recognized as offering to-day the best eggs obtainable in carlots in the Dominion. This condition has been brought about primarily by a system of co-operative collection and marketing, the foundation of which was laid by the Live Stock Branch, in conjunction with the provincial Department of Agriculture, some six years ago. Further, the inspectors' report on the eggs for export put up by the Dundas Co-operative Association in Ontario is to the effect that there are not grades high enough in the present standards prescribed by the regulations to accommodate the quality offered. No means have yet been devised equal to co-operative movement to stimulate prompt delivery, frequent marketing, and despatch in moving the eggs from the point of lay to point of storage or consumption, and having in mind the important place which such activities must have in raising the quality of the product throughout the Dominion, it is clear that all legitimate assistance possible should be extended to the organization of co-operative egg and poultry shipping organizations. With this end in view an increased appropriation is being asked for this year.

## POULTRY STOCK IMPROVEMENT.

High class utility stock is the basis of all national improvement. While it is true from the standpoint of quality that eggs as laid are one of the most uniform products in nature, increased volume is largely a matter of breeding and selection. There was a time when trap nesting was about the only means available to indicate the productiveness of individual birds. In the last few years, however, both experiment stations and individuals have demonstrated that high producers can be separated from non-producers by the application of comparatively simple and authenticated tests. In other words, in the culling demonstrations that have been given on some hundreds of farms during the past year it has been clearly proven that it is possible to take out from 40 to 60 per cent of the stock in the average farm flock and still leave the farmer with as many eggs per day as he was getting before. No line of work previously undertaken has done more to impress upon the individual producer the economics of good stock and rigid selection.

Poultry breed quickly and are a class of live stock the entire complexion of which can be changed nationally in a comparatively few years. Extensive investigation has shown that high productiveness is largely a sex limited characteristic. The male constitutes more than 50 per cent of the flock. It is conceded, therefore, that any effort directed along these lines should have to do primarily with the selection and approval of the male birds.

The department has under consideration a scheme of national registration and approval whereby individual effort along lines suggested may be fostered and encouraged. The foundation for this work has been effectively laid in certain parts of the Dominion, and it is possible that important announcements in reference thereto may be made during the present year.

## EXHIBITS.

The exhibits work carried on by the Poultry Division during the past few years was further amplified and extended last year, the principal addition being a large new exhibit featuring greater production and increased consumption of poultry products. A feature of this exhibit was the attractive display in glass cases of wax and plaster cast imitations of many of the principal ways in which eggs and poultry are utilized as food. This exhibit toured all of the larger exhibitions from coast to coast.

For some time there has been a growing feeling that the exhibits' work as carried on should illustrate more and more the phases of work actually underway and constitute as it were, a medium for bringing the different lines of work more definitely before the public. To this end a smaller exhibit, featuring the four principal activities of the Poultry Division, as outlined in the opening paragraph, was prepared. This exhibit made the circuit of many of the smaller fairs and poultry exhibitions in eastern Canada. In addition, the extensive exhibit prepared the year previous illustrating co-operative marketing has been used wherever opportunity offered, and at the Guelph Winter Fair last year there was erected a full-size cross section of a model for an ice-cooled chill room suitable for the pre-cooling of eggs and dressed poultry at country shipping points.

Owing to the increasing demand for these exhibits from year to year, and the fact that much of the improvement that has taken place in the quality of eggs marketed may be directly attributable to this work, it is planned to use this medium even more extensively in the future in featuring the different aspects of the work carried on by this division.

### THE MARKETS DIVISION.

In order that the producers of live stock may market their surplus stock to the very best advantage, the Markets Division places at their disposal a reliable and unbiased source of information as to the conditions under which their animals are marketed. Producers are supplied with reliable knowledge as to supply and demand so that they may better regulate the movement of their stock to the market, thereby ensuring an even volume of receipts on market days, precluding congestion, scarcity, and wide price fluctuations; they are informed as to general conditions of feed and pasture, as to the world's supply and distribution of live stock, and on other subjects either directly or indirectly influencing the marketing of their stock. The ultimate aim of the division is to provide the producers with every facility in as far as a knowledge of markets and marketing is concerned thereby placing them on an equal footing with the trade.

As the public stockyards are the centres where supply and demand are best indicated, and where an index to general live stock conditions can best be secured, representatives of the branch are stationed at all the large central livestock yards in the Dominion. These men, specially selected for the work, classify all live stock offered for sale, according to quality, ascertain the point of origin of the stock from each province, record actual sales, ascertain average prices and report on the conditions under which sales are made. This information is forwarded to Ottawa by mail and telegraph, and is recorded, co-ordinated, edited, and used as a source from which a weekly market news service is derived. This service consisted during the past year of reports covering the grading, average price, price range for the bulk of sales, and top price of all live stock marketed at the stockyards, situated at Montreal, Toronto, and Winnipeg, together with weekly comments in detail on supply, demand and distribution of the live stock after selling whether to the packer and butcher trade, shipment back to country points, or on export account. A table of receipts at the leading stockyards for comparative periods was also appended. In addition market comments dealing with the live stock transactions at the Calgary and Edmonton yards were prepared and included in the weekly service. This service was distributed through co-operation with the farm press and through a mailing list confined to persons directly interested in the live stock industry. During the year, the list was increased by over 100 per cent, chiefly through personal inquiry. Monthly and annual statistical statements followed up the weekly reports.

That this service is appreciated is manifested by the fact that many of the leading agricultural journals in the country have given preference to the departmental reports over the information they formerly published. The weekly news letter and statistical table are now a regular feature of the live stock section of many of the most important farm journals, and occupy a place in the library of representatives of official agriculture.

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During the year, the division was able to bring up to date, the large amount of statistical data as to the point of origin, grading, and quality of every head of stock sold at a public stockyard during the past three years. This information is compiled by counties in Ontario and Quebec, and by definite areas in the Prairie Provinces, and is now complete for the years of 1917 and 1918. On January of the present calendar year, statements as to the marketings from the various provinces by counties and areas were prepared and mailed to the farm press, to agricultural representatives, official agriculture, and to officers of the branch situated at the stockyards. These statements have taken various forms and following is one which deals with the question of the percentage of steers suitable for export alive or dressed, marketed from Ontario during the month of March, 1919.

ONTARIO Produced Live Stock marketed at a Public Stockyards with percentages of Export Quality, by counties, March, 1919.

	Cattle.		Calves.		Hogs.		Sheep.	
	Total Cattle.	Per Cent. Export Steers.	Total Calves.	Per Cent. Beef Bred.	Total Hogs.	Per Cent. Good Bacon.	Total Sheep.	Per Cent. Good Grade.
Algoma	13	Nil	Nil	Nil	192	83.8	Nil	Nil
Brant	567	Nil	71	39.0	97	99.0	40	80.0
Bruce	1,423	6.18	8	75.0	706	97.6	45	56.0
Carleton	317	22.4	38	Nil	270	98.9	24	59.5
Dufferin	998	8.9	19	89.0	1.04	89.2	46	61.0
Dundas	35	Nil	468	Nil	198	90.9	3	100.0
Durham	895	1.9	861	3.2	627	94.2	97	59.0
Elgin	190	12.1	300	14.6	657	93.4	19	31.2
Essex	29	Nil	20	35.0	338	93.2	2	100.0
Frontenac	Nil	Nil	14	14.3	75	84.6	Nil	Nil
Glengarry	58	Nil	193	Nil	254	72.7	18	80.0
Greenville	99	Nil	670	Nil	141	82.8	85	0.0
Grey	2,693	10.5	47	7.2	3,556	94.3	260	66.1
Haldimand	317	Nil	27	18.5	Nil	Nil	Nil	Nil
Halton	881	15.5	145	44.1	1,079	95.6	195	72.4
Hastings	350	5.6	556	11.3	869	92.5	26	65.1
Huron	1,688	11.0	56	53.5	1,236	96.5	151	74.2
Kent	675	8.0	28	57.1	789	88.9	69	73.9
Lambton	101	6.0	8	75.0	97	91.8	Nil	Nil
Lanark	498	18.3	19	16.8	467	88.3	23	50.0
Leeds	85	Nil	673	1.3	1,257	80.1	25	86.0
Lennox and Addington	44	Nil	198	18.7	55	58.1	30	92.6
Lincoln	19	Nil	14	35.7	Nil	Nil	4	100.0
Middlesex	282	15.2	25	24.0	498	95.7	60	75.0
Muskoka	36	Nil	Nil	Nil	42	100.0	Nil	Nil
Nipissing	11	Nil	Nil	Nil	88	84.0	29	100.0
Norfolk	125	1.0	54	22.2	276	98.5	84	88.0
Northumberland	423	Nil	159	18.9	644	95.4	60	71.8
Ontario	1,704	8.2	107	50.4	389	96.2	123	91.8
Oxford	1,186	1.0	981	6.2	594	94.7	92	70.0
Perry Sound	18	Nil	7	28.5	306	54.5	46	80.4
Perth	963	8.2	262	50.7	1,842	95.8	202	61.3
Peterborough	1,721	8.9	211	9.0	502	91.1	89	75.0
Prescott	656	1	135	46.6	18	99.0	46	78.0
Prince Edward	Nil	Nil	Nil	Nil	Nil	Nil	10	100.0
Renfrew	147	Nil	133	9.8	237	74.2	26	58.0
Simcoe	294	14.4	76	1.3	258	78.0	36	31.0
Stromont	2,130	2.8	131	81.6	4,912	94.3	256	83.9
Russell	37	Nil	1,665	Nil	663	84.7	2	Nil
Victoria	4	Nil	2	Nil	115	68.7	2	Nil
Waterloo	591	6.7	30	66.6	344	95.4	35	85.7
Welland	957	10.1	337	3.2	742	91.1	25	96.0
Wellington	140	Nil	11	45.6	1	85.6	Nil	Nil
Weston	2,931	9.6	71	39.0	2,336	85.6	404	80.6
Wentworth	249	8.4	22	9.0	191	95.8	Nil	Nil
York	2,248	3.9	280	45.0	1,676	92.8	458	81.0
Totals	28,898	Av. 7.0	9.27	Av. 11.9	31,235	Av. 92.2	3,246	72.3

In view of the energetic programme in force to enhance the production and quality of our live stock and live stock products, in anticipation of an increased export trade in the same, information such as the preceding, regarding the marketable stock of the Dominion, is of considerable value. It has already received editorial attention from the farm press, as also appreciation from others interested in the advancement of the live stock industry. Intelligence of this character is now available for public use, and can be obtained either at the branch or at the offices of the branch situated at stockyards within the provinces.

In addition to having secured information bearing directly on the marketing of live stock, the officers of the division supervised the operation of the earlot and free-freight policies of the branch, as outlined under the report of the Cattle Division, and placed their services at the disposal of those requiring assistance in purchasing and shipping live stock. It is not too much to say that the very favourable increases in the condition and quality of the live stock population of the Prairie Provinces during the past two years, have been due in no small degree to the good work done by the representatives of the branch of the Winnipeg, Calgary, and Edmonton stockyards.

The officers of the branch at the yards are becoming recognized as bureaus of market information, and the officers are at all times ready to aid and direct farmers visiting the market and requiring advice and assistance. In fact this departmental representation is much appreciated and is now considered as performing an indispensable function in facilitating the purchase and sale of live stock at the stock yards, and, as well, at country points.

The staff at the branch, employed to prepare for record and publication, the information received from the centres of trade, has been augmented during the year in order to take care of the increasing volume of information.

A noticeable point in connection with the year's work was the volume of inquiries received from the trade and from producers for information dealing with all phases of the situation as regards domestic and foreign live stock and live stock products. Having made provision during the year for keeping such information up-to-date and readily available, the division is in a position to handle an extensive inquiry department, dealing with the live stock industry and markets of the other large meat exporting countries of the world, as well as with those of the Dominion.

#### FEED DIVISION.

During the year this division has continued with the work of purchasing concentrated feeding stuffs, and their distribution to districts where the feed shortage was most acute. This service, which was commenced last year, has proven very popular and orders for ear lots of feed were received from all parts of the Dominion. In this way a considerable quantity of feed was disposed of and the live stock industry has benefited materially as a result. With the signing of the armistice, the demand eased off slightly, due partly to a popular impression that there would be a speedy decline to pre-war values, which resulted in a disposition on the part of many feeders to curtail expenditures until lower levels had been reached. However, while prices weakened somewhat.



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and concentrates were available at lower prices, this was only a temporary relief, and values soon advanced to higher levels.

Aside from bran and shorts, the feeds most in demand were corn, oil cake and screenings (standard stock feed). This division did not undertake to handle mill feeds, these being left entirely with the trade to distribute, but the following quantities of corn, oil cake and screenings were sold:—

Corn.	Oil Cake.	Screenings.
4,364 tons.	3,956 tons.	5,145 tons 1,568 lb.

It will be noted that this represents a tonnage of 13,465 tons 1,568 pounds, the money value of which was approximately \$657,483.

As the practice of purchasing and distributing feeds was adopted as a war measure, it is intended to discontinue this work as soon as present stocks are depleted.

## DOMINION EXPERIMENTAL FARMS AND STATIONS.

Despite the difficulties caused by shortage of labour and by the absence of many of the trained officers of this branch, on active service overseas, it was found possible to carry on effectively all the main lines of investigation and experiment and, in addition, to do a considerable amount of special work, either directly connected with Canada's war effort or arising from war conditions.

In animal husbandry, the shortage of such concentrates as bran, shorts, oil cake, etc., and their high price brought up a number of new problems in feeding. In field husbandry, labour shortage led to a more intensive study of labour-saving devices. Every effort to encourage poultry keeping, gardening, etc., was made. In the Division of Chemistry a large number of analyses were made of materials purchased for army and navy use. In the Division of Forage Plants the special work of root seed production took up a great deal of time and attention and was successfully carried on. With flax, under the stimulus of small European production and insistent war demand, a good response was made to efforts to increase fibre flax production. Successful trials of a flax pulling machine were made. Large shipments of fibre flax-seed were made to Ireland at the request of the Imperial authorities.

While no new experimental stations were established during the year and only a limited amount of building work was done, owing to high cost of materials and scarcity of labour, the superintendents of the branch farms and stations, many of whose assistants were overseas, could cope with the work only by the most strenuous endeavours.

Altogether, then, the year was a very busy one throughout the experimental farms systems.

During the year the following reports, bulletins, pamphlets, and circulars were sent to press:—

## Annual Report of the Experimental Farms, 1917-18.

## Bulletins, Regular Series—

- No. 91. Poultry Feeds and Feeding.
- 92. The Strawberry and its Cultivation.

## Bulletins, Second Series—

- No. 34. The Rearing of Rabbits.
- 35. Tomato Diseases.
- 36. Feeds and Feeding.
- 37. Peach Canker.

## Pamphlets—

- No. 17. Fish Meal as a Live Stock Food.  
 18. Recleaned Elevator Screenings as a Food for Live Stock.  
 19. How to Make and Use a Hot-bed and Cold Frame.  
 20. Some Varieties of Tobacco Recommended for the Province of Quebec.  
 21. Construction and Care of Tobacco Seed-beds in the Province of Quebec.  
 22. Tomato Culture.  
 23. Cabbage and Cauliflower Culture.  
 24. Asparagus, Celery and Onion Culture.  
 25. Bean Anthracnose.  
 26. Melon Culture.  
 27. Cultivation of Some Staple Vegetables.  
 28. The Rod Cultivator.

## Special Circulars—

- No. 17. Ensilage in 1918.  
 18. When Should Potatoes be Planted to Obtain Maximum Crops?  
 19. The Importance of Planting Good Seed Potatoes for high Yields.  
 20. Flax for Fibre; the Canadian Farmer's Opportunity."

## Regular Circulars—

- No. 15. Selecting and Wintering Biennial Vegetables for Seed.  
 16. Best Varieties of Grain.  
 17. Every Gardener his own Seed Grower.

Nos. 11, 12, and 13 of "Seasable Hints" were issued and 139 press articles.

Seeding was completed early in 1918, but, in the West, was followed by cold weather and heavy frost in May and dry weather with high winds in June. Large areas had to be resown. The drought continued in July with frosts in the latter part of the month. In the eastern provinces conditions were favourable although rains at harvest time caused delay and some damage to crops, especially in the province of Quebec.

For 1918 the total area under field crops is estimated at 51,427,100 acres, an increase of 8,824,902 acres over 1917. The acreage sown to wheat was the largest on record, 17,353,902, giving an average yield of 11 bushels per acre, 4½ bushels per acre less than 1917.

A new high mark was set for the total value of Canada's field crops, namely, \$1,367,909,970, an increase of \$23,273,520 over the total value for the previous year, which was itself a record.

Some figures on the total and average yields and values of our principal field crops are given:—

AREAS and Estimates of Yield and Value of Field Crops, 1918.

Crop.	Area.	Yield per	Total	Weight per	Average	Total
		Acre.	Yield.	measured	Price per	value.
	Acres.	bus.	bus.	lb.	\$	\$
Fall Wheat.....	416,615	19 00	7,942,800	61 19	2 08	16,516,000
Spring Wheat.....	16,937,287	10 75	181,132,550	38 69	2 02	365,151,700
All Wheat.....	17,353,902	11 00	189,075,350	50 44	2 02	381,677,700
Oats.....	14,790,336	28 75	426,312,500	35 61	0 78	331,387,400
Barley.....	3,153,711	24 50	77,287,240	47 24	1 00	77,378,570
Rye.....	555,294	15 25	8,504,400	56 60	1 49	12,728,600
Peas.....	235,976	13 25	3,090,400	39 93	2 54	7,873,100
Beans.....	228,577	15 50	3,563,380	58 67	5 41	19,283,900
Buckwheat.....	548,097	20 75	11,375,500	47 41	1 58	18,018,100
Mixed Grains.....	921,826	28 75	35,662,300	46 39	1 14	40,726,500
Flax.....	1,068,120	5 75	6,055,200	53 72	3 13	18,951,000
Corn for Husking.....	250,000	56 75	14,214,200	53 97	1 75	24,902,800
Potatoes.....	735,192	142 00	104,364,200	.....	0 98	102,235,300
Turnips, Mangels, etc.....	325,037	377 50	122,699,600	.....	0 43	52,252,000
		tons.	tons.	.....	.....	.....
Hay and Clover.....	10,544,625	1 40	14,772,300	.....	16 25	241,277,300
Fodder Corn.....	502,069	9 50	4,787,500	.....	6 15	29,439,100
Sugar Beets.....	18,000	10 00	180,000	.....	10 25	1,845,000
Alfalfa.....	196,428	2 25	446,400	.....	17 84	7,963,500

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## NUMBER of Farm Live Stock in the Dominion, 1914-18.

Live Stock.	1914.	1915.	1916.	1917.	1918.
Horses . . . . .	2,947,738	2,906,069	3,258,342	3,412,749	3,609,257
Milch Cows . . . . .	2,673,286	2,666,346	2,833,433	3,202,283	3,543,600
Other Cattle . . . . .	3,363,531	3,309,155	3,760,718	4,718,657	6,507,267
Sheep . . . . .	2,058,045	2,038,662	2,022,941	2,069,358	3,052,748
Swine . . . . .	3,434,261	3,111,900	3,474,840	3,619,382	4,289,682

## EXPERIMENTAL STATION, CHARLOTTETOWN, P.E.I.

Seeding commenced in Prince Edward Island late in April and was finished early in May under favourable conditions. The growing season was excellent for grain crops which gave heavy yields; hay was rather below the average due to cold, dry weather in May and June. Fruits were a light crop as were also vegetables. Roots were below the average yield. Potatoes suffered severely, in unsprayed districts, from Late Blight and there were serious losses from rot.

To stimulate interest in poultry keeping an egg-laying contest was started in the autumn and will be continued for a year. Marked interest in the results is being shown.

A considerable amount of mangel and turnip seed was produced and twenty acres were devoted to growing stecklings for root seed production in 1919.

A permanent poultry house and a number of portable houses were built during the year.

## EXPERIMENTAL STATION, KENTVILLE, N.S.

The bright weather during April and May, with light rainfall, favoured seeding operations and hastened fruit tree bloom by from two to three weeks over 1917. Precipitation during the early growing season was rather light but a good hay crop was gathered. Cereals grew and matured well but wet weather at harvest gave trouble and did some damage. Corn for ensilage was a fair crop and roots very good.

About fifteen tons of turnip seed was grown, also a small quantity of mangel seed. Thirty-four acres of stecklings were grown and stored.

A piggery 60 feet by 18 feet was put up.

## EXPERIMENTAL FARM, NAPPAN, N.S.

Seeding commenced on May 15. June and most of July were cool but the fine weather of August gave a good opportunity for hay-making. There were several severe frosts in early September, which injured garden crops and a heavy rain-storm on the 21st, with high tides broke the dykes in many places and did much damage to hay on marshes.

The average yields on the farm were wheat, 24 bushels 25 pounds per acre; oats, 26 bushels 27 pounds; barley, 38 bushels 45 pounds; mixed grain, 39 bushels. The

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average yield of roots was 883 bushels per acre, and potatoes 255 bushels 35 pounds. Upland hay yielded 2 tons 106 pounds per acre. The yield of marsh hay was low owing to the dykes breaking several times during the season.

Four tons of turnip seed was grown and 10 acres sown for steekling production.

The new piggery was completed during the year and considerable fencing, draining and roadwork done. About 600 feet of new dyke was built and much repair work done on the old dyke.

## EXPERIMENTAL STATION, FREDERICTON, N.B.

The winter of 1917-18 was the coldest and stormiest on record. Snow disappeared rapidly towards the end of March leaving abundant moisture in the soil. May was warm and favourable for spring work but June brought frosts with considerable crop damage. Harvest conditions were favourable up to September 11, when wet weather prevailed up to the end of the first week in October.

The pure-bred herds of dairy Shorthorns, Ayrshires and Holsteins increased naturally during the year. Some good milk records were made and in the grading-up experiments the heifers generally showed improvement over their dams. A good crop of lambs was raised and the flock of Angora goats increased by ten kids. The work with swine, poultry and bees, was continued successfully.

In field husbandry, oats yielded 33½ bushels per acre, the crop being damaged by flooding. Three acres of wheat yielded 70 bushels; winter rye, 20 bushels per acre and field beans 10 to 24 bushels, according to variety. Turnips yielded from 17 tons to 9½ tons per acre, mangels 14 tons 1,868 pounds and carrots 136 to 380 bushels. Hay gave slightly over 2 tons per acre. Ensilage corn was practically a failure, owing to late sowing.

The regular experimental work with cereals, forage crops, fertilizers, fruits and vegetables was carried on.

Almost half a ton of turnip seed was produced and 12 acres of stecklings grown, also a half acre of flax for fibre which was shipped to Ottawa for treatment.

Experimental work with potatoes was continued, including tests of varieties, study of diseases, sprays, insecticides, etc.

A root cellar, 25 feet by 30 feet, was built, considerable stone was removed from the fields and stumping and brushing done. Five acres were tile drained.

## EXPERIMENTAL STATION, STE. ANNE DE LA POCATIERE, QUE.

After the most severe winter of many years snow disappeared about April 20, although the ground remained frozen and rainy weather following prevented work on the land until May 18. May, June and July, gave twice the usual rainfall, hindering seeding and cultivation. Hay was saved in good condition in August but the grain harvest was carried on with difficulty in rainy weather. Roots and potatoes were saved in good condition.

Fourteen draught horses, including 5 registered Percheron mares, were kept on the station and some interesting figures as to cost of production of colts were gathered.

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In dairy cattle Ayrshires is the breed kept, and considerable experimental and cost of production work was carried on. A herd of Yorkshire swine and of Shropshire sheep is being formed. The work with poultry was hampered somewhat by lack of help and feeds.

Some interesting data in honey production, wintering of bees, etc., were secured.

In field husbandry three rotations are carried on of three, four and five years' duration. On these Marquis and Huron wheats yielded at the rate of 43 bushels 4 pounds and 44 bushels 55 pounds per acre, respectively; Banner oats 72 bushels and Daubney 67 bushels per acre; and Arthur peas 30 bushels 22 pounds.

In horticulture the tests of varieties were materially reduced this year. The severe winter of 1917-18 proved very destructive to the fruit trees. Twenty-five acres were devoted to steckling production and a good crop was gathered. An acre of flax for fibre was grown and the crop shipped to Ottawa for treatment.

Considerable repair work was done on the station buildings and the calf barn was finished. Several thousand feet of drain tile were laid and 1,200 rods of fencing put up. A large quantity of stone was gathered from the fields and a good amount of roadwork done.

An exhibit of station products was made at six points, a number of excursions to the station were entertained, as well as several thousand visitors coming individually in small groups.

## EXPERIMENTAL STATION, CAP ROUGE, QUE.

The growing season in central Quebec was cooler, with more sunshine and greater precipitation than the average for the past seven years. The hay crop was a very good one, cereals gave a fair yield, while corn for ensilage and field roots gave a poor return.

With dairy cattle the experimental work in grading up, experimental feeding and experimental housing was continued. With horses, the main lines of experiment were in breeding, colt raising, feeding and housing. The work with sheep and poultry falls under similar headings of feeding, housing, and breeding.

In field husbandry the work comprised the gathering of figures as to cost of production, comparison of rotations, rates of seeding, soil management and agricultural engineering.

The usual work of testing varieties of cereals, forage plants, vegetables and fruits was carried on, as well as a series of special fertilizer experiments.

The new calf barn was completed during the year.

## EXPERIMENTAL STATION, SPIRIT LAKE, QUE.

The spring weather at this station was cold and wet. Frost was registered every month except July. A severe frost on August 18 destroyed almost all crops.

The yield of hay was fairly good and was harvested in good condition.

## EXPERIMENTAL STATION, LENNOXVILLE, QUE.

Ploughing commenced on April 15 and seeding on April 30. Favourable weather in May permitted the finishing of seeding operations early. Wet weather prevented

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hayng until the latter half of July, but the crop was a good one. The season for corn was too wet and damage was done by frost in August and September. Yields of grains and roots were very fair.

A beginning was made this year in establishing a herd of dual-purpose Shorthorns. The flock of sheep numbered 63 head, pure-bred Oxfords and Oxford grades. The wool clip sold for \$328.33. A herd of swine was started, six young registered sows and a boar, all Yorkshires, being received from the Central Farm.

In horticulture the very cold winter of 1917-18 caused a great deal of winter-killing, and the cold, backward summer following was conducive neither to recovery from winter injury nor to good yields.

Excellent progress was made with the buildings and general farm improvements. A deep well pump and pneumatic tanks were installed to deliver water to all the buildings from the artesian well drilled last year. A considerable amount of roadwork was also done. The dairy building was completed and also the poultry administration building. A new piggery and some poultry colony houses were put up and some repairs and remodelling done to the dwelling houses on the station.

## EXPERIMENTAL STATION, KAPUSKASING, ONT.

April, 1918, gave excellent weather for spring cultivation but was followed by a very cold and stormy May. Seeding began May 30 but, owing to bad weather, was not finished until June 20. The months of July, August, and September were unfavourable to growth and the autumn rains greatly hindered fall ploughing.

Fall wheat and rye sown in 1917 gave yields of 30 bushels and 22 bushels per acre respectively. Spring wheat did not mature nor did barley. Oats matured on summer fallow but were a poor yield. Grains which did not mature were cut for ensilage and proved excellent for the purpose.

A dairy herd of Ayrshires and Holsteins and a beef herd of Shorthorns were established and a start made with hogs and sheep. A milking machine was intalled in the dairy barn.

One hundred acres were stumped, fifty acres slashed and 12 broken for crop during the year. A large quantity of logs were cut and sawn into lumber for the station buildings of which a cottage, boarding house, silo and temporary piggery were built.

General improvements effected include a mile of roadmaking, 4,000 feet of tile laid, 430 rods of wire fencing put up and one-half mile of sidewalk laid.

## EXPERIMENTAL STATION, MORDEN, MAN.

After the severe winter of 1917-18, spring opened early and some seeding was done in the district before the end of March. April was warm but with high winds which caused soil drifting and destroyed large areas of spring wheat. Severe frost in May killed vegetation to the ground. In spite of these drawbacks, however, the yield of cereals was good and the quality excellent.

No experimental or breeding work with horses or cattle has yet been started at this station. The grading-up work with sheep was continued and noteworthy results are being obtained.

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Horticulture is a main feature of the work at this station and the 90 acres allotted thereto were all taken up with orchard or garden in 1918. The orchards were greatly extended, some 1,200 young trees being set out. Large areas of vegetables were grown. Potatoes in field lots yielded over 500 bushels per acre. Beans gave 20 bushels per acre. The possibility of producing seed of many vegetables with profit was clearly indicated.

During the season a sheep shed, an implement shed and a silo were erected. Some work on the roads was done and the fencing put in first-class condition.

## EXPERIMENTAL FARM, BRANDON, MAN.

The season of 1918 was the poorest, from a crop production standpoint, in the history of the farm, with the possible exception of one of the seasons in the 80's. The spring of 1918 was very early and crops started well, but were damaged a great deal by high winds. Little moisture remained in the soil from 1917. The rainfall was very deficient, which, combined with excessive wind, made all crops light. Though the rainfall was greater than in 1917, crops showed drought effects to a much greater degree, as it was the second year of drought and other conditions were unfavourable.

No experimental feeding was done with horses, but a record of feed used by each horse was kept, and it was found that the cost of feeding a working gelding for a year at present feed prices was \$100.39.

Milk records of the dual-purpose Shorthorns were not as high as usual owing to poor pastures and lack of best grades of winter feed resulting. The demand for young stock of milking strain is still very keen, and several bull calves were sold to farmers. The cost of raising a calf to one year of age and of feeding a mature cow was determined, though the latter cost varies according to the cow's milk production. Results of experiments in rations showed that much cheaper and better growth resulted from a ration in which succulent feed (corn silage) was the principal part and the grain portion small.

Experiments in the cost of feeding sheep were carried on, and the grading experiment, which was begun in 1911, was completed. The object of the experiment was to demonstrate how quickly and easily improvement and uniformity could be obtained through the continued use of good rams of one breed. This flock is being used in a breed test for the production of market lambs, and crossing with other breeds carried on.

The cost of feeding a mature sow for one year was found to be \$41.40 and the cost of raising a young sow from weaning to one year was \$29.74. Results of experiments showed that re-cleaned screenings are fully equal to barley for finishing pigs for the market. In the experiments with hog pastures it was demonstrated that the cost of feeding growing pigs could be reduced at least 25 per cent by the use of rye, oats and barley, and rape as pastures.

Pullets have been trap-nested and records kept of egg production. Selection of the best laying hens for breeding purposes is practised.

Three colonies of bees were wintered over. The dry season was not favourable for honey production, but a fair amount was gathered.

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Several rotations were under test. The average cost per acre of operating these rotations and the average return per acre with the resultant profit were determined. Several cultural experiments were tried and much data gathered.

In cereals variety tests were conducted, and for the first time since the introduction of Marquis wheat it has been excelled by Red Fife. This was due to the peculiarity of the season, which favoured late varieties. Victory oats gave the highest yield, but Banner has the highest five-year average with Gold Rain a close second. Two-rowed varieties of barley excelled six-rowed, Charlottetown No. 80 standing first. In five-year averages Manchurian has the highest yield. Tests of peas, flax, and rye were also conducted.

Late rains helped the forage crops, of which corn and roots were a fairly good crop. Alfalfa withstood the drought best of any hay crop and Brome grass best of the grasses. Among crops for green feed, oats gave the best results.

Variety tests of vegetables were carried on and the most suitable ones for use in Manitoba determined. Cultural tests were also made and many annual and perennial flowers tested. Experiments were continued in the growing of fruits suitable for Manitoba.

Several exhibits were sent to fairs in the province, and the championship for best bacon pig, any breed, was won; also the reserve championship for Canadian-bred Clydesdale mare. On "Farmers' Day," July 11, approximately 2,500 people visited the farm, and several other picnics and deputations during the year came to see the farm.

#### EXPERIMENTAL FARM, INDIAN HEAD, SASK.

The season opened early, beginning on March 28, though subsequent high winds, lack of rain and summer frosts, were unfavourable to cereal and forage crops. Pasture and hay crops were very light.

Experiments to determine cost of wintering horses were conducted. The Short-horn dual-purpose herd is very promising.

Sheep breeding was most successful, data as to feeding costs, in wintering pure-bred and grade sheep, were gathered. Surplus stock of young, pure-bred boars was readily disposed of, and the daily cost of wintering sows outside was determined.

Poultry breeding is gaining interest throughout the province. Two breeds only were kept at the farm.

Field husbandry experiments were mainly rotation and cultural, four rotations being considered. Variety tests of cereals were conducted and results were good, excepting flax, which was a total failure. The yield of corn for ensilage was normal, but root crops suffered from winds and lack of moisture. The season was unfavourable for investigational work with clovers and grasses.

Fruit crops were practically a failure on account of frosts. The vegetable garden was almost destroyed by hot winds on June 10. Potatoes were average as to yield and quality.



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## EXPERIMENTAL STATION, ROSTHERN, SASK.

The season of 1918 was deficient in moisture, especially during the latter part. This led to considerable soil-drifting on summer-fallowed or fall-ploughed land and resulted in light hay crops. Grain and root crops were average. The low temperature of 30.6 on July 25 shrunk up the winter rye, which yielded an unusually poor crop.

As there are sixteen horses for regular farm work and two extra for the garden, the station has ample horse-power requirements. A creditable nucleus for a good dairy herd is at present under way. The steers purchased in the fall and sold in April or May have brought good profit. An experiment in feeding roots to steers proved that the roots have a feeding value of \$18 per ton. We have now a much larger flock of sheep than the one we began with. They are also of much superior quality. A start was made in hogs in the Autumn of 1917 by obtaining six sows and one boar which, for the year, brought in a total of \$1,475.

Owing to many of the trial plots in grain being blown out or buried, very little was accomplished in deducing comparative yield of different varieties. However, Marquis and Red Fife wheat, Gold Rain, Twentieth Century, Banner, O.A.C. No. 72, and Victory oats were the leaders in yields. The comparative yields of barley were very different from former years, as in 1918 O.A.C. No. 21 was eighth on the list instead of first as formerly.

The extremely dry season of 1918 prevented accurate determination of results of rotation of crops, owing to hay and corn returns being unusually low, whereas, in wet seasons, hay returns alone are usually greater than the grain.

Owing to the lack of uniformity in the quality of the plots chosen for cultural investigations, very few results were obtained. The effect of barnyard manure to summer-fallow on the following wheat crop showed an increase of 14½ bushels per acre.

Although the hay crops were not up to the standard, yet the effect of the grass in binding the soil in soil-drifting districts is a very important consideration. Mangels, sugar-beets, and carrots do not give satisfactory yields, but turnips have yielded well every year.

In 1918, the trees and shrubs had fully recovered from the set-back they received on account of the hailstorm in 1916. The new growth, however, of shrubs and the more tender trees was not sufficiently strong to withstand the early September frosts. The Caragana forms the most effective wind-break, although the Russian poplar and maple serve the purpose fairly well.

Experimental work has been under way to determine a hardy apple with a good quality. The first characteristic has been attained, but these varieties have not yet come into bearing. The fact that many farmers of the district have been growing plums for a number of years indicates good possibilities for the development of plum culture. The small fruits have yielded profitably every year since 1914.

Cabbage, cauliflower and celery yielded well in 1918. Although there seems to be considerable difficulty in the growing of celery yet we have been successful for the past seven years. Owing to the blight of the blossom of tomatoes due to cool nights, this crop seems to be generally doubtful. With the exception of one variety, Peep o' Day, the corn was a failure.

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## EXPERIMENTAL STATION, SCOTT, SASK.

Owing to spring opening favourably, seeding commenced early, but subsequent winds caused excessive evaporation and soil drifting, injuring young plants. The drought continued until late in July, when there was one heavy rain. Frosts damaged wheat on July 24 and 26, and in September there was drought and frost, making crops the lightest in the history of this part of Saskatchewan.

One team of young geldings has been sold at a good figure and data gathered on cost of feeding work horses and raising horses. Nineteen steers were sold at a net profit of \$17.77 each. Feeding experiments were conducted and value of dehorning proved. Good returns were made on sheep. Experiments consisted of grading up, using range ewes and Shropshire rams for foundation stock. Feeding experiments were also carried on. Gains were determined in feeding swine with self-feeders *v.* open troughs. Seventy-one fat hogs were marketed and one boar sold.

Comparisons were made with hens *v.* early pullets for egg production and fertility of the eggs. It has been found that March and April hatched birds are best for winter eggs.

Several rotations have been under test in field crops and cost per acre of different rotations determined. Cultural and rates of seeding experiments were continued, also data gathered on dates of seeding and ability of different crops to withstand frost.

The yields in cereals were unusually low owing to drought. In the uniform test plots of wheat Marquis and Red Bobs gave the heaviest yields, while Marquis weighed  $\frac{1}{2}$  pound per bushel more than Red Bobs. Banner oats proved superior to Victory in ability to withstand adverse conditions. Barley was poor and peas a failure. Flax plots were destroyed by a windstorm in June. Experiments with fall rye have been conducted.

All classes of forage crops were low in yield, though Western Rye grass and sweet clover proved best able to withstand adverse conditions.

The importance of growing the hardiest varieties of bush fruits has been demonstrated as in previous years. Vegetables were very much set back by drought and later frost, and for the first time in the history of this station potatoes were produced at a loss.

## EXPERIMENTAL STATION, LETHBRIDGE, ALTA.

Work on the land commenced April 3, and seeding on the 7th. Rainfall during the growing season was very light (2.31 inches from April 1 to July 31) so that yields on non-irrigated land were very light. On land summer-fallowed in 1917 no grain at all was produced.

As usual, most of the field experimental work was conducted in duplicate on the irrigated and non-irrigated parts of the station. On the former, the yields were very light. Under irrigation, the highest yield of wheat was Marquis, 61 bushels 38 pounds per acre; Danish island oats gave 107 bushels; Bark's barley the same per acre. Mackay peas yielded 66 bushels per acre. In corn for ensilage, irrigated Yellow Dent

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gave over 16½ tons per acre. Several of the early varieties ripened seed. Roots were a good crop as was alfalfa under irrigation. On dry land the latter and the grasses were practically a failure. Nine hundred pounds of mangel seed was grown and 16 acres of stecklings harvested. Feeding tests with steers were carried on during the winter of 1917-18, showing a profit of \$20.12 per head for the first lot sold and of \$41.76 per head for a lot of 18 fed six weeks longer. A test started last winter is not yet completed.

The flock of sheep consists of 41 ewes, 35 shearling ewes, 27 ewe lambs and one Shropshire ram. The ewes are grade Shropshires bred up from a Merino base. During the year 7 pure-bred Lincolus and 5 pure-bred Rambouillets were bought for breeding work.

Feeding tests with lambs were carried on. One lot was sold early in the spring at a profit of \$1.69 per head; the second lot was sheared early in April and sold about the middle of May, giving a profit of \$5.27 per head. Homegrown lambs gave a greater profit than range lambs.

With swine, the Berkshire is the breed kept. Some experimental feeding was done during the year and an experiment in "hogging-off peas" was conducted, giving a return of \$35 per acre for the crop.

The year with poultry was a successful one, and the demand for stock and eggs was greater than the supply.

Fruit crops were light. A large number of trees were winter-killed and frosts destroyed the crop on others. A good crop of the hardy vegetables was gathered.

## EXPERIMENTAL STATION, LACOMBE, ALTA.

The land was in excellent condition, with a good supply of moisture when seeding commenced on April 13. May and early June was dry and windy with some damage from frost, and a severe frost in July injured crops severely in central and northern Alberta. Harvesting was carried on under favourable conditions and considerable fall ploughing was done.

There were 26 head of horses on the station and some experimental work was carried on as to cheap methods of wintering.

The dairy herd was composed of 29 head pure-bred Holsteins and 21 grade Holsteins. The average record of milk production was 7,539.1 pounds and the average return per cow for her product made into cheese was 188.25.

With sheep, over 400 ewes were used in the first year of the grading-up experiment, using rams of Shropshire, Oxford, Leicester, Cheviot, Hampshire and Corridale breeding.

Feeding tests with swine were continued, including pasture experiments and trials of self feeders. The year with poultry and bees was a successful one.

In field husbandry the work with rotations and cultural experiments was continued.

Tests of varieties of cereals, grasses and clovers and vegetables were carried on, but owing to scarcity of labour and seed the tests of varieties of corn and roots were discontinued for the year. Some varieties of apple trees fruited, and small fruits gave very good crops.

## EXPERIMENTAL STATION, SUMMERLAND, B.C.

The season of 1918 was the driest recorded in the Summerland district. There was a shortage of water for irrigation and crops grown under dry-farming conditions were only saved in some districts by rain in August.

In field husbandry some interesting data were gathered as to the relation between amount of water supplied and yield, also as to the advantage of sowing without a nurse crop. In the test of cereals good yields were obtained on the irrigated plots, but those on dry land were a failure. An important feature of the work with forage plants was the growing of carrot and mangel seed. Two tons of carrot seed and over 7,200 pounds of mangel seed were produced and 20 acres of stecklings grown.

The fruit in the orchards under various treatments continue to make good growth. The tests of vegetables were reduced this year in order to leave more land for root-seed production.

The herd of beef cattle numbered 53. A feeding experiment was carried on during the winter, but owing to the high cost of feed, the margin of profit was small.

The herd of swine now numbers 25. Some experiments in feeding and housing were conducted with poultry and bees; the year was a fairly successful one.

Some additional plumbing was put in several poultry houses and hog cabins were built, and also a permanent root cellar. The office building and poultry administration building were painted and considerable wood-work done. Exhibits were made at a number of provincial fairs.

## EXPERIMENTAL STATION, INVERMERE, B.C.

Seeding was completed by the first week in May, under favourable conditions, with abundant moisture in the soil, but prolonged drought following severely injured and in some cases destroyed, crops not under irrigation. Where water was applied some exceptionally heavy crops were grown. Rain during drought brought on a good second growth and improved pasture conditions.

A commencement was made towards establishing a herd of Shorthorns and of Berkshire swine. Some interesting results were obtained in the laying record work with poultry and in the cost of feeding. The average yield of honey was 118.9 per colony.

An exhibit was shown at a number of fall fairs.

## EXPERIMENTAL FARMS, AGASSIZ, B.C.

While the total precipitation for the growing season of 1918 was above the average the rainfall was badly distributed, resulting in injury from drought and dissolved and sprouted grain at harvest time. All crops gave decreased yields. Potatoes suffered from blight and rot.

There are ten work-horses and one driver on the farm, and feed costs were found to increase greatly during the year, amounting to 10.4 cents per work-hour for the heavy draft horses and 9.77 cents for the light draft.

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The herd of dairy cattle numbers 80 head, made up of 39 pure-bred and 41 grade Holsteins. The quality of the herd is steadily improving. The average milk yield for the 29 cows, finishing a lactation period, was 9,042.19 pounds. The experimental feeding work was continued. Much of the milk was made into cream, Camembert, and Stilton cheese, and sold in Vancouver at a good profit.

The Dorset Horned and Oxford Down breeds of sheep are kept. The wool clip totalled 518 pounds from 67 sheep, and brought 61 cents per pound net. The sheep grading experiment was continued with good results.

With swine, the experimental work included comparisons of the self-feeder with trough feeding, barrow versus sow pigs for pork production, harvesting peas with swine, comparisons of barley with grade A screenings, and feeding varying quantities of skim milk.

Good progress was made in the work with poultry, including the breeding of heavy-laying strains and experimental feeding and housing, fertility studies, etc.

In forage crops special attention was paid to root seed growing. A ton of mangel seed was produced and 24 acres of stecklings grown. This work necessitated the reduction of the variety tests.

In the orchards, the trees are recovering from the ice injury of 1917. The season for small fruits was a good one.

Some repair work was done on the farm buildings and three acres stumped and cleaned last year were levelled, ploughed and sown to peas and oats. Three acres were brushed and stumped.

## EXPERIMENTAL STATION, SIDNEY, B.C.

Insufficient moisture from April to September was the great drawback in the season of 1918. Seeding was completed three weeks earlier than the preceding year.

The regular work in breeding, experimental feeding and record keeping was carried on with the dairy, cattle, swine and poultry. The bees gathered a surplus of 50 pounds per hive.

In field husbandry four rotations are being carried on. Yields of fall wheat show from 21½ to 24 bushels per acre. Spring wheat yielded very low owing to drought. Fall-sown oats also did best, although 50 per cent winter-killed. Good crops of root seed were obtained but the stecklings suffered from drought.

The orchards made good growth and gave heavy crops of fruit and nuts. Good results were obtained in vegetable-seed production and in the growing of medical plants, bulbs, etc.

A small building for horticultural work and a silo were put up, fields cleaned of stones and roots, roads and fences improved during the year. An exhibition was shown at a number of fairs throughout the province.

## SUBSTATIONS.

Experimental work with cereals, forage crops, vegetables and fruits was carried on at Beaverlodge, Grande Prairie district, Fort Vermilion, Peace River district and at Grouard, all in northern Alberta; at Fort Smith, Fort Resolution and Fort Provi-

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dence, in the southwest territories; at Salmon Arm, B.C., and at Swede Creek, near Dawson, in the Yukon. The work at Beaverlodge and Fort Vermilion is of a much wider scope than has been possible at the other points, and some very interesting and valuable data as to the agricultural possibilities of those districts have been obtained. The work at Swede Creek was started last year and so far has been mainly preparatory.

### DIVISION OF CHEMISTRY.

The various phases of the division's activities have been carried forward during the past year with more than a fair measure of success, considering the serious difficulties—the absence of several members of the staff on active military service and the heavy influx of special work arising out of war conditions—under which the division has laboured.

For the fourth year in succession, a special effort has been made to encourage and assist the individual farmer towards a greater and more economical production of foodstuffs. The means by which this has been chiefly accomplished are by furnishing information and advice by correspondence, the examination of samples of soils, cattle feeds, etc., by analytical work wherever necessary and by bulletins, circulars, press articles, etc., specially written to meet the need and occasion. From the attitude of the farming community toward this campaign of education and the practical results in increased yields which have been obtained throughout the Dominion it is felt that these efforts have been successful. The influence of this work, we may be sure, is not merely transitory; Canadian agriculture, from the standpoint of efficiency and economy, must have received permanent value from this and similar movements.

The number of samples received for analysis during the past fiscal year was 9,568—a very large increase over that of any previous year. About 4,000 of these samples were flour and there were approximately 1,500 of condensed milk—both important matters of special interest, as connected with the export of food commodities for military and civilian use overseas and arising out of war conditions.

Owing to the pressure of work requiring immediate attention there has been, of necessity, a reduction in the time usually devoted to investigation and research. With the establishment of peace and the conclusion of special war work, these vitally important branches will again be prosecuted.

Further work has been accomplished in connection with the classification of certain lands in southern Alberta with irrigable and non-irrigable areas. This investigation, undertaken and conducted for the Reclamation Service, Department of the Interior, comprises the determination of the alkali content (if "alkali" is present) and of the physical condition of the soils and subsoils in question, and also, at present, the study of a number of closely allied features, e.g. the alkali content of soils as related to plant growth, the influence of irrigation on the vertical distribution of "alkali" etc.

Some progress has been made in the agricultural-meteorological study, in which the division has the assistance and co-operation of the Meteorological Service, but on the other hand there is a large amount of analytical work in connection therewith awaiting attention. Speaking broadly, the investigation has for its object the study

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of the influence of climatic and seasonal conditions on the yield and composition of crops. As the work progresses, information of a most valuable character to many phases of Canadian agriculture will undoubtedly be obtained.

The sugar-beet investigation has been continued. Beets of well recognized factory varieties, from imported and Canadian grown seed, have been grown on eighteen of the farms and stations of the system. The analytical results furnish confirmatory evidence as to the high quality of the beets grown from the Canadian seed and show that roots rich in sugar and of high purity can be grown in many parts of the Dominion.

The feeding value of the more important varieties of the field roots—mangles, turnips and carrots—as grown on the Central Farm, has been analytically determined. The results will be of interest to all stockmen using this important constituent in their rations.

The investigational work with fertilizers again yielded valuable data and indicated courses of future profitable study, particularly in respect to new and unusual sources of nitrogen, phosphoric acid and potash, which have been tested with a view to determining their fertilizing influence as compared with those of the more commonly used materials.

At five farms and stations of experimental farms system a new and comprehensive scheme (including 60 treated plots) was adopted with the object, primarily, of discovering the most profitable combination and quality of a fertilizer mixture, as measured by its influence, in relation to cost, throughout a three-year crop rotation. The plan provides also for the comparison of fertilizer mixtures with and without potash, of fertilizers used with and without manure, and of organic sources of plant food with those of mineral origin, etc.

The results from the crop of the first year, while not to be taken as conclusive, show—as might be expected at this stage—the superiority of the more readily available forms of the fertilizing elements supplied; they furnish also further proof of the superiority of manure and fertilizers as compared with results from the use of either alone.

The work in connection with the determination of the fertilizing value of rain and snow has shown that the precipitation at Ottawa has contributed 5.845 pounds per acre of nitrogen in readily assimilable forms during the past year. From 80 to 85 per cent of this nitrogen is furnished by the rain. At a conservative estimate the rain and snow supply, per acre, annually, plant food worth from \$1.25 to \$1.50.

About two hundred farmers submitted samples of their well waters for examination during the year. The results showed that only 33 per cent might be classified as pure and wholesome. The division again emphasizes the danger of polluted water to man and beast.

A large series of hay and pasture grasses is in course of analysis. The results will indicate the feeding value of the varieties under examination at several stages of growth, thus furnishing information as to the relative nutritive properties of the grasses and the best time at which to cut them for hay. This work has been undertaken for the division of Forage Plants, in connection with the breeding and selection experiments with grasses carried on by that division.

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An important phase of the work of the division has been the analysis of samples of mill and other feeds sent in by farmers for examination for a report as to nutritive value. The larger number of these feeds have been oat products from oatmeal and breakfast food mills, and many of them, we regret to say, have been found to consist essentially or largely of oat hulls and of exceedingly poor quality.

To obtain a more complete and satisfactory knowledge of the various feeds on the Canadian market than would be obtained from the samples ordinarily sent in by farmers, a series comprising more than 400 samples has been collected at a number of points throughout the Dominion. These are now in course of analysis.

Among the fertilizing materials examined, limestones constitute the larger number. These have been sent in chiefly by provincial Departments of Agriculture, with a view to employing the deposits, when of good quality, in the manufacture of ground limestone—a soil amendment which is yearly receiving an extended use in Eastern Canada.

More than 4,000 samples of flour have been examined and reported on in connection with the official flour contracts in Canada. This work, in the first instance, was undertaken for the British War Office and has more recently been continued for the Wheat Export Company, the "Official agents of the Allied Governments," who have the purchasing of all flour supplies for military and civilian use overseas. This analytical control has not only been the means of effecting for the Empire and Allies, a saving of many thousands of dollars in the purchasing of the flour but also in keeping down the moisture content, has ensured the flour against spoiling during transportation and storage—a matter of no small importance.

The work for the Meat Inspection Division (Health of Animals Branch) has included the examination of 2,691 samples, of which 1,514 were condensed milks. The remainder comprised lards, tallows, oils, butters, oleomargarine, preserved meats, colours and dyes stuffs, preservatives, spices and condiments, evaporated fruit and vegetables.

A considerable amount of investigatory and analytical work of an important character has been undertaken for other branches of the Department of Agriculture and also for the several departments of the Government service. Among the latter may be mentioned the Post Office Department, the Department of Naval Service, the Department of the Interior, and the War Purchasing Board. The scope of these investigations shows that the Division of Chemistry of the Experimental Farms in addition to its purely agricultural work is materially assisting in many matters of general interest and importance.

#### DIVISION OF FIELD HUSBANDRY.

The Field Husbandry Division during the past fiscal year continued the investigations in soil management, crop management, and agricultural engineering. Both soil cultural and rotation investigations are under way on all the branch farms and stations in the Prairie Provinces and on the eastern and British Columbia farms and stations rotation work is established and cultural investigations are being introduced. At the present time this latter work is in operation on the Experimental Farm, Charlottetown,



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P.E.I. At the Central Farm, Ottawa, the available land is fully occupied with rotations, thus enlargement on the work here is impossible unless more land is procured.

As in the past, the cost of production of crops has received considerable attention on the several farms and stations. Observations are made also on the influence which labour saving implements and different methods of cropping have in lowering costs.

## FIELD CROPS AT THE CENTRAL FARM.

On the Central Farm, uniformly heavy yields were recorded in 1918. Cool, dry weather in April facilitated seeding operations, with the result that all grain was sown by the end of the month. Hoed crops, including potatoes, mangels and Indian corn, were planted by May 24 and at this date grain, meadows and pasture were growing rapidly. The month of June was cooler and wetter than usual and while grain and root crops did well, corn and hay made slow growth. Hay was cut early in July, averaging 2.25 tons per acre; a second cut later in the season made a total yield of 3.62 tons per acre. In August, oats were harvested averaging a profitable yield of 77.3 bushels per acre. September was exceptionally wet, and, while corn harvesting was tedious the crop was saved in good condition, averaging 18 tons green fodder per acre. Potatoes were dug early in October and averaged 275 bushels per acre. Continued wet weather in September and October nullified the efforts at after-harvest cultivation. Fall ploughing was hampered, but favoured by an open fall this work was practically completed.

## DIVISION OF ANIMAL HUSBANDRY.

The live stock work on all experimental farms and stations has made marked progress in all branches during the year. In addition to the lines of work already established, many new lines of work have been undertaken. Again, every effort was made to assist in the movement for greater production of animals and animal products. The question of animal feeds was given attention, especially along the lines of testing by-products available but not generally appreciated as feeds. Other similar trials were conducted in methods of feedings and labour-saving devices in feeding. A large number of articles and circulars were published giving this information.

## HORSES.

The horses on the Central Farm are mostly of the draught type, excepting the necessary drivers and express horses. With the exception of two tractors which are used experimentally, all power and transportation on this farm is furnished by horses. Amongst the draught horses are a number of excellently bred Clydesdale mares, which are used for general farm work and for breeding purposes. Very few foals were born during the year, but these did exceptionally well. No feeding experiments were conducted with the working horses during the year, but the accumulation of correct data as to the costs of rearing, cost of maintaining horses, and the like, continued on this farm and on the branch farms.

## CATTLE.

*Beef Cattle.*—Breeding beef-cattle are not maintained on this farm, owing to the lack of sufficient housing and pastures. This is unfortunate, as the demand for information and assistance along these lines is rapidly increasing in this part of Canada. During the past year, however, considerable experimental work was conducted in the finishing of steers for market. Three lines of work were undertaken and conducted successfully. These are as follows:—

1. A comparison of rough, open-front sheds with warm barns for winter steer finishing. Although the steers housed in the barn made the greatest gains in proportion to feeds consumed, yet the interest on the building more than offset the difference in profits.

2. A comparison of light *v.* medium-grain feeding in winter finished steers. This trial showed again the value of comparatively light-grain finishing until very near the end of the finishing period. Although gains were not quite as great, yet profits were decidedly greater for the light-grain fed steers.

3. A comparison of breeds of steers in winter finishing. Although in this trial the Shorthorns stood first, Herefords second, and Angus third, as to profits, total gains and economy of gains, yet a careful study of the individual groups showed that there was more difference within the breeds themselves than between the breeds. Hence, several years' trials with large numbers of steers would be necessary in order to draw definite conclusions.

*Dairy Cattle.*—The herds of dairy cattle have progressed rapidly during the past year. Many excellent animals are now to be found in the four breeds—Ayrshire, French-Canadian, Holstein and Jersey—as well as a few choice grades of the Ayrshire and Holstein breeds. The health of the herd has been excellent throughout the year and the losses which were exceedingly light, were due largely to old age or accident. Again there is a material increase in the size of these herds, and the dairy barns are filled. The average milk production per cow has again largely increased, and in spite of high feed prices, profits also have been increased. Many splendid records have been made by individuals of all breeds. The increased demand for young breeding stock and the more rapid sale of young bulls are a healthy indication of the increasing popularity of the work done by this farm.

Several important lines of dairy-cattle feeding experiment were conducted during the year. Outstanding amongst these are:—

1. Completion of the comparisons of ensilage *v.* green feed as summer supplements.

2. The trial of new products, such as coffee bran and palm nut oil meal, with the hope of discovering cheaper substitutes for expensive feeds, of which there was a limited supply.

3. Several trials were made with new compounded dairy meals as compared with well balanced standard meal rations.

4. An increasing number of experiments with equipment, such as milking machines, was conducted.

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5. A series of experiments was also inaugurated to discover the exact cost of rearing young dairy cattle.

Experiments along the lines of dairy manufacturing continue to hold a prominent place in the work of this Division, but the real investigational work is largely curtailed for the lack of a modern and commodious dairy. The gross receipts from dairy products sold again show a marked increase, this year the amount exceeded \$12,500.

## SHEEP.

The sheep on this farm continue to improve rapidly as to quality and profits. Owing to the very limited area for pasture greater expansion in the sheep work is impossible. However, careful figures are collected as to cost of rearing, profits from a small farm flock and a few trials in feeding, care and management are conducted. In spite of the decline in price of wool and the somewhat lower values of lamb and mutton than of a year ago, the profits in this department continue large.

## SWINE.

Swine husbandry has expanded even more rapidly than other live stock, due to their requiring less land. Two large pure-bred herds are kept representing the two breeds—Yorkshire and Berkshire. From these herds large numbers of breeding animals are sold annually, as well as several cars of butcher hogs finished on various experiments. Excellent results from experiments were obtained. Some of the more important of these experiments were:—

1. Pastures for growing shoats, comparing clover, rape and barley pastures with dry lot feeding.
2. Pastures for dry sows.
3. Grain rations for weaning pigs.
4. Screenings (standard stock food) compared with other available grains.
5. Shelters for finishing hogs during summer and winter.
6. Self-feeders for winter and summer use.

## ASSISTANCE TO BRANCH FARMS.

The Dominion Animal Husbandman, in addition to other duties, has visited the branch farms and stations and assisted the superintendents in establishing more and larger herds and flocks, in increasing production, establishing new lines of live stock investigation, planning new buildings, adopting labour saving machinery and similar extensions and improvements.

In addition to this regular work on branch farms, this division also has control of the cattalo breeding work being conducted by the Experimental farms at the Buffalo Park, Wainwright, Alberta. Little progress has been made during the year, but prospects are brighter for the future.

## MISCELLANEOUS.

This division has continued preparing and distributing free plans of farm buildings.

Correspondence has again increased enormously over preceding years and every attention is given to this direct means of assisting farmers.

In addition to the above enumerated and other regular work, the staff of this division has been called upon to address a large number of meetings, prepare special material for publication by other branches and departments and to judge live stock at a large number of agricultural fairs.

## HORTICULTURAL DIVISION.

While the horticultural work on the Experimental Farms and Stations has been hampered to a considerable extent during the war because of lack of skilled help, a large proportion of the gardeners having left to go overseas, and while in 1918 this condition reached a very acute stage, yet considerable work was done.

It has been the aim to establish horticultural plantations on all the farms and stations, and for the prairies and other parts of Canada where settlements are comparatively new, the importance of obtaining new and hardy plants has received much consideration. Canadians in the past have had to depend on other countries for new varieties of fruits and vegetables, but the Experimental Farms Branch has for some years been breeding new varieties with the object of obtaining such as would be suitable for the climatic conditions met with in different parts of Canada. The wild Siberian crab was used as the basis for one line of apple-breeding work for the colder parts of Canada, and certain varieties, such as Osman and Columbia, though crab apples, are a marked advance over the wild crab and are doing well in the Prairie Provinces. Many crosses between these hardy improved crab apples and the apple were made, and trees resulting from them have fruited, and the best of these, which are much larger than the first crosses, have been propagated, and are being tested for relative hardiness. A large collection of hardy fruits has been brought together at the Experimental Station, Morden, Man., and many trees were added to the orchard there in 1918. Collections of fruits were also sent to the newer Experimental stations at Beaverlodge, Alta.; Kapuskasing, Ont., and Spirit Lake, Que., and it will soon be known which of the cultivated varieties will succeed best at these stations.

Collections of vegetables and flower seeds have also been sent to these newer stations, and valuable information is being accumulated for the use of settlers who will be saved much expense and disappointment by learning from the station nearest to them what will and what will not succeed. Vegetable seeds were again sent to the far northern substations in 1918. From these tests, year after year, valuable data in regard to the climate and the possibilities of growing different kinds of horticultural plants are being obtained.

The Dominion Horticulturist visited the principal farms and stations, as usual, in 1918 to confer with the superintendents in regard to the work.

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## INJURY DONE BY THE SEVERE WINTER OF 1917-18.

The winter of 1917-18 will long be remembered by fruit growers in the provinces of Ontario and Quebec, for not for many years has there been such loss from winter-killing. Very low temperatures in early winter coming after a short season of growth when the wood was not as fully ripened as usual, is thought to have been the main cause of so many trees being killed, although the long-continued cold weather was, no doubt, responsible for much of it. In the Province of Quebec a very large proportion of the Fameuse trees were killed, it being estimated that from 50 to 75 per cent died. The losses were very heavy in the large apple orchards along lake Ontario and, in the tender fruit districts, while relatively few trees were killed, the peach trees were in many cases severely injured. In the orchards at the Experimental Farm, Ottawa, the losses were heavy among apple trees and European plums and, while but few pears and cherries had been growing there, they were badly affected. This severe winter, however, again clearly brought out the fact that hardier varieties are needed for Canadian orchards. Many hardy good varieties of apples originated in the Horticultural Division withstood this cold winter, and it is expected that some of them will eventually take the place of more tender sorts now on the market.

## VEGETABLE SEED CROPS.

While vegetable seed was not grown on a large scale, as was the case with field roots in the division of Forage Crops, experiments were continued at the central and branch farms in the Horticultural Division in the growing of seed of the different kinds of vegetables with a view to learning more about methods of growing and yields and quality of home-grown seed and in order to obtain foundation stock for increase should the war continue and the shortage of vegetable seeds become acute, necessitating the growing of seed in Canada to meet the requirements. Very good seed crops were obtained of beets, carrots, parsnips, spinach, lettuce, radish and other annual and biennial vegetables, and much was learned in regard to methods of culture and storage. From experiments which have been made in the comparison of the crops raised from home-grown and imported seed, the crops from home-grown seed have compared very favourably with the imported.

## VEGETABLE CULTURE AND BREEDING.

While cultural experiments with vegetables were not so numerous as in some previous years, more attention having been paid to seed crops, some interesting results were obtained. The importance of planting potatoes not later than the middle of May for largest yields in the older settled parts of the province of Ontario or where the summers are warmest was again confirmed, and just as marked differences were obtained from seed of the same variety of potatoes but from different sources as in other years. Crops of cucumbers, tomatoes, melons and head lettuce were among those grown in the greenhouses. Certain varieties of head lettuce, such as Early Paris and Sutton Golden Ball, have been found to be much more suitable for growing in greenhouses in winter at Ottawa and can be planted more closely together than the Boston Market, which is the favourite variety where winters are milder.

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Work in the breeding of vegetables was continued in 1918. A special endeavour is being made to originate early varieties of corn, peas, beans, tomatoes, onions, etc., that are earlier, more productive, and better in quality than those available at present. Among the newer crosses which have been made are some very promising varieties of peas.

#### EXPERIMENTS AND DEMONSTRATIONS IN CANNING FRUITS AND VEGETABLES.

The work begun last year in experimenting with different methods of canning fruits and vegetables, and in demonstrating the best methods to the public was continued in 1918, as the interest in the canning of vegetables was great, and the demonstrations proved very popular, many persons going to see them. A large number of inquiries were received by letter. The work was in charge of a graduate in domestic science from MacDonal College, Que. The information obtained from the two years' experiments has been put in bulletin form, and will be published during the coming year.

#### ORNAMENTAL PLANTS.

While the more practical, or economic, side of the horticultural work, received the greatest attention during the war, the ornamental was not neglected, as there is great need for improvement in the grounds about many Canadian homes, and it has been the aim to obtain information that would prove useful to those who desired to beautify their home surroundings, by experimenting with many kinds of plants at the experimental farms and stations in different parts of Canada. The ornamental grounds at these places were visited by very many persons during the year, who must have received much inspiration to beautify their homes. The professional florist has also been considered, and experiments were continued with greenhouse flowers, especial attention being paid to the chrysanthemum, schizanthus, cineraria, cyclamen and geranium, some very fine varieties of the last having been originated at the Experimental Farm, Ottawa.

### CEREAL DIVISION.

#### THE SEASON.

Broadly speaking, the season of 1918 was unfavourable for cereals in Canada, because of the drought and frost which occurred over some of the largest cereal-producing areas. Farming conditions were, however, very good in many sections of the country, particularly in Ontario, and the provinces farther east; although an excess of rain in the late summer and early autumn caused difficulties and damage in some districts, especially in the province of Quebec. On account of continued high prices for all kinds of farm produce, the season was a successful one almost everywhere, except in those unfortunate localities where the lack of rain was acutely felt, and where in consequence, the crops were almost a total failure.

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## TESTS OF VARIETIES.

The usual variety tests were conducted on the Central Experimental Farm at Ottawa, and on the various branch experimental farms and stations. At a few places the tests did not give much information of value, on account of the unusual weather conditions, but at the majority of the farms, interesting observations were made in regard to the characteristics of the varieties and their suitability for the various climatic conditions of our country.

## NEW VARIETIES.

From time to time the Dominion Cerealist introduces new varieties of grain, derived from the large series of crosses which he has carried out during the last decade or two.

Ruby wheat, which was introduced last season, did very well in all the localities where it was expected to succeed, except where drought and frost were very severe. It proved, however, reasonably resistant to these unfavourable conditions. A considerable quantity of Ruby wheat has been distributed free during the past winter, to farmers who wished to test this promising new variety.

The new hulless oat Liberty, which was announced a year ago, has been distributed to a number of farmers in various parts of the country, and interesting results are expected this season from these free samples. Only a very few could be sent out a year ago, but some of those gave extremely good results. This new oat is beginning to be much sought after on account of its special adaptability to the production of a high grade of feed with the minimum of trouble and expense.

The new variety of barley, Albert, Ottawa 54, which was introduced a short time ago, has proved very productive, considering its extreme earliness. While it will never be a popular sort for ordinary uses, it is certainly worthy of consideration wherever the greatest earliness is required. It may also be of special value in helping to solve the wild oat problem in the central provinces.

## FREE DISTRIBUTION OF SEED GRAIN.

The annual seed distribution was carried on as usual, but a larger number of samples than in the previous year were distributed. Although some of the seed sent out was not as large and plump as might have been desired, on account of the dry conditions where the grain was grown, nevertheless it was all of very high quality and purity, and was appreciated by the farmers who received it. The grain for distribution was grown chiefly at the following farms: Indian Head and Rosthern, Sask., Brandon, Man., Cap Rouge and Ste. Anne de la Pocatière, Que., and the Central Farm at Ottawa.

## MILLING AND BAKING TESTS.

The investigations under this head were conducted as usual, a large number of new cross-bred wheats being studied, so as to eliminate any which were deficient in baking quality. A new series of studies on the effect of age on wheat and flour was

started and tests begun some years ago were continued. It has been found that both wheat and flour remain in good condition for a surprisingly long time under proper conditions of storage. Excellent bread was made from flour twelve years old. Considerable time was devoted to a study of bread produced by mixing various flours with ordinary wheat flour.

#### DIVISION OF BOTANY.

The investigations into the distribution of white pine blister rust were continued during the past year, and were extended into the prairie provinces with a view to observing whether the rust would be found on currants—principally black currants which are the most commonly affected—that originated in an area known to be generally affected by the currant stage of this rust. It is held by some investigators that the commercial distribution of currants may serve as a means for spreading the disease into areas as yet not invaded. Fortunately the inspectors were unable to find any evidence in practical support of this point of view.

The disease is still confined to southern Ontario and Quebec.

A number of experimental blister rust control areas were established during the year; it is the intention to observe in these areas the effects of practical control measures on a larger scale. The damage to pines, even in areas reported to be severely affected, has so far been very slight. Indeed it would seem that the investigations conducted by the officers of the department reveal a far more hopeful future for the pines than seemed reasonable to expect at the outset.

Some few years ago, the division commenced determined efforts to increase the yield of potatoes, as it had been found that certain diseases conveyed principally by unsound tubers—though these themselves showing no external signs of disease—were generally responsible for the low average yields in certain localities. Good results have been obtained from a change of seed, and the necessity of providing prolific strains free from the constitutional troubles, led to systematic inspection of growing crops of harvested tubers, those qualifying being certified as first-grade. These seeds are very readily bought wherever it is found necessary to change the seed supply. The aim of this work is to effect a general improvement of the potato industry of Canada, and not merely to encourage the production of first-rate seed by a limited number of growers. This aim should not be lost sight of.

The free distribution of pure cultures of nitro bacteria, is increasingly made use of by farmers all over the Dominion. The benefits frequently emphasized in the crops treated with these cultures are earlier maturity, better stands, larger yields, and, in the case of alfalfa, increased resistance to winter killing.

In the field laboratories of the division, useful progress has been made, partly by demonstrating successful control methods of destructive diseases such as late blight in potatoes, and partly by the investigation into the cause and control of plant diseases in general.

Thus the Charlottetown laboratory principally looks after potato disease investigations, while the Fredericton laboratory devotes its energies to the control of diseases



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affecting vegetable and root crops, and the St. Catharines laboratory to the diseases of fruits. However, the main purpose of all these laboratories is to act in an advisory capacity on matters pertaining to the general plant pathological problem of their respective localities.

Investigations with a view to discovering some means or measures by which the severe annual losses from grain rust may be reduced, have been going on for two years. Generally speaking careful farming, the avoidance of cultural errors, together with other essential primary factors well observed, must be regarded as the most practical means at present to meet a rust epidemic. It seems largely a question of anticipating losses, by preparing at the outset to meet them. Good and systematic progress is being made in this work. A spirit of co-operation with the grain-producing States of the Union to the south, promises concerted action relating to the eradication of certain barberry species, which act as host plants to grain rust. Efforts are being made in the Dominion to have all these barberry bushes removed.

Reference to investigations of a more technical character going on in each of the laboratories of the division, is being omitted since they cannot well be reported on until concluded.

In general and systematic botany the regular lines of work were carried on, including identification of plants, giving information on medicinal and poisonous plants, adding to the collections in the Herbarium and Arboretum, etc. Climatic tests were carried out with a number of plants of economic value.

## DIVISION OF FORAGE PLANTS.

## FIELD ROOT VARIETIES.

Numerous observations have been made, especially during the last few years, to the effect that a large number of the varieties of field roots, including mangels, swede turnips, and carrots, which are offered for sale in Canada, are far below the standard in respect to uniformity and trueness to type. In many cases, especially in mangels, the seed sold under a certain name produces crops in which it is even difficult to find roots belonging to the type which the name indicates.

Realizing that there was room for improvement work with field-root varieties in Canada, the division undertook some years ago to improve a few of the best known types of field root by means of a simple method of mass-selection whereby, without much labour and expense, superior strains could be developed from the old standard varieties. This method, which is a combination of selection for purity of type and selection for increased average dry-matter content, has given so promising results that, this year, the division has recommended its introduction on all farms and stations in Eastern Canada and British Columbia. A plan has been worked out whereby it will be possible, by adoption of the method of mass-selection referred to, to develop strains of all the different types of mangels, swede turnips, and carrots, improved to such a degree that seed produced of the same may to advantage be used as so-called "stock seed" by any one who, in the future, may interest himself in the production of field root seed as a commercial undertaking.

## FIELD ROOT SEED PRODUCTION.

*Experiments.*—Experiments at the Central Experimental Farm for the purpose of ascertaining what principal factors influence the yields of root-seed crops have so far been confined to mangels, for the reason that, of the field roots, mangels have so far never failed to produce excellent seed at Ottawa. This year, although the weather conditions during harvesting time were extremely unfavourable, seed of an exceedingly high quality was obtained. As a matter of fact, the mangel seed produced at Ottawa this year is far superior in respect to vitality to any mangel seed raised on any other Dominion Experimental Station.

The experiments in mangel seed raising conducted in previous years have demonstrated that early planting of the seed roots and a good state of fertility of the soil are factors upon which a heavy seed yield depends. This year a somewhat elaborate experiment, comprising 96 different plots, was conducted for the purpose of ascertaining what influence some other factors have on the seed yields. The results obtained corroborate the results obtained in previous experiments, viz: that a heavy application of manure together with a liberal amount of chemical fertilizers increase the seed yields very considerably. They also show that far heavier seed yields per acre are obtained when the seed roots are planted comparatively closely together than when they are spaced farther apart. Thus, anywhere from 25 to 50 per cent heavier crops may be obtained with the seed-roots planted 3 by 1½ feet than when they are planted 3 by 3 feet apart.

*Emergency Root Seed Production.*—On recommendation of the Seed Commissioner, the department requested, in 1917, the Division of Forage plants to arrange for the production of field root-seed on a commercial basis this year, the said seed to be made available to the market in case a shortage in the seed supply should develop. Under the direction of the Dominion Agrostologist considerable quantities of root-seed were produced and the following quantities made available to the market for the 1919 seeding:—

	Pounds.
Mangel seed . . . . .	24,300
Swede turnip seed . . . . .	36,700
Field carrot seed . . . . .	4,200

Of these quantities the various experimental farms and stations contributed as follows:—

	Pounds.
Ottawa . . . . .	17,200
Kentville, N.S. . . . .	26,500
Nappan, N.S. . . . .	7,000
Fredericton, N.B. . . . .	300
St. Anne de la Pocatière . . . . .	900
Lethbridge, Alta. . . . .	1,000
Summerland, B.C. . . . .	10,000
Agassiz, B.C. . . . .	1,500
Sidney, B.C. . . . .	300

In case it should be found necessary to produce similar or large amounts of field root-seed in 1919, the division has arranged to have the necessary stockings available in the spring of 1919 for planting to seed at the above-mentioned stations.

## BREEDING WORK.

Owing to the large amount of extra work which the division was called upon to do in connection with emergency root-seed production, it was found impossible to pursue the breeding work with grasses and clovers in all its details. However, some lines of the breeding which required a comparatively small amount of work were followed up, the most interesting ones being the breeding work with Red clover and the work with Western Rye grass.

*Breeding work with Red clover.*—The breeding work with Red clover, which was started in 1913, has now advanced so far that practical results are being obtained. The division started the red-clover breeding with the object of developing in the first place, a perfectly winter-hardy strain of, if possible, greater longevity than the ordinary biennial red clover. When this object had been reached, the division, it was planned, would proceed with the development of particularly high-yielding varieties from within the winter-hardy strain.

The first object of the breeding work, i.e. the development of a winter-hardy strain of a perennial character, is now accomplished. The strain in question was sown in test plots in 1916. In 1917 one hay crop and one seed crop were harvested and in 1918 two crops were taken from the very same plants which yielded one hay crop and one seed crop in 1917. This red-clover strain, consequently, is capable of yielding full crops for at least two consecutive years. Indeed, judging from the stand early in the spring of 1919, it will even last through three consecutive years and may, therefore, be considered a true perennial. This perennial red clover will furnish the material for red-clover breeding for increased yield.

*Western Rye grass.*—Experiments conducted with Western Rye grass during the last few years have revealed that this grass, unlike all other cultivated grasses, breeds normally true to type, the reason for this being that the individual plants are regularly self-fertilized. In this respect the Western Rye grass behaves just like wheat and, this being the case, it will be a simple matter to develop hundreds of distinct and constant varieties of the Western Rye grass in a comparatively short time. The division secured, this year, about one-hundred living plants of Western Rye grass, representing as many different wild forms. These will, it is intended, serve as starting material for quite extensive breeding work which will be proceeded with the coming year.

## BEE DIVISION.

Beekeeping was stimulated during the year by the continued rise in the price of honey after a winter which set in severe early and consequently caused considerable loss of bees to those who were unprepared.

Bees were kept at sixteen of the experimental farms during the year. At the Central Farm, Ottawa, 6,485 pounds of honey were taken from 33 colonies, spring count, a return of 196 pounds per colony, making the average for the past six years 121 pounds per colony.

During the season of 1918 the study of the two principal problems of beekeeping in Canada, reduction of winter loss of bees, and the control of swarming, was continued

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at the Central Farm. As a contribution to the solution of these problems, and in order to make better use of the excellent opportunity for raising bees in the spring prior to the surplus honey flow that the climate of most parts of Canada presents, a system of management involving the keeping of two queens in the hive for eleven months was devised by the Apiarist and carried out experimentally on a small scale with encouraging results.

Progress was made in an attempt to breed a non-swarming variety of bee. A number of queens were bred at the Central Farm from the only colony out of thirty-one in the apiary that made no preparations for swarming. Some of these queens were taken by the Apiarist in nuclei with drones of selected percentage to Kapuskasing, Ont., and Lake Edward, Que., to be mated, there being no probability that other drones were present in the neighbourhood of these places. Several matings were obtained, and much information which it is expected will facilitate bee-breeding work in the future was secured.

Beekeeping conditions in the northern part of Canada were studied concurrently with the mating experiments. The need for better protection of the hives in summer, better insulation and drainage of bee cellars, and the presence of certain conditions favourable for the black race of bees were noted.

The usual comparison between wintering bees outside and in the cellar was made at the Central Farm, and the advantages of wintering outside in cases containing four colonies each, in a place sheltered from wind, were again demonstrated. It was found that a thickness of five to six inches of packing consisting of planer shavings between the hives and the sides of the case gave no better results than a thickness of two and a half to three inches of the same material.

Different kinds of winter stores for bees were tested at Ottawa in 1918-19, and special attention was paid to substitutes for the syrup made from refined sugar on account of the serious shortage of this due to the war. Syrup made from raw sugar was found inferior to that from refined sugar, and cane syrup (golden syrup) killed in three months the only colony to which this was supplied. Dandelion honey was found to be unwholesome, but the white honey gathered in July, 1918, was found wholesome. The best results, however, were, as usual, obtained from the regular stores supplemented with a liberal amount of syrup made from refined sugar.

#### POULTRY DIVISION.

In the Poultry Division, work of all kinds pertaining to the production of poultry is conducted. This includes experiments and investigations and a limited amount of demonstration in the form of exhibits at fairs, etc. The investigations besides poultry, include work with wild fowl, pigeons and rabbits.

This year the division has carried on at fifteen branch farms and stations besides the central plant at Ottawa. One new plant was started at Summerland, in the Okanagan valley, B.C., and buildings were commenced at Lennoxville, P.Q., but could not be finished in time for stock before winter.

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During the winter 1918-19 a special poultry exhibit was sent to a circuit of winter shows throughout western Ontario. This proved a very attractive as well as instructive exhibit.

The work of the year, as a whole, has been the most satisfactory of any year since the division was inaugurated. For the past three or four years the work has been more or less hampered, because of the fact that many of our best men were enlisting. During this year, and especially the latter part of the year, the men have been returning and better men were available.

The pedigree breeding conducted at the central plant has been developing. This year practically every branch farm received a number of pedigreed cockerels for breeding purposes. Several of the branch farms, where suitable stock and efficient management are available, are now assisting in the pedigree work.

## EGG LAYING CONTEST.

A new feature was introduced this year, being an egg-laying contest, staged at the Experimental Farm, Charlottetown, P.E.I. This contest was started November 1 last, to run for eleven months. There are twenty pens of eight birds each, seven of which are pens from the Island. The housing is in colony houses, 10 by 12, two pens to a house.

Egg laying contests have done much to encourage production, and the interest taken in this contest should emphasize the value of the hen that knows how to lay.

## TOBACCO DIVISION.

The season of 1918 was a remarkable one in the history of tobacco-growing in Canada. Never before had our native tobaccos been in such active demand, and as a consequence the price paid for these reached a level which may never be attained again. The cause of this was doubtless the increase in duties on imported tobacco placed in the spring of 1918 and the lowering of the world's supply of tobacco. The most lasting result of the situation last year is that a number of Canadian manufacturers who previously had been somewhat unwilling to try our native tobaccos made up their minds to use them to a considerable extent.

In Quebec the season was unfavourable and good crops were the exception. The total yield did not exceed that of 1917, although the area planted to tobacco was considerably larger. On the other hand the high prices obtained for the crop made the year a very profitable one indeed to the tobacco grower.

While the tobacco crop in Quebec suffered from too much moisture and too low a temperature, in Ontario it was damaged by a long drought which on most plantations kept the tobacco plant from reaching full development. The Ontario production of tobacco was about eight million pounds of which one million was of yellow tobacco, air cured.

On the Experimental Station at Harrow, the results obtained in 1918 were very satisfactory, the quality of the yellow flue-cured tobacco was the best so far produced

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there. While the leaves were somewhat shorter than usual the colour was clearer and the proportion of yellow tobacco much higher.

At the Farnham, Que., Tobacco Station, results were not so good. The district in which the station is located suffered very much from constant rain and cold weather. It was the middle of August before really warm weather was experienced and under these conditions a normal tobacco harvest was impossible. At the station at St. Jacques l'Achigan, Que., the tobacco leaves harvested were short but of good quality.

The results obtained on the tobacco plantation at the General Farm were particularly good. The selections made preserved their characteristics and even showed some improvement. Some of them may be considered now as practically fixed at least from the industrial point of view. Certain crosses recently made promise to be very interesting.

The study of tobacco soils in Canada progressed well as far as the tobacco districts of Ontario are concerned and a bulletin is now in preparation giving some of the results of this work. The work in the curing barn and tobacco warehouse was carried on successfully and the value of certain varieties grown in Canada and used as cigar binders was definitely established. Comparisons in different methods of fermentation of tobacco were also made.

The demand for seed of the White Burley tobacco was much greater than heretofore and it was evident that the tobacco growers of Ontario were planning to increase considerably the area planted to this tobacco. The demand in Quebec for tobacco seed of varieties suitable for pipe tobacco lessened considerably, owing no doubt to the increased prices being paid for cigar tobacco. This is doubtless only a temporary condition which will correct itself as soon as the price of cigar tobacco becomes normal.

#### DIVISION OF ILLUSTRATION STATIONS.

The work on the Illustration Station for the past four years is showing the value of continuous good cultivation, systematic rotation of crops and, particularly, the value of good seed.

During the past season, it was quite noticeable that crops grown on the Illustration Stations, and for several miles round, gave higher yields than those grown on farms more distant.

In most parts of Alberta and Saskatchewan, seeding began about April 15. There was a good supply of moisture in the surface soil and the seed germinated rapidly, making good growth for a short time. Continuous dry weather, accompanied by high winds checked the growth to such an extent that in some districts crops were almost a failure. In eastern and northern Saskatchewan and in northern Alberta few crops were harvested.

The following are the rotations being conducted on the Illustration Stations:—

##### SOUTHERN ALBERTA AND SASKATCHEWAN.

###### *Two-year rotation.*

Summer-fallow and wheat alternately.

Summer-fallow and oats alternately.

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*Three-year rotation.*

Summer-fallow, wheat, wheat.

Summer-fallow, oats, oats.

*Four-year rotation.*

Summer-fallow, wheat seeded with Western Rye Grass, hay, hay.

## NORTHERN ALBERTA AND SASKATCHEWAN.

*Three year rotation.*

Summer-fallow, wheat, wheat.

Summer-fallow, oats, oats.

*Five year rotation.*

Summer-fallow, wheat, oats seeded with Western Rye grass, hay, hay.

Interest in corn-growing is increasing, particularly in southern Alberta. Wheat and corn are sown alternately, the object being to see if corn can be profitably grown and how much summer-fallow might thus be eliminated.

*Fodder Crops.*

Western Rye grass and alfalfa are grown on the Illustration Stations. It is found that when alfalfa is grown in rows and cultivated, better results are obtained than when it is sown broadcast.

*Gardens.*

While the chief object of the Illustration Stations is soil cultivation and crop rotation, other departments of the farm receive attention from the instructors.

A collection of garden seeds, which had been generated and tested at the Experimental Farm, was sent to each illustration Station. Instruction was given as to their growing and record sheets were provided each operator so that notes might be taken as to the suitability of the seed to the different sections of the Dominion.

Increased interest is being shown in this work, especially by the women and children, who, in many cases, take full charge of the gardens.

*Poultry.*

The poultry on the Illustration Stations is being improved. With but few exceptions most of the flocks are now pure bred. The surplus stock is sold to neighbouring farmers for breeding purposes.

*Visits to the Illustration Stations.*

The inspector in charge of the work in each province, visits the illustration fields at least once each month and a visit is made by the supervisor once each year.

The object of these visits is to instruct the operators, and to see that the work is carried out as directed.

Farms in the surrounding districts are also visited and advice and instruction is given in general farm work.

## QUEBEC.

The object of the Illustration Stations is to grow such varieties of grain, clover, grasses, corn, roots, etc., as are suitable to the soil and climate in which the stations are located.

Rotation of crops is also one of the special features of the work.

The following rotation is now being carried on at most of the stations in the province:—

Hoed crops, including corn, roots, potatoes, etc.

Grain seeded with clovers and grasses.

Clover hay, usually two crops the same season, one for fodder, the other for seed.

Hay or pasture. When timothy is harvested, part of the field is saved for seed.

The following are some of the noticeable features of the work:—

In a four year rotation one quarter of the illustration fields are in cultivated crops, following a meadow. As soon as the hay crop is removed, the land is ploughed as shallow as possible and kept perfectly free from growth until autumn, when it is thoroughly ploughed and set up to the winter frosts. By this method the land is kept free from weeds and the soil put in good mechanical condition for grain to be seeded with clovers and timothy the following year.

When 10 pounds of timothy and 10 pounds of clover are sown on land prepared as above there is very little difficulty in securing a good crop of grain and there scarcely ever fails to be a good growth.

Illustration Stations are now in operation at the following points in Quebec.

Aubrey, Châteauguay County,	New Richmond, Bonaventure County,
Lachute, Argenteuil County,	Rimouski, Rimouski County,
Paspebiac West, Bonaventure County,	St. Clet, Vaudreuil County,
Stanbridge East, Missisquoi County,	<b>St. Isidore</b> , Dorchester County,
Drummondville, Drummond County,	Ste. Julie, Verchères County,
Lac à la Tortue, Champlain County,	St. Gédéon, Chicoutimi County.
L'Assomption, L'Assomption County.	

## DIVISION OF FIBRE PLANTS.

The work of the Economic Fibre Production Division during the year consisted chiefly of variety and fibre yield tests, tests of pulling machines, investigations of other flax machinery devices and water retting.

Variety tests with several strains of flax were conducted on the Central Farm and at several points throughout the Dominion. The yields were on the whole satisfactory. The Long Stem variety stood highest in order of merit. The flax produced in Ontario was valued more highly by United States spinners on account of its superior spinning qualities.



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Pulling machines of several designs were tested out, one of which was found to do satisfactory work. In all probability several of these machines will be operating during the coming season.

Decorticating machines were investigated but none was found to have any commercial value.

A considerable quantity of flax straw was retted in the concrete tanks for commercial purposes, using water at different temperatures. It was found that water at 75 degrees F. gave the most rapid and satisfactory ret. The time required was five days. The fibre from the retting experiments were tested out in the heckling process for yield and spinning qualities, and gave excellent results.

## DIVISION OF EXTENSION AND PUBLICITY.

Although in some provinces the number of fairs held was greatly reduced, owing to war conditions, in other parts of Canada the work of the division was expanded, so that the total number of exhibits made remained about normal. A feature of the year was the increased number of applications for exhibits at seed fairs, winter fairs, etc., which were complied with as far as possible. A specially large and complete exhibit was made at the Central Canada Exhibition held at Ottawa in September, and in March, 1919, the chief of the division left for France in charge of an exhibit for the Industrial Fairs at Lyons, France.

Through the medium of the fairs at which an experimental farm exhibit was made, a considerable amount of literature on farm topics was distributed to applicants, and several thousand names added to the mailing lists of the department.

## HEALTH OF ANIMALS BRANCH.

The Veterinary Director General, who is in charge of the Health of Animals Branch, administers the Animal Contagious Diseases Act and the Meat and Canned Foods Act. The enforcement of these acts necessitates the employment of approximately two hundred and sixty (260) veterinary inspectors and one hundred and forty (140) lay assistants.

This division is maintained for the sole purpose of protecting our live stock interests from infection from outside sources, and also for the purpose of controlling and eradicating serious contagious diseases within our borders. In order to prevent the introduction of disease from outside sources, quarantine stations and inspection ports are maintained along the international boundary, as well as on the Atlantic and Pacific seaboards. Practically all of our overseas importations arrive at the Atlantic seaboard and the majority of these are consigned to the Quarantine station at Quebec.

The live stock interests of the Dominion are constantly increasing in importance, and especially in view of conditions resulting from the war, the value of maintaining an efficient effective force for the control and, where possible, the eradication of contagious animal diseases cannot be over estimated. Work of this nature, involving

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the performance of so much professional work of a very important and responsible character, necessitates careful selection of the officers upon whom the responsibility must largely rest. Difficulty is, therefore, constantly experienced in maintaining an adequate efficient force to combat outbreaks of animal diseases which may at any time occur in varying degrees of severity.

It was found many years ago advisable to absolutely prohibit the importation of cattle, sheep, other ruminants and swine from many of the countries of Europe, owing to the introduction of contagious pleuro-pneumonia into the United States from that source.

It is very unfortunate that action of this kind is necessary, owing to the fact that our live stock breeders have been unable to import certain strains of certain species of animals, which are highly desirable. It would, however, be the height of folly to permit any of these importations from these countries so long as serious transmissible diseases of live stock are known to exist. War activities in these countries have increased the danger, and with a view to protecting our live stock interests from the possible introduction of infection from these countries through the medium of our returned soldiers and their supplies, it has been found necessary to prohibit the importation of any horses known to have been in those countries. With the return of our soldiers there is an ever existing danger of infection being introduced into this country, and it will, therefore, be necessary to exercise the greatest vigilance for some time to prevent or control any outbreak of a foreign disease which may at any time be detected in this country. The importance of preventing such outbreaks cannot be overestimated, especially in view of the necessity of greater production in all lines of agriculture. It is essential, therefore to maintain an adequate and efficient staff of officers who are entrusted with this most important work.

The statistics for the year 1918-19 will be found in the special report of the Veterinary Director General, which will, I think, show that the policies of my department are sound and practical.

The attention of my officers has been directed in the field principally to suppressing outbreaks of hog cholera, mange and glanders.

#### HOG CHOLERA.

Hog cholera is more evenly distributed throughout this country than any of the other diseases with which we deal. This is undoubtedly largely due to one of the common sources of infection, that of feeding garbage to hogs, which contains scraps of infected pork and bacon.

Experiments have shown that the infection of hog cholera is not destroyed by the curing and smoking processes, and that when pieces of hams or bacon, obtained from carcasses of infected animals, are fed to hogs, the disease is quickly transmitted. My officers have experienced so much trouble in dealing with outbreaks due to this cause that, upon the recommendation of the Veterinary Director General, it was found necessary to control the feeding of garbage to hogs from premises other than those on which it was produced. The licensing of garbage feeding premises has given good results, but there are large feeders who object to the cooking of the garbage. The

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department has, however, insisted upon the feeding of cooked garbage only, with the exception of a few cases where the hogs had been immunized by my officials by the use of the simultaneous treatment of virus and serum. Fortunately the hog cholera situation in this country does not justify the general use of the virus, and so long as the outbreaks can be controlled as expeditiously as they have been in the past, it is not my intention to permit the use of virus except in special cases.

Serum is used by my officers when dealing with outbreaks of this disease. All hogs on infected premises not showing any clinical symptoms of hog cholera are injected with serum by a veterinary officer and the place quarantined, instead of, as in the past, being slaughtered and burned and buried. This policy has not in any way interfered with the prompt control of the disease and has been advantageous, owing to the fact that large quantities of pork have been saved which otherwise would have been destroyed.

## MANGE IN CATTLE AND HORSES.

Cattle mange is still giving my officers considerable trouble in the infected territory in the Provinces of Alberta and Saskatchewan. Although our statistics show that the number of actually infected cases has decreased, trouble has been experienced owing to the fact that a few shipments of infected cattle have been detected in the United States markets. This resulted in the United States authorities exercising more care in the enforcement of their regulations, which interfered with the free market of cattle from the infected area. In view of the importance of the United States market to our live stock breeders, the Veterinary Director General has arranged to visit Washington immediately, with a view to placing the facts in connection with the mange situation clearly before the authorities there, and I have every reason to believe that, with the facts before them, satisfactory arrangements will be made. Very careful consideration has been given to the best means of eradicating mange, and various opinions have been expressed by those interested. It is encouraging to note that the stockmen are becoming more concerned regarding the eradication of this disease, as their co-operation is essential in dealing with malady of this kind under the many difficulties inseparable from range conditions.

The area in question is a large one, and it is, therefore, not an easy matter to deal effectively with animals running on unfenced lands. There is, however, a large portion of this area on the western boundary in which very little mange has been detected for some time. I am, therefore, considering the advisability of removing this area at an early date from the infected territory.

It may also be possible to remove other areas on the eastern boundary of the infected territory. It is, I think, essential to reduce the area immediately it is safe to do so and to concentrate our efforts in a smaller territory. There are so many difficulties to encounter in the treatment of these animals; weather conditions frequently make it impossible to hold a large number of cattle which have been dipped once for a second dipping, and many of them, during storms, travel long distance and come in contact with stock which have hitherto been unexposed to infection. If, therefore, it is possible to reduce this area much greater progress can be made.

## GLANDERS.

This dangerous disease of horses, mules and asses has been kept under control during the past period. The largest number of cases, as in the past, have been dealt with in the Province of Saskatchewan. Nova Scotia, New Brunswick and British Columbia have been free from this disease, while only one case has been found in Ontario, three in Quebec and eight in Alberta. A few cases have been dealt with in Manitoba, the infection in these cases having originated outside of this province.

The compulsory slaughter and compensation policy enforced by this Branch has been practical and effective. The careful investigation of all suspected cases and the careful inspection and test of import horses without doubt keep the disease under satisfactory control, and finally result in its eradication. The number of cases dealt with during the past year, when compared with those of a few years ago, would indicate that glanders has been adequately suppressed and that the possibilities of big outbreaks of this disease occurring in the future are very slight.

## DOURINE.

This troublesome disease has also been practically eradicated during the last few years. My department has been fortunate in preventing its dissemination to any extent from the district in which it was first detected many years ago. It has, however, been necessary to destroy a large number of valuable animals infected with this malady in order to control the disease. During the past fiscal year there have not been more than twenty animals destroyed. The majority of these cases were suspects, and as the animals were not of great value, it was considered wise to destroy them and pay compensation therefor.

## SHEEP SCAB.

This disease has not been detected in any province in this country, except Manitoba, during the past year. In Manitoba only six cases were dealt with in a district in which the disease has been known to exist during the past two years.

In order to protect our flocks from infection from outside sources a thirty days' quarantine is still required for all breeding sheep from the United States, unless they are accompanied by a certificate signed by an officer of the Federal Bureau of Animal Industry, stating that they have been twice dipped under official supervision. An exception to this ruling is made in connection with sheep from the States of Washington, North Dakota, Montana, Idaho, and Wyoming. Sheep from these states are permitted entry without quarantine if accompanied by a federal certificate stating that the sheep have been inspected by a federal officer and found free from disease, and that no serious diseases of sheep exist in the county or counties in which the animals originated. All sheep are, however, carefully inspected by one of my officers upon arrival at the boundary.

## ANTHRAX.

This very serious disease affecting all domestic animals, as well as man, is seldom dealt with in this country. Some very serious outbreaks have been encountered in the

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past. In recent years the majority of the outbreaks have been due to infection introduced by foreign hides and have occurred in the vicinity of tanneries. During the past year, however, only two very small outbreaks occurred in the province of Quebec.

In view of the importance of safeguarding our interests from infection of foreign origin, all hides coming from countries in which this disease is prevalent, are held at the port of entry and are not permitted to go to destination unless it is found that the purchasers have suitable facilities for the disinfection of these hides. Shipments are unloaded under the supervision of my officers, who take immediate measures for the disinfection of the car in which the hides were conveyed, as well as of all contact matter, including the boots and clothing of the persons engaged in handling the hides. The hides are removed to a convenient location where they are stored and placed in vats containing suitable disinfectants, as rapidly as facilities will permit.

Anthrax vaccine for immunizing purposes is manufactured by the pathologists of this branch and is supplied to veterinarians at cost.

The quarantining of infected premises and immunization of all contact animals has had a beneficial effect in controlling the few outbreaks which have occurred.

## RABIES.

This very serious disease has fortunately not been detected during the past year in this country.

## TUBERCULOSIS.

Careful consideration has been given to the suppression of this disease. No change, however, has been made during the past year in the policy which has in recent years been followed in dealing with this malady. Owing to its wide prevalence its suppression is attended by very many difficulties, and as it is quite impracticable to take drastic measures in an endeavour to control tuberculosis, unless the live stock men are in accord with our policy and are willing to co-operate with us, it is essential to exercise caution. I have not, therefore, so far found it advisable to inaugurate a compulsory slaughter policy, with compensation payment, with the exception of animals slaughtered under the Municipal Tuberculosis Order. This order is limited to municipalities having by-laws requiring licensing of all dairies. The order has been in force for several years, but until quite recently very few municipalities took advantage of it. There has, however, been no undue difficulty in its enforcement, and the municipalities have been well satisfied with its provisions.

Progress is also being made in the eradication of this disease in herds placed under the supervision of my department. The number of these herds has gradually increased and my officers make systematic tests of all cattle in these herds and also make tests of any animals which are purchased before they are brought into the herd. I have not, however, considered it good policy to insist upon the slaughter of reactors in these cases or to pay compensation therefor. The owners are permitted to take whatever measures my officers consider safe in disposing of the reactors, and they, therefore, obtain the market value of the carcasses in all cases found to be fit for food purposes.

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Records of tests of cattle in these supervised herds, as well as the herds tested under the Tuberculosis Order, show quite clearly that the eradication of tuberculosis is a practical problem. It has been found that after the first reactors are taken from the herd, with few exceptions the retests of the same herd reveal a very small percentage of reactors.

In order to protect our live stock interests from infection from outside sources, cattle imported into this country for any purpose other than immediate slaughter, are tested with tuberculin either by an American officer of the Bureau of Animal Industry or by one of the officers of the Health of Animals Branch.

The tuberculin which is used in making the official tests is manufactured by the pathological staff.

In order to encourage the testing of cattle, the department supplies this tuberculin free of charge to veterinarians under certain conditions. The veterinarian conducting the test must forward to the veterinary director general a report of the test and all reacting cattle must be held until they have been permanently earmarked by one of my officers. Although the department takes no further action with these cases, an observant purchaser soon recognizes the official mark and knows that the animal has been declared to be affected with tuberculosis.

#### LABORATORIES.

The work in the laboratories located at Ottawa, Lethbridge and Agassiz, has been of great value to the live stock interests throughout this country. Numerous specimens are continually being received at these laboratories for diagnostic purposes, and full information is forwarded to the persons sending these specimens.

At the Ottawa laboratory many biological products are manufactured for diagnostic and immunizing purposes, which are used in controlling outbreaks of disease.

It has also been necessary to conduct research work, but owing to the very limited accommodation at these laboratories, it has been impossible to give this particular work the attention which it deserves. As it is essential to give more attention to important research work, the department has recently acquired a suitable property in the vicinity of Hull. It is my intention to equip a suitable laboratory on this property, as well as stables and other buildings to facilitate investigation of this nature.

#### MEAT AND CANNED FOODS DIVISION.

The work of this division has been unusually heavy owing to the increased demand for foods for army and civilian needs in Great Britain and the allied countries. This work has been carried on by my officers under excessive strain and labour due to the fact that it was impossible to obtain any further help. This shortage of help was intensified by the fact that the War Purchasing Commission requested a final inspection at the seaboard, also certification as to count and weight. The loyalty of the members of the staff is appreciated, and the thoroughness with which they performed their work is attested by the following statement made by the British authorities to their representative: "We are instructed to place on record the British

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Ministry of Food (London's) appreciation of the work that they have done, the proof of which is the exceptionally small number of complaints which have been received—in number fewer than the complaints which would have been received in normal times."

During the year the Meat and Canned Foods Act was amended so that all imports of the various foods covered by the Act are subject to the same requirements as those manufactured in Canada. Authority was also granted whereby the Governor in Council may bring within the operation of the Act any food or food products other than those specially mentioned.

A number of prosecutions were instituted during the year for violations of the Act and in all cases a conviction was secured and penalties imposed.

In order to protect consumers of canned fruits and vegetables and their products, new regulations were passed in which standards of quality were defined. While it is more or less impossible as yet to state fully the beneficial effects of such standards, there is now no reason why the purchaser should not know the contents of the package as the label must truthfully describe the product. This will permit the selection of the quality desired and will encourage the packing of a high class article which will not be undermined by the cheaper grades, as was the case when the quality was not defined by statute nor specified on the label.

A number of new establishments were placed under the operation of the Act during the past twelve months. Inspection was refused to others owing to their construction and sanitary equipment not being up to the standard required.

We were able during the year to make large sales of condensed milk to the allies upon our furnishing full information regarding weight and quality. Hundreds of samples were taken and tested, and with few exceptions the requirements of the Allied Purchasing Commission were complied with.

During the fall we were able by having our new standards of quality in force to sell to the British Government all our surplus stock of evaporated apples. This product was graded and marked by my officers and an official certificate issued. The value of this work cannot be overestimated since it furnished to our foreign customers a Government guarantee as to quality and thereby prevented the possibility of inferior products leaving Canada, which could not have done other than damage our export trade which is so essential at the present time.

There will in all probability be an amendment to our present regulations whereby it will be made illegal to export any food or food products coming under the Act unless they have been specially examined and an official certificate issued.

## THE FRUIT BRANCH.

It is with deep regret that I record the death of Donald Johnson, which took place on August 4 last. Mr. Johnson was appointed Dominion Fruit Commissioner in May, 1914, on the formation of the Fruit Branch as a separate branch of the Department of Agriculture, and for four years worked diligently and conscientiously to promote and foster the best interests of the fruit industry. He was obliged through ill health to leave his office in May, 1918, and died at his home in Forest, Ontario, less

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than three months later. The work of the branch was subsequently carried on by Mr. Fred. H. Grindley as Acting Commissioner until the appointment of the present Commissioner, Mr. C. W. Baxter, the latter part of October. Mr. Baxter has been on the staff of the department since 1912, first as Chief Fruit Inspector for the Prairie Provinces and, more recently, as Chief Fruit Inspector for Eastern Ontario and Quebec. At the time of his appointment to the position of Fruit Commissioner he was temporarily employed by the Canada Food Board in charge of the Enforcement Section.

#### THE FRUIT SEASON.

The severe cold weather during the winter of 1917-18 had a serious effect upon apple orchards, particularly in Ontario and Quebec. Reports of winter injury became more serious as the season advanced and it was apparent that many trees had been completely killed. Famense orchards in eastern Ontario and Quebec were particularly affected. In Nova Scotia early reports indicated a heavy decrease in yield, as compared with the previous season, but the total crop finally harvested was approximately the same. British Columbia produced an apple crop slightly less than that of 1917. Apple scab was fairly prevalent in all parts of Canada, but not so much so as in previous years. A fairly large proportion of No. 1 fruit was therefore marketed.

The removal of the apple embargo in November permitted the export of apples to Great Britain during the remainder of the season. In Great Britain the primary distributors' maximum prices was fixed at 6½d. per pound and the retailers' maximum price at 9d. per pound. Ocean freight rates opened at \$5 per barrel and \$2 per box but were later reduced to \$3 per barrel and \$1.25 per box. These rates and fixed prices were such as to leave a very fair margin of profit for the Canadian shipper. Over 200,000 barrels of apples were exported from Nova Scotia, as well as a considerable quantity from Ontario.

Peaches were only a medium crop in British Columbia and Ontario. A severe frost on May 24 greatly reduced the yield of peaches and other tender fruits in British Columbia.

Pears and plums were a light crop in Ontario, especially early varieties. Later varieties, such as Lombard and Reine Claude, gave heavy yields in the Niagara District. In British Columbia the yield of plums was good; pears gave a fifty per cent increase over the previous season.

Small fruits were generally light and prices exceptionally high. Grapes were a light to medium crop in the Niagara Peninsula.

#### AMENDMENTS TO FRUIT MARKS ACT.

The amendments to Part IX of the Inspection and Sale Act, which had been recommended at a conference of representative fruit growers in March, 1918, were approved by Parliament on May 24. Some of these became effective at once, while those covering the size of fruit packages were to become effective on June 1, 1919. It was found, however, later in the season, that the dimensions of the eleven and six quart climax baskets, as amended, were not satisfactory. A number of meetings



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were therefore held and an effort made to prescribe and agree upon the dimensions of a standard form upon which these baskets should be made, rather than attempt to define the dimensions of the baskets themselves. The measurements of the required forms have now been obtained, and pending the necessary legislation, the use of the old style package will be continued without interference or restriction by this department. Some changes have also had to be made in connection with the standard apple barrel and those will be made legal at the same time as those governing the climax fruit baskets. It is therefore to be supposed that, after the coming fruit season has passed, the standardization of all fruit packages will have been completed.

## WEIGHTS OF POTATOES, ETC.

Owing to certain inconsistencies in the sale of potatoes in bags, it was thought desirable that the regulations compelling the use of the 90 pound bag should be enforced by the inspection staff of the Fruit branch. These regulations were embodied in Part X of the Inspection and Sale Act (Sections 337, 338, 356 and 357) and had previously been under the supervision of the Department of Trade and Commerce. Their enforcement had not, however, been possible owing to lack of adequate inspection staff. In August, 1918, therefore, an arrangement was made between this Department and the Department of Trade and Commerce whereby these sections were transferred to the Fruit Branch for enforcement. Much has already been done to check the sale of potatoes in other than the legal bag, and the difficulties previously experienced by purchasers, on account of the varying weights of bags, will be soon overcome.

## FRUIT CROP REPORTS.

Fruit crop reports were published monthly from June to October inclusive and covered very fully the situation in all parts of Canada as the season advanced.

Telegraphic reports were also published from August to February twice weekly. In order to effect a more rapid delivery of these telegraphic reports, rendered necessary on account of frequent changes in market quotations, they were published simultaneously at Vancouver, Winnipeg, Ottawa, and Middleton, N.S., for local delivery. This change was of very great benefit, and was continued from October until the end of the calendar year. It is proposed to adopt the same plan again the ensuing year, introducing it in August to cover shipments of tender fruits as well as apples.

## FRUIT EXHIBITS.

To stimulate public interest in the fruit industry and to increase the consumption of Canadian apples particularly, an attractive exhibit was made at the Canadian National Exhibition in Toronto, and was awarded the gold medal. A similar exhibit was made at the Horticultural Show at St. Catharines in September. In connection with these two exhibits a free distribution of an "Apple Recipe" book was made, of which 30,000 copies were printed. Practically all of these reached the hands of housewives and others who would be likely to make good use of them.

## ONION AND POTATO GRADING.

Some attention has been given to the question of establishing uniform grades for onions and potatoes and enforcing the compulsory grading of these commodities. Before attempting to proceed with the preparation of legislative measures, it was considered advisable to obtain an expression of opinion from those concerned. A circular letter was therefore sent to growers' associations, individual growers, and dealers throughout the country. From several hundred replies received it is apparent that compulsory grading will meet with marked general favour. During the coming season it is proposed to call together representatives of the several provinces in order to proceed with the definition of grades and the drafting of the necessary legislation.

## CO-OPERATION WITH CANADA FOOD BOARD.

As in the previous year, members of the Fruit Branch have assisted in the enforcement of the regulations of the Canada Food Board. Practically all of the fruit inspectors have aided in the collection of license fees, which were forwarded to the Food Board through the office of the Fruit Commissioner. In fact, all intercourse and correspondence between the Food Board and the fruit inspectors was transacted in that manner. An office was established by the Food Board in Toronto and another in Hamilton, of which Mr. J. R. Hastings, acting Chief Fruit Inspector for western Ontario, took charge. On the appointment of Mr. Baxter as Fruit Commissioner in October, Mr. F. H. Steele, Chief Fruit Inspector for the Prairie Provinces, took charge of the enforcement section of the Canada Food Board at Ottawa, and continued in that work for three months, after which time the work of the Board had so lessened that the assistance and co-operation of the Fruit Branch was no longer necessary. During the year much valuable aid was also given to the Canada Food Board by Mr. Geo. E. McIntosh, officer in charge of transportation in the Fruit Branch. An outline of this work is included in this report under the heading "Transportation."

## TRANSPORTATION.

The transportation work of the Fruit Branch is under the direction of Mr. Geo. E. McIntosh. During the past year Mr. McIntosh visited the western provinces in July and August to inquire into the complaints of shippers, to interview railway officials, and to adjust, so far as he was able, difficulties arising from carload minimums, rates, switching privileges, station facilities, etc. He also attended, in February, sittings of the Railway Commission in all provinces, in connection with the proposed increase in express rates.

Much help was given to the Canada Food Board in the enforcement of Order in Council No. 3430, which prohibited unnecessary delay in the unloading of cars containing foodstuffs. This office dealt with over one thousand cars, reported by the railway companies as being delayed at destination under load. These cars contained practically every variety of food and their prompt unloading was enforced by this office up to the point of seizure; when that became necessary they were referred to the Canadian Food Board. By this means an inestimable amount of waste was prevented.

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In September Mr. H. H. Shaeffer was temporarily appointed in Nova Scotia to assist fruit shippers in obtaining cars for Canadian shipments and for export shipments, and to take care of their requirements, as much as possible, when there was a shortage of cars on the Dominion Atlantic Railway, by obtaining them through the Canadian Pacific Railway. He also assisted in obtaining ocean space and in advising shippers as to proper routing of shipments, etc. Mr. W. P. Fox was similarly employed on Prince Edward Island to aid in the movement of potatoes from that Province.

A number of circulars have been sent out from Ottawa informing shippers of changes in classifications, tariffs and shipping regulations generally.

In co-operation with the British Ministry of Food and the British Ministry of Shipping in Montreal, assistance was given in the allotment of space for export shipments of apples after the embargo had been lifted.

## INSPECTION WORK.

Owing to the light crop of apples, particularly in Eastern Canada, it was possible to make a reduction in the staff, and only thirty-two temporary inspectors were appointed during the past season as compared with forty-four in 1917-18. In addition to these men, who were employed for periods from three to six or seven months each during the active fruit season, there are twelve permanent inspectors on the staff in addition to the chief inspectors. The country is divided, for inspection purposes, into five districts, with a chief inspector in charge of each. These districts with the number of inspectors located in each during the season of 1918-19 were as follows:—

The system of inspection at point of shipment has been continued and gives most satisfactory results. In addition to examining large quantities of fruit packed in the orchard or at the shipping station, our men are able to give valuable information to fruit growers and packers relative to all matters concerning the packing, grading, shipping and marketing of their fruit. This educational work forms a very considerable part of the inspectors' duties, and is much appreciated by growers, packers and shippers, and has a positive value to the consuming public inasmuch as the presence of our inspectors in the orchards and packing houses has had a marked effect in lowering the number of shipments of improperly packed and falsely marked fruit.

For many years the inspection of apples formed the chief work of our inspectors but since 1915, in response to requests from growers, shippers, dealers and consumers, more attention has been paid to the inspection of other fruits, including strawberries, cherries, plums, etc. The chief complaints regarding these fruits were with respect to immature shipments, which had a very disastrous effect on the market for later and properly matured fruit, the over-facing of basket fruit and the failure to properly fill open packages. While the presence of our inspectors had already caused considerable improvement in these matters, it has been possible to secure much more direct results since these points have been covered by the amendments of May 24, 1918. During the past season our inspectors have spent a great deal of time in familiarizing packers and shippers with these amendments, which cover the points already mentioned and also provide for more definite grades, a clearer definition of over-facing and for the standardization of all the fruit packages in common use in Canada.

All cases of violation of the Act have been investigated by the chief inspector for the district in which the packed lived, but slightly more leniency was shown in taking action against these offenders during the past season than in former years, owing to the unsettled condition of the industry, particularly in connection with labour, and also owing to the fact that many of the packers were ignorant of or did not thoroughly understand the requirements of the amendments of 1918. The convictions secured during the past season were twenty-two.

As in former years the permanent staff have been able to give considerable assistance, in co-operation with the provincial and local authorities, in connection with orchard demonstrations and meetings to encourage improved orchard practice and modern methods of packing, grading, shipping and marketing. The inspection of basket factories was also continued. Many of our inspectors acted as instructors at courses in box and barrel packing; and a number have been asked to serve as judges at fruit exhibitions.

Special efforts were made during the past year to assist in the settlement of disputes between shippers and dealers. In the past losses and waste of fruit and vegetables have occurred frequently through consignees refusing to accept cars for various reasons. To facilitate prompt delivery, ensure fairness to both consignee and shippers and to avoid unnecessary waste, our inspectors during the past season have been authorized to make inspections of such cars or shipments upon request of either shipper or consignee, sending copies of their reports, showing the exact condition of the goods, to the applicant. Many shippers and consignees have taken advantage of this service, which has resulted in the satisfactory settlement of many cases and the prevention of waste of food.

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## INSPECTION STATISTICS.

The following table gives comparative statements of the number of lots inspected and the number of packages inspected for the seasons 1914-15 to 1918-19 inclusive:—

Variety.	No. of lots inspected.	No. of pkgs. in lot inspected.	No. of pkgs. inspected.	
1914-15.				
Apples .....	Barrels,	8,926	765,445	59,602
" .....	Boxes,	2,769	457,055	36,118
" .....	Baskets,	191	29,476	3,994
Crab Apples .....	Boxes,	38	2,443	951
Pears .....	"	894	91,121	9,760
Peaches .....	"	735	183,952	10,635
" .....	Basket,	147	17,797	2,422
Plums .....	"	643	180,154	12,294
Tomatoes .....	"	305	103,742	12,171
Small Fruits .....	Quarts,	1,162	1,329,598	151,599
Grapes .....	Baskets,	244	308,728	22,394
			Total ..	321,300
1915-16.				
Apples .....	Barrels,	8,882	810,858	60,248
" .....	Boxes,	4,297	758,337	46,791
" .....	Baskets,	264	14,319	1,797
Pears .....	Boxes,	1,062	121,414	8,816
Peaches .....	"	1,422	270,508	12,575
" .....	Baskets,	838	106,569	10,796
Plums .....	"	968	482,416	22,231
Tomatoes .....	"	633	290,343	7,926
Small Fruits .....	Quarts,	1,724	2,670,984	275,234
Grapes .....	Baskets,	260	322,332	11,395
			Total ..	477,809
1916-17.				
Apples .....	Barrels,	6,412	404,597	43,369
" .....	Boxes,	2,337	579,148	32,420
" .....	Baskets,	188	14,472	1,332
Pears .....	Boxes,	200	108,426	6,108
Peaches .....	"	1,179	289,560	15,612
Plums .....	Baskets,	609	158,133	7,215
Tomatoes .....	"	624	136,993	5,812
Small Fruits .....	Packgs.	2,039	282,365	99,799
Grapes .....	Baskets,	193	273,435	7,951
			Total ..	219,608
1917-18.				
Apples .....	Barrels,	5,652	379,496	40,117
" .....	Boxes,	3,157	968,892	35,888
" .....	Baskets,	196	16,146	1,709
Pears .....	Boxes,	779	112,717	4,954
Peaches .....	"	1,303	324,228	14,481
Plums .....	Baskets,	773	195,084	5,952
Tomatoes .....	"	652	158,971	6,383
Small Fruits .....	Packgs.	1,312	248,539	14,637
Grapes .....	Baskets,	135	153,027	3,415
			Total ..	127,536
1918-19.				
Apples .....	Barrels,	4,861	382,653	36,947
" .....	Boxes,	2,431	760,307	26,769
" .....	Baskets,	122	19,614	1,212
Pears .....	Boxes,	576	101,675	4,267
Peaches .....	"	794	242,735	8,806
Plums .....	Baskets,	515	182,286	4,576
Tomatoes .....	"	394	145,119	3,630
Small Fruits .....	Packgs.	852	173,567	11,616
Grapes .....	Baskets,	166	198,336	2,126
			Total ..	198,949

## ENTOMOLOGICAL BRANCH.

The work of this branch has comprised: the administration of those regulations under the Destructive Insect and Pest Act affecting insect pests including the inspection and fumigation of foreign nursery stock or other plant products; the suppression of the brown-tail moths in Nova Scotia and New Brunswick; the study of the natural control of insects and the introduction and colonization of parasitic and predacious insects; the conducting of investigations on insects affecting farm, garden and orchard crops, forest and shade trees, grain and stored products, domestic and other animals, household and public health, and the dissemination of information concerning the control of such insect pests; the naming of collections of insects for institutions and individuals; and the administration of an appropriation for the care of orchards on the Indian reservations in British Columbia.

In addition, the chief officer of the branch, in his capacity as Consulting Zoologist, has been called upon to advise on questions relating to the protection and encouragement of birds, the conservation of mammals, and the destruction of noxious species.

While the main work of the officers of the branch has been investigation, they continued during the season of 1918 the policy that has been adopted during the war of giving special attention to the work of assisting increased production by promoting crop protection. Certain of the officers have devoted their entire time to demonstration and other forms of extension work on crop protection, and results of material value have accrued. So useful have the branch laboratories proved as means of increasing the scope of our investigations and of getting into closer touch with farmers and others whose interests we are serving that in order to meet the increasing demands for assistance in this work it has been necessary to increase the number of assistants at these laboratories.

The following is a brief summary of the various lines of work that have been undertaken during the last year by the officers in charge of these laboratories and under the direction of the Dominion Entomologist:—

*Annapolis Royal, N.S.*—The control of insects affecting orchard crops and potatoes including very extensive experimental tests on the comparative killing value of different insecticides used alone and in combination with fungicides, and their effect on foliage. Our recommendations concerning the use of arsenate of lime as a substitute for the more expensive arsenate of lead has been widely followed with satisfactory results. Work was conducted in numerous demonstration orchards and extensive demonstration work was undertaken on potatoe spraying, in consequence of which increased yields were obtained in many districts. This laboratory now constitutes the headquarters for investigations on insecticides.

*Fredericton, N.B.*—The brown-tail moth work in the Maritime Provinces is directed from this laboratory which is also the headquarters for the work of introducing and establishing the parasitic and predacious enemies of the brown-tail and gipsy moths, and for the investigations we are conducting on the natural control of insects. Satisfactory progress has been made in the studies of the natural control

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of the spruce budworm, tent caterpillars, fall webworm, and oyster shell scale, which are being studied throughout their range in Canada. In addition to the foregoing lines of work, the crop protection work in New Brunswick has been carried on from this laboratory and valuable extension work has been accomplished.

*Hemmingford, P.Q.*—The work of this laboratory has consisted mainly in conducting experimental and demonstration work on the control of insects affecting orchards and potatoes. Over twenty orchards were utilized and in addition to spraying investigations on the use of dust insecticides were carried out. In the dairying sections the distribution and control of the warble fly are being studied.

*Fort Coulonge, P.Q.*—During the past year a laboratory has been established at this place for forest insect investigations after profitable preliminary work in the previous year. The main work consists of an extensive study of timber boring beetles.

*Vineland Station, Ont.*—Investigations on aphids and on insects affecting small fruits have constituted the chief work of this laboratory. Special attention was paid to the pear psylla; and comparative tests of orchard sprays were also made. Certain pests peculiar to greenhouses were investigated.

*Strathroy, Ont.*—White grub investigations form the chief work carried on at this laboratory. Attention has also been paid to insects affecting the principal field crops in western Ontario.

*Treesbank, Man.*—The officer in charge of this laboratory devotes most of his attention to the study of insects affecting cereal crops and their control. This work has included in particular investigations on the western wheat stem sawfly and grass stem maggots. The White grub studies commenced in 1914 have been practically completed.

*Saskatoon, Sask.*—As a result of work carried out in 1917 it was decided to establish a laboratory for Saskatchewan at Saskatoon where the main work consists in a study of insects affecting live stock. Both flies, horse flies and black flies are now receiving attention.

*Lethbridge, Alta.*—The absence on military service overseas of the officer stationed at this laboratory and his assistant rendered it necessary to discontinue temporarily our work there.

*Vernon, B.C.*—This laboratory now constitutes the head quarters for our entomological investigations in British Columbia. The attention of our officers has been devoted chiefly to the major pests affecting the fruit-growers' interests, such as codling moth, and peach twig borer. In addition certain insects, such as onion thrips and maggot, affecting important local crops have been studied.

*Victoria, B.C.*—The work in the southern portion of Vancouver Island, of which the control of the strawberry root weevil is the most important, is carried on from this laboratory.

*Agassiz, B.C.*—In order to extend the investigations on the natural control of insects and to study in British Columbia the outbreak of the insects now under investigation, an officer was stationed at this laboratory during the past year.

At Ottawa the investigation of white grubs and of the control of root and onion maggots was continued on a more extended scale with promising results.

In order to facilitate further the importation of nursery stock from the British Isles, the city of Quebec was made a port of entry for nursery stock originating in Europe.

The inspection, under the provisions of the Destructive Insect and Pest Act, of nursery stock originating in Europe, Asia and the New England States was continued. The increased transportation charges and shipping difficulties caused a further decline in the number of trees and plants imported, but altogether about one and one-quarter million were inspected and a number of foreign pests were intercepted.

The campaign against the brown-tail moths in Nova Scotia and New Brunswick has been responsible for the attainment of a situation which may be regarded on the whole as being satisfactory. This condition of affairs is due solely to the careful scouting for and destruction of winter webs that has taken place each winter. A further reduction in the abundance of this pest in both provinces was brought about; in Nova Scotia 3,024 winter webs were collected during the winter 1917-18 as compared with 10,619 winter webs collected during the previous winter, and in New Brunswick 375 winter webs were collected after most careful scouting, during the winter 1917-18 as compared with 395 winter webs collected during the winter of 1916-17.

In the investigations on the natural control of insect pests valuable information has been secured and we hope to be able to make practical use of some of our discoveries regarding the parasitism of such native insects as the tent caterpillars and spruce budworm. We were able to prove during the year that we had been successful in introducing and establishing another important species of parasite, namely, *Compsilura concinnata*.

It is very gratifying to note that our work on forest insects is being appreciated by the lumbermen and limit holders who are now realizing the significance of insect damage in forest protection. During the year, in co-operation with the Commission of Conservation, we began an important study which has for its object the determination of the various factors that govern the reproduction of our cut-over coniferous forests in Eastern Canada. On the practical application of the knowledge so gained will depend the future of these forests. Extensive dying off of balsam throughout Eastern Canada was investigated and a number of other lines of work, including further studies and a number of insects affecting shade trees were prosecuted.

During the year greater attention has been paid to insects and pests affecting stored grain and this work is being extended on account of its economic importance in relation to the storage and shipment of our chief harvest.

Miscellaneous investigations on insects affecting garden crops, greenhouses and the household have been carried out and the correspondence regarding the control of such insects continues to increase.

The study of insecticides and their application was continued and several promising combinations were made by our officers. In addition to increasing the efficiency of insecticides our object is to lower the cost of manufacture and application and thus in addition to increasing crop protection reduce the cost of crop production.



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In his capacity as Consulting Zoologist the officer in charge of the branch has had to devote much time to questions relating to the conservation of native birds and mammals and the control of noxious species, particularly in his capacity as Secretary of the Advisory Board on Wild Life Protection which interdepartmental committee has been called upon to deal with many subjects during the past year. \*

The following publications have been issued from the Entomological Branch during the year:—

## Entomological Bulletins—

- No. 14. Canadian Bark-beetles, Part II: A preliminary classification, with an account of their habits and means of control. By J. M. Swaine.  
 No. 15. The Pear Thrips (*Taeniothrips inconsequens* Uzel) and its control in British Columbia. By A. E. Cameron and R. C. Treherne.

## Entomological Circulars—

- No. 11. The White-Marked Tussock Moth and its control on shade trees and orchard trees. By J. M. Swaine and G. E. Sanders.

## Crop Protection Leaflets—

- No. 9. The Pea Weevil. By Arthur Gibson.  
 No. 10. Arsenate of Lime. By G. E. Sanders.

In addition to the above publications the officers of the Branch have contributed papers embodying the more technical results of their work in the *Canadian Entomologist* and other scientific journals. Articles have also been contributed each month to *The Agricultural Gazette of Canada* on subjects to which the officers of the branch have been devoting study.

The National Collection of Insects is increasing in size and importance through the activities of the officers of the branch and the generosity of private collectors whose assistance in building up a working national collection is greatly appreciated. Owing to the increasing magnitude of the collection and the growing demand for assistance in the determination of small collections, it has been necessary to arrange for the appointment of a special officer to devote all his time to this work.

## THE INTERNATIONAL INSTITUTE BRANCH.

On April 30, 1918, the president of the International Institute announced the sudden death of Mr. Santiago Aldunate, former delegate for Chili, and an honorary member of the permanent committee. Reference was made to the exceptional activity in connection with the institute, the valuable collaboration in its work, and the lucidity of the views of this devoted friend of the institute, who had been attending the meeting of the permanent committee from its inception until recently.

Reference was also made to the role being played by the institute during the war, and to the high praise voiced by Mr. Henri Sagnier before the Academie d'Agriculture de France. After referring to the prominent and able part taken by Mr. Louis Dop, representative for France, he said: "Thanks to the high inspiration and the skilful management of its permanent committee, thanks to the happily inspired special measures adopted, the Institute has been able to continue its existence and its functions in midst of the general upheaval. The facts have proved and prove every day that the governments were thus happily inspired in maintaining an institution which seems to have been created for the sole purpose of constituting a living symbol of the

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works of peace. Thanks to its direct and permanent relations with the different states, the Institute can furnish reliable data almost daily on the progress of production, the preliminary forecast and final yield of crops, on the available supplies, on the variation in prices, on transportation, etc. It conducts a permanent investigation to which governments have recourse and which renders the greatest service."

That these services were real and much appreciated appears from communications from the Minister of Colonies, from the United States Bureau of Crop Estimates, and the United States War Trade Board. The latter board wrote to Mr. Lubin: "You will no doubt realize the nature of the work of our department which controls all the exports and imports. We gather our information from the most reliable sources, and we feel that your publications present an inestimable aid in view of the decisions that have to be made in connection with the exports and imports of agricultural products. Receive the expression of our high appreciation for the usefulness of your bulletins."

At a meeting on November 21, shortly after the Armistice, the president, upon meeting the permanent committee after the long holiday, made an interesting address in the course of which, among other observations, he referred to the satisfaction which must be common to all victors, neutrals, and even the vanquished, that of witnessing the world progress towards a happier future. The new treaty of peace would mark the opening of a new era where reason could be substituted for force, and where the superior and common authority would impose its decision upon the unreasonable ambition of kings and people. He greeted with enthusiasm the prospective realization of the League of Nations.

The president referred to the fact that during the preceding four years the institute alone, among other international institutions, had not only survived but continued its work as usual; but when a great number of the officials at the beginning of the war started for opposite camps, the decision to continue in spite of all was difficult of execution. Obstacles multiplied during the course of the conflict but, in exercising great patience in the midst of such exaggeration, a practical solution was found for the problems that daily arose.

The president said in conclusion: "Our mission now becomes more vast, more complex and arduous. The intensification of production, which is urged in all countries after such a great destruction of wealth, imposes upon us new tasks and responsibilities still more grave. All the branches of our activity must furnish a considerable contribution to the work which is expected of us, not only in respect to the reconstruction of the wealth destroyed, but in order to prepare for humanity a more worthy and happier future. We must study the means of rendering more efficacious and more general the benefits that may be derived from all the progress of scientific agriculture, the sole source of greater production. We have to take up once more the examination of organization against the diseases of plants which we had to abandon a few months after the important International Conference held in Rome in 1914. We must see whether the time has not arrived, as I believe it has, to proceed to the institution of an international observatory for agricultural labour, which constituted a part of the institute's original programme and has now become a prime importance. All the numerous questions connected with the statistics of production, and more still with the statistics of trade, urgently await our solutions. We should

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place ourselves in touch with existing institutions in order to render more useful, and especially more active, our studies in connection with agricultural association and credit. We should seek methods of rendering ourselves useful to the least advanced countries, and we must intensify our work in the interests of the production of tropical countries."

The late Mr. David Lubin, delegate for the United States, agreed with the president with reference to the great services the institute might render in connection with destroyed wealth. Now was the opportunity for the institute of achieving what His Majesty the King of Italy had in mind when he took the initiative in its creation. For that purpose, he would at once make a formal proposal that the permanent committee appoint a commission of five members, which should draw up a schedule of the branches of the work in which the institute might render services, either at once or in the future, and submit that schedule to the permanent committee for discussion at its next meeting. That after discussion the committee should be charged to proceed to the meeting place of the Peace Conference for the purpose of explaining the programme of the institute's work and all the facilities which it offers, so that the institute might take its place as an organ of the League of Nations, duly recognized in the final peace. This proposal of Mr. Lubin was adopted, although in a different form, it having been decided on the motion of the French delegate that a resolution be forwarded to the different governments to ask them to make the requisite representations to their representatives at the Peace Conference.

It was also at the permanent committee meeting of November 21 that the secretary general, Signor Dragoni, upon being reminded that the arrears due from certain adhering States were considerable, stated that there was an evident difference between the financial situation as it is disclosed by the table showing the arrears in the payment of contributions and the real situation. If the 520,000 liras due for 1918 were considered, it might be inferred that there was a deficit, whereas it must not be forgotten that there was collected in 1918 more than 200,000 liras of arrears in contributions of preceding years so that, while at the end of September, 1917, there was available in cash only 959,000 liras, at the end of September, 1918, there was in cash 1,200,000 liras, or an effective improvement of more than 150,000 liras. This result is all to the honour of the financial policy of the institute thanks to which, during the four years of war, the institute has really set aside one million liras, its reserve which was 200,000 liras having risen to 1,200,000 liras.

The secretary general also referred to the various communications received expressing approval of the institute's work, alluding to the Interallied Food Council, consisting of the Requirement Ministers of Great Britain, United States, France and Italy. The Director-General of Requirements wrote: "I know perfectly through my personal experience that the publications of the institute are practically the only reliable source for international statistics of cereals, and that these publications contain the best comparable data obtainable. Do not for a moment doubt that the allied countries appreciate the precious work of the institute." The secretary general referred to the communications of Weddel & Co., of London, and the American Bureau of Animal Industry, who paid a tribute to the new service which furnishes the imports and exports of meats, and who suggest further development of such statistics.

At the permanent committee meeting of December 7, the questions connected with the programme of the next general assembly meetings were discussed. Without presuming to anticipate the decisions of the permanent committee, it is of interest to state that the very able and thorough report of Professor Lorenzoni is to form the basis for discussion of the question of ocean freight rates and the control of ocean trade, a proposal long advocated by Mr. Lubin and supported by the British, French and Italian delegates. During the war the policy of ocean freight control became a reality and was resorted to much more vigorously than its author, Mr. Lubin, had expected.

Mr. Lubin's proposals at this meeting, chiefly with reference to discussion at the next general assembly meetings of the questions of pure food laws, agricultural labour, and the submission of the programme of statistics to the different food controllers, marked the closing official act in his life work. On January 1, the founder of the institute passed away, in the midst of the intense activities that had characterized his whole career. Having been constantly in intimate relations with the allied leaders charged with the regulation of the food supply during the war, his scheme contemplating the control of ocean freight rates and the constitution of an international Reserve Board along the lines of that existing in the United States, undoubtedly exercised a powerful influence in the systems of control which actually prevailed. All of his important proposals to the International Institute have borne good fruit. He has shown the practicability of an international institution of very wide scope and usefulness. Through many years of continuous active propaganda issued chiefly from its offices, he has effectively worked towards popularizing the ideas underlying the League of Nations which, at the moment of his death, was on the point of becoming a reality. In this, as in all his work, it is now generally recognized that he was a most effective champion of the world's agricultural interests. On March 27 the Canadian Senate passed an appropriate resolution commemorating his notable career.

The seventh volume of the "International Year Book of Agricultural Legislation," containing all the laws, decrees and ordinances of interest to agriculture promulgated in 1917 in all countries, was published in the fall of 1918. The exceptional conditions in which the legislation of 1917 had risen give a special interest to this volume. It contains a faithful picture of the effort made by each country to regulate production and the food supply. The work is published in French only, but the English introduction of 60 pages traces clearly the general lines followed by the year's legislation.

A notable example of the laws published in this series of year books is the Act of the British Parliament of May 31, 1917, consolidating in a single text all the regulations relating to the defence of the realm since the outbreak of the war. Other examples are the United States Federal Farm Loan Act of 1916, and the law of the Union of South Africa, June 23, 1917, concerning the trade in manures, food for live stock, seeds and substances used to combat the disease of plants. The texts of several measures relating to the regulation of prices and the taxation of income and profits have also been given.

Besides furnishing the information desired at the headquarters of the institute, it is the duty of the International Institute Branch to turn to good account and enable

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Canadians to reap the maximum of benefit from a Government expenditure, outside of Canada, of some \$150,000,000 annually on agriculture. It is the business of the officials at the Rome headquarters to concentrate the essential features of the information, to emphasize scientific discoveries and practical progressive methods of applying newly established scientific principles, and particularly to cultivate a disposition among all the agriculturists of the world to co-operate for their common welfare. They realize these objects by means of their periodical public meetings in the nature of world's parliaments of agriculture, but more effectively perhaps by means of their permanent bureau among the 100 members of which some of the world's distinguished experts are constantly at work for the common cause. They present the results of their work in the form of publications devoted to (1) Crop Reporting and Commercial Statistics; (2) Review of the Science and Practice of Agriculture; (3) Review of Agricultural Economics, Organization and Administration; (4) also a supplementary report, created since the war, dealing with tropical products, the trade in live stock, foodstuffs and fertilizers, the scattered character of whose statistics does not permit of regular classification for the purpose of presenting a maximum of comparable world-wide results, such as can be done more effectively for the cereal crops; (5) regular annual publications, such as the "International Year Book of Agricultural Legislation."

The Institute Branch at Ottawa is not only possessed of this information in the summary form in which the institute publications necessarily issue it, but the branch also procures the original publications and periodicals from which the summaries were prepared, and any other obtainable literature on the same subject, and all this material is made easily accessible to Canadians, whether in Ottawa or elsewhere.

Brief indications of this rich material are communicated monthly to the *Agricultural Gazette*, and periodically special investigations of the world's cereal situation are made and the results prepared in the same manner. The branch's work tends to bring Canadians to a realization of the fact that, however important is their own work and their own agricultural expenditure of some \$10,000,000, they also derived full benefit of a larger world expenditure, thus made in a considerable degree gratuitously available to them; to bring them to realize that they should reap the benefit, not only of the excellent and more directly applicable work of their own experts, but also the comparable and adaptable results of the work of a much larger body of experts labouring in other countries under different conditions. It appears from the preceding reports of this branch that the agriculturists of Canada, especially the expert administrative and teaching bodies, are gradually becoming better acquainted with the facilities offered by this permanent commission and centre of inquiry for foreign agriculture.

Some of the subjects on which information was sought by written inquiries received from Canada and outside of Canada, and furnished during the year, were: "The wheat problem in the United States and Canada"; "Exploitation of capitalist farms in Egypt"; "Dry Farming"; "Desiccation of Potatoes"; "Nettle Fibres"; "Implements exhibited at agricultural shows"; "Agricultural conditions in Poland"; "Agriculture in Japan, China, and India"; "The live stock situation at the end of the war"; "The world's food situation"; "The

world's supply of cereals"; "Per capita consumption of agricultural products in various countries"; "World's trade in agricultural products"; "Cost of production of agricultural products"; "Consumption of Fertilizers"; "Co-operative organization of farmers in Canada"; "Agricultural credit in various countries"; "Insurance against frost and drought."

During the year the usual contributions were made by this branch to the *Agricultural Gazette*. These included the continuation of the series of original articles, begun in 1916, on the world's food supply. The articles published in the past year were: "Bacteriological Analysis of Pellagra-Producing Diets"; "The Wheat Crop of 1917"; "World's Wheat Prospects for 1918-19"; "Food Prospects under Peace Conditions"; "World's Live Stock." The more important articles republished from the original Institute Bulletins were: "The Problem of Agricultural Meteorology"; "The Effect of one Growing Plant upon another"; "Marquis Wheat"; "Movement and Distribution of Water in the Soil"; "Electrocultural Experiments in Great Britain and France"; "Electric Farming in the United States"; "Electroculture of Growing Crops in Scotland"; "Influence of Crop, Season and Water on the Bacterial Activities of the Soil"; "The Cause and Prevention of Hairless Pigs"; "Cattle Lice and How to Eradicate Them"; "Nutritive Deficiencies of Wheat and Grain Mixtures and the Pathological Conditions Produced in Swine by their Use"; "The Role of Water in the Dairy Cow's Ration"; "The Breeds of Dairy Cattle in the United States"; "Trials of Agricultural Machinery" (a series of articles on competitive trials in different countries); "The Tractor in Relation to the Farm and its Machinery"; "Factors Governing the Design of a Small Agricultural Tractor"; "Mechanical Ploughing" (three articles on methods of ploughing, illustrated with diagrams); "Fire Prevention and Fire Fighting on the Farm"; "Cost of Keeping Farm Horses and Cost of Farm Labour in the United States"; "Study on the Cost of Market Milk Production in the United States"; "Influence of the City on Farming"; "Municipal Drying Plants for Fruits and Vegetables in the United States"; "Researches on Apple Spot Diseases"; "Settlement of Ex-Service Men within the British Empire after the War"; "Agricultural Reconstruction in the United Kingdom"; "A Statistical Inquiry into Agricultural Organization in the United States"; "Agricultural Co-operation in Scotland."

*The Library.*—During the year 1918-19, 1,574 bound volumes were added to the library making a total received of 6,322. An average of 750 unbound books and pamphlets was received every month (duplicates not being included). These have been classified by subject, and the resources of the library include the following:—

Sections.		Sections.	
Bibliography . . . . .	2	United States D.A. . . . .	33
Sociology . . . . .	137	"    exp-r. stations . . . . .	94
Including Statistics . . . . .	39	Soils . . . . .	7
Agricultural credit . . . . .	3	Plants—Diseases and pests . . . . .	6
Co-operation . . . . .	6	Including—	
Science . . . . .	27	Chemistry . . . . .	2
Agriculture, general . . . . .	6	Biology . . . . .	2
Agricultural bulletins . . . . .	12	Botany . . . . .	5
"    reports . . . . .	22	Zoology . . . . .	6
"    societies . . . . .	6	Veterinary medicine . . . . .	10

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	Sections		Section
Periodicals.....	145	Live stock (not including herdsbooks).....	9
Reference books.....	12	Dairying.....	4
Crops.....	5	Bees.....	1
Fruit.....	5	Game.....	2
Horticulture.....	5	Home economics.....	5

(Other subjects are not included in the above.)

Catalogue cards received from the Library of Congress or typed in the Library bring the number of cards in the catalogue up to the total of 193,125. The Library of Congress cards (of which are received by subscription all referring to agriculture) are an important guide to agricultural literature and by following them, as well as the literature referred to in the "International Review of the Science and Practice of Agriculture," "International Review of Agricultural Economics," "The Experiment Station Record," "The Agricultural Index," "The Cumulative Book Index," and the lists of government publications received from London, Washington, and our own Canadian lists, it is hoped to build up an agricultural library which will become more and more useful for research. As the Library has the catalogue of the U.S.D.A. Library, use might be made of it for loans from Washington. The Library of Congress cards do the work of an expert cataloguer. It would mean a great deal of work to do cataloguing which is done for us by them at the expenditure of a comparatively small sum.

Cards for 289 volumes purchased and located in other offices of this Department have been entered in the catalogue.

Periodicals which are indexed in the "Agricultural Index" are all available for consultation in the library. Besides these the aim is to have on hand all Canadian agricultural periodicals, all periodicals from foreign governments referring to agriculture, and some other important ones not included in those already referred to.

Special purchases during the year include the library of the former pathologist of the Health of Animals Branch. This consists of 205 volumes and a large number of pamphlets and periodicals and a catalogue of about 3,000 cards.

The library obtained by purchase a number of old publications of the U.S. Department of agriculture which were needed to complete files. Back issues of the following periodicals were also bought to make complete sets: Soil science, Phytopathology, Journal of Genetics, Journal of Agricultural Science, Journal of the American Society of Agronomy, Journal of Heredity, Journal of Economic Entomology.

A "want" list of U.S. Experiment Station publications was sent out in May 1918, with the result that a large number of bulletins was sent. The immediate response of the American officials was much appreciated. The thousands of duplicates received were offered to various officials of this department and the remainder were returned to the issuing stations.

Books and periodicals lent to persons, for use outside of the use made in the library, numbered 1,028.

## THE PUBLICATIONS BRANCH.

As a feature of the policy of the Department of Agriculture to materially increase the production of crops and other farm products, a number of pamphlets have been prepared and distributed during the period of the war and more especially during the past fiscal year. The number of the larger bulletins and reports has consequently been reduced. The smaller publications, designated circulars, special circulars, pamphlets, crop protection leaflets, and leaflets, have covered practically the whole range of work necessary to be done on the farms, gardens, and orchards of Canada. These have been prepared by the officers of the different branches of the department specially qualified to deal with the respective subjects. It has been the duty of the Publications Branch to distribute these, as well as the more regular bulletins and reports, to the respective mailing lists and to such individuals as applied and to others who could best reach the producers of the various products of the soil. A keen demand was experienced for the gardening leaflets through the publication by the newspapers of press notices prepared and sent out by the Publications Branch. To each of the applicants, for these and all other publications not already on the mailing list, was sent an application card so designed that, when filled in and returned it became the guide to the staff in adding the names of the applicants to the subject lists desired. Following is a list of the publications distributed during the year:—

## Reports—

- The Minister of Agriculture.
- The Agricultural Instruction Act.
- The Dominion Experimental Farms.
- The Veterinary Director General.
- The Proceedings of a Dominion Dairy Conference.
- The Canadian Record of Performance for Pure-Bred Dairy Cattle, Live Stock Branch.
- Fourteenth Annual Report Canadian Seed Growers' Association
- Five Monthly Fruit Crop Reports, Fruit Branch.

## Bulletins—

- Apple Culture in Canada, No. 86, Experimental Farms.
- The Potato in Canada, No. 90, Experimental Farms.
- Poultry Feeds and Feeding, No. 91, Experimental Farms.
- Elevage du Lapin, No. 34, Experimental Farms.
- Peach Canker, No. 37, Experimental Farms.
- The Apple Bud-Moths and Their Control in Nova Scotia, No. 16, Entomological Branch.
- The Fruit Worms of the Apple in Nova Scotia, No. 17, Entomological Branch.
- List, Cheese Factories, Creameries, Skimming Stations, No. 54, Dairy Branch.
- Poultry Keeping in Town and Country, No. 89, Experimental Farms.
- The Diseases of Tomatoes, No. 35, Experimental Farms.
- l'Elevage du Mouton au Canada (New Edition), No. 12, Live Stock Branch.
- Agricultural Instruction in Canada.



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## Circulars—

- Vegetable Gardening at Home and on Vacant Lots, No. 14, Experimental Farms.
- Selection and Wintering of Biennial Vegetables for Seed, No. 15, Experimental Farms.
- The White-marked Tussock Moth and Its Control, No. 11, Entomological Branch.
- Keeping Dairy Herd Records, No. 25, Dairy and Cold Storage Branch.
- The Best Varieties of Grain, No. 6, Experimental Farms.

## Special Circulars—

- The Self Feeder for Hogs, No. 15, Experimental Farms.
- Labour Saving on the Farm, No. 16, Experimental Farms.
- Ensilage in 1918, No. 17, Experimental Farms.
- When Should Potatoes be Planted to Obtain Maximum Crops? No. 18, Experimental Farms.
- Importance of Planting Good Seed Potatoes, No. 19, Experimental Farms.
- Grow Flax for Fibre, No. 20, Experimental Farms.

## Pamphlets—

- Karakule Sheep and Persian Lamb Fur Production, No. 15, Live Stock Branch.
- Fish Meal as a Live Stock Food, No. 17, Experimental Farms.
- Recleaned Elevator Screenings (Standard Stock Food) as a Food for Live Stock, No. 18, Experimental Farms.
- How to Make and Use Hotbeds and Cold Frames, No. 19, Experimental Farms.
- Some Varieties of Tobacco Recommended for the Province of Quebec, No. 20, Experimental Farms.
- The Construction and Care of Tobacco Seed Beds in the Province of Quebec, No. 21, Experimental Farms.
- Cleaning Seed, No. S-1, Seed Branch.
- Red Clover Seed and Its Impurities, No. S-2, Seed Branch.
- Seed Importation Regulations, No. S-12, Seed Branch.

## Crop Protection Leaflets—

- Cutworms and their Control, No. 3, Entomological Branch.
- Root Maggots and Their Control, No. 4, Entomological Branch.
- Prevent White Grub Injury, No. 5, Entomological Branch.
- How to Control Locusts or Grasshoppers, No. 6, Entomological Branch.
- Rats and Mice, No. 7, Entomological Branch.
- Aphids or Plant Lice, No. 8, Entomological Branch.
- The Pea Weevil, No. 9, Entomological Branch.
- Arsenate of Lime, No. 10, Entomological Branch.

## Miscellaneous—

- List of Publications Available for Distribution, Publications Branch.  
 Announcement of the Opening of the Winnipeg Seed Laboratory, Seed Branch.  
 Hangers and Circulars Respecting Bankers' Competition for Boys and Girls,  
 Live Stock Branch.  
 Display Posters and Cards announcing availability of such new publications  
 as were not distributed to the mailing lists, Publications Branch.  
 Leaflets S-3 to S-10 describing Noxious Weeds, and the several editions of  
 Seasonable Hints, Seed Branch and Experimental Farms.

## THE DISTRIBUTION.

During the year the Publications Branch distributed about 3,900,000 copies of publications. Of these 3,750,000 were distributed to the mailing lists and the remainder in response to requests.

The following table shows the number of copies distributed:—

	To the Mailing Lists.	On Request.
Reports. . . . .	36,740	7,975
Bulletins. . . . .	320,987	29,000
Seasonable hints. . . . .	721,983	5,320
Pamphlets. . . . .	558,801	68,260
Circulars. . . . .	1,261,478	37,880
Leaflets. . . . .	472,145	1,500
Announcement and application mailing list cards and posters. . . . .	292,493	—
The Agricultural Gazette . . . . .	60,369	3,672
	<hr/> 3,725,996	<hr/> 153,607

## THE MAILING LISTS.

The mailing lists, which contain about 200,000 English and 51,000 French names, are divided into seven main subject lists and a number of minor lists. The main lists contain the names of persons who desire publications on field crops, live stock, dairying, poultry, gardening, bees, and tobacco. The names with addresses are embossed on metal stencils from which the entire lists, or any number of them, can be mechanically addressed without duplication. The lists are under constant revision. About 25,000 new names were added, 35,000 removed, and upwards of 7,500 addresses changed during the year. The minor lists include egg, produce and seed dealers, drovers, banks, school inspectors, agricultural officials and teachers, and others to whom is sent information from time to time.

The available publications of the department number upwards of two hundred titles.

## THE AGRICULTURAL GAZETTE OF CANADA.

The Agricultural Gazette, which is constantly gaining recognition as a record of official agricultural activities and progress in Canada, continues to enjoy the editorial support of the officials of the provincial departments of agriculture and of education.

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The policy during the year has been directed more and more to assist in standardizing throughout Canada the practices of government departments, more especially in administration, investigation, and instruction.

This journal, which has reached its sixth volume, contained during the year reviews of the recent federal and provincial legislation, announcements of new agricultural policy, accounts of the important departmental and association activities, especially in relation to co-operative enterprises, and such agricultural extension work as was carried on under the provisions of the Agricultural Instruction Act.

The whole respectfully submitted.

T. A. CRERAR,

*Minister of Agriculture.*

## APPENDIX No. 1.

## ORDER OF THE BOARD OF AGRICULTURE AND FISHERIES.

DATED 5TH DECEMBER, 1918.

## IMPORTATION OF DOGS (AMENDMENT) ORDER OF 1918 (No. 2).

The Board of Agriculture and Fisheries, by virtue and in exercise of the powers vested in them under the Diseases of Animals Acts, 1894 to 1914, and of every other power enabling them in this behalf, do order, and it is hereby ordered, as follows:—

1. The period of detention and isolation prescribed by the Importation of Dogs Order of 1914 (hereinafter referred to as "the principal Order") is hereby increased to six calendar months, and the principal Order shall be read and have effect as if "six calendar months" were substituted for "four calendar months."

2. In the case of a dog landed after the thirtieth day of November, nineteen hundred and eighteen, under the authority of a license granted under the principal Order, the license shall have effect as if "six calendar months" were therein inserted instead of "four calendar months."

3. The Importation of Dogs (Amendment) Order of 1918 is hereby revoked.

4. This order may be cited as the Importation of Dogs (Amendment) Order of 1918 (No. 2) and shall be read with the principal Order.

In witness whereof the Board of Agriculture and Fisheries have hereunto set their Official Seal this fifth day of December, nineteen hundred and eighteen.

[L.S.]

W. H. CHAMBERLAIN,

*Authorized by the President.*